Jøtul North America Inc.

Project #24-268
Model: F602 V3
Type: Catalytic Wood Fired Room Heater
April 3, 2024
Revised June 4, 2025

ASTM E2780 Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters
EPA Test Method 28R for Certification and Auditing of Wood Heaters

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Revision Summary

Date: April 3, 2024 – Original Issue

Date: June 4, 2025 – Revised the following items:

- Added post-test leak check results to Run 2. These results were collected on the data of the test, but mistakenly not transcribed. See Appendix A.
- Added 5lb audit weight #139 to equipment list on page 6 and its calibration certificate to Appendix C.
- Added tunnel schematic and ASTM E2515 verification statements to report body.

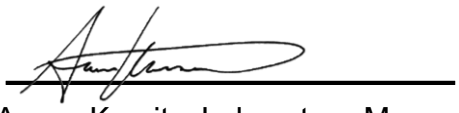
Contents

Affidavit

PFS-TECO was contracted by Jøtul North America Inc. (Jøtul) to provide testing services for the F602 V3 Catalytic Wood-Fired Room Heater per EPA Method 28R, *Certification and Auditing of Wood Heaters*. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory beginning on March 19, 2024, and ending on March 21, 2024. PFS-TECO's Portland Laboratory is located at 11785 SE Highway 212 – Suite 305, Clackamas, Oregon 97015. Testing procedures followed EPA Method 28R and ASTM E2780, *Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters*. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel*.

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

Jøtul contracted with PFS-TECO to perform EPA certification testing on the F602 V3 Catalytic Wood-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. All testing was performed by Sebastian Button.

Notes

- Prior to start of testing, 50 hours of conditioning was performed by the manufacturer at a medium burn setting in accordance with ASTM E2780.
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- A separate, independent, third filter train was utilized to determine 1st hour emissions for all test runs.
- A total of 5 test runs were completed. One test run in each of the 4 specified burn rate categories, as well as an additional category 1 test, which was intended to be a category 2 test, but since the air control was not at its lowest setting, did not constitute a valid low burn test. All runs have been found to be appropriate, no anomalies occurred. See the Run Narrative section for further detail on each run.
- All filters and O-rings weighed in pairs.

Wood Heater Identification and Testing

- Appliance Tested: ***F602 V3***
- PFS Tracking Number: ***185***
- *Manufacturer:* ***Jøtul***
- Catalyst: ***Yes***
- Heat exchange blower: ***None***
- Type: ***Wood Stove***
- Style: ***Free Standing Wood Stove***
- Date Received: ***Monday, March 18, 2024***
- Testing Period – Start: ***Tuesday, March 19, 2024***
  Finish: ***Thursday, March 21, 2024***
- Test Location: ***PFS TECO***
  11785 SE Hwy 212
  Clackamas, OR 97015
- Elevation: ***~131 Feet above sea level***
- Test Technician(s): ***Sebastian Button***
- Observers: ***Ames Denis of Jøtul***

Test Procedures and Equipment

All Sampling and analytical procedures were performed by Sebastian Button. All procedures used are directly from ASTM E2780 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
53	APEX XC-60-ED Digital Emissions Sampling Box A
54	APEX XC-60-ED Digital Emissions Sampling Box B
203	APEX XC-50-DIR Digital Emissions Sampling Box C
55	Apex Ambient Air Sample Box
57	California Analytical ZRE CO2/CO/O2 IR ANALYZER
94	Moisture meter calibration block
95	Anemometer
97	10 lb audit weight
139	5 lb audit weight
107	Sartorius Analytical Balance
109A/B	Troemner 100mg/200mg Audit Weights
111	Dwyer 1430 Microtector
115	Delmhorst Wood Moisture Meter
189	Mettler 3'x3' floor scale w/digital weight indicator
207	Dewalt Tape Measure
208	Digital Calipers
215	Temperature Logger
CC121798	Gas Analyzer Calibration Span Gas
CC139173	Gas Analyzer Calibration Mid Gas

Barometric Pressure data was taken from a local National Weather Service station, corrected for altitude differences in accordance with ASTM E2515 6.1.2.

Results

A total of 5 test runs where performed on the F602 V3. The weighted average emissions rate for the 5 run test series was measured to be **1.4 g/hr** with a Higher Heating Value efficiency of **77%.** The average CO emission rate for the 5 tests was **1.3 g/min.** The Jøtul F602 V3 Catalytic Wood-Fired Room Heater meets the 2020 cribwood PM emission standard of ≤ 2.0 g/hr per CFR 40 part 60, §60.532 (b).

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

Summary Table

	Cat. 1 ≤0.80 kg/hr	Cat. 1 ≤0.80 kg/hr	Cat. 2 0.80 - 1.25 kg/hr	Cat. 3 1.25 - 1.90 kg/hr	Cat. 4 Max Burn Rate
Date	3/20/2024	3/19/2024	3/21/2024	3/21/2024	3/19/2024
Run Number	3	1	5	4	2
Emission Rate (g/hr)	0.18	0.44	0.56	2.05	4.17
Burn Rate (kg/hr)	0.38	0.69	1.07	1.50	1.85
Heat Output (Btu/hr)	5,994	10,296	15,652	19,646	23,415
Overall Efficiency (% HHV)	85%	81%	80%	71%	69%
CO Emissions (g/MJ Output)	0.22	0.79	0.96	6.74	8.68
CO Emissions (g/kg Dry Fuel)	3.80	12.58	15.14	94.64	118.47
CO Emissions (g/min)	0.02	0.14	0.26	2.33	3.57
Emissions – 1st hr (g/hr)	0.75	1.06	1.06	2.89	5.08
Weighted particulate emission average of 5 test runs: 1.4 grams per hour.					
Weighted average HHV efficiency of 5 test runs: 77%.					
Average CO Emissions Rate: 1.3 g/min					

Test Run Narrative

Run 1

Run 1 was performed on 3/19/2024 as an attempted category 2 test, per EPA Method 28R. The total test time was 174 minutes. The particulate emissions rate for the test was 0.44 g/hr, the burn rate was 0.69 kg/hr with an HHV efficiency of 80.9%. Because the burn rate fell out of the range of a category 2 test, but was not done with air control fully closed, this is neither a valid category 2 or category 1 test. However, all test results were appropriate and valid, so this test is included in the weighted average calculations. There were no other anomalies and all other test criteria were met.

Run 2

Run 2 was performed on 3/19/2024 as a category 4 test, per EPA Method 28R. The total test time was 64 minutes. The particulate emissions rate for the test was 4.17 g/hr, the burn rate was 1.85 kg/hr with an HHV efficiency of 68.9%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 3

Run 3 was performed on 3/20/2024 as a category 1 test, per EPA Method 28R. The total test time was 365 minutes. The particulate emissions rate for the test was 0.18 g/hr, the burn rate was 0.38 kg/hr with an HHV efficiency of 85.5%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 4

Run 4 was performed on 3/21/2024 as a category 3 test, per EPA Method 28R. The total test time was 81 minutes. The particulate emissions rate for the test was 2.05 g/hr, the burn rate was 1.50 kg/hr with an HHV efficiency of 70.8%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 5

Run 5 was performed on 3/21/2024 as a category 2 test, per EPA Method 28R. The total test time was 116 minutes. The particulate emissions rate for the test was 0.56 g/hr, the burn rate was 1.07 kg/hr with an HHV efficiency of 79.5%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of the ASTM E2780 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

Run	Ambient (°F)		Relative Humidity (%)		Average Barometric Pressure (In. Hg.)	Preburn Fuel Weight (lbs)	Test Fuel Weight (lbs)	Test Fuel Moisture (%DB)	Test Run Time (Min)
	Pre	Post	Pre	Post					
1	69	70.4	33.8	33.7	29.86	5.19	5.20	20.1	174
2	73	73.5	33.1	33	29.85	5.98	5.13	20.2	64
3	67	66.5	35.7	36.8	29.87	4.51	6.02	20.1	365
4	69	68.9	35.7	34.9	29.94	6.72	5.25	19.3	81
5	71	70.1	31.6	35.8	29.93	5.64	5.35	19.9	116

Appliance Operation and Test Settings

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

Settings & Run Notes

	Pre-Burn Air Setting	Test Run Air and Fan Settings
Run 1	Air control open 0.060” from fully closed	Air control open 0.060” from fully closed
Run 2	Air control fully open	Air control fully open
Run 3	Air control fully closed	Air control fully closed
Run 4	Air control open 0.150” from fully closed	Air control open 0.150” from fully closed
Run 5	Air control open 0.090” from fully closed	Air control open 0.090” from fully closed

Appliance Description

Model(s): F602 V3

Appliance Type: Catalytic Wood-Fired Room Heater

Total/Usable Firebox Volume: 0.79 ft^3, the total firebox volume and usable firebox volume are the same for this appliance.

Air Introduction System: Primary Air enters the firebox from the bottom of the door and goes directly into the firebox. Primary air is controlled via a slide arm located on the door below the glass, which moves right (open) to left (closed). Secondary air is pulled through an opening in the back of the appliance and channeled up through the secondary air baffle. Secondary air is automatically metered into the firebox fire a control damper that opens and closes via a bimetallic damper. Dimensions on all these features can be found in Appendix D.

Baffles: A secondary air manifold/baffle plate is constructed of 0.075" thick aluminized steel.

Catalytic Combustor: A 8.5" x 2.688", 2.92" thick metal catalyst is located in the flue gas path just prior to the flue collar. The appliance does not utilize any catalytic control bypass, flue gases are always routed through the catalyst. The appliance also features a catalyst temperature monitoring probe on the side of the appliance, the temperature probe tip is located within 1" of the catalyst exit.

Refractory Insulation: The firebox is lined with 0.25" thick kaowool blanket

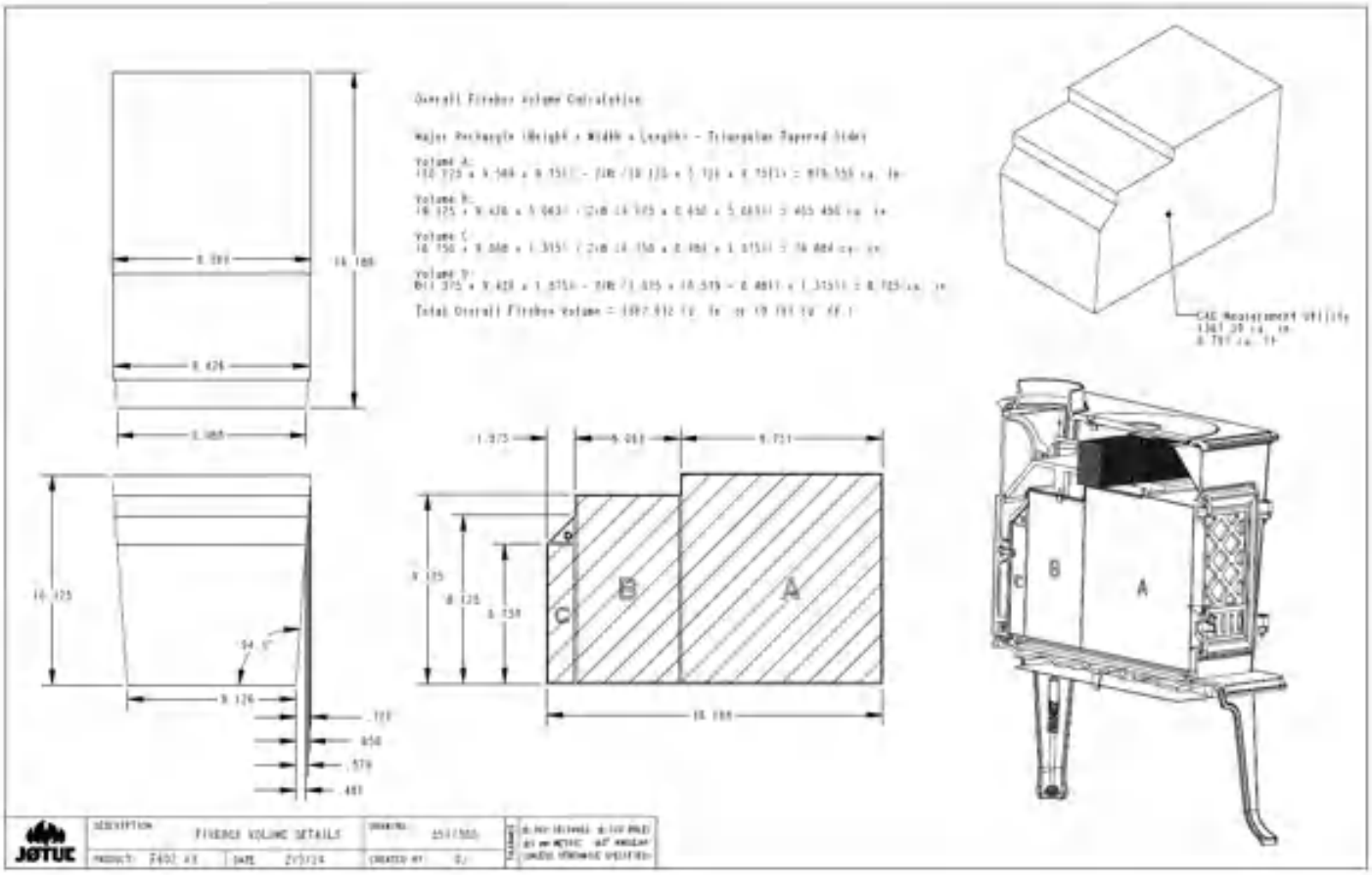
Flue Outlet: 4-inch exhaust outlet located on the top of the appliance.

Fan: No fan option available on this unit

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

Firebox Volume Dimension

Total Firebox Volume = Usable Firebox Volume



Appliance Front

Appliance Left

Appliance Right

Appliance Rear

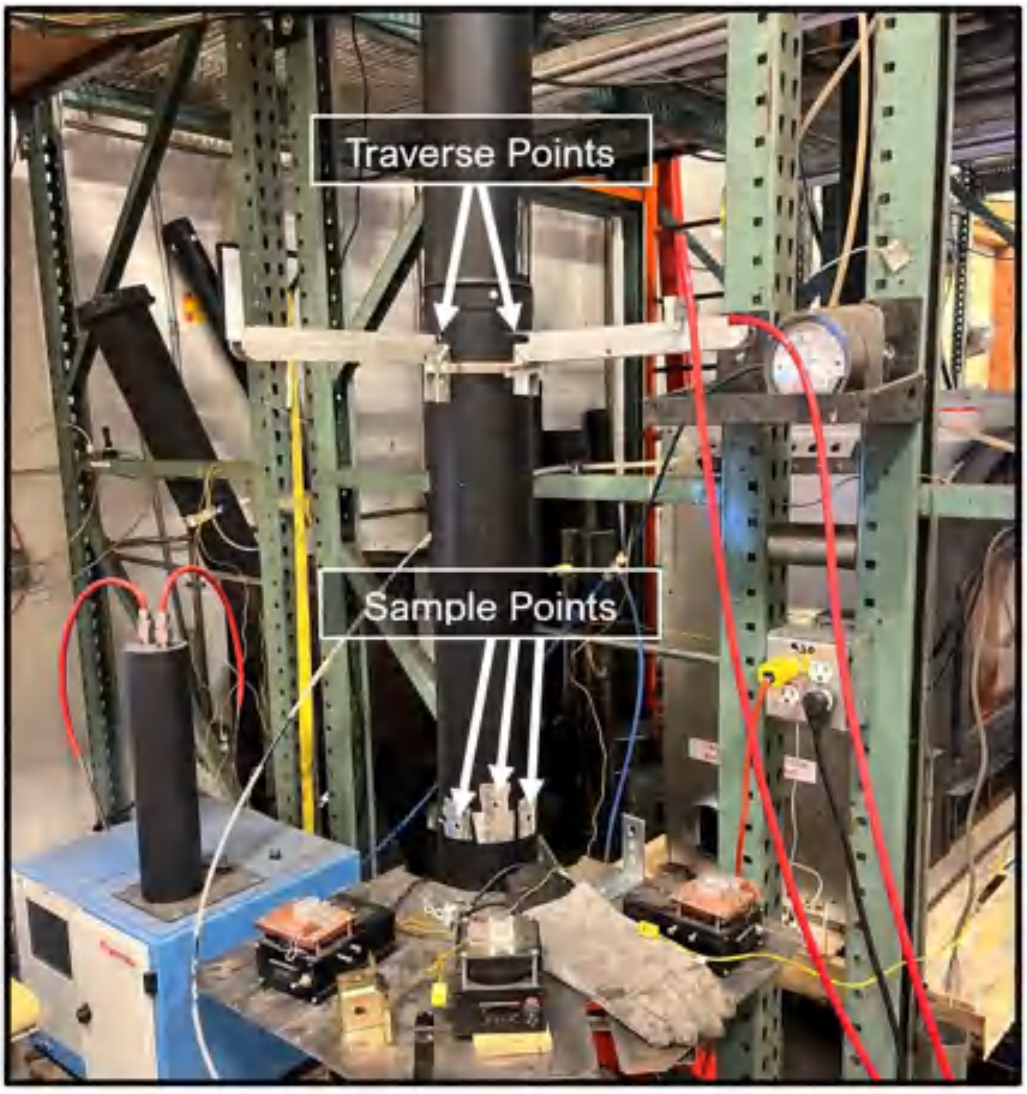
Test Fuel Properties

Test fuel used was Douglas Fir dimensional lumber, air-dried to the specified moisture content range. A typical fuel load is pictured below:

Typical Fuel Load

Sampling Locations and Descriptions

Sample ports are located 14 feet downstream from any disturbances and 2 feet upstream from any disturbances. Flow rate traverse data was collected 12 feet downstream from any disturbances and 4 feet upstream from any disturbances. (See below).



ASTM E2515-11 Sampling Procedures:

Sample Collection: Verified – Yes:☒ No:☐ (if No Explain)

Four separate, complete particulate sampling trains were used for each run. Filter face velocity at no time exceeded 150mm/sec during any test run. The dry gas meters were calibrated for the flow rates encountered during the test runs.

The 47mm filter holder assemblies consist of an aluminum front housing and polycarbonate rear housing, with the rear housing located 75mm downstream from the front housing. The front filter support frit is stainless steel.

Probe assemblies are constructed from 316 grade stainless steel tubing with an outside diameter or 6.35mm and 310mm length.

A type K thermocouple filter temperature monitor probe is installed behind the front filter housing with its tip directly exposed to the sample gas.

Sample gas drying systems are located prior to each metering system and include temperature sensors.

The metering systems include vacuum gauges, leak-free diaphragm-type pumps, and type K thermocouple temperature sensors. The gas meters have a resolution of 0.001 cubic feet.

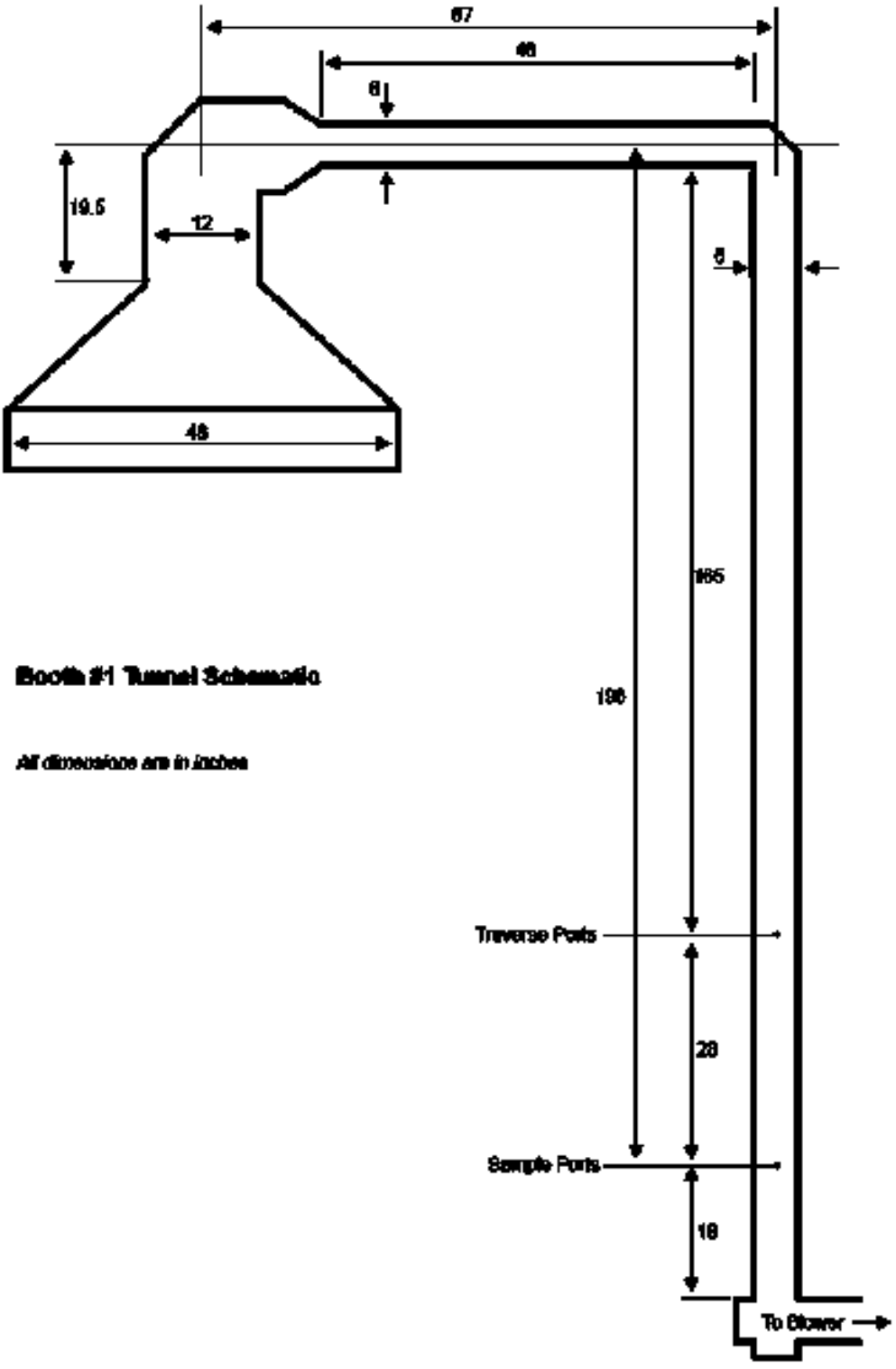
Barometric pressure data was taken from local National Weather Service station KPDX. As PFS and KPDX are at the same altitude, the correction for altitude per ASTM E2515-11 6.1.2 is 1:1.

Dilution tunnel temperature was measured by a type K thermocouple probe.

Dilution tunnel velocity was measured prior to each run by performing a velocity traverse and monitored throughout each run by measuring pitot pressure at the tunnel centroid. Traverses were performed using a Dwyer Model 1430 Microtector in accordance with the instrument owners' manual. This includes leveling and zeroing the instrument prior to each use and performing pre- and post-test leak checks on the pitot tubing.

To monitor and log centroid pitot pressure, the pressure transducer of an Apex Instruments XC-60-DIR sample box was used. Both pieces of equipment offer precision in excess of the +/-0.001" specified in section 6.1.5 of ASTM E2515-11, and are therefore suitable for use with flows under 800 ft/min. Both pieces of equipment are plumbed to the same pitot tube, which is in accordance with the design shown in Appendix X2 of ASTM E2515-11.

The dilution tunnel is constructed in accordance with the requirements of ASTM E2515-11, as shown below:



Booth #1 Tunnel Schematic

All dimensions are in inches

Sample ports are located 16.5 feet downstream from any disturbances and 2 feet upstream from any disturbances. Flow rate traverse data was collected 8 feet downstream from any disturbances and 4 feet upstream from any disturbances.

Flow is induced and maintained by a centrifugal-type blower.

Test facility temperature is monitored by a type T thermocouple probe, located in a 150mm long, 50mm diameter pipe shield located in the 90-degree arc in front of the test unit, between 1-2m away, and in the horizontal plane of the test unit air intake.

Test facility airflow was measured with an anemometer capable of measuring velocities less than 20 ft/min.

Reagents and Standards: Verified – Yes:☒ No:☐ (if No Explain)

Pall Type A/E Glass fiber 47mm filters having at least 99.95% efficiency at 0.3-micron particles were used.

Test samples were conditioned in an airtight desiccator containing calcium sulfate desiccant, with specific humidity of less than 0.005 g/liter prior to and after the testing.

Acetone was used to clean probe assemblies both prior to pretest desiccation and prior to post-test desiccation.

Calibration and Standardization: Verified – Yes:☒ No:☐ (if No Explain)

The gas metering system is calibrated every six months traceable to NIST and demonstrating an uncertainty of +/- 0.75% of the measured volume.

All thermocouples discussed in this report are calibrated traceable to NIST every six months.

The analytical balance has a resolution of 0.1mg and is calibrated traceable to NIST every six months. Before each test and before each weighing of samples, the balance is audited with a calibrated 200mg weight.

All other measurement equipment used for this test is calibrated traceable to NIST at an appropriate interval. See Appendix C for all calibration records.

Procedures: Verified – Yes:☒ No:☐ (if No Explain)

The following procedures were performed and/or observed prior to testing:

- The dilution tunnel was cleaned with an appropriately sized steel brush.

- Induced draft was evaluated by measuring flue static pressure with the dilution tunnel blower operating and no fire in the appliance. No induced static pressure was observed (all readings <0.005" H2O) in any appliance door/air damper configuration.

- Smoke capture was evaluated by operating the appliance at a high burn rate and visually monitoring smoke collection by the hood. No less than 100% smoke collection was observed at the minimum tunnel flow rate.

Prior to ignition for each run, a velocity traverse was conducted to determine dilution tunnel velocity. Traverse points were determined in accordance with Figures 5 and 6 of ASTM E2515-11, and velocity calculated in accordance with section 9.3.2, excluding center readings. The pitot tube was placed in the center of the tunnel for the duration of each test run.

Prior to tare analysis, probes were cleaned with acetone, O-rings cleaned of any residue, and filters were visually check for pinhole leaks or irregularities. Filters, O-rings, and probes were desiccated at 20+/-5C for at least 24 hours and weighed at intervals of not less than 6 hours until constant weight was attained. Filters and O-rings were both weighed in pairs.

Tared samples were assembled into three dual filter holder assemblies (A, B, and first hour) and the single ambient filter assembly. Blunt tweezers and surgical gloves were used to avoid damage or contamination of the samples. The three dual filter assemblies were inserted to the appropriate depth in the tunnel (within the 2" diameter centroid, no closer than 1" apart).

Leak checks were performed on sampling systems as follows:

- Leak checks were performed on the pitot tube lines before and after each test run by applying a pressure differential of at least 3" H2O and sealing the pitot tube opening. Pressure remained stable for at least 15 seconds all checks of both the pressure and suction sides, confirming that no leaks were present.

- All four sampling trains were leak-checked before and after each test run. Pre-test leak checks were conducted at the vacuum level corresponding to each sample pump's flow setting, in accordance with Note 5 of ASTM E2515-11. Post-test checks were conducted at the highest vacuum level encountered during the test, or the pre-test vacuum level, whichever was greater. Of the leak rate limits (0.01 cfm or 4% of sample rate), 4% of the sample rate is lower, and at no point was the measured leakage rate greater than this.

- The portion of the sampling trains from the pumps to the dry gas meters (that is, the positive pressure section of the metering system) was leak checked semiannually during calibration. This check was performed by closing the main inlet valve and pressurizing the outlet of the dry gas meter to at least 7" H2O, and ensuring the pressure remained stable for at least 1 minute.

Sampling began at the start of each test run as defined by the applicable procedure and continued until the defined end of the test run. Readings were collected at 1-minute intervals. During all test runs, the following conditions were maintained:

- Test facility temperature was between 55 and 90 F.
- Air velocities were less than 50ft/min within 2ft of the appliance
- Filter holder temperatures were no greater than 90 F.
- Sample flow rates were maintained within 10% of the initial proportionality ratio.

Following each test run and its associated leak checks, samples were recovered by disassembling the filter holder components and replacing them in the desiccator. The outside of the probes was cleaned with acetone prior to desiccation.

Sample weights were determined using the same analytical balance and procedures used for tare weights. Filters, O-rings, and probes were desiccated at 20+/-5C for at least 24 hours and weighed at intervals of not less than 6 hours until constant weight was attained. Filters and O-rings were both weighed in pairs. Components were not exposed to laboratory atmosphere for more than 2 minutes per weighing.

Sampling Methods

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

Analytical Methods Description

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

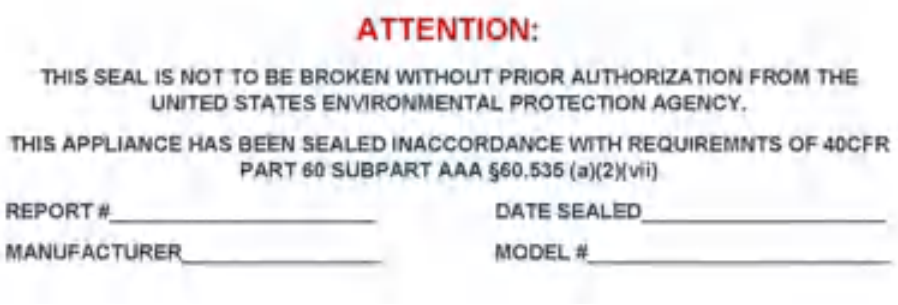
Calibration, Quality Control and Assurances

Calibration procedures and results were conducted per EPA Method 28R and ASTM E2515-11. Test method quality control procedures (leak checks, volume meter checks, stratification checks, proportionality results) followed the procedures outlined. All leak check data can be found on the Quality systems check page for each run performed in Appendix A of the report.

Appliance Sealing and Storage

Upon completion of testing, the appliance was secured with metal strapping and the seal below was applied, the appliance was then returned to the manufacturer's location at: 55 Hutcherson Drive, Gorham, ME 04038, for archival.

Sealing Label


ATTENTION:

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

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

REPORT #_____ DATE SEALED_____

MANUFACTURER_____ MODEL #_____

Sealed Unit

List of Appendices

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

Appendix A – Test Run Data, Technician Notes, and Sample Analysis: Page 26 Non-CBI PDF

Appendix B – Labels and Manuals: Page 224 Non-CBI PDF

Appendix C –Equipment Calibration Records: Page 262 Non-CBI PDF

Appendix D – Design Drawings (CBI Report Only)

Appendix E – Manufacturer QAP (CBI Report Only)

Appendix A: Test Run Data

EPA Method 28R Weighted Average Emissions

Client: Jotul
Stove Model: F602V3
Test Dates: 3/19 - 3/21/24
Job Number: 24-268

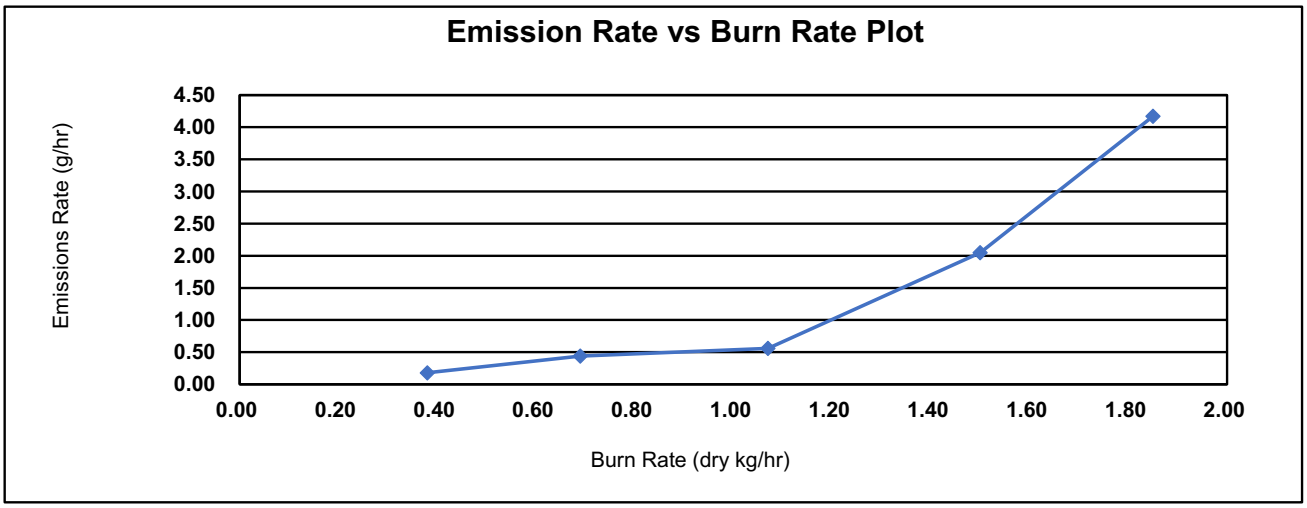
Signature/Date:

Weighted Average Particulate Emissions (g/hr):	**1.4**
Weighted Average HHV Efficiency (%):	**76.7%**
Weighted Average LHV Efficiency (%):	**82.9%**
Average CO Emissions (g/min):	**1.3**

Individual Run Summaries

Run Number:	3	Run Number:	1
Burn Rate (dry kg/hr):	0.38	Burn Rate (dry kg/hr):	0.69
Emissions Rate (g/hr):	0.18	Emissions Rate (g/hr):	0.44
HHV Efficiency (%):	85.5%	HHV Efficiency (%):	80.9%
LHV Efficiency (%):	92.4%	LHV Efficiency (%):	87.4%
Weighting Percentage (%):	7.82%	Weighting Percentage (%):	21.17%
Run Number:	5	Run Number:	4
Burn Rate (dry kg/hr):	1.07	Burn Rate (dry kg/hr):	1.50
Emissions Rate (g/hr):	0.56	Emissions Rate (g/hr):	2.05
HHV Efficiency (%):	79.5%	HHV Efficiency (%):	70.8%
LHV Efficiency (%):	86.0%	LHV Efficiency (%):	76.6%
Weighting Percentage (%):	32.85%	Weighting Percentage (%):	24.61%

Run Number	2
Burn Rate (dry kg/hr)	1.85
Emissions (g/hr)	4.17
HHV Efficiency (%)	68.9%
LHV Efficiency (%)	74.5%
Weighting Percentage (%):	13.56%



Monday, March 18, 2024

Mr. Sebastian Button
PFS-TECO
11785 SE Highway 212 – Suite 305
Clackamas, OR 97015

RE: F 602 V3 air control and operation instructions

Dear Mr. Button,

The following is provided as guidance for adjusting the air control of the Jøtul F 602 V3 to achieve burn rates in the appropriate categories. There is no blower option for this appliance so instructions regarding blower speed are omitted.

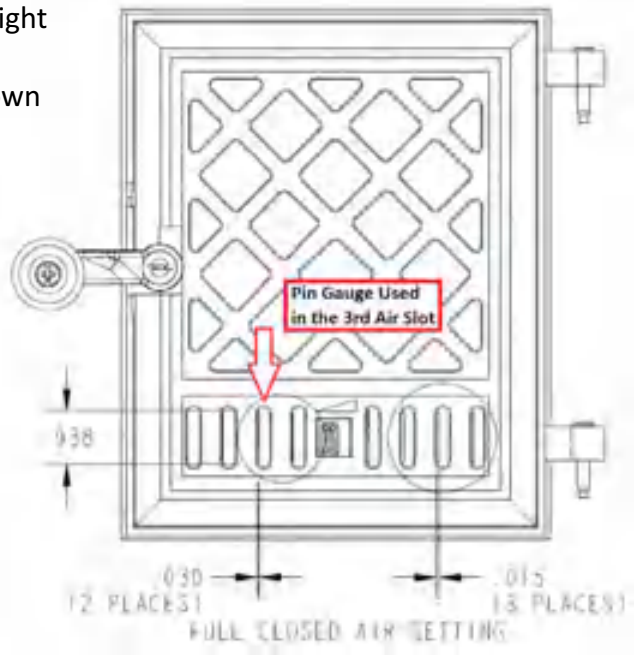
The primary air is operated by a left to right sliding control located on the front door of the stove located below the fire viewing area.

The secondary air control is automatically controlled by way of a metallic coil located in an enclosure at the top right rear of the back plate, as looking from the front of the stove. The bi-metallic coil is connected by a cable to a pivot point type air shutter over an opening at the lower rear center of the stove.

The air control settings are as follows:

Burn Rate	Primary Air Control Position
Low (Min. <1.00 dry kg/hr.)	Fully to the left (pinned .030”)
Med. Low (1.00 - 1.25 dry kg/hr.)	1/32” to the right (pinned .060”)
Med. High (1.25 - 1.90 dry kg/hr.)	3/32” to the right (pinned .090”)
Medium High (Max dry kg/hr.)	Fully to the right

Figure showing which air opening was gauged shown in figure to the right:



A uniform charcoal bed can be achieved by using approximately 2 lbs. of kindling, and two pre-burn loads. First pre-burn runs on high air setting for 15 -20 mins then is adjusted to a setting to achieve desired burn rate.

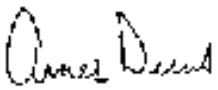
Pre-burn pieces consist of dimensional 2x4's with an approximate length 50% of the nominal test load. This length works well during stirring events.

First pre-burn is approx. 70-80% of the test fuel weight, and second pre-burn is 110-120% of test fuel weight.

Second pre-burn stirred when 30% consumed and 70% consumed to ensure no yellow flame is present before test fuel is loaded.

If you have any questions, feel free to contact me.

Kind Regards,



Ames Denis
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Jøtul North America
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207-591-6620

Sebastian Button

From: Ames Denis <adenis@jotulnoamer.com>
Sent: Thursday, March 21, 2024 1:42 PM
To: Sebastian Button
Cc: John Steinert
Subject: Re: V602 Preliminary Results

For the Category 2 burn please use .090" for the setting in the third opening.

Ames

From: Ames Denis <adenis@jotulnoamer.com>
Sent: Thursday, March 21, 2024 10:32 AM
To: Sebastian Button <sebastian.button@pfsteco.com>
Cc: John Steinert <john.steinert@pfsteco.com>
Subject: Re: V602 Preliminary Results

After inspecting further .150" would be a better choice.

Ames

From: Ames Denis
Sent: Thursday, March 21, 2024 9:35 AM
To: Sebastian Button <sebastian.button@pfsteco.com>
Cc: John Steinert <john.steinert@pfsteco.com>
Subject: Re: V602 Preliminary Results

Given the slightly lower than anticipated burn rates. Please use .188 gauged opening measured at the third air slot described in instructions for the next attempt.

Kind Regards

Ames

Sent from my iPhone

On Mar 21, 2024, at 9:24 AM, Sebastian Button <sebastian.button@pfsteco.com> wrote:

Ames,

See preliminary results for first three runs in the table below. The attempted medium low ended up burning to slowly so we do not yet have a valid med low test. We may need to adjust the air settings provided in the instructions you sent me to meet the burn rate requirements (still need to do a cat 2 and 3).

Run	Burn rate (kg/hr)	Emissions (g/hr)	Air Setting
1	0.69	0.50	0.06" open (med low setting)
2	1.85	3.84	Full Open
3	0.38	0.23	Full Closed

Sebastian Button
Laboratory Supervisor - Portland Laboratory

PFS TECO
11785 SE Highway 212 - Suite 305
Clackamas, OR 97015
O:503-650-0088
C:971-506-8805
Sebastian.button@pfsteco.com
www.pfsteco.com

Pre-Conditioning Data

Client: Jotul
Model: F602 V3
Date(s): 3/4 - 3/6/24
Job #:
Tracking #:
Technician: Ames + Michael B.

Elapsed Time (hrs)	Flue (°F)	Catalyst Exit (°F)	Notes: Indicate initial air setting and any changes in in setting during conditioning, as well as weight and average moisture content of all fuel additions.
0	223	1090	4.70 21.2% MC half open
1	337	762	5.80 21.6% MC half open
2	305	670	6.4 lbs 22.4% MC half open
3	~~308~~	~~701~~	~~5.1 lbs 20.1% MC half open~~
4	302	701	5.1 lbs 22.1% MC ~~half open~~ adjust down 1/8"
5	186	800	Adjust to 1/8 Open
6	275	570	4.9 lbs 20.1% MC half open
7	317	617	5.4 lbs 23.2% MC half open
8	281	762	
9	298	985	5.35 lbs 21.8% MC half Open
10	240	779	
11	244	448	5.7 lbs 21.5% MC half open
12	300	610	(11m) 5.45 lbs 22% MC half open
13	315	1001	
14	280	758	(12:30pm) 5.4 lbs 20.95% MC half open
15			
16	270	794	5.25 lbs 20.85% MC half open
17	297	698	5.4 lbs 22.25% MC half open
18			
19	214	809	Turn Air to High Reduce Coal Bed
20	298	822	5.15 lbs 20.5% MC Back to half open
21			
22	232	394	Shovel out ash and Reload 5.3 lbs 20.1% half Open
23			
24	247	1060	5.45 lbs 22.2% MC High 5min back to half Open
28			
26			
27	220	778	4.8 lbs 20.0% MC HALF OPEN
28			
29	196	697	6.95 lbs 21% MC HALF OPEN
30			
31	~~316~~ 316	1021	5.5lbs 21.8% MC Half open
32	306	928	
33	~~260~~ 260	768	5.95 lbs 22.8% MC half open
34	~~313~~ 313	1048	
35	266	618	5.7 lbs 23.3% MC half open
36	312	1050	
37	250	610	5 lbs 21.75% MC half open
38	240	901	shoveled ashes out I am added 6lbs 21.6% half open
39			
40	265	802	4.35 lbs 21.3% MC half Open
41	231	623	5.3 lbs 22.5% MC half Open top 1/8 closed
42			
43	209	870	Air back to half open try to load but too full
44	267	567	5.2 lbs 24% MC half Open
45	265	750	5.4 lbs 22.9% MC half Open
46			
47	272	629	5.4 lbs 23.1% MC half Open
48			
49	245	702	5.55 lbs 22.2% MC Half Open
50			
51	312	899	5.50 lbs 23% MC Half Open

Signature/Date: 3/6/24 3/4/2024

L.A.W. CALIBRATION, LLC
41 Spring Hill Road, Saco, ME - 04072. USA
Tel.: (207) 494-7538
Email: info@lawcalibration.com

Platform Scale
137

CALIBRATION CERTIFICATE

CERTIFICATE #	022124-15-001	*Work Order*	022124-15-OS-01	***Calibration Result***	**AS LEFT-PASS**
Issue Date	21-Feb-2024				

CERTIFICATE ISSUED TO

Customer Name	JOTUL NORTH AMERICA			*Telephone*	207-251-6617
Address	55 Hutcherson Drive			*City*	Gorham
State	ME	*Zip Code*	04038	*Country*	USA

INSTRUMENT DETAILS

Description	PLATFORM SCALE			*Make*	SELLETON
Asset / I.D. #	000137	*Serial #*	4208226401065	*Model*	SL-7515-C

CALIBRATION INFORMATION

Received Date	21-Feb-2024	*Received Condition*	Operational	*Due date format*	
Calibration Date	21-Feb-2024	*Calibrated @*	Customer Site	End of Month	
Next Calibration Due	28-Feb-2025	*Cal Frequency**	12 Months (1 Year)		

* Customer requested to apply OEM recommended cal frequency.

CALIBRATION METHOD

Procedure	See Attached	*Environmental*	7.2 ºC (or) 45.0 ºF
Calibration Data	Attached	*Conditions*	18.3 % RH

STANDARDS USED

Asset #	*Description*	*Model*	*Serial #*	*Cal Due Date*
LAW-4072	500lb Weight Kit - Red	Class F	LAW-4062-71	31-Mar-2024
LAW-4105	500lb Weight Kit - Blue	Class F	LAW-4095-4104	29-Feb-2024
LAW-3202	Temperature/Humidity Data Logger	UHADO-16	A0C1011065F5	31-Oct-2024

Notes:

George Hunt

Calibrated By: ***Malcolm Hunt***

Reviewed By: ***Melissa Vittorioso***
3/7/2024

This is to certify that the above item was calibrated using standards whose measurement results are traceable to reference standards developed and maintained by National Metrology Institutes (NMI), such as (NIST USA, NRC Canada) to International System of Units (SI) and/or based on fundamental physical constants. Measurement results pertain only to the item calibrated and apply at the time of measurements. Test Uncertainty Ratio (TUR) is greater than 4:1, unless noted by an asterisk (*). Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of k = 2. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration. LAW CALIBRATION, LLC is accredited to ISO/IEC 17025 through A2LA (certificate # 2398.01) and its Quality Management System is also in compliance with and meets the requirements of ISO 9001 current Standard and their applicable clauses. The statement of conformity is based on simple acceptance when determining the pass/fail status of the test instrument. The calibration uncertainty is not taken into account in the statement on conformity. Ultimately is it up to the customer to interpret the effects of the associated uncertainties on the margins of tolerance. This certificate and the attached data (if any) shall not be reproduced except in full without written approval of the laboratory.

CALIBRATION DATA

Customer Name	JOTUL NORTH AMERICA	Certificate Number	Procedure
Asset # / I.D. #	000137	022124-15-001	CAL-4000

Description	PLATFORM SCALE	Serial #	4208226401065
Make	SELLETON	Received Date	21-Feb-2024
Model	SL-7515-C	Calibration Date	21-Feb-2024

AS FOUND

Range: 1000 [LB]

Linearity Load Test [LB]

Resolution: 0.1 [LB]

Standard	Unit Under Test	Tolerance (±)		Result (Pass/Fail)
0.000	0.00	0.2		PASS
50.000	50.10	0.2		PASS
100.000	100.40	0.2		FAIL
150.000	150.40	0.2		FAIL
200.000	200.40	0.2		FAIL
250.000	250.40	0.2		FAIL
300.000	300.30	0.2		FAIL
550.000	350.30	0.2		FAIL
400.000	000137	0.2	4208226401065	FAIL
450.000	450.20	0.2		PASS
500.000	500.20	0.2		PASS
550.000	550.10	0.2		PASS
600.000	600.00	0.2		PASS
650.000	650.00	0.2		PASS
700.000	699.90	0.2		PASS

Shift Test [LB]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
150.000	149.8	0.2	PASS
150.000	149.8	0.2	PASS
150.000	149.8	0.2	PASS
150.000	149.8	0.2	PASS

*** End of Data ***

L.A.W. Calibration, LLC

CALIBRATION DATA

Customer Name	JOTUL NORTH AMERICA	Certificate Number	Procedure
Asset # / I.D. #	000137	022124-15-001	CAL-4000
Description	PLATFORM SCALE	Serial #	4208226401065
Make	SELLETON	Received Date	21-Feb-2024
Model	SL-7515-C	Calibration Date	21-Feb-2024

AS LEFT

Range: 1000 [LB]

Linearity Load Test [LB]

Resolution: 0.1 [LB]

Standard	Unit Under Test	Tolerance (±)		Result (Pass/Fail)
0.000	0.0	0.2		PASS
50.000	50.0	0.2		PASS
100.000	99.9	0.2		PASS
150.000	149.9	0.2		PASS
200.000	199.9	0.2		PASS
250.000	249.9	0.2		PASS
300.000	299.9	0.2		PASS
350.000	349.9	0.2		PASS
400.000	000137	0.2	4208226401065	FAIL
450.000	450.0	0.2		PASS
500.000	500.0	0.2		PASS
550.000	550.0	0.2		PASS
600.000	600.0	0.2		PASS
650.000	650.0	0.2		PASS
700.000	700.0	0.2		PASS

Shift Test [LB]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
150.000	149.9	0.2	PASS
150.000	149.9	0.2	PASS
150.000	149.9	0.2	PASS
150.000	149.9	0.2	PASS

*** End of Data ***

RICE LAKE Certificate of Weight Calibration

ISO/IEC 17025:2017 & ANSI/NCSL-Z540-1-1994 ACCREDITED

Traceable Certificate Number: 3684541
Contractor: ULINE
12575 ULINE DR
PLEASANT PRAIRIE, WI 53158-3686

Purchase Order Number: 7994872
Client: JOTUL NORTH AMERICA INC
55 HUTCHERSON DR
207-576-8722
GORHAM, ME 04038

Hook #136
5 lb weight
to check fuel
load

TMAP

Date Received: 19 Feb 2024
Date Calibrated: 01 Mar 2024
Recalibration Date: 01 Mar 2025
NIST Certificate Number: 684/O-0000046697 & 684/290551-18
If there are two NIST numbers, one or both may apply
Calibrated By: 22
Procedure: WI05-0023 Rev. K
Condition of Weights: New
Description of Weights: 5 lb Satin Finish Weight, ASTM Class 5, S/N AXL3
Comments:

Key Notes

Finish	Indicates the weight does not meet the finish requirements
Material	Indicates the weight does not meet the material requirements
New Wt	Indicates new weight
Missing Wt	Indicates replaced missing weight with new weight
Damaged Wt	Indicates replaced damaged weight
Replaced OOT	Indicates replaced out of tolerance weight
OOT	Indicates correction plus or minus Uncertainty greater than or equal to MPE
Magnetic Wt	Indicates replaced magnetic weight
Design	Indicates the weight does not meet the design or shape requirements
Repainted	Indicates the weight was repainted after As Found obtained
Other	See comments above

Cleaning Levels

A	Dusted with brush or cloth
B	Spot cleaned with ethyl alcohol
C	Full surface cleaned with ethyl alcohol
D	Spot cleaned with non-alcohol solvent followed by ethyl alcohol
E	Full surface cleaned with non-alcohol solvent followed by ethyl alcohol
F	No cleaning performed

Material Abbreviations

AL	Aluminum	TA	Tantalum
SS	Stainless Steel	BR	Brass
CI	Cast Iron	PL	Platinum
IR	Iron	NS	Nickel Silver
MS	Mild Steel	OR	Other/Unknown

Check with your local state agency for certification of compliance on Legal-for-Trade items. The weight accuracy class is referenced in the Description of Weights. Unless otherwise noted, the weights calibrated meet the requirements of the accuracy class. Results relate only to weights calibrated. The Surface Finishes of weights are evaluated visually. Weights are screened for magnetism using work instruction WI05-0035 when they are new, when requested by the customer or when weights are suspected of not meeting specifications. Density if measured is measured using OIML R111-1 (2004) method A2. Conventional Mass is reported based on a reference density of 8.0 g/cm^3. The Uncertainty of Measurement is included in the determination of Maximum Permissible Error (MPE) Pass/Fail Criteria. The specifications for Maximum Permissible Error (MPE) can be found in NIST Handbook 105-1 (2019), NIST Handbook 105-1 (1990), ASTM E617-23 or OIML R111-1 (2004), manufacturer specifications or customer specifications.

The Uncertainty assigned to the Conventional Mass values are the result of the root-sum-square of the type A and type B components, calculated in accordance with NIST SOP 29 and the Guide to the expression of uncertainty in measurement, with coverage factor (k=2), to express the expanded uncertainty with an approximate 95.45% confidence level. This report is not to be used to claim product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any government agency.

Dan Demers, Metrologist

01 Mar 2024
Issued Date:

NVLAP CALIBRATION
NVLAP LAB CODE 105001-0

ilac-MRA

Prepared By:
Rice Lake Weighing Systems® ● PN 64784 ● 12/21
230 West Coleman Street ● Rice Lake, WI 54868 ● USA
TEL: 715-234-9171 ● FAX: 715-234-6967
Definitions: http://certs.ricelake.com/certs/DefinitionsV2.docx

ilac-MRA
A2LA ACCREDITED
Certificate #4363.01

RICE LAKE

Certificate of Weight Calibration

ISO/IEC 17025:2017 & ANSI/NCSL-Z540-1-1994 ACCREDITED

Traceable Certificate Number: 3684541
Client: JOTUL NORTH AMERICA INC
Date Calibrated: 01 Mar 2024

Temperature Range: 20.59 °C
Pressure Range: 728.02 mmHg
Relative Humidity Range: 51 %

As Left Data (As Found Data is undifferentiated from As Left Data unless listed in As Found Data table)

Nominal Value	Unique ID	True Mass (Same UOM as Nom.)	True Mass Corr. (mg)	Conv. Mass (Same UOM as Nom.)	Conv. Mass Corr. (mg)	(k=2) Unc. (± mg)	MPE (± mg)	MPE Pass (Y=Pass N=Fail)	Assumod Density (g/cm^3)	Assumed Material	Const. Type	Balance Used	Roference Standard Set Used	Air Density (mg/cm^3)	Clean Level
5 lb AXL3		5.000120	55	5.000105	48	14	110	Y	7.84	SS	II	1808Q	D564Q	1.1460	A

Moisture Meter Calibration

Moisture Meter: Make: Delmhorst Model: RDM3 Serial #: 16071
Calibration Block: Make: Delmhorst Model: ~~032024~~ MCS-1 Serial #: N/A 032024

Date: 3/4/24
Time: 10:00
Calibrated By: Michael B.
MU: 1/8th
Calibration Due: Daily
for douglas fir @ 70°F on 2pin setting ✓ Stock #: 135

12% Moisture		22% Moisture					
Reference Percentage	Measured Percentage	Reference Percentage	Measured Percentage				
12.4	13	23.9	24	✓			

Date 3/4/24

Printed Name	Signature	Date
Michael Barrett	MBarrett	

Delmhorst®
INSTRUMENT CO

LETTER OF CERTIFICATION

February 20, 2024

Jotul North America
55 Hutcherson Drive
Gorham, ME 04038

Gentlemen:

Subject: Moisture Content Standard Model MCS-1, Serial No. 022024

This is to certify that the primary calibration - electrical resistance - of the Delmhorst Moisture Meters for wood has been tested on equipment whose accuracy is certified by the following equipment:

General Radio Bridge, Model No. 1644-A, S/N 2526
Keithley Multimeter, Model No. 197, S/N 283483

The calibration of these instruments, certified by Iridustrial Process Measurement, Inc. with **Report No. 89613-01 dated November 13, 2023, and Report No. 89613-02 dated November 15, 2023**, is traceable to the NIST. Industrial Process Measurement, Inc. is certified to ISO 17025 standard.

The MCS-1 (Moisture Content Standard) is an external means to check the Delmhorst Moisture Meters for wood at two points – 12 % and 22% on the Douglas Fir, 4 Pin mode. The two points will yield readings of 12.9% and 23.9% if the meters are set on the Douglas Fir, 70°F, 2 Pin mode. The analog meters in their standard form are always set at Douglas Fir 70°F 4 Pin mode. The resistance values at said points, i.e., 120 Megohms and 1.1 Megohms, verified with the same equipment as above, are within ±10% of the above values.

The analog Moisture Meters, checked with the MCS-1 Standard, should read within (±) one division on the dial at the point(s) checked; the digital Moisture Meters should read within ±0.5 M.C. of the indicated values.

Sincerely,

John C. Laurenzi
President

JCL:RB

Thermocouple Calibration

Date: 3/1/24
Time: 10:30 am

Next Calibration Due: 3/1/2025
Barometric Pressure: 30.49 in. Hg

Elevation Westbrook ME 75'
Boil correction 212.81

ID#	Type	Location	Ice Bath		Boiling Water	
			Meas'd * Temp °F	Ref ** Temp°F	Meas'd* Temp°F	Ref** Temp°F
132	K	R+D Lab	33.8 °F	32.0 °F	213.9 °F	212.81
133	K	R+D Lab	33.9 °F	32.0 °F	214.1 °F	212.51

* Measured Temp: ~~Omega Digital Temperature Calibrator/Thermometer, Model CL521 Serial Number~~ _____ Fluke 52 Stock # 00028 cal due 10/23/24

** Reference Temp.: ASTM Mercury-in-Glass Thermometer
Serial Number _____ or ASTM E563-Standard Practice for Preparation and Use of Freezing Point Reference Baths
Boiling Water- see attached chart for temperature corrected for barometric pressure

Printed Name	Signature	Date
Ames Denis	Ames Denis	3/1/24

L.A.W. CALIBRATION, LLC
41 Spring Hill Road, Saco, ME - 04072. USA
Tel.: (207) 494-7538
Email: info@lawcalibration.com

CALIBRATION CERTIFICATE

CERTIFICATE #	020823-04-009	*Work Order*	21245	***Calibration Result***	**AS FOUND-PASS**
Issue Date	8-Feb-2023	*Customer PO*	VERBAL		

CERTIFICATE ISSUED TO

Customer Name	JOTUL NORTH AMERICA			*Telephone*	207-251-6617
Address	55 Hutcherson Drive			*City*	Gorham
State	ME	*Zip Code*	04038	*Country*	USA

INSTRUMENT DETAILS

Description	MULTIFUNCTION CALIBRATOR			*Make*	ACCUPRO
Asset / I.D. #	1198A12	*Serial #*	1198A12	*Model*	CL-9001 DIAMOND

CALIBRATION INFORMATION

Received Date	30-Jan-2023	*Received Condition*	Operational	*Due date format*	
Calibration Date	8-Feb-2023	*Calibrated @*	Our Labs	End of Month	
Next Calibration Due	29-Feb-2024	*Cal Frequency**	12 Months (1 Year)		

* Customer requested to apply OEM recommended cal frequency.

CALIBRATION METHOD

Procedure	See Attached	*Environmental*	19.9 ºC (or) 67.8 ºF
Calibration Data	Attached	*Conditions*	39.0 % RH

STANDARDS USED

Asset #	*Description*	*Model*	*Serial #*	*Cal Due Date*
LAW-1095	Advanced Multiproduct Calibrator	4010	Y1295K20	31-Aug-2023
LAW-1096	T/C (ITS90) Src/Meas + CJC	EA001A	113150K20	31-Oct-2023
LAW-1002	Multimeter	34401A	us36109565	30-Nov-2023

Notes:

Calibrated By: ***Flynn Dorn*** *Reviewed By:* ***Alexis White***
3/6/2023

This is to certify that the above item was calibrated using standards whose measurement results are traceable to reference standards developed and maintained by National Metrology Institutes (NMI), such as (NIST USA, NRC Canada) to International System of Units (SI) and/or based on fundamental physical constants. Measurement results pertain only to the item calibrated and apply at the time of measurements. Test Uncertainty Ratio (TUR) is greater than 4:1, unless noted by an asterisk (*). Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of k = 2. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration. LAW CALIBRATION, LLC is accredited to ISO/IEC 17025 through A2LA (certificate # 2398.01) and its Quality Management System is also in compliance with and meets the requirements of AS9100, ANSI/NCSL Z540.1, ISO 9001, ISO 10012 & ISO 13485 current Standards and their applicable clauses. The statement of conformity is based on simple acceptance when determining the pass/fail status of the test instrument. The calibration uncertainty is not taken into account in the statement on conformity. Ultimately is it up to the customer to interpret the effects of the associated uncertainties on the margins of tolerance. This certificate and the attached data (if any) shall not be reproduced except in full without written approval of the laboratory.

CALIBRATION DATA

Customer Name	JOTUL NORTH AMERICA	Certificate Number	Procedure
Asset # / I.D. #	1198A12	020823-04-009	OEM
Description	MULTIFUNCTION CALIBRATOR	Serial #	1198A12
Make	ACCUPRO	Received Date	30-Jan-2023
Model	CL-9001 DIAMOND	Calibration Date	8-Feb-2023

AS FOUND

DC Voltage Measurement Test [mV]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
10.000	10.01	0.050	PASS
100.00	100.00	0.050	PASS
190.0	100.00	0.050	PASS

DC Voltage Measurement Test [V]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
1.000	1.000	0.013	PASS
5.00	4.998	0.013	PASS
10.0	9.996	0.013	PASS
19.0	18.994	0.013	PASS
45.0	44.992	0.013	PASS

DC Current Measurement Test [mA]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
0.000	0.000	0.013	PASS
4.000	4.000	0.013	PASS
8.000	8.000	0.013	PASS
12.000	12.000	0.013	PASS
16.000	16.001	0.013	PASS
24.000	24.002	0.013	PASS
50.000	50.005	0.013	PASS

Frequency Measurement Test [Hz]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
10.00	10.0	0.10	PASS
100.00	100.0	0.10	PASS
1000.00	1000.0	0.10	PASS

Frequency Measurement Test [kHz]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
1.000	1.001	0.001	PASS
10.00	10.000	0.001	PASS

Resistance MeasurementTest [Ω]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
0.000	0.0	0.175	PASS
100.00	100.0	0.175	PASS
200.000	200.0	0.175	PASS
490.000	490.1	0.175	PASS

*** Data Continued ***

CALIBRATION DATA

Customer Name	JOTUL NORTH AMERICA	Certificate Number	Procedure
Asset # / I.D. #	1198A12	020823-04-009	OEM
Description	MULTIFUNCTION CALIBRATOR	Serial #	1198A12
Make	ACCUPRO	Received Date	30-Jan-2023
Model	CL-9001 DIAMOND	Calibration Date	8-Feb-2023

AS FOUND

Temperature Measurment Test [°C], K Type

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
-150.0	-149.5	0.5	PASS
0.00	0.2	0.5	PASS
100.0	100.3	0.5	PASS
500.0	500.2	0.5	PASS
1350.0	1350.1	0.5	PASS

Temperature Measurment Test [°C], Pt100

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
-100.0	-99.5	0.5	PASS
0.00	0.0	0.5	PASS
100.0	100.1	0.5	PASS

DC Voltage Source Test [mV]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
9.999	10.00	0.05	PASS
100.003	100.00	0.05	PASS
190.00	190.00	0.05	PASS

DC Voltage Source Test [V]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
1.000	1.000	0.005	PASS
5.000	5.000	0.005	PASS
10.001	10.000	0.005	PASS
19.001	19.000	0.005	PASS

DC Current Source Test [mA]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
0.0000	0.000	0.006	PASS
3.9990	4.000	0.006	PASS
7.9992	8.000	0.006	PASS
11.9980	12.000	0.006	PASS
15.9990	16.000	0.006	PASS
23.9990	24.000	0.006	PASS

Frequency Source Test [Hz]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
10.000	10.0	0.100	PASS
100.00	100.0	0.100	PASS
1000.02	1000.0	0.100	PASS

*** Data Continued ***

L.A.W. CALIBRATION, LLC

CALIBRATION DATA

Customer Name	JOTUL NORTH AMERICA	Certificate Number	Procedure
Asset # / I.D. #	1198A12	020823-04-009	OEM
Description	MULTIFUNCTION CALIBRATOR	Serial #	1198A12
Make	ACCUPRO	Received Date	30-Jan-2023
Model	CL-9001 DIAMOND	Calibration Date	8-Feb-2023

AS FOUND

Freqency Source Test [kHz]

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
1.0000	1.000	0.001	PASS
10.0002	10.000	0.001	PASS

Temperature Source Test [°C], K Type

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
-149.97	-150.0	0.5	PASS
0.21	0.0	0.5	PASS
100.07	100.0	0.5	PASS
500.20	500.0	0.5	PASS
1350.33	1350.0	0.5	PASS

Temperature Source Test [°C], Pt100

Standard	Unit Under Test	Tolerance (±)	Result (Pass/Fail)
-100.19	-100.0	0.8	PASS
-0.32	0.0	0.8	PASS
99.87	100.0	0.8	PASS
799.64	800.0	0.8	PASS

*** End of Data ***

Temp Scan Calibration Procedure:

Calibration procedure tools:

1. Diamond Calibrator
2. TC Wire (type K)
3. Copper wire for TC shorts
4. IO Tech TempScan Manual

Procedure:

First check cards to see if calibration is needed. To do this see below

1. Open Scan 32 software and set up 4 charts with limits to show ± 1°F.
2. The four charts are to examine channel 32, 28, 16, and 12
3. Set diamond calibrator to out put 32°F. And connect it to the corresponding connections on the rear of TempScan cart. Note: #32 is bottom and the 12th is 12 down from top of column, each card is allocated on column on the back of cart.
4. Input this signal into channels and observe
5. If all channels show temp within tolerance then cut and past chart into this document and change calibration dates to show that card has been examined.
6. Do this for two other temps, 212°F and 500°F. If all are with in spec then no calibration is needed
7. If channels are out of spec then hard calibration is needed. See manual, and hints below:

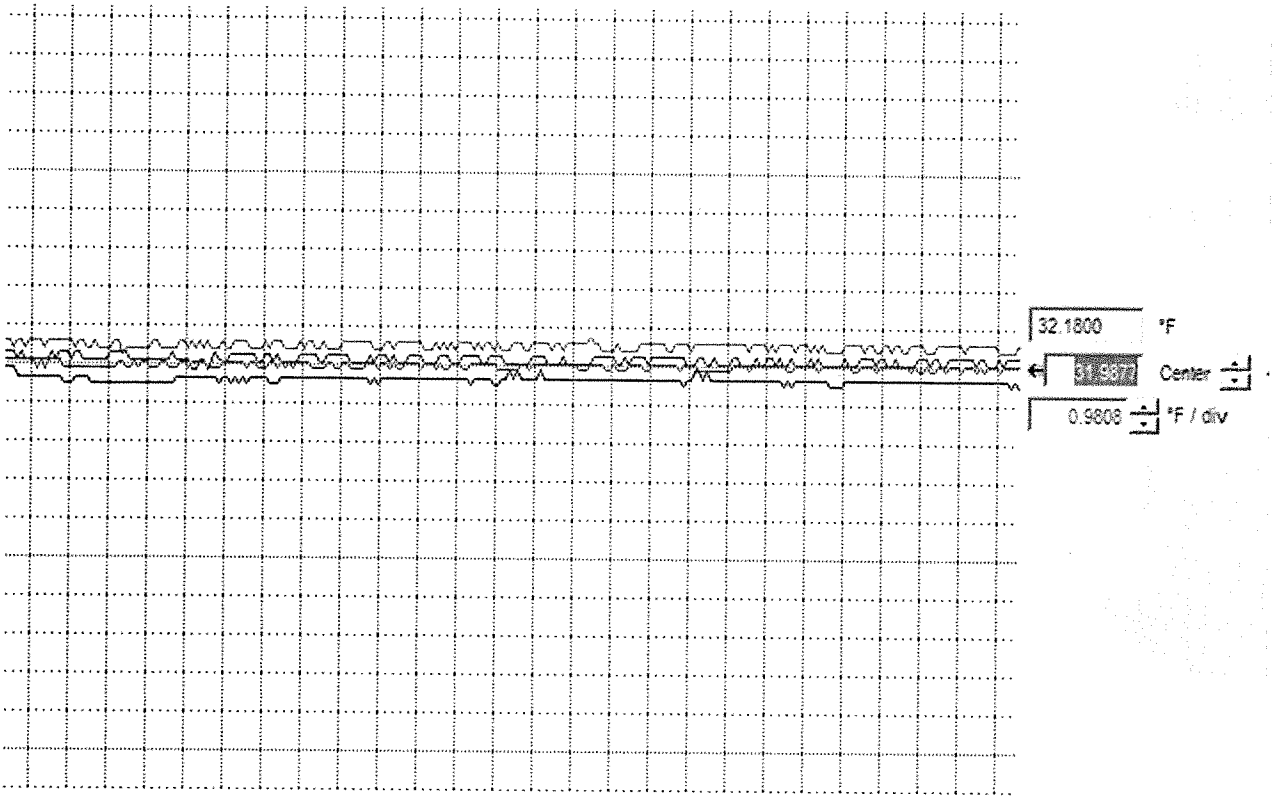
Hard Calibration procedure

1. Turn off TempScan and Expansion Chassis
2. Remove desired card form unit
3. Disconnect all TC wires from Card, make sure that wires are marked with their channel number before removing
4. Make shorts with copper wire for all channels and place them on card terminals
5. Reinsert card into TempScan and wait at least one hour
6. Start Chart view software and click Device menu, then Status, then calibration.
7. Follow steps listed in windows.
8. If error for Open TC comes up just disregard and skip to the next step
9. Double check the result of the hard calibration by repeating the procedure above

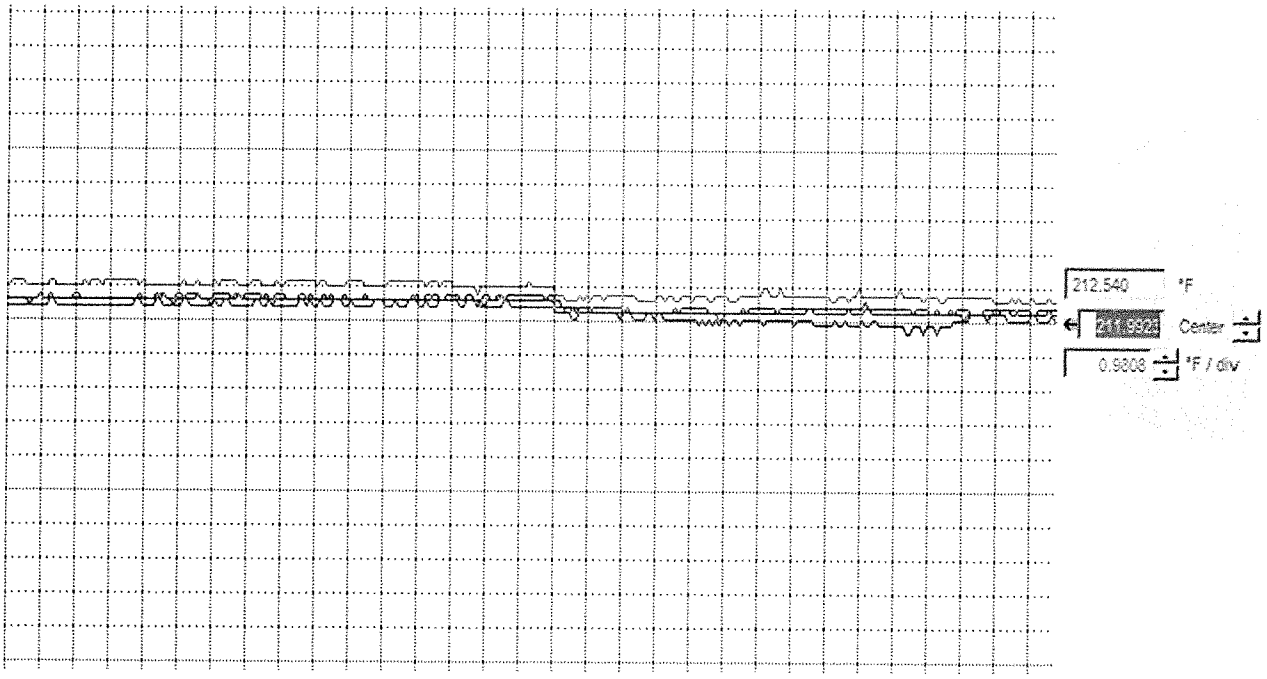
NOTE: Do not solder TCs, connect TC directly to calibrator do not use different connecting wires to attach.

TC SLOT 01 at 32 deg F: Stock # 00069 Serial #: 165728
Calibrated: 2/21/24 Due: 2/21/25

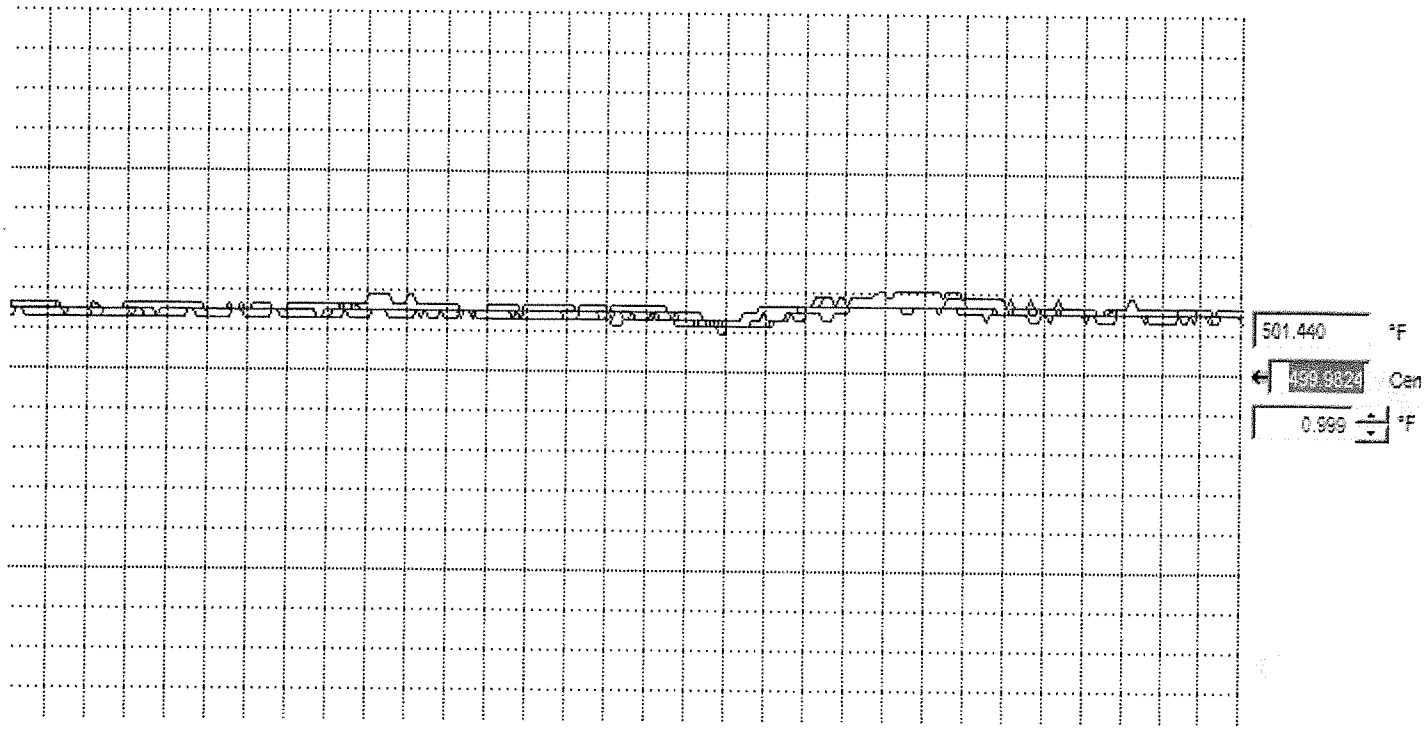
ALL CHANNELS: MU= .001



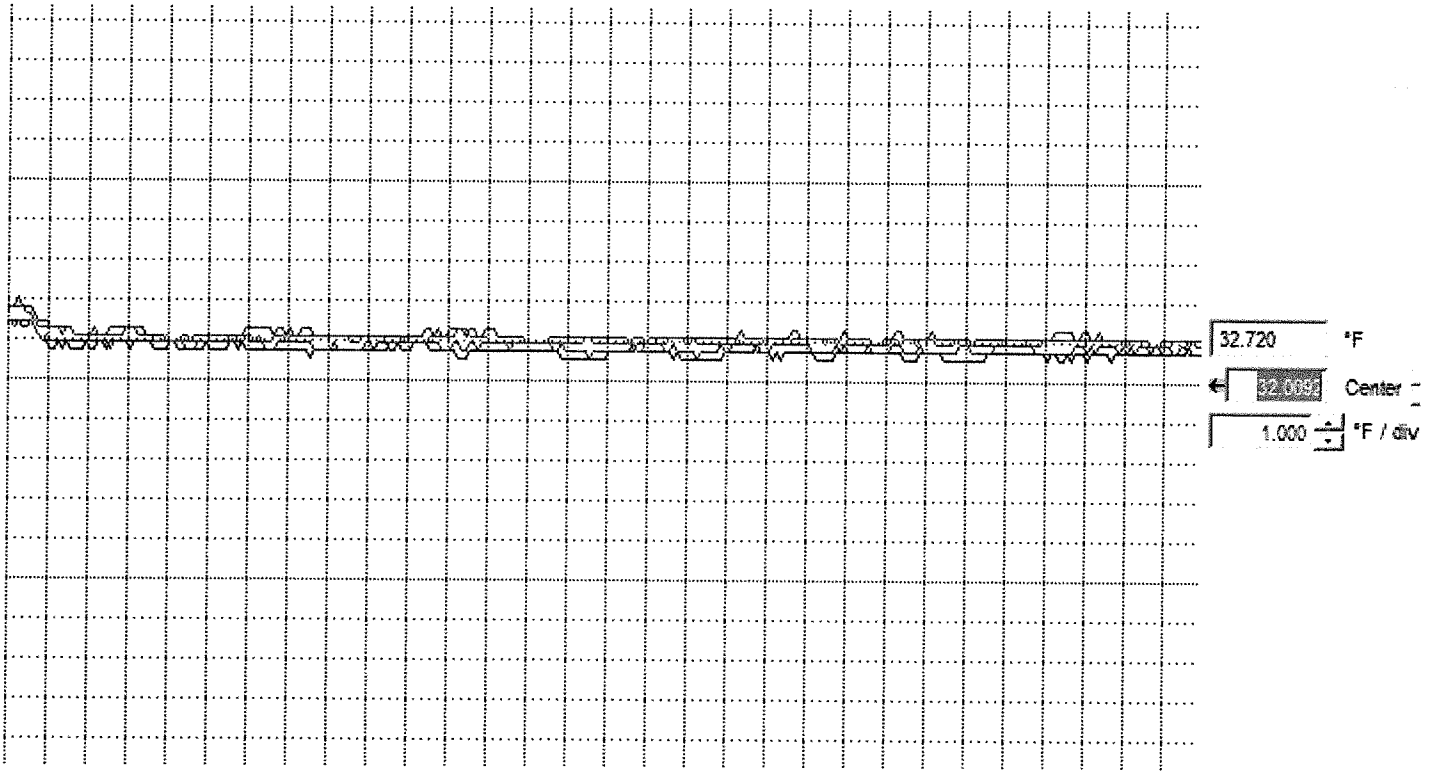
TC SLOT 01 at 212 deg F: Stock # 00069 Serial #: 165728
Calibrated: 2/21/24 Due: 2/21/25



TC SLOT 01 at 500 deg F: Stock # 00069 Serial #: 165728
Calibrated: 2/21/24 Due: 2/21/25



TC SLOT 02 at 32 deg F: Stock # 00047 Serial #: 165727
Calibrated: 2/21/24 Due: 2/21/25



Temperature Device Calibration

Temperature Device: Make: Fluke Model: 52 Serial #: 028
Calibrator: Make: Accupro Model: Diamond Serial #: 038

Date: 10/23/23
Time:
Calibrated By: Michael
Measurement Uncertainty: 0.1
Calibration Due: 10/23/24

Stock #:

Type	Channel	Ice Bath or Cal Value		Boil Water or Cal Value		Upscale Value	
		Measured Temp	Reference Temp	Measured Temp	Reference Temp	Measured Temp	Reference Temp
	T1	32	32.6	212	~~211~~ 211.8	500	499.6
			+.6		+/- .2		-.4
	T2	32	32.4	212	212.2	500	499.8
			+.4		+.2		-.2

Printed Name	Signature	Date
Michael Barrett		10/23/23

		Scale Data Logger			Temp Data Loger			
Line #	Hour Duration	Date	Time Stamp	Scale Weight (lb)	Temp Time Stamp	Temp Logger Date	Flue Temp deg F	Cat Temp deg F
					9:58:47 AM	3/4/2024	77.36	73.76
					10:08:47 AM	3/4/2024	246.20	888.44
					10:18:47 AM	3/4/2024	210.56	657.32
					10:28:47 AM	3/4/2024	283.82	1103.40
1	0	3/4/2024	10:32:50 AM	3.8	10:38:47 AM	3/4/2024	368.06	1171.40
2	0.17	3/4/2024	10:42:50 AM	2.1	10:48:47 AM	3/4/2024	367.52	1173.40
3	0.33	3/4/2024	10:52:50 AM	0.8	10:58:47 AM	3/4/2024	361.40	1021.80
4	0.50	3/4/2024	11:02:50 AM	0.2	11:08:47 AM	3/4/2024	313.70	794.30
5	0.67	3/4/2024	11:12:50 AM	5.3	11:18:47 AM	3/4/2024	308.66	942.98
6	0.83	3/4/2024	11:22:50 AM	4.6	11:28:47 AM	3/4/2024	300.74	906.08
7	1.00	3/4/2024	11:32:50 AM	4	11:38:47 AM	3/4/2024	305.24	995.36
8	1.17	3/4/2024	11:42:51 AM	3.2	11:48:47 AM	3/4/2024	302.36	1001.80
9	1.33	3/4/2024	11:52:51 AM	2.5	11:58:47 AM	3/4/2024	290.48	970.16
10	1.50	3/4/2024	12:02:51 PM	2	12:08:47 PM	3/4/2024	280.40	924.26
11	1.67	3/4/2024	12:12:51 PM	1.4	12:18:47 PM	3/4/2024	274.10	902.48
12	1.83	3/4/2024	12:22:51 PM	1.1	12:28:47 PM	3/4/2024	271.58	913.46
13	2.00	3/4/2024	12:32:51 PM	0.7	12:38:47 PM	3/4/2024	310.64	777.74
14	2.17	3/4/2024	12:42:51 PM	6.5	12:48:47 PM	3/4/2024	357.26	1123.50
15	2.33	3/4/2024	12:52:51 PM	5.6	12:58:47 PM	3/4/2024	383.72	1206.50
16	2.50	3/4/2024	1:02:51 PM	4.4	1:08:47 PM	3/4/2024	404.24	1243.60
17	2.67	3/4/2024	1:12:51 PM	3.3	1:18:47 PM	3/4/2024	392.72	1141.30
18	2.83	3/4/2024	1:22:51 PM	1.9	1:28:47 PM	3/4/2024	356.54	1107.00
19	3.00	3/4/2024	1:32:51 PM	1.7	1:38:47 PM	3/4/2024	328.46	1080.00
20	3.17	3/4/2024	1:42:51 PM	1.4	1:48:47 PM	3/4/2024	324.50	1028.50
21	3.33	3/4/2024	1:52:51 PM	1.2	1:58:47 PM	3/4/2024	309.02	997.88
22	3.50	3/4/2024	2:02:52 PM	1.2	2:08:47 PM	3/4/2024	284.90	930.38
23	3.67	3/4/2024	2:12:52 PM	1.1	2:18:47 PM	3/4/2024	270.86	865.58
24	3.83	3/4/2024	2:22:52 PM	1	2:28:47 PM	3/4/2024	274.82	991.40
25	4.00	3/4/2024	2:32:52 PM	5.8	2:38:47 PM	3/4/2024	230.36	936.86
26	4.17	3/4/2024	2:42:52 PM	5.4	2:48:47 PM	3/4/2024	216.32	905.72
27	4.33	3/4/2024	2:52:52 PM	5.1	2:58:47 PM	3/4/2024	204.80	892.22
28	4.50	3/4/2024	3:02:52 PM	4.9	3:08:47 PM	3/4/2024	197.96	877.64
29	4.67	3/4/2024	3:12:52 PM	4.8	3:18:47 PM	3/4/2024	191.12	836.24
30	4.83	3/4/2024	3:22:52 PM	4.7	3:28:47 PM	3/4/2024	184.64	807.80
31	5.00	3/4/2024	3:32:52 PM	4.6	3:38:47 PM	3/4/2024	196.70	819.14
32	5.17	3/4/2024	3:42:52 PM	4.4	3:48:47 PM	3/4/2024	260.24	1046.70
33	5.33	3/4/2024	3:52:52 PM	3.4	3:58:47 PM	3/4/2024	287.24	1053.70
34	5.50	3/4/2024	4:02:52 PM	2.3	4:08:47 PM	3/4/2024	302.90	960.62
35	5.67	3/4/2024	4:12:52 PM	1.5	4:18:47 PM	3/4/2024	296.42	867.56
36	5.83	3/4/2024	4:22:52 PM	0.9	4:28:47 PM	3/4/2024	285.62	824.18
37	6.00	3/4/2024	4:32:52 PM	0.5	4:38:47 PM	3/4/2024	276.80	792.50
38	6.17	3/4/2024	4:42:53 PM	0.3	4:48:47 PM	3/4/2024	270.50	691.16
39	6.33	3/4/2024	4:52:53 PM	4.7	4:58:47 PM	3/4/2024	299.12	918.32
40	6.50	3/4/2024	5:02:53 PM	3.9	5:08:47 PM	3/4/2024	297.68	935.60
41	6.67	3/4/2024	5:12:53 PM	3.2	5:18:47 PM	3/4/2024	291.92	947.48
42	6.83	3/4/2024	5:22:53 PM	2.6	5:28:47 PM	3/4/2024	286.34	936.86
44	7.17	3/4/2024	5:32:53 PM	2.4	5:38:47 PM	3/4/2024	276.80	918.86
45	7.33	3/4/2024	5:42:53 PM	1.8	5:48:47 PM	3/4/2024	275.90	900.14
46	7.50	3/4/2024	5:52:53 PM	1.5	5:58:47 PM	3/4/2024	272.66	865.04

47	7.67	3/4/2024	6:02:53 PM	0.8	6:08:47 PM	3/4/2024	274.64	866.66
48	7.83	3/4/2024	6:12:53 PM	5.8	6:18:47 PM	3/4/2024	375.44	1198.90
49	8.00	3/4/2024	6:19:32 PM	4.8	6:28:47 PM	3/4/2024	388.76	1221.40
50	8.17	3/4/2024	6:29:32 PM	3.7	6:38:47 PM	3/4/2024	378.50	1137.20
51	8.33	3/4/2024	6:39:32 PM	2.7	6:48:47 PM	3/4/2024	350.96	1031.70
52	8.50	3/4/2024	6:49:32 PM	2	6:58:47 PM	3/4/2024	318.02	942.80
53	8.67	3/4/2024	6:59:33 PM	1.6	7:08:47 PM	3/4/2024	312.98	912.56
54	8.83	3/4/2024	7:09:33 PM	1.4	7:18:47 PM	3/4/2024	304.34	888.44
55	9.00	3/4/2024	7:19:33 PM	1.2	7:28:47 PM	3/4/2024	296.96	875.12
56	9.17	3/4/2024	7:29:33 PM	1.4	7:38:47 PM	3/4/2024	383.72	1211.70
57	9.33	3/4/2024	7:39:33 PM	5.2	7:48:47 PM	3/4/2024	385.52	1154.10
58	9.50	3/4/2024	7:49:33 PM	4	7:58:47 PM	3/4/2024	362.84	1058.20
59	9.67	3/4/2024	7:59:33 PM	3.2	8:08:47 PM	3/4/2024	342.32	983.48
60	9.83	3/4/2024	8:09:33 PM	2.5	8:18:47 PM	3/4/2024	327.20	945.68
61	10.00	3/4/2024	8:19:33 PM	2.1	8:28:47 PM	3/4/2024	338.72	885.56
62	10.17	3/4/2024	8:29:33 PM	1.7	8:38:47 PM	3/4/2024	335.12	861.08
63	10.33	3/4/2024	8:39:33 PM	1.2	8:48:47 PM	3/4/2024	274.28	862.16
64	10.50	3/4/2024	8:49:33 PM	1	8:58:47 PM	3/4/2024	247.10	768.38
65	10.67	3/4/2024	8:59:34 PM	1.3	9:08:47 PM	3/4/2024	240.08	727.70
66	10.83	3/4/2024	9:09:34 PM	1.2	9:18:47 PM	3/4/2024	219.56	726.08
67	11.00	3/4/2024	9:19:34 PM	0.9	9:28:47 PM	3/4/2024	253.22	966.92
68	11.17	3/4/2024	9:29:34 PM	6.6	9:38:47 PM	3/4/2024	297.50	1045.40
69	11.33	3/4/2024	9:39:34 PM	5.9	9:48:47 PM	3/4/2024	311.18	1047.90
70	11.50	3/4/2024	9:49:34 PM	5.1	9:58:47 PM	3/4/2024	312.98	1034.80
71	11.67	3/4/2024	9:59:34 PM	4.2	10:08:47 PM	3/4/2024	329.72	1140.40
72	11.83	3/4/2024	10:09:34 PM	3.3	10:18:47 PM	3/4/2024	359.24	1026.10
73	12.00	3/4/2024	10:19:34 PM	2.4	10:28:47 PM	3/4/2024	322.16	954.14
74	12.17	3/4/2024	10:29:34 PM	1.8	10:38:47 PM	3/4/2024	308.30	928.40
75	12.33	3/4/2024	10:39:34 PM	1.3	10:48:47 PM	3/4/2024	296.24	836.60
76	12.50	3/4/2024	10:49:34 PM	1.1	10:58:47 PM	3/4/2024	268.34	769.64
77	12.67	3/4/2024	10:59:34 PM	1	11:08:47 PM	3/5/2024	273.74	876.92
78	12.83	3/4/2024	11:09:35 PM	6.2	11:18:47 PM	3/5/2024	312.44	985.64
79	13.00	3/4/2024	11:19:35 PM	5.4	11:28:47 PM	3/5/2024	327.38	1075.10
80	13.17	3/4/2024	11:29:35 PM	4.7	11:38:47 PM	3/5/2024	337.28	1073.10
81	13.33	3/4/2024	11:39:35 PM	3.8	11:48:47 PM	3/5/2024	338.00	1026.70
82	13.50	3/4/2024	11:49:35 PM	3	11:58:47 PM	3/5/2024	327.20	960.80
83	13.67	3/4/2024	11:59:35 PM	2.4	12:08:47 AM	3/5/2024	317.30	935.96
84	13.83	3/5/2024	12:09:35 AM	1.7	12:18:47 AM	3/5/2024	306.68	906.26
85	14.00	3/5/2024	12:19:35 AM	1.4	12:28:47 AM	3/5/2024	288.86	848.66
86	14.17	3/5/2024	12:29:35 AM	4.1	12:38:47 AM	3/5/2024	273.02	821.30
87	14.33	3/5/2024	12:39:35 AM	0.7	12:48:47 AM	3/5/2024	250.52	727.88
88	14.50	3/5/2024	12:49:35 AM	0.6	12:58:47 AM	3/5/2024	241.52	722.12
89	14.67	3/5/2024	12:59:36 AM	0.5	1:08:47 AM	3/5/2024	330.80	1148.90
90	14.83	3/5/2024	1:09:36 AM	5.2	1:18:47 AM	3/5/2024	368.42	1191.00
91	15.00	3/5/2024	1:19:36 AM	4.1	1:28:47 AM	3/5/2024	373.28	1136.70
92	15.17	3/5/2024	1:29:36 AM	2.9	1:38:47 AM	3/5/2024	354.20	1046.30
93	15.33	3/5/2024	1:39:36 AM	2.2	1:48:47 AM	3/5/2024	333.68	972.50
94	15.50	3/5/2024	1:49:36 AM	1.6	1:58:47 AM	3/5/2024	319.10	941.90
95	15.67	3/5/2024	1:59:36 AM	1	2:08:47 AM	3/5/2024	305.24	876.74
96	15.83	3/5/2024	2:09:36 AM	0.7	2:18:47 AM	3/5/2024	292.82	849.74
97	16.00	3/5/2024	2:19:36 AM	0.5	2:28:47 AM	3/5/2024	277.88	795.92
98	16.17	3/5/2024	2:29:36 AM	0.4	2:38:47 AM	3/5/2024	344.30	1148.90
99	16.33	3/5/2024	2:39:36 AM	4.9	2:48:47 AM	3/5/2024	338.90	1127.10

100	16.50	3/5/2024	2:49:36 AM	4	2:58:47 AM	3/5/2024	332.06	1085.20
101	16.67	3/5/2024	2:59:36 AM	3.2	3:08:47 AM	3/5/2024	328.46	1116.50
102	16.83	3/5/2024	3:09:36 AM	2.4	3:18:47 AM	3/5/2024	321.98	1098.10
103	17.00	3/5/2024	3:19:36 AM	1.8	3:28:47 AM	3/5/2024	313.16	1048.30
104	17.17	3/5/2024	3:29:36 AM	1.3	3:38:47 AM	3/5/2024	305.24	1022.20
105	17.33	3/5/2024	3:39:36 AM	0.9	3:48:47 AM	3/5/2024	297.32	986.00
106	17.50	3/5/2024	3:49:36 AM	0.5	3:58:47 AM	3/5/2024	283.82	878.72
107	17.67	3/5/2024	3:59:36 AM	0.3	4:08:47 AM	3/5/2024	298.76	1060.30
108	17.83	3/5/2024	4:09:36 AM	5.2	4:18:47 AM	3/5/2024	324.14	1129.50
109	18.00	3/5/2024	4:19:36 AM	4.5	4:28:47 AM	3/5/2024	317.66	1056.40
110	18.17	3/5/2024	4:29:37 AM	3.7	4:38:47 AM	3/5/2024	292.82	989.60
111	18.33	3/5/2024	4:39:37 AM	3.1	4:48:47 AM	3/5/2024	279.32	930.20
112	18.50	3/5/2024	4:49:37 AM	2.6	4:58:47 AM	3/5/2024	267.26	897.44
113	18.67	3/5/2024	4:59:37 AM	2.3	5:08:47 AM	3/5/2024	260.60	889.16
114	18.83	3/5/2024	5:09:37 AM	1.9	5:18:47 AM	3/5/2024	260.24	897.62
115	19.00	3/5/2024	5:19:37 AM	1.6	5:28:47 AM	3/5/2024	252.32	860.18
116	19.17	3/5/2024	5:29:37 AM	1.4	5:38:47 AM	3/5/2024	228.02	808.52
117	19.33	3/5/2024	5:39:37 AM	1.2	5:48:47 AM	3/5/2024	206.60	791.24
118	19.50	3/5/2024	5:49:37 AM	1.2	5:58:47 AM	3/5/2024	299.30	856.58
119	19.67	3/5/2024	5:59:37 AM	0.8	6:08:47 AM	3/5/2024	312.62	917.60
120	19.83	3/5/2024	6:09:37 AM	0.6	6:18:47 AM	3/5/2024	302.18	852.80
121	20.00	3/5/2024	6:19:37 AM	0.5	6:28:47 AM	3/5/2024	300.92	1125.30
122	20.17	3/5/2024	6:29:37 AM	4.2	6:38:47 AM	3/5/2024	304.88	1081.20
123	20.33	3/5/2024	6:39:38 AM	4.7	6:48:47 AM	3/5/2024	303.44	1053.90
124	20.50	3/5/2024	6:49:38 AM	4.8	6:58:47 AM	3/5/2024	302.00	1055.80
125	20.67	3/5/2024	6:59:38 AM	4.2	7:08:47 AM	3/5/2024	288.14	987.26
126	20.83	3/5/2024	7:09:38 AM	3.6	7:18:47 AM	3/5/2024	276.62	953.24
127	21.00	3/5/2024	7:19:38 AM	3.3	7:28:47 AM	3/5/2024	266.90	938.30
128	21.17	3/5/2024	7:29:38 AM	2.9	7:38:47 AM	3/5/2024	259.34	900.68
129	21.33	3/5/2024	7:39:38 AM	2.7	7:48:47 AM	3/5/2024	248.36	872.24
130	21.50	3/5/2024	7:49:38 AM	2.6	7:58:47 AM	3/5/2024	236.30	810.50
131	21.67	3/5/2024	7:59:38 AM	2.6	8:08:47 AM	3/5/2024	225.14	766.22
132	21.83	3/5/2024	8:09:38 AM	2.4	8:18:47 AM	3/5/2024	220.64	751.28
133	22.00	3/5/2024	8:19:38 AM	2.3	8:28:47 AM	3/5/2024	216.14	753.62
134	22.17	3/5/2024	8:29:38 AM	2.3	8:38:47 AM	3/5/2024	214.88	740.84
135	22.33	3/5/2024	8:39:38 AM	2.3	8:48:47 AM	3/5/2024	224.24	629.42
136	22.50	3/5/2024	8:49:38 AM	2.3	8:58:47 AM	3/5/2024	239.90	416.12
137	22.67	3/5/2024	8:59:39 AM	6.9	9:08:47 AM	3/5/2024	263.66	812.12
138	22.83	3/5/2024	9:09:39 AM	6.1	9:18:47 AM	3/5/2024	290.48	933.98
139	23.00	3/5/2024	9:19:39 AM	5.2	9:28:47 AM	3/5/2024	308.84	978.44
140	23.17	3/5/2024	9:29:39 AM	4.4	9:38:47 AM	3/5/2024	310.46	988.16
141	23.33	3/5/2024	9:39:39 AM	3.6	9:48:47 AM	3/5/2024	324.86	1042.30
142	23.50	3/5/2024	9:49:39 AM	2.8	9:58:47 AM	3/5/2024	321.98	993.56
143	23.67	3/5/2024	9:59:39 AM	2.2	10:08:47 AM	3/5/2024	318.74	938.48
144	23.83	3/5/2024	10:09:39 AM	1.5	10:18:47 AM	3/5/2024	309.38	883.22
145	24.00	3/5/2024	10:19:39 AM	1.1	10:28:47 AM	3/5/2024	294.62	809.24
146	24.17	3/5/2024	10:29:39 AM	0.7	10:38:47 AM	3/5/2024	281.12	759.74
147	24.33	3/5/2024	10:39:39 AM	0.6	10:48:47 AM	3/5/2024	268.34	733.64
148	24.50	3/5/2024	10:49:39 AM	0.5	10:58:47 AM	3/5/2024	258.98	724.46
149	24.67	3/5/2024	10:59:39 AM	0.5	11:08:47 AM	3/5/2024	246.02	684.14
150	24.83	3/5/2024	11:09:39 AM	0.4	11:18:47 AM	3/5/2024	242.42	529.88
151	25.00	3/5/2024	11:19:40 AM	5.9	11:28:47 AM	3/5/2024	233.78	861.80
152	25.17	3/5/2024	11:29:40 AM	5.5	11:38:47 AM	3/5/2024	238.64	875.30

153	25.33	3/5/2024	11:39:40 AM	4.9	11:48:47 AM	3/5/2024	238.82	868.64
154	25.50	3/5/2024	11:49:40 AM	4.3	11:58:47 AM	3/5/2024	236.84	865.22
155	25.67	3/5/2024	11:59:40 AM	3.7	12:08:47 PM	3/5/2024	235.40	869.36
156	25.83	3/5/2024	12:09:40 PM	3.2	12:18:47 PM	3/5/2024	231.98	835.52
157	26.00	3/5/2024	12:19:40 PM	2.7	12:28:47 PM	3/5/2024	228.02	809.24
158	26.17	3/5/2024	12:29:40 PM	2.5	12:38:47 PM	3/5/2024	227.12	787.10
159	26.33	3/5/2024	12:39:40 PM	2.1	12:48:47 PM	3/5/2024	228.20	791.60
160	26.50	3/5/2024	12:49:40 PM	1.9	12:58:47 PM	3/5/2024	230.72	786.38
161	26.67	3/5/2024	12:59:40 PM	1.6	1:08:47 PM	3/5/2024	231.08	780.08
162	26.83	3/5/2024	1:09:40 PM	1.3	1:18:47 PM	3/5/2024	227.84	787.82
163	27.00	3/5/2024	1:19:40 PM	1.2	1:28:47 PM	3/5/2024	221.00	779.00
164	27.17	3/5/2024	1:29:40 PM	1.1	1:38:47 PM	3/5/2024	248.36	807.08
165	27.33	3/5/2024	1:39:41 PM	5.6	1:48:47 PM	3/5/2024	251.06	856.58
166	27.50	3/5/2024	1:49:41 PM	5.5	1:58:47 PM	3/5/2024	250.70	858.74
167	27.67	3/5/2024	1:59:41 PM	5.2	2:08:47 PM	3/5/2024	254.12	896.90
168	27.83	3/5/2024	2:09:41 PM	4.8	2:18:47 PM	3/5/2024	252.68	930.92
169	28.00	3/5/2024	2:19:41 PM	4.4	2:28:47 PM	3/5/2024	251.60	933.44
170	28.17	3/5/2024	2:29:41 PM	3.9	2:38:47 PM	3/5/2024	252.50	949.82
171	28.33	3/5/2024	2:39:41 PM	3.3	2:48:47 PM	3/5/2024	247.82	840.74
172	28.50	3/5/2024	2:49:41 PM	2.8	2:58:47 PM	3/5/2024	241.16	837.32
173	28.67	3/5/2024	2:59:41 PM	2.6	3:08:47 PM	3/5/2024	230.54	793.76
174	28.83	3/5/2024	3:09:41 PM	2.6	3:18:47 PM	3/5/2024	219.74	767.84
175	29.00	3/5/2024	3:19:41 PM	2.5	3:28:47 PM	3/5/2024	213.62	761.54
176	29.17	3/5/2024	3:29:41 PM	2.4	3:38:47 PM	3/5/2024	207.32	748.58
177	29.33	3/5/2024	3:39:41 PM	2.3	3:48:47 PM	3/5/2024	201.92	709.52
178	29.50	3/5/2024	3:49:41 PM	2.2	3:58:47 PM	3/5/2024	197.24	697.46
179	29.67	3/5/2024	3:59:41 PM	3	4:08:47 PM	3/5/2024	309.02	1058.00
180	29.83	3/5/2024	4:09:41 PM	8.4	4:18:47 PM	3/5/2024	336.38	1066.50
181	30.00	3/5/2024	4:19:41 PM	7.4	4:28:47 PM	3/5/2024	353.84	1050.10
182	30.17	3/5/2024	4:29:42 PM	6.3	4:38:47 PM	3/5/2024	355.10	1059.30
183	30.33	3/5/2024	4:39:42 PM	5.1	4:48:47 PM	3/5/2024	349.16	1026.30
184	30.50	3/5/2024	4:49:42 PM	4.2	4:58:47 PM	3/5/2024	336.02	998.06
185	30.67	3/5/2024	4:59:42 PM	3.3	5:08:47 PM	3/5/2024	325.04	1004.40
186	30.83	3/5/2024	5:09:42 PM	2.3	5:18:47 PM	3/5/2024	315.86	992.48
187	31.00	3/5/2024	5:19:42 PM	1.4	5:28:47 PM	3/5/2024	322.52	954.32
188	31.17	3/5/2024	5:29:42 PM	0.8	5:38:47 PM	3/5/2024	281.48	786.74
189	31.33	3/5/2024	5:39:42 PM	0.6	5:48:47 PM	3/5/2024	255.38	769.82
190	31.50	3/5/2024	5:49:42 PM	0.4	5:58:47 PM	3/5/2024	264.92	718.88
191	31.67	3/5/2024	5:59:42 PM	5.6	6:08:47 PM	3/5/2024	348.98	1158.80
192	31.83	3/5/2024	6:09:42 PM	4.7	6:18:47 PM	3/5/2024	344.84	1067.40
193	32.00	3/5/2024	6:19:42 PM	3.7	6:28:47 PM	3/5/2024	332.60	1002.60
194	32.17	3/5/2024	6:29:42 PM	2.9	6:38:47 PM	3/5/2024	325.94	975.02
195	32.33	3/5/2024	6:39:42 PM	2.3	6:48:47 PM	3/5/2024	316.58	959.72
196	32.50	3/5/2024	6:49:43 PM	1.8	6:58:47 PM	3/5/2024	304.70	925.52
197	32.67	3/5/2024	6:59:43 PM	1.3	7:08:47 PM	3/5/2024	295.88	927.14
198	32.83	3/5/2024	7:09:43 PM	0.9	7:18:47 PM	3/5/2024	278.42	838.04
199	33.00	3/5/2024	7:19:43 PM	0.5	7:28:47 PM	3/5/2024	261.32	784.58
200	33.17	3/5/2024	7:29:43 PM	0.5	7:38:47 PM	3/5/2024	262.58	525.92
201	33.33	3/5/2024	7:39:43 PM	6.3	7:48:47 PM	3/5/2024	314.78	1062.10
202	33.50	3/5/2024	7:49:43 PM	5.7	7:58:47 PM	3/5/2024	315.86	1067.20
203	33.67	3/5/2024	7:59:43 PM	4.9	8:08:47 PM	3/5/2024	311.36	1058.70
204	33.83	3/5/2024	8:09:43 PM	4.1	8:18:47 PM	3/5/2024	312.80	1085.90
205	34.00	3/5/2024	8:19:43 PM	3.4	8:28:47 PM	3/5/2024	314.24	1078.50

206	34.17	3/5/2024	8:29:43 PM	2.8	8:38:47 PM	3/5/2024	344.48	961.52
207	34.33	3/5/2024	8:39:43 PM	2.2	8:48:47 PM	3/5/2024	313.70	965.84
208	34.50	3/5/2024	8:49:43 PM	1.5	8:58:47 PM	3/5/2024	357.62	751.28
209	34.67	3/5/2024	8:59:44 PM	1	9:08:47 PM	3/5/2024	289.04	858.56
210	34.83	3/5/2024	9:09:44 PM	0.7	9:18:47 PM	3/5/2024	272.48	837.68
211	35.00	3/5/2024	9:19:44 PM	0.4	9:28:47 PM	3/5/2024	275.18	714.74
212	35.17	3/5/2024	9:29:44 PM	0.4	9:38:47 PM	3/5/2024	301.46	1059.60
213	35.33	3/5/2024	9:39:44 PM	5.5	9:48:47 PM	3/5/2024	310.28	1061.10
214	35.50	3/5/2024	9:49:44 PM	4.8	9:58:47 PM	3/5/2024	306.86	1026.50
215	35.67	3/5/2024	9:59:44 PM	4.3	10:08:47 PM	3/5/2024	309.20	1065.60
216	35.83	3/5/2024	10:09:44 PM	3.7	10:18:47 PM	3/5/2024	311.36	1069.00
217	36.00	3/5/2024	10:19:44 PM	3.1	10:28:47 PM	3/5/2024	307.94	1002.90
218	36.17	3/5/2024	10:29:44 PM	2.4	10:38:47 PM	3/5/2024	299.12	906.26
219	36.33	3/5/2024	10:39:44 PM	2	10:48:47 PM	3/5/2024	293.90	897.44
220	36.50	3/5/2024	10:49:44 PM	1.6	10:58:47 PM	3/5/2024	288.86	893.30
221	36.67	3/5/2024	10:59:44 PM	1.1	11:08:47 PM	3/6/2024	287.96	882.14
222	36.83	3/5/2024	11:09:44 PM	0.9	11:18:47 PM	3/6/2024	278.06	640.04
223	37.00	3/5/2024	11:19:44 PM	0.7	11:28:47 PM	3/6/2024	245.12	766.04
224	37.17	3/5/2024	11:29:44 PM	0.5	11:38:47 PM	3/6/2024	302.36	1083.20
225	37.33	3/5/2024	11:39:45 PM	4.9	11:48:47 PM	3/6/2024	333.14	1127.10
226	37.50	3/5/2024	11:49:45 PM	4.1	11:58:47 PM	3/6/2024	334.58	1072.60
227	37.67	3/5/2024	11:59:45 PM	3.2	12:08:47 AM	3/6/2024	322.52	980.60
228	37.83	3/6/2024	12:09:45 AM	2.5	12:18:47 AM	3/6/2024	309.38	999.14
229	38.00	3/6/2024	12:19:45 AM	1.8	12:28:47 AM	3/6/2024	357.08	674.24
230	38.17	3/6/2024	12:29:45 AM	1.3	12:38:47 AM	3/6/2024	293.36	912.56
231	38.33	3/6/2024	12:39:45 AM	1	12:48:47 AM	3/6/2024	280.40	865.04
232	38.50	3/6/2024	12:49:45 AM	0.7	12:58:47 AM	3/6/2024	280.40	557.96
233	38.67	3/6/2024	12:59:45 AM	6	1:08:47 AM	3/6/2024	336.56	1087.90
234	38.83	3/6/2024	1:09:45 AM	5.1	1:18:47 AM	3/6/2024	346.46	1116.30
235	39.00	3/6/2024	1:19:45 AM	4.3	1:28:47 AM	3/6/2024	338.36	1069.70
236	39.17	3/6/2024	1:29:46 AM	3.5	1:38:47 AM	3/6/2024	325.04	1047.20
237	39.33	3/6/2024	1:39:46 AM	2.7	1:48:47 AM	3/6/2024	312.26	1013.40
238	39.50	3/6/2024	1:49:46 AM	2.1	1:58:47 AM	3/6/2024	305.06	994.64
239	39.67	3/6/2024	1:59:46 AM	1.6	2:08:47 AM	3/6/2024	299.66	967.10
240	39.83	3/6/2024	2:09:46 AM	1.2	2:18:47 AM	3/6/2024	290.30	905.18
241	40.00	3/6/2024	2:19:46 AM	0.8	2:28:47 AM	3/6/2024	279.68	849.02
242	40.17	3/6/2024	2:29:46 AM	0.7	2:38:47 AM	3/6/2024	267.08	806.90
243	40.33	3/6/2024	2:39:46 AM	0.6	2:48:47 AM	3/6/2024	333.14	1164.20
244	40.50	3/6/2024	2:49:46 AM	4.3	2:58:47 AM	3/6/2024	353.12	1146.70
245	40.67	3/6/2024	2:59:46 AM	3.4	3:08:47 AM	3/6/2024	352.04	1113.40
246	40.83	3/6/2024	3:09:46 AM	2.4	3:18:47 AM	3/6/2024	337.28	1042.70
247	41.00	3/6/2024	3:19:46 AM	1.6	3:28:47 AM	3/6/2024	319.28	988.52
248	41.17	3/6/2024	3:29:46 AM	1.2	3:38:47 AM	3/6/2024	303.62	927.14
249	41.33	3/6/2024	3:39:46 AM	0.6	3:48:47 AM	3/6/2024	292.64	881.24
250	41.50	3/6/2024	3:49:46 AM	0.4	3:58:47 AM	3/6/2024	280.22	845.42
251	41.67	3/6/2024	3:59:46 AM	0.2	4:08:47 AM	3/6/2024	295.34	1045.20
252	41.83	3/6/2024	4:09:47 AM	5.1	4:18:47 AM	3/6/2024	285.08	992.12
253	42.00	3/6/2024	4:19:47 AM	4.4	4:28:47 AM	3/6/2024	266.00	942.44
254	42.17	3/6/2024	4:29:47 AM	3.9	4:38:47 AM	3/6/2024	246.20	908.96
255	42.33	3/6/2024	4:39:47 AM	3.5	4:48:47 AM	3/6/2024	235.40	912.92
256	42.50	3/6/2024	4:49:47 AM	3.2	4:58:47 AM	3/6/2024	226.40	890.96
257	42.67	3/6/2024	4:59:47 AM	2.8	5:08:47 AM	3/6/2024	219.74	866.30
258	42.83	3/6/2024	5:09:47 AM	2.5	5:18:47 AM	3/6/2024	214.34	853.52

259	43.00	3/6/2024	5:19:47 AM	2.3	5:28:47 AM	3/6/2024	210.92	854.60
260	43.17	3/6/2024	5:29:47 AM	1.9	5:38:47 AM	3/6/2024	256.64	840.92
261	43.33	3/6/2024	5:39:47 AM	1.5	5:48:47 AM	3/6/2024	254.30	818.60
262	43.50	3/6/2024	5:49:47 AM	1.4	5:58:47 AM	3/6/2024	252.68	789.98
263	43.67	3/6/2024	5:59:47 AM	1.5	6:08:47 AM	3/6/2024	252.86	788.36
264	43.83	3/6/2024	6:09:47 AM	1.4	6:18:47 AM	3/6/2024	274.82	899.24
265	44.00	3/6/2024	6:19:47 AM	6.3	6:28:47 AM	3/6/2024	352.94	1142.20
266	44.17	3/6/2024	6:29:47 AM	5.2	6:38:47 AM	3/6/2024	349.16	1061.10
267	44.33	3/6/2024	6:39:47 AM	4.3	6:48:47 AM	3/6/2024	335.30	992.84
268	44.50	3/6/2024	6:49:47 AM	3.6	6:58:47 AM	3/6/2024	324.86	973.40
269	44.67	3/6/2024	6:59:47 AM	3	7:08:47 AM	3/6/2024	320.00	957.38
270	44.83	3/6/2024	7:09:47 AM	2.5	7:18:47 AM	3/6/2024	316.22	923.54
271	45.00	3/6/2024	7:19:47 AM	2.1	7:28:47 AM	3/6/2024	309.20	903.74
272	45.17	3/6/2024	7:29:48 AM	1.8	7:38:47 AM	3/6/2024	304.88	872.42
273	45.33	3/6/2024	7:39:48 AM	1.5	7:48:47 AM	3/6/2024	290.30	805.46
274	45.50	3/6/2024	7:49:48 AM	1.3	7:58:47 AM	3/6/2024	269.96	759.02
275	45.67	3/6/2024	7:59:48 AM	1.2	8:08:47 AM	3/6/2024	310.46	1128.00
276	45.83	3/6/2024	8:09:48 AM	6.2	8:18:47 AM	3/6/2024	371.30	1189.90
277	46.00	3/6/2024	8:19:48 AM	5.1	8:28:47 AM	3/6/2024	379.40	1201.80
278	46.17	3/6/2024	8:29:48 AM	4.1	8:38:47 AM	3/6/2024	380.30	1185.40
279	46.33	3/6/2024	8:39:48 AM	3	8:48:47 AM	3/6/2024	367.88	1082.30
280	46.50	3/6/2024	8:49:48 AM	2.2	8:58:47 AM	3/6/2024	348.62	1001.50
281	46.67	3/6/2024	8:59:48 AM	1.7	9:08:47 AM	3/6/2024	332.42	958.10
282	46.83	3/6/2024	9:09:48 AM	1.3	9:18:47 AM	3/6/2024	318.20	918.68
283	47.00	3/6/2024	9:19:48 AM	0.8	9:28:47 AM	3/6/2024	300.56	868.10
284	47.17	3/6/2024	9:29:48 AM	0.7	9:38:47 AM	3/6/2024	284.72	795.74
285	47.33	3/6/2024	9:39:48 AM	0.6	9:48:47 AM	3/6/2024	273.02	765.50
286	47.50	3/6/2024	9:49:49 AM	0.5	9:58:47 AM	3/6/2024	267.08	751.28
287	47.67	3/6/2024	9:59:49 AM	0.5	10:08:47 AM	3/6/2024	267.98	621.50
288	47.83	3/6/2024	10:09:49 AM	5.8	10:18:47 AM	3/6/2024	327.38	1041.60
289	48.00	3/6/2024	10:19:49 AM	5.1	10:28:47 AM	3/6/2024	361.04	1135.60
290	48.17	3/6/2024	10:29:49 AM	4.1	10:38:47 AM	3/6/2024	364.64	1088.10
291	48.33	3/6/2024	10:39:49 AM	3.2	10:48:47 AM	3/6/2024	359.78	1010.70
292	48.50	3/6/2024	10:49:49 AM	2.3	10:58:47 AM	3/6/2024	342.86	948.38
293	48.67	3/6/2024	10:59:49 AM	1.7	11:08:47 AM	3/6/2024	326.66	912.02
294	48.83	3/6/2024	11:09:49 AM	1.3	11:18:47 AM	3/6/2024	320.90	916.88
295	49.00	3/6/2024	11:19:49 AM	0.9	11:28:47 AM	3/6/2024	300.56	855.86
296	49.17	3/6/2024	11:29:49 AM	0.7	11:38:47 AM	3/6/2024	277.16	775.04
297	49.33	3/6/2024	11:39:49 AM	0.5	11:48:47 AM	3/6/2024	258.44	725.00
298	49.50	3/6/2024	11:49:49 AM	0.3	11:58:47 AM	3/6/2024	250.88	725.18
299	49.67	3/6/2024	11:59:49 AM	0.2	12:08:47 PM	3/6/2024	279.68	945.50
300	49.83	3/6/2024	12:09:49 PM	5.3	12:18:47 PM	3/6/2024	345.74	1104.10
301	50.00	3/6/2024	12:19:50 PM	4.4	12:28:47 PM	3/6/2024	351.14	1033.30
302	50.17	3/6/2024	12:29:50 PM	3.6	12:38:47 PM	3/6/2024	347.36	1014.10
303	50.33	3/6/2024	12:39:50 PM	2.6	12:48:47 PM	3/6/2024	341.96	998.24
304	50.50	3/6/2024	12:49:50 PM	1.9	12:58:47 PM	3/6/2024	335.12	962.24
305	50.67	3/6/2024	12:59:50 PM	1.2	1:08:47 PM	3/6/2024	325.76	934.88
306	50.83	3/6/2024	1:09:50 PM	0.8	1:18:47 PM	3/6/2024	317.12	908.96
307	51.00	3/6/2024	1:19:50 PM	0.2	1:28:47 PM	3/6/2024	384.98	1219.10
308	51.17	3/6/2024	1:29:50 PM	4.7	1:38:47 PM	3/6/2024	388.04	1208.30
309	51.33	3/6/2024	1:39:50 PM	3.7	1:48:47 PM	3/6/2024	377.24	1191.90
310	51.50	3/6/2024	1:49:50 PM	2.8	1:58:47 PM	3/6/2024	368.06	1136.30
311	51.67	3/6/2024	1:59:50 PM	2	2:08:47 PM	3/6/2024	354.38	1051.00

312	51.83	3/6/2024	2:09:50 PM	1.5	2:18:47 PM	3/6/2024	340.70	1011.70
313	52.00	3/6/2024	2:19:50 PM	0.9	2:28:47 PM	3/6/2024	328.82	957.20
314	52.17	3/6/2024	2:29:50 PM	0.5	2:38:47 PM	3/6/2024	316.22	928.40
315	52.33	3/6/2024	2:39:50 PM	0.2	2:48:47 PM	3/6/2024	298.94	856.40
316	52.50	3/6/2024	2:49:51 PM	0.1	2:58:47 PM	3/6/2024	276.98	775.58
317	52.67	3/6/2024	2:59:51 PM	0	3:08:47 PM	3/6/2024	270.86	778.82
318	52.83	3/6/2024	3:09:51 PM	0	3:18:47 PM	3/6/2024	265.10	770.18
			3:19:51 PM	0	3:28:47 PM	3/6/2024	259.88	753.98
			3:29:51 PM	0	3:38:47 PM	3/6/2024	255.56	735.26
			3:39:51 PM	0	3:48:47 PM	3/6/2024	251.96	736.34
			3:49:51 PM	0	3:58:47 PM	3/6/2024	241.88	678.38
			3:59:51 PM	0	4:08:47 PM	3/6/2024	233.06	655.70

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 1 Data Summary

Client:	Jotul
Model:	F602 V3
Job #:	24-268
Tracking #:	185
Test Date:	3/19/2024

Techician Signature

3/25/2024
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Burn Rate (kg/hr):	0.69

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	15.346	31.857	30.694	8.556
Average Gas Velocity in Dilution Tunnel (ft/sec)	18.9			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12644.9			
Average Gas Meter Temperature (°F)	69.5	85.9	89.0	81.6
Total Sample Volume (dscf)	15.463	31.113	29.820	8.373
Average Tunnel Temperature (°F)	84.5			
Total Time of Test (min)	174			
Total Particulate Catch (mg)	0.0	1.1	1.0	0.7
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000354	0.0000335	0.0000836
Total PM Emissions (g)	0.00	1.30	1.23	1.06
Particulate Emission Rate (g/hr)	0.00	0.45	0.42	1.06
Emissions Factor (g/kg)	-	0.65	0.61	-
Difference from Average Total Particulate Emissions (g)	-	0.03	0.03	-
Difference from Average Total Particulate Emissions (%)	-	2.6%	2.6%	
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	1.26
Particulate Emission Rate (g/hr)	0.44
Emissions Factor (g/kg)	0.63
HHV Efficiency (%)	80.9%
LHV Efficiency (%)	87.4%
CO Emissions (g/min)	0.14

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	76.5	OK
Face Velocity	< 30 ft/min	10.2	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min:68.2/Max:70.4	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
Stove Surface ΔT	<126°F	89.5	OK

B415.1 Efficiency Results

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/19/24
Run:	1
Control #:	24-268
Test Duration:	174
Output Category:	1

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	80.9%	87.4%
Combustion Efficiency	99.4%	99.4%
Heat Transfer Efficiency	81.4%	87.9%

Output Rate (kJ/h)	10,854	10,296	**(Btu/h)**
Burn Rate (kg/h)	0.68	1.49	**(lb/h)**
Input (kJ/h)	13,422	12,732	**(Btu/h)**

Test Load Weight (dry kg)	1.96	4.33	**dry lb**
MC wet (%)	16.72		
MC dry (%)	20.08		
Particulate (g)	1.26		
CO (g)	25		
Test Duration (h)	2.90		

Emissions	**Particulate**	**CO**
g/MJ Output	0.04	0.79
g/kg Dry Fuel	0.64	12.58
g/h	0.44	8.53
g/min	0.01	0.14
lb/MM Btu Output	0.09	1.83

Air/Fuel Ratio (A/F)	14.48

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	7.00	19.7			
2x4	7.00	20.1			
2x4	7.00	22.8			
2x4	7.00	23.4			
2x4	7.00	18.7			
2x4	7.00	22.6			
2x4	7.00	19.3			

Total Fuel Weight (lbs): 5.19
Average Moisture (%DB): 20.9

Firebox Volume (ft^3): 0.79
Total 2x4 Crib Weight, with spacers (lbs): 5.20
Total 4x4 Crib Weight, with spacers (lbs): 0.00
Total Wet Fuel Weight, with spacers (lbs): 5.20

Coal Bed Range (20-25%):
Min (lbs): 1.04
Max (lbs): 1.30

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	13.50	1.41	20.5	21.4	19.1	1.17
2x4	13.50	1.32	19.8	22.0	18.9	1.10
2x4	13.50	1.43	19.1	20.3	19.6	1.19

Total Dry Weight, no spacers (lbs): 3.46
Total Dry Weight, with spacers (lbs): 4.41

Spacer Moisture Readings (%DB)

11.3	8.5	9.2					
9.3	7.3	10.4					
7.8	11.1						
11.7	8.7						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	28.2	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	6.58	OK
2x4 Fuel Mix	35 - 65 % of total weight	N/A	N/A

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Jotul	Job #:	24-268
Model:	F602 V3	Tracking #:	185
Run #:	1	Technician:	SJB
Test Start Time:	12:04	Date:	3/19/2024

Total Sampling Time (min):	174
Recording Interval (min):	1

Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.005	(B)
Meter Box γ Factor:	1.004	(C)
Meter Box γ Factor:	1.013	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	3/18/2004
Test Fuel Scale Audit (lbs)	5.00
Platform Scale Audit (lbs)	5.0

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.88	29.83	29.86
Relative Humidity (%)	33.8	33.7	
Room Air Velocity (ft/min)	0	0	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		15.346	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.001	cfm @	-6	in. Hg
(B)	0.002	0.002	cfm @	-6	in. Hg
(C)	0.001	0.001	cfm @	-6	in. Hg
(Ambient)	0.000	0.000	cfm @	-6	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.064	67
2	0.072	67
3	0.092	67
4	0.074	67
5	0.054	67
6	0.080	67
7	0.108	67
8	0.090	67
Center	0.082	67

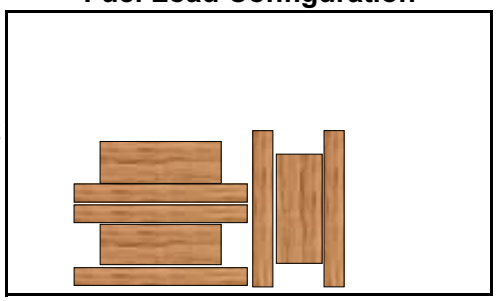
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.56	ft/sec
V_{scent}:	18.98	ft/sec
F_p:	0.978	[ratio]
Initial Tunnel Flow:	214.2	scf/min

Static Pressure: -0.130 in. H_2O

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Left



Firebox Right

Firebox Front View

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)	20.1

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Recording Interval (min): 1
Run Time (min): 90

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	6.44	-0.067	390	402	387	590	181	390.0	390	66
1	6.33	-0.071	391	404	386	584	183	389.6	341	67
2	6.23	-0.073	391	405	387	592	185	392.0	332	67
3	6.12	-0.074	391	406	390	605	187	395.6	334	66
4	6.02	-0.075	389	406	393	619	188	399.0	337	66
5	5.93	-0.075	388	405	396	631	190	401.8	341	66
6	5.83	-0.075	387	404	398	641	192	404.4	343	67
7	5.72	-0.074	386	403	400	650	193	406.3	344	66
8	5.62	-0.075	386	403	402	657	195	408.4	346	67
9	5.52	-0.076	386	403	404	663	196	410.4	347	67
10	5.41	-0.077	385	403	405	670	198	412.2	352	67
11	5.30	-0.077	386	404	406	676	199	414.2	356	67
12	5.18	-0.077	387	405	407	681	200	416.0	357	67
13	5.08	-0.076	387	406	408	684	202	417.4	358	67
14	4.96	-0.077	387	408	409	687	203	418.6	358	67
15	4.85	-0.077	388	409	409	691	204	420.1	358	67
16	4.76	-0.077	390	411	410	692	205	421.4	358	67
17	4.65	-0.075	391	412	410	694	206	422.5	357	67
18	4.56	-0.075	392	414	411	695	207	423.6	357	67
19	4.46	-0.074	393	416	411	698	207	425.0	355	67
20	4.37	-0.076	394	418	412	699	208	426.2	355	67
21	4.28	-0.074	396	420	412	700	209	427.5	355	67
22	4.19	-0.072	397	423	413	702	210	428.7	354	67
23	4.10	-0.074	399	425	413	702	211	430.1	353	67
24	4.01	-0.075	404	428	414	705	211	432.3	352	67
25	3.92	-0.073	406	430	415	706	213	433.9	350	67
26	3.83	-0.071	409	433	416	707	213	435.5	350	67
27	3.75	-0.072	412	436	416	709	214	437.3	350	67
28	3.66	-0.075	413	439	418	711	215	439.0	349	67
29	3.57	-0.073	417	442	419	712	215	441.2	349	67
30	3.49	-0.072	420	445	420	714	216	442.9	348	67
31	3.39	-0.075	423	448	421	715	217	444.8	348	67
32	3.33	-0.073	425	451	423	716	218	446.2	348	68
33	3.26	-0.071	427	453	424	714	218	447.2	345	68
34	3.20	-0.071	429	455	425	713	219	448.2	342	68
35	3.14	-0.069	430	457	425	708	220	448.0	336	68
36	3.09	-0.068	432	459	424	701	220	447.4	330	68
37	3.05	-0.068	434	461	423	691	221	446.0	325	68
38	2.66	-0.102	437	463	422	681	222	444.9	370	68
39	2.85	-0.076	439	464	425	670	223	443.9	404	68
40	2.75	-0.076	437	465	425	675	224	445.2	377	68
41	2.65	-0.075	440	466	425	683	225	447.8	370	68
42	2.55	-0.077	441	467	426	692	226	450.5	368	68
43	2.48	-0.074	443	467	427	700	226	452.8	367	68
44	2.41	-0.075	444	468	428	705	227	454.4	366	68

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Recording Interval (min): 1
Run Time (min): 90

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
45	2.35	-0.073	444	468	429	706	227	454.7	363	68
46	2.29	-0.073	445	468	429	706	228	455.1	360	68
47	2.23	-0.071	447	468	429	703	229	455.1	357	68
48	2.18	-0.069	449	467	429	698	230	454.8	353	68
49	2.13	-0.071	451	467	429	691	231	453.7	349	68
50	2.09	-0.070	451	466	429	686	231	452.6	346	68
51	2.04	-0.070	451	466	429	680	232	451.4	343	68
52	1.99	-0.069	452	465	429	676	233	450.8	341	68
53	1.94	-0.068	453	465	428	670	233	449.9	339	68
54	1.89	-0.070	454	464	428	664	234	448.8	336	68
55	1.85	-0.068	455	464	428	660	235	448.3	333	68
56	1.82	-0.068	455	463	428	656	235	447.4	333	69
57	1.77	-0.068	454	463	428	651	236	446.4	332	69
58	1.74	-0.068	455	462	428	646	237	445.8	330	69
59	1.71	-0.065	456	462	428	642	238	445.0	326	69
60	1.67	-0.066	457	461	428	636	238	444.1	324	69
61	1.67	-0.067	456	460	427	629	239	442.1	321	68
62	1.64	-0.064	456	460	426	623	240	440.8	317	69
63	1.62	-0.063	456	459	425	615	240	438.9	313	69
64	1.60	-0.063	456	458	424	607	241	437.1	311	68
65	1.58	-0.060	455	457	422	599	242	435.0	308	69
66	1.56	-0.060	452	456	421	592	243	432.8	303	69
67	1.54	-0.062	453	455	420	586	244	431.6	301	69
68	1.51	-0.061	452	455	419	580	244	429.7	299	68
69	1.50	-0.061	449	454	418	574	245	428.0	296	68
70	1.48	-0.060	448	454	417	570	245	426.8	295	68
71	1.45	-0.061	447	453	416	565	246	425.3	294	69
72	1.44	-0.062	445	452	415	561	247	423.9	293	69
73	1.42	-0.059	444	451	414	558	247	422.8	294	69
74	1.40	-0.062	442	450	413	555	248	421.5	293	68
75	1.39	-0.060	439	448	412	552	249	420.0	294	69
76	1.37	-0.060	438	447	412	550	249	419.1	293	69
77	1.34	-0.061	435	445	411	548	250	417.7	295	69
78	1.33	-0.060	432	443	409	546	250	416.0	295	69
79	1.32	-0.059	432	441	408	544	251	415.1	292	69
80	1.31	-0.059	429	439	407	541	252	413.5	291	68
81	1.29	-0.059	428	437	405	538	252	412.1	290	68
82	1.28	-0.060	426	435	403	534	253	410.2	288	68
83	1.26	-0.058	424	433	402	530	254	408.5	286	68
84	1.25	-0.058	421	432	400	526	254	406.6	284	68
85	1.23	-0.057	420	430	398	522	255	404.9	282	68
86	1.22	-0.059	416	428	396	519	255	402.8	282	69
87	1.21	-0.057	416	427	394	515	256	401.3	281	69
88	1.19	-0.060	416	425	392	511	256	399.9	280	68
89	1.18	-0.055	413	423	390	508	256	398.1	279	69

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Recording Interval (min): 1
Run Time (min): 90

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
90	1.17	-0.056	413	422	388	505	257	396.9	278	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.079	0.01	71	0.1		5.20		89	317	70	69
1	0.170	0.170	0.081	2.89	71	1.1	-	5.18	-0.02	92	300	71	69
2	0.334	0.164	0.080	2.95	71	1.1	-	5.12	-0.06	88	278	71	69
3	0.502	0.168	0.079	2.99	71	1.2	-	5.05	-0.07	87	279	71	69
4	0.674	0.172	0.078	3.02	71	1.1	-	4.95	-0.10	86	287	71	68
5	0.843	0.169	0.082	3.05	71	1.1	-	4.87	-0.08	86	296	71	68
6	1.011	0.168	0.081	3.07	71	1.1	-	4.79	-0.08	86	306	71	68
7	1.185	0.174	0.079	3.11	71	1.1	-	4.71	-0.08	86	311	71	68
8	1.359	0.174	0.082	3.12	72	1.2	-	4.61	-0.10	86	315	71	68
9	1.529	0.170	0.079	3.14	72	1.1	-	4.53	-0.08	86	318	71	68
10	1.703	0.174	0.083	3.16	72	1.2	96	4.45	-0.08	86	319	71	69
11	1.880	0.177	0.080	3.19	72	1.1	-	4.37	-0.08	86	321	72	69
12	2.055	0.175	0.082	3.20	72	1.1	-	4.29	-0.08	87	321	72	68
13	2.227	0.172	0.083	3.21	73	1.1	-	4.21	-0.08	87	321	72	68
14	2.403	0.176	0.082	3.23	73	1.2	-	4.13	-0.08	87	322	72	68
15	2.580	0.177	0.083	3.23	73	1.1	-	4.04	-0.09	87	324	72	68
16	2.758	0.178	0.082	3.24	73	1.1	-	3.95	-0.09	87	324	72	68
17	2.932	0.174	0.081	3.25	73	1.1	-	3.87	-0.08	87	324	72	68
18	3.108	0.176	0.082	3.26	74	1.2	-	3.78	-0.09	87	324	72	68
19	3.287	0.179	0.082	3.27	74	1.2	-	3.70	-0.08	87	324	72	68
20	3.466	0.179	0.084	3.29	74	1.1	98	3.62	-0.08	87	322	72	68
21	3.644	0.178	0.080	3.28	75	1.2	-	3.54	-0.08	87	322	72	68
22	3.819	0.175	0.083	3.29	75	1.2	-	3.46	-0.08	87	321	72	68
23	3.999	0.180	0.082	3.30	75	1.2	-	3.37	-0.09	87	320	73	69
24	4.178	0.179	0.081	3.31	76	1.2	-	3.29	-0.08	87	320	73	69
25	4.357	0.179	0.080	3.31	76	1.2	-	3.21	-0.08	87	320	73	69
26	4.534	0.177	0.083	3.30	76	1.2	-	3.13	-0.08	87	320	73	69
27	4.712	0.178	0.082	3.32	77	1.2	-	3.05	-0.08	87	321	73	69
28	4.893	0.181	0.082	3.33	77	1.2	-	2.97	-0.08	88	322	73	69
29	5.075	0.182	0.081	3.33	77	1.2	-	2.89	-0.08	87	322	73	69
30	5.254	0.179	0.082	3.33	77	1.2	99	2.82	-0.07	87	321	73	69
31	5.431	0.177	0.083	3.34	78	1.2	-	2.74	-0.08	88	322	73	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
32	5.610	0.179	0.081	3.34	78	1.2	-	2.67	-0.07	88	322	73	69
33	5.792	0.182	0.082	3.34	78	1.2	-	2.59	-0.08	88	324	73	69
34	5.974	0.182	0.081	3.36	79	1.2	-	2.50	-0.09	88	327	73	69
35	6.154	0.180	0.081	3.35	79	1.2	-	2.42	-0.08	88	326	73	69
36	6.332	0.178	0.082	3.35	79	1.2	-	2.35	-0.07	88	326	73	69
37	6.512	0.180	0.080	3.35	80	1.2	-	2.28	-0.07	88	323	73	69
38	6.694	0.182	0.082	3.35	80	1.3	-	2.22	-0.06	87	320	73	69
39	6.876	0.182	0.081	3.37	80	1.2	-	2.16	-0.06	88	318	73	69
40	7.057	0.181	0.079	3.36	80	1.2	101	2.11	-0.05	88	315	73	69
41	7.237	0.180	0.082	3.37	81	1.2	-	2.05	-0.06	88	312	73	69
42	7.417	0.180	0.082	3.37	81	1.2	-	2.00	-0.05	87	310	73	69
43	7.599	0.182	0.083	3.38	81	1.2	-	1.96	-0.04	87	306	74	69
44	7.781	0.182	0.082	3.37	81	1.2	-	1.92	-0.04	87	303	74	69
45	7.964	0.183	0.082	3.38	82	1.2	-	1.88	-0.04	87	300	74	69
46	8.146	0.182	0.083	3.37	82	1.2	-	1.84	-0.04	87	298	74	69
47	8.324	0.178	0.083	3.38	82	1.2	-	1.80	-0.04	87	294	74	69
48	8.505	0.181	0.081	3.39	82	1.2	-	1.76	-0.04	87	292	74	69
49	8.690	0.185	0.083	3.39	83	1.2	-	1.72	-0.04	87	291	74	70
50	8.874	0.184	0.082	3.41	83	1.2	101	1.68	-0.04	86	289	74	69
51	9.055	0.181	0.083	3.39	83	1.2	-	1.63	-0.05	87	290	74	70
52	9.237	0.182	0.081	3.39	83	1.2	-	1.60	-0.03	87	289	74	69
53	9.418	0.181	0.082	3.40	84	1.2	-	1.56	-0.04	87	287	74	69
54	9.599	0.181	0.083	3.39	84	1.3	-	1.52	-0.04	87	286	74	69
55	9.783	0.184	0.081	3.40	84	1.2	-	1.48	-0.04	87	284	74	69
56	9.968	0.185	0.081	3.41	84	1.2	-	1.44	-0.04	87	282	74	69
57	10.150	0.182	0.081	3.41	84	1.2	-	1.42	-0.02	87	281	74	70
58	10.331	0.181	0.083	3.41	85	1.2	-	1.38	-0.04	87	280	74	69
59	10.514	0.183	0.083	3.42	85	1.2	-	1.35	-0.03	86	279	74	69
60	10.697	0.183	0.082	3.42	85	1.2	100	1.32	-0.03	86	276	74	69
61	10.880	0.183	0.082	3.41	85	1.2	-	1.29	-0.03	86	274	74	70
62	11.066	0.186	0.081	3.42	85	1.2	-	1.26	-0.03	86	272	74	70
63	11.249	0.183	0.082	3.42	86	1.2	-	1.24	-0.02	86	270	74	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
64	11.430	0.181	0.082	3.42	86	1.2	-	1.21	-0.03	86	269	74	70
65	11.613	0.183	0.081	3.43	86	1.3	-	1.18	-0.03	86	267	74	69
66	11.797	0.184	0.082	3.43	86	1.3	-	1.16	-0.02	86	266	74	70
67	11.981	0.184	0.079	3.44	86	1.3	-	1.13	-0.03	86	265	74	69
68	12.167	0.186	0.081	3.43	86	1.2	-	1.10	-0.03	86	265	74	70
69	12.350	0.183	0.083	3.44	87	1.3	-	1.08	-0.02	85	263	74	70
70	12.534	0.184	0.080	3.44	87	1.2	101	1.06	-0.02	86	261	74	70
71	12.717	0.183	0.080	3.43	87	1.2	-	1.04	-0.02	86	260	74	69
72	12.900	0.183	0.082	3.45	87	1.2	-	1.00	-0.04	85	259	74	70
73	13.086	0.186	0.082	3.44	87	1.3	-	0.99	-0.01	85	258	74	70
74	13.271	0.185	0.083	3.45	87	1.3	-	0.97	-0.02	85	256	74	70
75	13.455	0.184	0.080	3.44	87	1.2	-	0.95	-0.02	85	255	74	70
76	13.640	0.185	0.082	3.44	88	1.3	-	0.93	-0.02	85	253	74	69
77	13.821	0.181	0.083	3.43	88	1.2	-	0.91	-0.02	85	253	74	70
78	14.002	0.181	0.079	3.45	88	1.3	-	0.89	-0.02	85	252	74	70
79	14.188	0.186	0.082	3.44	88	1.2	-	0.88	-0.01	85	251	74	70
80	14.376	0.188	0.080	3.46	88	1.2	102	0.87	-0.01	85	251	74	70
81	14.563	0.187	0.082	3.45	88	1.2	-	0.86	-0.01	85	250	74	70
82	14.746	0.183	0.083	3.43	88	1.2	-	0.84	-0.02	85	250	74	70
83	14.929	0.183	0.080	3.44	89	1.2	-	0.83	-0.01	85	248	74	70
84	15.113	0.184	0.081	3.45	89	1.3	-	0.82	-0.01	85	247	74	70
85	15.297	0.184	0.082	3.46	89	1.2	-	0.81	-0.01	84	246	74	70
86	15.483	0.186	0.082	3.44	89	1.3	-	0.79	-0.02	84	244	74	70
87	15.669	0.186	0.082	3.45	89	1.2	-	0.78	-0.01	84	242	74	70
88	15.858	0.189	0.084	3.45	89	1.2	-	0.77	-0.01	84	240	74	70
89	16.039	0.181	0.081	3.46	89	1.2	-	0.76	-0.01	84	238	74	70
90	16.221	0.182	0.082	3.45	89	1.3	101	0.74	-0.02	84	236	74	70
91	16.402	0.181	0.080	3.45	89	1.3	-	0.74	0.00	84	234	74	69
92	16.592	0.190	0.081	3.45	89	1.3	-	0.72	-0.02	84	233	74	70
93	16.777	0.185	0.082	3.46	89	1.2	-	0.72	0.00	84	232	74	70
94	16.965	0.188	0.081	3.46	90	1.2	-	0.71	-0.01	83	229	74	70
95	17.149	0.184	0.081	3.47	90	1.2	-	0.71	0.00	83	229	74	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
96	17.334	0.185	0.082	3.47	90	1.2	-	0.69	-0.02	83	227	74	70
97	17.517	0.183	0.084	3.46	90	1.2	-	0.68	-0.01	83	225	74	70
98	17.702	0.185	0.083	3.46	90	1.2	-	0.67	-0.01	83	224	74	70
99	17.889	0.187	0.083	3.46	90	1.3	-	0.66	-0.01	83	223	74	70
100	18.074	0.185	0.084	3.47	90	1.2	100	0.65	-0.01	83	222	74	70
101	18.262	0.188	0.083	3.46	90	1.3	-	0.65	0.00	83	221	74	70
102	18.446	0.184	0.084	3.47	90	1.2	-	0.64	-0.01	83	220	74	69
103	18.631	0.185	0.083	3.46	90	1.3	-	0.63	-0.01	83	219	74	69
104	18.815	0.184	0.083	3.47	90	1.2	-	0.62	-0.01	83	218	74	69
105	18.999	0.184	0.084	3.46	90	1.2	-	0.61	-0.01	83	217	74	70
106	19.187	0.188	0.083	3.46	90	1.2	-	0.60	-0.01	83	215	74	70
107	19.373	0.186	0.083	3.48	91	1.3	-	0.59	-0.01	83	213	74	69
108	19.560	0.187	0.082	3.46	91	1.3	-	0.58	-0.01	83	212	74	70
109	19.745	0.185	0.080	3.47	91	1.2	-	0.57	-0.01	83	211	74	70
110	19.931	0.186	0.082	3.46	91	1.2	100	0.57	0.00	83	210	74	70
111	20.114	0.183	0.080	3.48	91	1.3	-	0.56	-0.01	82	210	74	70
112	20.299	0.185	0.082	3.48	91	1.2	-	0.54	-0.02	82	209	74	70
113	20.487	0.188	0.084	3.47	91	1.3	-	0.52	-0.02	82	208	74	70
114	20.673	0.186	0.081	3.46	91	1.3	-	0.53	0.01	82	207	74	70
115	20.861	0.188	0.082	3.47	91	1.2	-	0.51	-0.02	82	206	74	70
116	21.046	0.185	0.082	3.48	91	1.2	-	0.50	-0.01	82	205	74	70
117	21.232	0.186	0.084	3.47	91	1.2	-	0.50	0.00	82	204	74	70
118	21.415	0.183	0.083	3.47	91	1.3	-	0.48	-0.02	82	204	74	70
119	21.600	0.185	0.084	3.48	91	1.3	-	0.48	0.00	82	203	74	70
120	21.788	0.188	0.082	3.48	91	1.3	100	0.48	0.00	82	202	74	70
121	21.974	0.186	0.083	3.48	91	1.2	-	0.46	-0.02	82	201	74	70
122	22.162	0.188	0.084	3.47	91	1.2	-	0.45	-0.01	82	201	74	70
123	22.347	0.185	0.084	3.49	91	1.2	-	0.45	0.00	82	201	74	70
124	22.534	0.187	0.082	3.47	91	1.3	-	0.43	-0.02	82	201	74	70
125	22.717	0.183	0.086	3.49	91	1.3	-	0.42	-0.01	82	201	74	70
126	22.903	0.186	0.081	3.49	92	1.3	-	0.41	-0.01	82	200	74	70
127	23.089	0.186	0.080	3.49	92	1.2	-	0.40	-0.01	90	275	74	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
128	23.276	0.187	0.082	3.48	92	1.3	-	0.39	-0.01	87	234	74	70
129	23.464	0.188	0.082	3.48	92	1.2	-	0.37	-0.02	84	218	74	70
130	23.650	0.186	0.084	3.48	92	1.3	100	0.36	-0.01	83	212	74	70
131	23.837	0.187	0.083	3.49	92	1.2	-	0.36	0.00	83	209	74	70
132	24.020	0.183	0.082	3.49	92	1.3	-	0.34	-0.02	83	208	74	70
133	24.207	0.187	0.083	3.48	92	1.3	-	0.33	-0.01	82	208	74	70
134	24.392	0.185	0.078	3.49	92	1.2	-	0.33	0.00	82	207	74	70
135	24.580	0.188	0.079	3.47	92	1.2	-	0.31	-0.02	82	206	74	70
136	24.766	0.186	0.082	3.49	92	1.3	-	0.30	-0.01	82	205	74	70
137	24.954	0.188	0.081	3.49	92	1.2	-	0.29	-0.01	82	204	74	70
138	25.140	0.186	0.081	3.48	92	1.2	-	0.28	-0.01	82	204	74	70
139	25.326	0.186	0.083	3.48	92	1.3	-	0.28	0.00	82	203	74	70
140	25.511	0.185	0.083	3.49	92	1.3	99	0.27	-0.01	82	203	74	70
141	25.696	0.185	0.084	3.48	92	1.3	-	0.26	-0.01	82	202	74	70
142	25.884	0.188	0.084	3.49	92	1.2	-	0.25	-0.01	82	202	74	70
143	26.070	0.186	0.083	3.49	92	1.2	-	0.24	-0.01	82	202	74	70
144	26.259	0.189	0.083	3.49	92	1.2	-	0.23	-0.01	82	201	74	70
145	26.445	0.186	0.082	3.49	92	1.2	-	0.22	-0.01	82	201	74	70
146	26.632	0.187	0.084	3.48	92	1.2	-	0.21	-0.01	82	202	74	70
147	26.816	0.184	0.082	3.50	92	1.3	-	0.21	0.00	82	202	74	70
148	27.002	0.186	0.082	3.49	92	1.3	-	0.20	-0.01	82	201	74	70
149	27.187	0.185	0.084	3.50	92	1.2	-	0.19	-0.01	82	202	74	70
150	27.376	0.189	0.081	3.49	92	1.3	100	0.18	-0.01	82	201	74	70
151	27.563	0.187	0.084	3.49	93	1.3	-	0.17	-0.01	82	201	74	70
152	27.751	0.188	0.085	3.49	92	1.3	-	0.16	-0.01	82	201	74	70
153	27.937	0.186	0.083	3.49	93	1.3	-	0.15	-0.01	82	202	74	70
154	28.123	0.186	0.082	3.49	93	1.2	-	0.15	0.00	82	202	74	70
155	28.308	0.185	0.080	3.49	93	1.3	-	0.14	-0.01	82	202	74	70
156	28.497	0.189	0.083	3.49	93	1.2	-	0.13	-0.01	82	202	74	70
157	28.682	0.185	0.084	3.49	93	1.3	-	0.12	-0.01	82	203	74	70
158	28.868	0.186	0.082	3.49	93	1.2	-	0.13	0.01	82	202	74	70
159	29.057	0.189	0.084	3.49	93	1.2	-	0.12	-0.01	82	202	74	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
160	29.243	0.186	0.083	3.50	93	1.3	101	0.10	-0.02	82	201	74	70
161	29.430	0.187	0.082	3.48	93	1.2	-	0.10	0.00	82	201	74	70
162	29.614	0.184	0.080	3.50	93	1.2	-	0.09	-0.01	82	200	74	70
163	29.801	0.187	0.084	3.49	93	1.3	-	0.08	-0.01	82	200	74	70
164	29.987	0.186	0.084	3.51	93	1.2	-	0.09	0.01	82	200	74	70
165	30.175	0.188	0.081	3.50	93	1.2	-	0.06	-0.03	82	200	74	70
166	30.362	0.187	0.079	3.49	93	1.3	-	0.06	0.00	82	201	74	70
167	30.550	0.188	0.085	3.48	93	1.3	-	0.05	-0.01	82	201	74	70
168	30.736	0.186	0.084	3.49	93	1.3	-	0.04	-0.01	82	201	74	70
169	30.922	0.186	0.082	3.49	93	1.3	-	0.04	0.00	82	201	74	70
170	31.107	0.185	0.083	3.50	93	1.2	100	0.03	-0.01	82	201	74	70
171	31.289	0.182	0.083	3.49	93	1.2	-	0.03	0.00	82	200	74	70
172	31.478	0.189	0.084	3.48	93	1.2	-	0.02	-0.01	82	200	74	70
173	31.668	0.190	0.083	3.49	93	1.3	-	0.01	-0.01	82	200	74	70
174	31.857	0.189	0.081	3.49	93	1.2	100	0.00	-0.01	82	200	74	70
Avg/Tot	31.857	0.183	0.082	3.39	85.9	1.2	100			84.5	251.4	73.7	69.5

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.01	72	0.6		73	-0.058	6.56	0.029
1	0.122	0.122	3.08	72	1.9	-	73	-0.057	1.41	0.115
2	0.291	0.169	3.09	72	2.2	-	73	-0.061	5.48	0.016
3	0.463	0.172	3.10	72	1.7	-	74	-0.063	8.65	0.017
4	0.635	0.172	3.09	72	2.0	-	74	-0.066	12.22	0.016
5	0.804	0.169	3.09	72	1.8	-	74	-0.066	12.43	0.014
6	0.975	0.171	3.09	72	1.9	-	74	-0.067	13.60	0.189
7	1.148	0.173	3.11	72	2.1	-	74	-0.067	13.25	0.060
8	1.320	0.172	3.12	72	1.9	-	74	-0.071	12.97	0.016
9	1.490	0.170	3.12	72	1.9	-	74	-0.068	13.10	0.022
10	1.662	0.172	3.11	73	2.0	98	74	-0.067	13.06	0.016
11	1.835	0.173	3.11	73	1.7	-	74	-0.067	13.08	0.023
12	2.006	0.171	3.12	73	2.2	-	74	-0.068	13.10	0.014
13	2.176	0.170	3.11	73	1.7	-	74	-0.070	13.15	0.011
14	2.349	0.173	3.12	73	2.0	-	74	-0.068	13.47	0.017
15	2.523	0.174	3.13	74	2.2	-	74	-0.068	13.83	0.052
16	2.693	0.170	3.13	74	1.9	-	74	-0.069	13.84	0.034
17	2.865	0.172	3.12	74	1.9	-	75	-0.069	13.78	0.058
18	3.038	0.173	3.12	75	1.7	-	75	-0.069	13.82	0.101
19	3.212	0.174	3.13	75	1.8	-	75	-0.068	13.92	0.160
20	3.383	0.171	3.13	75	2.2	100	75	-0.069	14.02	0.223
21	3.556	0.173	3.13	76	2.1	-	75	-0.069	14.16	0.259
22	3.730	0.174	3.13	76	2.0	-	75	-0.070	14.12	0.259
23	3.904	0.174	3.13	76	2.2	-	75	-0.068	14.27	0.357
24	4.076	0.172	3.14	77	2.0	-	75	-0.066	14.47	0.478
25	4.249	0.173	3.14	77	1.8	-	75	-0.067	14.41	0.480
26	4.424	0.175	3.14	77	1.7	-	75	-0.067	14.56	0.453
27	4.598	0.174	3.14	78	1.7	-	75	-0.069	14.60	0.497
28	4.770	0.172	3.14	78	1.7	-	75	-0.068	14.82	0.429
29	4.943	0.173	3.14	78	2.2	-	75	-0.068	14.85	0.442
30	5.118	0.175	3.14	78	1.7	100	75	-0.068	14.84	0.412
31	5.293	0.175	3.14	79	1.7	-	75	-0.069	14.88	0.499

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	5.465	0.172	3.14	79	2.1	-	75	-0.067	14.91	0.627
33	5.639	0.174	3.13	80	2.1	-	75	-0.069	14.92	0.858
34	5.814	0.175	3.14	80	1.8	-	75	-0.068	14.96	0.982
35	5.989	0.175	3.14	80	2.0	-	76	-0.067	15.00	0.926
36	6.162	0.173	3.14	81	2.0	-	76	-0.067	15.10	0.704
37	6.336	0.174	3.14	81	1.7	-	76	-0.067	14.72	0.260
38	6.512	0.176	3.14	81	1.9	-	76	-0.065	14.05	0.033
39	6.687	0.175	3.14	82	1.8	-	76	-0.066	13.56	0.005
40	6.860	0.173	3.14	82	1.7	102	76	-0.064	12.78	0.006
41	7.034	0.174	3.14	82	1.8	-	76	-0.064	11.52	0.005
42	7.210	0.176	3.14	82	2.1	-	76	-0.064	10.59	0.006
43	7.386	0.176	3.15	83	2.1	-	76	-0.062	10.06	0.006
44	7.560	0.174	3.14	83	1.8	-	76	-0.063	10.95	0.003
45	7.733	0.173	3.14	83	1.7	-	76	-0.061	10.94	0.008
46	7.909	0.176	3.15	84	2.2	-	76	-0.061	10.85	0.006
47	8.086	0.177	3.15	84	1.7	-	76	-0.060	10.67	0.007
48	8.260	0.174	3.15	84	2.2	-	76	-0.059	10.65	0.005
49	8.433	0.173	3.14	85	1.7	-	76	-0.062	10.69	0.007
50	8.609	0.176	3.15	85	2.0	101	76	-0.059	10.82	0.003
51	8.786	0.177	3.15	85	2.2	-	76	-0.059	10.87	0.004
52	8.961	0.175	3.16	85	1.8	-	76	-0.060	10.83	0.004
53	9.135	0.174	3.14	86	2.2	-	76	-0.059	10.51	0.006
54	9.311	0.176	3.15	86	2.2	-	76	-0.059	10.13	0.005
55	9.488	0.177	3.16	86	2.2	-	76	-0.058	10.10	0.006
56	9.665	0.177	3.16	86	1.7	-	76	-0.059	9.91	0.005
57	9.841	0.176	3.15	87	1.9	-	76	-0.057	9.89	0.004
58	10.016	0.175	3.16	87	2.2	-	76	-0.058	9.64	0.006
59	10.192	0.176	3.16	87	2.0	-	76	-0.057	9.56	0.003
60	10.369	0.177	3.16	87	1.7	100	76	-0.059	9.14	0.005
61	10.546	0.177	3.16	88	2.0	-	76	-0.056	8.89	0.004
62	10.719	0.173	3.16	88	2.2	-	76	-0.056	8.64	0.005
63	10.895	0.176	3.16	88	1.9	-	76	-0.057	8.58	0.004

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	11.074	0.179	3.16	88	2.2	-	76	-0.055	8.61	0.004
65	11.251	0.177	3.17	89	2.1	-	76	-0.058	8.69	0.004
66	11.427	0.176	3.17	89	2.2	-	76	-0.056	8.79	0.005
67	11.603	0.176	3.17	89	1.8	-	76	-0.055	8.76	0.005
68	11.779	0.176	3.18	89	1.9	-	76	-0.055	8.85	0.004
69	11.957	0.178	3.18	89	2.0	-	76	-0.054	8.74	0.006
70	12.134	0.177	3.17	90	1.8	101	76	-0.055	8.71	0.006
71	12.309	0.175	3.18	90	1.7	-	76	-0.055	8.24	0.006
72	12.486	0.177	3.17	90	2.2	-	76	-0.055	8.22	0.005
73	12.664	0.178	3.18	90	2.1	-	76	-0.053	8.20	0.006
74	12.843	0.179	3.18	90	2.2	-	76	-0.053	7.99	0.006
75	13.020	0.177	3.18	91	1.7	-	77	-0.053	7.93	0.005
76	13.195	0.175	3.18	91	2.2	-	76	-0.053	7.70	0.008
77	13.371	0.176	3.18	91	1.9	-	76	-0.052	7.24	0.004
78	13.547	0.176	3.17	91	2.2	-	76	-0.054	6.94	0.006
79	13.726	0.179	3.17	91	2.2	-	76	-0.054	6.68	0.007
80	13.906	0.180	3.18	91	2.0	101	76	-0.052	6.51	0.009
81	14.082	0.176	3.18	92	2.2	-	77	-0.053	6.52	0.008
82	14.259	0.177	3.18	92	1.7	-	76	-0.053	6.39	0.006
83	14.438	0.179	3.18	92	2.0	-	76	-0.052	6.19	0.006
84	14.616	0.178	3.18	92	2.2	-	76	-0.052	6.12	0.006
85	14.793	0.177	3.18	92	2.2	-	76	-0.052	6.24	0.008
86	14.969	0.176	3.17	92	1.8	-	76	-0.052	6.20	0.005
87	15.148	0.179	3.18	92	1.8	-	76	-0.052	6.19	0.002
88	15.329	0.181	3.18	93	2.0	-	77	-0.052	6.09	0.004
89	15.504	0.175	3.18	93	1.7	-	76	-0.049	6.03	0.006
90	15.680	0.176	3.18	93	2.1	101	77	-0.050	6.13	0.005
91	15.855	0.175	3.18	93	2.1	-	76	-0.050	6.09	0.013
92	16.037	0.182	3.18	93	2.0	-	76	-0.048	6.01	0.005
93	16.216	0.179	3.19	93	1.7	-	76	-0.046	5.91	0.004
94	16.393	0.177	3.18	93	1.8	-	76	-0.047	5.86	0.006
95	16.569	0.176	3.18	93	1.8	-	76	-0.051	5.89	0.007

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	16.747	0.178	3.18	94	2.1	-	76	-0.048	5.89	0.007
97	16.926	0.179	3.19	94	1.7	-	76	-0.047	5.86	0.006
98	17.106	0.180	3.19	94	2.0	-	76	-0.046	5.87	0.004
99	17.283	0.177	3.19	94	2.2	-	76	-0.047	5.82	0.004
100	17.459	0.176	3.19	94	2.0	99	76	-0.048	5.93	0.005
101	17.637	0.178	3.19	94	2.1	-	76	-0.047	5.85	0.004
102	17.817	0.180	3.19	94	2.0	-	76	-0.045	5.86	0.007
103	17.996	0.179	3.19	94	2.2	-	76	-0.046	5.82	0.007
104	18.174	0.178	3.19	94	1.7	-	76	-0.045	5.95	0.003
105	18.350	0.176	3.19	94	1.7	-	76	-0.046	5.95	0.007
106	18.528	0.178	3.18	95	1.8	-	76	-0.046	6.06	0.007
107	18.708	0.180	3.19	95	2.0	-	76	-0.044	6.19	0.004
108	18.888	0.180	3.19	95	2.2	-	76	-0.046	6.25	0.005
109	19.066	0.178	3.20	95	2.0	-	76	-0.046	6.29	0.004
110	19.242	0.176	3.20	95	1.8	99	76	-0.046	6.39	0.004
111	19.420	0.178	3.19	95	2.2	-	76	-0.045	6.33	0.005
112	19.600	0.180	3.20	95	1.8	-	76	-0.043	6.48	0.004
113	19.780	0.180	3.19	95	2.0	-	76	-0.044	6.49	0.005
114	19.958	0.178	3.20	95	2.0	-	76	-0.044	5.69	0.003
115	20.135	0.177	3.19	95	2.3	-	76	-0.043	5.72	0.003
116	20.312	0.177	3.19	95	1.8	-	76	-0.042	5.72	0.004
117	20.493	0.181	3.19	95	1.8	-	76	-0.044	5.72	0.005
118	20.673	0.180	3.19	96	1.7	-	76	-0.043	5.83	0.008
119	20.851	0.178	3.20	96	2.2	-	76	-0.044	5.90	0.003
120	21.028	0.177	3.19	96	1.7	100	76	-0.043	5.92	0.006
121	21.206	0.178	3.19	96	1.7	-	76	-0.041	5.96	0.003
122	21.386	0.180	3.19	96	2.1	-	76	-0.044	5.80	0.009
123	21.566	0.180	3.19	96	2.2	-	76	-0.039	5.70	0.004
124	21.744	0.178	3.19	96	1.7	-	76	-0.043	5.91	0.006
125	21.921	0.177	3.20	96	1.7	-	76	-0.044	6.03	0.006
126	22.099	0.178	3.20	96	2.0	-	76	-0.043	6.15	0.004
127	22.279	0.180	3.19	96	1.7	-	76	-0.068	5.91	0.013

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
128	22.460	0.181	3.20	96	2.1	-	76	-0.043	7.14	0.013
129	22.637	0.177	3.19	96	1.7	-	76	-0.044	6.93	0.005
130	22.814	0.177	3.19	96	1.8	99	76	-0.044	6.69	0.002
131	22.993	0.179	3.19	96	2.0	-	76	-0.044	6.58	0.002
132	23.173	0.180	3.19	96	1.7	-	76	-0.045	6.48	0.004
133	23.353	0.180	3.20	96	2.1	-	76	-0.044	6.40	0.006
134	23.531	0.178	3.20	96	2.1	-	76	-0.044	6.30	0.004
135	23.708	0.177	3.19	97	2.0	-	76	-0.042	6.20	0.005
136	23.887	0.179	3.19	97	1.7	-	76	-0.043	6.13	0.004
137	24.067	0.180	3.19	97	1.9	-	76	-0.045	6.13	0.004
138	24.247	0.180	3.20	97	2.1	-	76	-0.043	6.16	0.003
139	24.426	0.179	3.19	97	1.9	-	76	-0.043	6.16	0.003
140	24.603	0.177	3.19	97	1.8	99	76	-0.044	6.18	0.004
141	24.782	0.179	3.19	97	1.8	-	76	-0.043	6.21	0.004
142	24.962	0.180	3.19	97	2.2	-	76	-0.044	6.21	0.004
143	25.141	0.179	3.19	97	1.8	-	76	-0.044	6.49	0.004
144	25.320	0.179	3.19	97	2.0	-	76	-0.042	6.53	0.005
145	25.498	0.178	3.20	97	1.7	-	76	-0.043	6.36	0.004
146	25.677	0.179	3.19	97	2.0	-	76	-0.043	6.07	0.005
147	25.856	0.179	3.20	97	2.2	-	76	-0.043	6.15	0.003
148	26.036	0.180	3.20	97	2.2	-	76	-0.042	6.11	0.003
149	26.216	0.180	3.20	97	2.1	-	76	-0.043	6.14	0.005
150	26.394	0.178	3.20	97	1.7	100	76	-0.043	6.14	0.002
151	26.573	0.179	3.20	97	2.2	-	76	-0.043	6.15	0.005
152	26.751	0.178	3.20	97	2.2	-	76	-0.043	6.13	0.004
153	26.931	0.180	3.19	97	2.1	-	76	-0.042	6.11	0.004
154	27.112	0.181	3.19	97	1.7	-	76	-0.042	6.11	0.001
155	27.290	0.178	3.20	97	1.7	-	76	-0.042	6.13	0.005
156	27.470	0.180	3.20	97	2.0	-	76	-0.041	5.59	0.003
157	27.646	0.176	3.20	97	1.7	-	76	-0.041	5.31	0.004
158	27.827	0.181	3.20	97	2.2	-	76	-0.044	5.19	0.002
159	28.007	0.180	3.19	97	2.2	-	76	-0.042	5.13	0.004

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
160	28.186	0.179	3.20	97	2.2	100	76	-0.043	5.08	0.004
161	28.363	0.177	3.20	97	1.9	-	76	-0.044	5.14	0.003
162	28.542	0.179	3.20	98	2.2	-	76	-0.042	5.13	0.003
163	28.723	0.181	3.19	98	2.1	-	76	-0.044	5.28	0.004
164	28.904	0.181	3.20	98	2.2	-	76	-0.043	5.32	0.001
165	29.081	0.177	3.20	98	2.2	-	76	-0.043	5.45	0.002
166	29.258	0.177	3.19	98	2.2	-	76	-0.042	5.49	0.002
167	29.438	0.180	3.19	98	2.0	-	76	-0.042	5.57	0.002
168	29.618	0.180	3.19	98	1.7	-	76	-0.045	5.52	0.005
169	29.798	0.180	3.20	98	1.8	-	76	-0.043	5.19	0.003
170	29.978	0.180	3.20	98	2.1	99	76	-0.042	4.95	0.004
171	30.151	0.173	3.19	98	1.9	-	76	-0.042	4.92	0.003
172	30.331	0.180	3.19	98	1.8	-	76	-0.043	4.91	0.003
173	30.514	0.183	3.20	98	1.8	-	76	-0.044	4.95	0.004
174	30.694	0.180	3.20	98	2.1	99	76	-0.042	4.99	0.002
Avg/Tot	30.694	0.176	3.15	89.0	1.9	100	75.9	-0.053	8.39	0.062

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
0	0.000		0.00	76	0.0		72
1	0.113	0.113	0.92	75	1.5	-	72
2	0.250	0.137	0.93	75	1.6	-	72
3	0.387	0.137	0.93	75	1.6	-	73
4	0.524	0.137	0.93	74	1.5	-	73
5	0.663	0.139	0.94	75	1.6	-	73
6	0.800	0.137	0.94	75	1.6	-	73
7	0.939	0.139	0.95	75	1.7	-	73
8	1.077	0.138	0.95	75	1.6	-	73
9	1.217	0.140	0.96	76	1.6	-	73
10	1.357	0.140	0.96	76	1.5	97	73
11	1.496	0.139	0.96	76	1.5	-	73
12	1.637	0.141	0.97	77	1.8	-	73
13	1.778	0.141	0.96	77	1.7	-	73
14	1.917	0.139	0.97	77	1.8	-	73
15	2.059	0.142	0.98	78	1.6	-	74
16	2.200	0.141	0.97	78	1.8	-	74
17	2.340	0.140	0.97	78	1.8	-	74
18	2.482	0.142	0.98	78	1.6	-	74
19	2.623	0.141	0.97	78	1.7	-	74
20	2.764	0.141	0.97	79	1.6	99	74
21	2.906	0.142	0.98	79	1.6	-	74
22	3.048	0.142	0.98	79	1.7	-	74
23	3.189	0.141	0.97	79	1.8	-	74
24	3.331	0.142	0.98	80	1.6	-	74
25	3.474	0.143	0.99	80	1.6	-	74
26	3.617	0.143	0.98	81	1.8	-	74
27	3.759	0.142	0.98	80	1.8	-	74
28	3.902	0.143	1.00	81	1.6	-	74
29	4.046	0.144	1.00	81	1.7	-	74
30	4.189	0.143	0.99	81	1.6	100	75
31	4.331	0.142	0.99	82	1.6	-	75

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
32	4.475	0.144	1.00	82	1.6	-	75
33	4.620	0.145	1.00	83	1.8	-	75
34	4.764	0.144	1.00	83	1.6	-	75
35	4.908	0.144	1.00	83	1.7	-	75
36	5.052	0.144	0.99	84	1.7	-	75
37	5.196	0.144	1.00	84	1.6	-	75
38	5.342	0.146	1.01	84	1.8	-	75
39	5.486	0.144	1.01	85	1.6	-	75
40	5.631	0.145	1.01	85	1.6	102	75
41	5.776	0.145	1.01	85	1.8	-	75
42	5.921	0.145	1.00	85	1.8	-	75
43	6.066	0.145	1.01	86	1.8	-	75
44	6.212	0.146	1.02	86	1.6	-	75
45	6.358	0.146	1.02	86	1.6	-	75
46	6.504	0.146	1.02	86	1.6	-	75
47	6.649	0.145	1.01	87	1.7	-	75
48	6.795	0.146	1.01	87	1.8	-	75
49	6.941	0.146	1.01	87	1.6	-	75
50	7.087	0.146	1.01	87	1.6	102	75
51	7.233	0.146	1.02	87	1.8	-	75
52	7.381	0.148	1.03	87	1.6	-	75
53	7.528	0.147	1.02	88	1.8	-	75
54	7.674	0.146	1.03	88	1.8	-	75
55	7.821	0.147	1.03	88	1.7	-	75
56	7.968	0.147	1.03	88	1.8	-	75
57	8.115	0.147	1.02	89	1.6	-	76
58	8.262	0.147	1.02	89	1.8	-	76
59	8.408	0.146	1.02	89	1.8	-	76
60	8.556	0.148	1.02	90	1.8	102	76
Avg/Tot	8.556	0.143	0.97	81.6	1.6	100	74.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 89

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	409	421	388	500	257	394.8	696.6
1	410	419	385	487	258	391.8	587.8
2	407	417	382	479	258	388.6	645.4
3	405	413	380	480	259	387.2	763.6
4	402	410	379	491	259	388.1	880.6
5	400	408	380	506	259	390.5	951.7
6	396	405	381	526	260	393.6	1000.3
7	394	403	383	543	260	396.6	1022.8
8	392	401	384	557	260	398.7	1032.2
9	390	399	386	568	260	400.6	1032.8
10	390	398	387	579	259	402.5	1029.1
11	390	397	387	588	259	404.4	1022.0
12	389	397	388	597	259	406.0	1013.9
13	390	397	389	605	259	407.7	1014.3
14	390	397	389	611	258	408.8	1024.0
15	391	397	390	618	257	410.5	1033.2
16	391	398	390	625	257	412.3	1037.0
17	393	399	391	632	256	414.0	1030.5
18	395	401	391	637	255	415.7	1024.6
19	397	402	392	642	254	417.4	1027.3
20	398	404	392	646	253	418.7	1036.6
21	399	406	393	650	253	420.3	1043.0
22	401	408	394	654	252	421.9	1053.0
23	403	410	395	658	251	423.5	1064.6
24	405	412	396	662	250	425.2	1079.9
25	407	414	397	665	249	426.6	1086.5
26	410	417	398	669	249	428.5	1091.1
27	412	419	399	672	248	430.0	1095.5
28	415	422	400	675	247	431.7	1098.7
29	417	425	401	678	246	433.5	1099.0
30	420	427	402	680	245	434.8	1096.5
31	420	430	403	682	244	436.0	1098.1
32	422	433	404	685	243	437.4	1100.7
33	424	436	406	689	242	439.4	1100.9
34	427	439	407	691	241	441.0	1094.9
35	430	442	408	693	241	442.6	1089.8
36	432	446	409	695	240	444.4	1089.0
37	435	449	410	698	240	446.0	1090.8
38	438	452	410	698	239	447.3	1077.8
39	440	455	411	697	239	448.3	1065.4
40	444	458	411	694	238	448.9	1061.7
41	444	461	410	690	237	448.4	1041.4
42	447	463	409	683	237	447.8	1015.4
43	449	465	408	674	237	446.5	995.3
44	450	465	407	669	236	445.4	1009.9
45	451	465	406	666	235	444.9	1022.9
46	449	465	406	663	235	443.5	1021.7
47	450	465	405	658	235	442.4	1011.4

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 89

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	451	464	404	653	234	441.2	1003.3
49	450	463	404	648	234	439.7	993.5
50	449	462	403	645	234	438.5	983.6
51	448	461	402	642	234	437.3	975.7
52	447	460	402	639	233	436.2	971.5
53	446	459	402	637	233	435.1	973.9
54	446	458	401	632	233	433.9	965.6
55	446	458	400	628	233	433.0	953.6
56	446	458	399	624	233	431.8	942.9
57	445	457	398	619	233	430.4	936.3
58	444	457	397	615	233	429.0	928.6
59	444	456	396	610	233	427.5	919.2
60	443	455	394	606	233	426.2	908.2
61	442	454	393	600	233	424.3	896.9
62	442	453	391	594	233	422.4	886.6
63	441	451	390	590	233	420.9	878.1
64	441	450	388	584	232	419.3	871.1
65	440	449	387	580	233	417.6	866.9
66	441	447	385	576	233	416.4	865.1
67	440	446	384	573	233	415.0	869.6
68	438	444	383	570	232	413.5	873.6
69	437	443	382	567	232	412.1	870.5
70	436	441	381	564	232	410.8	864.7
71	434	440	380	562	232	409.5	862.6
72	434	438	379	559	232	408.4	859.6
73	433	437	378	557	232	407.3	858.4
74	431	436	377	555	232	406.0	856.7
75	431	434	376	552	232	405.0	855.6
76	427	432	376	550	232	403.3	854.3
77	424	431	375	548	232	401.7	851.3
78	423	428	374	545	231	400.4	850.5
79	420	426	374	543	231	399.0	854.4
80	418	424	373	540	231	397.3	854.0
81	417	421	373	539	231	396.1	853.4
82	414	419	372	535	231	394.1	849.6
83	410	416	371	532	231	391.9	842.8
84	409	414	370	527	230	390.0	835.2
85	406	411	369	523	231	387.9	821.0
86	405	409	368	517	231	385.8	797.9
87	402	407	366	512	231	383.4	778.6
88	400	405	364	506	231	381.0	764.1
89	399	402	363	500	230	378.9	752.9
90	397	400	361	495	230	376.7	746.1
91	396	398	359	490	230	374.6	741.8
92	393	396	358	486	229	372.4	737.1
93	393	395	356	482	229	370.9	732.5
94	390	393	355	478	229	368.9	727.9
95	388	391	353	475	229	367.1	723.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 89

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	388	389	352	472	228	365.7	718.0
97	386	387	350	467	228	363.6	713.2
98	386	385	349	464	228	362.3	708.5
99	385	384	347	461	227	360.7	704.2
100	383	382	346	457	227	359.1	700.8
101	381	381	345	454	226	357.3	698.3
102	381	379	343	452	226	356.0	696.7
103	381	378	342	448	226	354.9	694.5
104	380	376	341	446	225	353.5	691.7
105	377	375	340	444	225	351.9	688.6
106	375	374	338	441	225	350.6	685.1
107	375	372	337	439	224	349.6	682.0
108	373	371	336	437	224	348.1	679.2
109	372	370	335	435	224	347.3	676.8
110	370	369	335	433	224	345.9	674.9
111	369	369	334	431	223	345.0	673.2
112	370	368	333	429	223	344.4	672.4
113	366	367	332	427	223	342.9	670.4
114	365	366	332	425	222	342.0	663.4
115	365	366	331	423	222	341.4	655.8
116	365	365	330	422	222	340.7	649.6
117	364	364	330	420	221	339.8	644.3
118	363	363	329	418	221	338.6	639.9
119	362	362	328	416	220	337.8	636.5
120	361	361	328	414	220	336.7	634.1
121	361	360	327	412	220	336.0	632.2
122	360	359	327	411	219	335.3	631.8
123	357	358	326	410	219	334.2	633.1
124	355	357	326	409	219	333.2	634.1
125	356	356	326	408	219	332.9	634.4
126	356	355	325	408	218	332.3	634.8
127	353	354	326	405	218	331.2	551.7
128	353	353	325	399	217	329.3	543.6
129	354	352	325	398	217	329.1	588.7
130	354	352	325	399	216	329.2	621.6
131	353	351	325	401	216	329.0	636.6
132	350	350	325	402	216	328.5	642.3
133	350	348	325	403	216	328.4	643.6
134	347	348	324	403	215	327.5	643.4
135	347	347	324	403	215	327.1	642.8
136	345	346	324	403	215	326.3	642.1
137	345	345	323	402	214	325.8	641.8
138	343	344	323	402	214	325.1	642.1
139	343	343	322	401	214	324.6	642.4
140	343	342	321	401	214	324.2	643.0
141	343	342	321	400	214	323.7	643.7
142	342	341	320	399	214	323.0	644.7
143	341	340	319	399	213	322.4	645.4

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 89

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	339	339	319	399	213	321.8	645.7
145	340	339	318	399	213	321.6	646.2
146	338	338	317	398	213	320.8	646.7
147	340	337	316	398	213	320.9	647.7
148	337	337	315	397	213	319.9	649.0
149	337	336	315	397	213	319.6	650.1
150	337	335	314	396	213	319.2	650.4
151	336	335	313	396	214	318.7	650.5
152	336	334	312	396	214	318.4	650.2
153	336	334	312	396	214	318.0	650.0
154	335	333	311	395	214	317.4	650.3
155	335	332	310	395	214	317.3	651.4
156	333	332	310	395	214	316.6	652.1
157	332	331	309	394	214	316.2	651.2
158	331	331	308	393	214	315.3	649.6
159	331	330	307	392	214	314.9	647.9
160	330	329	307	391	214	314.1	646.9
161	330	329	306	390	214	313.6	646.3
162	328	328	305	389	214	312.8	646.5
163	326	327	304	389	214	312.1	646.7
164	326	326	304	388	214	311.5	647.0
165	324	326	303	387	214	310.8	648.9
166	324	325	302	387	214	310.3	649.8
167	323	324	302	386	214	309.8	648.6
168	321	324	301	386	214	309.2	646.7
169	321	323	301	385	214	308.7	643.1
170	320	323	300	383	214	308.0	639.4
171	317	323	299	382	213	306.9	636.8
172	317	322	299	381	213	306.3	634.6
173	316	321	298	380	213	305.8	632.8
174	317	321	298	379	213	305.3	631.8
Average	388.3	392.9	358.5	512.4	230.2	376.5	809.2

LAB SAMPLE DATA - ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 1

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G961	240.4	241.1	0.7
	B	G962	239.5	240.2	0.7
	C - 1st Hour	G963	239.9	240.4	0.5
	Amb	G964	239.6	239.6	0.0
Probes	**A**	14A	116633.0	116633.2	0.2
	B	14B	116618.8	116618.9	0.1
	C - 1st Hour	14C	116529.9	116530.0	0.1
O-rings	**A**	14A	3367.1	3367.3	0.2
	B	14B	3342.1	3342.3	0.2
	C - 1st Hour	14C	3444.8	3444.9	0.1

Placed in Dessicator on:	3/19 - 15:15

		100.0		100.0					
Balance Audit (mg):		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	241.2	3/22 - 9:00	241.1	3/25 - 8:00				
	B	240.2	3/22 - 9:00	240.2	3/25 - 8:00				
	C - 1st Hour	240.6	3/22 - 9:00	240.4	3/25 - 8:00				
	Amb	239.7	3/22 - 9:00	239.6	3/25 - 8:00				
Probes	**A**	116633.2	3/22 - 9:00	116633.2	3/25 - 8:00				
	B	116619.0	3/22 - 9:00	116618.9	3/25 - 8:00				
	C - 1st Hour	116530.2	3/22 - 9:00	116530.0	3/25 - 8:00				
O-Rings	**A**	3367.4	3/22 - 9:00	3367.3	3/25 - 8:00				
	B	3342.5	3/22 - 9:00	3342.3	3/25 - 8:00				
	C - 1st Hour	3444.9	3/22 - 9:00	3444.9	3/25 - 8:00				

Train A Aggregate, mg:	**1.1**
Train B Aggregate, mg:	**1.0**
Train C Aggregate, mg:	**0.7**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 1 Test Date: 3/19/2024

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): 0.060" open from fully closed
Targeted Burn Category: Cat II

Preburn Notes

Time	Notes
9:15	Started fire with ~2 lbs of kindling
9:30	Added 4 additional lbs of kindling fuel
10:00	@ 3lbs, stirred fuel and closed air to test setting
10:33	Loaded preburn fuel, closed door, air set to test setting
11:11	Stirred coals, bring back pieces to front to ensure uniform charcoalization
12:03	Stirred coals and zeroed scale in preparation of fuel loading

Test Notes

Test Burn Start Time: 12:04 Test Fuel Loaded by: 30 seconds
Door Closed: 40 seconds Air Control Set at: 0 seconds
Other Loading Notes: N/A

Time	Notes
12:04	Loaded fuel, closed door immediately, air control left at test setting during loading.
14:10	Less than 0.1 lb consumed in last 10 minutes, so door was opened and remaining fuel was pulled forward, door open less than 10 seconds.

Test Burn End Time: 14:58

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.98 CO (%): 4.300
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	9:20	9:26	9:23	16:15	16:18	16:23
CO_2	0.00	10.06	16.87	0.00	10.07	16.89
CO	0.000	2.525	2.285	0.006	2.541	4.295

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

Technician Signature: Date: 3/20/24

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 1 Test Date: 3/19/2024

Test Fuel Front View

Test Fuel Iso View

Test Fuel Loaded in Stove

Air Setting

Technician Signature: Date: 3/20/24

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 1 Test Date: 3/19/2024

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date:

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 2 Data Summary

Client:	Jotul
Model:	F602 V3
Job #:	24-268
Tracking #:	185
Test Date:	3/19/2024

Techician Signature

3/25/2024
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Burn Rate (kg/hr):	1.85

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	5.635	11.478	11.149	8.615
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12262.6			
Average Gas Meter Temperature (°F)	73.7	84.7	87.4	87.7
Total Sample Volume (dscf)	5.631	11.228	10.857	8.334
Average Tunnel Temperature (°F)	104.8			
Total Time of Test (min)	64			
Total Particulate Catch (mg)	0.1	4.1	3.8	3.6
Particulate Concentration, dry-standard (g/dscf)	0.0000178	0.0003652	0.0003500	0.0004320
Total PM Emissions (g)	0.23	4.54	4.35	5.08
Particulate Emission Rate (g/hr)	0.22	4.26	4.07	5.08
Emissions Factor (g/kg)	-	2.30	2.20	-
Difference from Average Total Particulate Emissions (g)	-	0.10	0.10	-
Difference from Average Total Particulate Emissions (%)	-	2.2%	2.2%	
Difference from Average Emissions Factor (g/kg)	-	0.05	0.05	-

Final Average Results	
Total Particulate Emissions (g)	4.44
Particulate Emission Rate (g/hr)	4.17
Emissions Factor (g/kg)	2.25
HHV Efficiency (%)	68.9%
LHV Efficiency (%)	74.5%
CO Emissions (g/min)	3.57

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	<90 °F	82.4	OK
Face Velocity	< 30 ft/min	9.9	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min:72.7/Max:74.4	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
Stove Surface ΔT	<126°F	9.7	OK

B415.1 Efficiency Results

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/19/24
Run:	2
Control #:	24-268
Test Duration:	64
Output Category:	3

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	68.9%	74.5%
Combustion Efficiency	91.4%	91.4%
Heat Transfer Efficiency	75.4%	81.5%

Output Rate (kJ/h)	24,683	23,415	**(Btu/h)**
Burn Rate (kg/h)	1.81	3.99	**(lb/h)**
Input (kJ/h)	35,820	33,979	**(Btu/h)**

Test Load Weight (dry kg)	1.93	4.25	**dry lb**
MC wet (%)	16.81		
MC dry (%)	20.21		
Particulate (g)	4.44		
CO (g)	228		
Test Duration (h)	1.07		

Emissions	**Particulate**	**CO**
g/MJ Output	0.17	8.68
g/kg Dry Fuel	2.30	118.47
g/h	4.17	214.21
g/min	0.07	3.57
lb/MM Btu Output	0.39	20.17

Air/Fuel Ratio (A/F)	10.56

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	7.00	20.9			
2x4	7.00	20.5			
2x4	7.00	19.9			
2x4	7.00	19.2			
2x4	7.00	19.3			
2x4	7.00	20.1			
2x4	7.00	20.3			
2x4	7.00	22.1			

Total Fuel Weight (lbs): 5.98
Average Moisture (%DB): 20.3

Firebox Volume (ft^3): 0.79
Total 2x4 Crib Weight, with spacers (lbs): 5.13
Total 4x4 Crib Weight, with spacers (lbs): 0.00
Total Wet Fuel Weight, with spacers (lbs): 5.13

Coal Bed Range (20-25%):
Min (lbs): 1.03
Max (lbs): 1.28

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	13.50	1.34	20.4	21.5	20.9	1.11
2x4	13.50	1.32	19.8	21.1	19.9	1.10
2x4	13.50	1.41	19.3	19.1	19.9	1.18

Total Dry Weight, no spacers (lbs): 3.39
Total Dry Weight, with spacers (lbs): 4.35

Spacer Moisture Readings (%DB)

12.3	10.6	7.9					
12.6	12.6	11.4					
11.3	7.4						
7.5	9.3						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	27.5	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	6.49	OK
2x4 Fuel Mix	35 - 65 % of total weight	N/A	N/A

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Jotul	Job #:	24-268
Model:	F602 V3	Tracking #:	185
Run #:	2	Technician:	SJB
Test Start Time:	16:53	Date:	3/19/2024

Total Sampling Time (min):	64	
Recording Interval (min):	1	
Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.005	(B)
Meter Box γ Factor:	1.004	(C)
Meter Box γ Factor:	1.013	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	3/18/2004	
Test Fuel Scale Audit (lbs)	5.00	
Platform Scale Audit (lbs)	5.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.85	29.84	29.85
Relative Humidity (%)	33.1	33.0	
Room Air Velocity (ft/min)	0	0	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		5.635	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.001	0.001	cfm @	-6	in. Hg
(B)	0.001	0.001	cfm @	-6	in. Hg
(C)	0.001	0.001	cfm @	-6	in. Hg
(Ambient)	0.000	0.000	cfm @	-6	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.064	67
2	0.072	67
3	0.092	67
4	0.074	67
5	0.054	67
6	0.080	67
7	0.108	67
8	0.090	67
Center	0.082	67

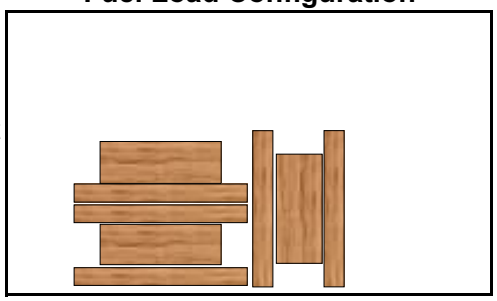
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.57	ft/sec
V_{scent}:	18.99	ft/sec
F_p:	0.978	[ratio]
Initial Tunnel Flow:	214.2	scf/min

Static Pressure: -0.130 in. H_2O

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Left



Firebox Right

Firebox Front View

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)	20.2

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Recording Interval (min): 1
Run Time (min): 65

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	7.45	-0.093	533	525	487	668	268	496.4	459	73
1	7.20	-0.099	529	522	492	689	271	500.6	492	73
2	6.97	-0.099	525	517	498	713	272	505.0	511	73
3	6.73	-0.099	521	512	504	736	275	509.3	522	73
4	6.51	-0.098	517	506	509	754	276	512.5	526	73
5	6.28	-0.098	512	501	513	769	278	514.7	525	73
6	6.08	-0.099	509	496	517	782	279	516.5	527	73
7	5.87	-0.099	508	492	521	792	280	518.3	526	73
8	5.67	-0.099	506	488	523	799	281	519.3	524	73
9	5.47	-0.099	505	485	526	805	281	520.3	524	73
10	5.28	-0.096	504	483	528	812	283	521.8	523	73
11	5.09	-0.098	506	481	531	817	283	523.7	521	73
12	4.90	-0.098	506	480	534	822	284	525.0	520	73
13	4.71	-0.096	507	480	536	825	284	526.4	518	73
14	4.54	-0.095	509	479	539	826	284	527.5	519	73
15	4.36	-0.094	512	480	543	830	285	529.7	516	73
16	4.18	-0.097	514	480	546	833	284	531.4	514	73
17	4.01	-0.095	517	481	549	837	285	533.6	512	73
18	3.86	-0.095	520	483	552	840	285	535.8	510	73
19	3.71	-0.092	525	485	554	841	285	537.9	508	73
20	3.55	-0.094	528	487	557	841	285	539.7	506	73
21	3.40	-0.093	534	489	559	844	286	542.4	504	73
22	3.28	-0.093	538	491	562	847	286	544.6	503	73
23	3.15	-0.093	540	494	565	847	286	546.4	504	73
24	3.03	-0.091	548	497	568	852	286	550.2	504	73
25	2.92	-0.092	551	500	572	856	286	553.0	504	73
26	2.80	-0.090	556	503	575	858	287	555.8	503	73
27	2.71	-0.092	559	506	578	861	287	558.1	502	74
28	2.61	-0.093	564	509	580	863	287	560.6	503	73
29	2.52	-0.090	566	512	582	864	288	562.5	502	74
30	2.44	-0.091	570	515	584	862	288	563.8	499	74
31	2.36	-0.089	573	517	584	856	289	563.8	493	74
32	2.29	-0.087	578	520	584	847	290	563.4	488	74
33	2.22	-0.088	580	521	583	838	290	562.4	482	73
34	2.16	-0.086	581	523	582	827	291	560.6	476	73
35	2.11	-0.085	585	524	580	816	292	559.6	470	74
36	2.06	-0.085	586	525	579	806	293	557.6	464	74
37	2.01	-0.085	584	525	577	797	294	555.5	458	74
38	1.96	-0.085	586	526	575	787	295	553.7	455	74
39	1.92	-0.083	587	526	572	777	297	551.7	451	73
40	1.87	-0.084	586	526	570	768	298	549.5	447	74
41	1.83	-0.081	585	526	567	759	299	547.1	443	74
42	1.79	-0.081	582	526	564	751	300	544.7	441	74
43	1.76	-0.082	583	527	561	741	301	542.6	437	74
44	1.73	-0.081	581	528	557	732	303	540.1	434	73

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Recording Interval (min): 1
Run Time (min): 65

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
45	1.70	-0.080	580	529	553	723	304	537.8	430	73
46	1.67	-0.080	577	530	549	715	306	535.3	426	73
47	1.63	-0.079	575	531	544	707	307	532.7	422	73
48	1.61	-0.079	572	531	540	699	309	530.3	419	73
49	1.59	-0.079	569	531	536	691	311	527.6	416	73
50	1.57	-0.079	566	531	533	683	312	524.9	413	73
51	1.54	-0.078	563	530	528	677	313	522.3	410	73
52	1.52	-0.078	560	529	525	669	315	519.3	407	73
53	1.48	-0.078	555	528	521	662	316	516.3	405	74
54	1.46	-0.077	551	527	517	656	317	513.3	403	73
55	1.45	-0.077	549	526	513	649	318	510.9	401	74
56	1.42	-0.076	544	524	510	644	319	508.1	399	74
57	1.40	-0.076	542	522	507	637	320	505.4	397	73
58	1.38	-0.076	537	520	503	630	320	502.0	396	73
59	1.36	-0.076	532	518	500	625	321	499.0	394	73
60	1.34	-0.076	529	515	497	619	322	496.3	392	73
61	1.33	-0.075	526	512	493	614	323	493.5	393	73
62	1.30	-0.077	522	509	490	609	324	490.5	393	73
63	1.29	-0.075	518	505	487	604	324	487.7	391	73
64	1.27	-0.076	512	502	484	599	324	484.1	389	73
65	1.25	-0.074	511	498	481	594	325	481.4	387	73

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.077	0.01	80	0.1		5.11		106	399	75	73
1	0.143	0.143	0.080	3.05	80	1.2	-	5.07	-0.04	109	372	75	73
2	0.317	0.174	0.077	3.09	80	1.2	-	4.96	-0.11	104	381	76	73
3	0.492	0.175	0.079	3.10	79	1.2	-	4.77	-0.19	105	430	76	73
4	0.665	0.173	0.078	3.12	79	1.2	-	4.57	-0.20	105	459	76	73
5	0.837	0.172	0.080	3.14	79	1.2	-	4.38	-0.19	106	481	76	73
6	1.014	0.177	0.081	3.15	79	1.2	-	4.19	-0.19	107	495	76	73
7	1.192	0.178	0.081	3.18	80	1.2	-	4.00	-0.19	108	504	76	73
8	1.368	0.176	0.081	3.20	80	1.2	-	3.83	-0.17	108	508	77	73
9	1.543	0.175	0.080	3.22	80	1.2	-	3.64	-0.19	108	512	77	73
10	1.721	0.178	0.078	3.24	80	1.2	99	3.47	-0.17	109	513	77	73
11	1.900	0.179	0.079	3.25	80	1.2	-	3.30	-0.17	109	516	77	73
12	2.078	0.178	0.080	3.24	80	1.2	-	3.13	-0.17	109	517	77	74
13	2.255	0.177	0.080	3.27	80	1.3	-	2.96	-0.17	110	517	78	74
14	2.432	0.177	0.080	3.27	80	1.2	-	2.80	-0.16	110	517	78	73
15	2.613	0.181	0.081	3.28	81	1.3	-	2.63	-0.17	110	517	78	74
16	2.794	0.181	0.082	3.28	81	1.3	-	2.49	-0.14	110	516	78	74
17	2.974	0.180	0.081	3.29	81	1.3	-	2.33	-0.16	110	515	78	74
18	3.149	0.175	0.080	3.28	81	1.3	-	2.17	-0.16	110	513	79	74
19	3.328	0.179	0.080	3.28	81	1.3	-	2.01	-0.16	110	512	79	73
20	3.509	0.181	0.080	3.29	82	1.3	101	1.87	-0.14	110	510	79	74
21	3.691	0.182	0.080	3.29	82	1.3	-	1.72	-0.15	110	507	79	74
22	3.870	0.179	0.080	3.28	82	1.3	-	1.59	-0.13	109	506	79	74
23	4.047	0.177	0.080	3.29	82	1.3	-	1.46	-0.13	110	504	79	74
24	4.226	0.179	0.082	3.29	83	1.4	-	1.32	-0.14	109	502	79	74
25	4.406	0.180	0.080	3.28	83	1.3	-	1.19	-0.13	109	498	79	74
26	4.588	0.182	0.081	3.28	83	1.4	-	1.06	-0.13	109	493	80	74
27	4.767	0.179	0.081	3.28	83	1.4	-	0.96	-0.10	108	491	80	74
28	4.945	0.178	0.081	3.29	84	1.4	-	0.87	-0.09	108	491	80	74
29	5.123	0.178	0.079	3.28	84	1.4	-	0.78	-0.09	107	494	80	74
30	5.304	0.181	0.083	3.29	84	1.4	100	0.74	-0.04	107	490	80	74
31	5.485	0.181	0.082	3.28	84	1.4	-	0.70	-0.04	107	478	80	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
32	5.665	0.180	0.081	3.31	85	1.4	-	0.67	-0.03	106	468	80	74
33	5.843	0.178	0.081	3.30	85	1.4	-	0.64	-0.03	105	457	80	74
34	6.022	0.179	0.082	3.30	85	1.4	-	0.62	-0.02	105	449	80	74
35	6.204	0.182	0.080	3.31	85	1.3	-	0.59	-0.03	105	442	80	74
36	6.385	0.181	0.080	3.31	86	1.4	-	0.56	-0.03	104	438	80	74
37	6.566	0.181	0.079	3.32	86	1.3	-	0.54	-0.02	104	433	80	74
38	6.744	0.178	0.079	3.32	86	1.4	-	0.53	-0.01	104	428	80	74
39	6.924	0.180	0.079	3.32	86	1.4	-	0.49	-0.04	103	424	80	74
40	7.106	0.182	0.079	3.33	87	1.4	100	0.47	-0.02	103	420	80	74
41	7.290	0.184	0.081	3.33	87	1.4	-	0.45	-0.02	103	417	80	74
42	7.471	0.181	0.081	3.32	87	1.4	-	0.42	-0.03	102	413	80	74
43	7.649	0.178	0.079	3.34	87	1.4	-	0.40	-0.02	102	410	80	74
44	7.829	0.180	0.082	3.32	88	1.4	-	0.40	0.00	102	408	80	74
45	8.013	0.184	0.080	3.33	88	1.4	-	0.36	-0.04	102	405	80	74
46	8.196	0.183	0.081	3.34	88	1.4	-	0.34	-0.02	102	403	80	74
47	8.380	0.184	0.080	3.34	88	1.4	-	0.32	-0.02	101	401	80	74
48	8.558	0.178	0.080	3.34	88	1.4	-	0.29	-0.03	101	399	80	74
49	8.738	0.180	0.079	3.34	88	1.4	-	0.27	-0.02	101	397	80	74
50	8.920	0.182	0.079	3.35	89	1.4	101	0.25	-0.02	101	396	80	74
51	9.103	0.183	0.080	3.34	89	1.4	-	0.23	-0.02	101	394	80	74
52	9.287	0.184	0.079	3.34	89	1.4	-	0.21	-0.02	100	392	80	74
53	9.470	0.183	0.080	3.34	89	1.4	-	0.19	-0.02	100	390	80	74
54	9.649	0.179	0.079	3.36	89	1.4	-	0.17	-0.02	100	389	80	74
55	9.831	0.182	0.079	3.35	90	1.4	-	0.16	-0.01	100	387	80	74
56	10.015	0.184	0.081	3.35	90	1.4	-	0.13	-0.03	100	386	80	74
57	10.197	0.182	0.080	3.37	90	1.4	-	0.11	-0.02	100	385	80	74
58	10.381	0.184	0.080	3.37	90	1.4	-	0.10	-0.01	99	383	80	74
59	10.564	0.183	0.079	3.36	90	1.4	-	0.08	-0.02	99	382	80	74
60	10.744	0.180	0.081	3.34	90	1.4	100	0.06	-0.02	99	380	80	74
61	10.926	0.182	0.079	3.36	91	1.4	-	0.04	-0.02	99	380	80	74
62	11.111	0.185	0.079	3.36	91	1.4	-	0.03	-0.01	99	379	80	74
63	11.295	0.184	0.079	3.36	91	1.4	-	0.01	-0.02	99	377	80	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
64	11.478	0.183	0.080	3.37	91	1.4	101	0.00	-0.01	99	375	80	74
Avg/Tot	11.478	0.179	0.080	3.24	84.7	1.3	100			104.8	446.8	79.0	73.7

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.01	83	0.7		78	-0.072	4.70	0.042
1	0.157	0.157	3.18	82	1.9	-	79	-0.071	1.55	0.087
2	0.331	0.174	3.17	82	1.8	-	79	-0.084	6.54	0.022
3	0.508	0.177	3.17	82	2.1	-	79	-0.090	15.01	2.467
4	0.685	0.177	3.16	82	2.1	-	79	-0.093	15.09	3.142
5	0.860	0.175	3.16	82	1.9	-	79	-0.095	15.28	3.406
6	1.032	0.172	3.15	82	1.7	-	79	-0.095	15.53	3.256
7	1.207	0.175	3.14	82	2.2	-	79	-0.094	15.56	3.085
8	1.384	0.177	3.14	82	2.2	-	80	-0.095	15.55	2.667
9	1.559	0.175	3.14	82	1.9	-	80	-0.095	15.54	2.330
10	1.732	0.173	3.13	82	2.2	102	80	-0.096	15.45	2.037
11	1.906	0.174	3.13	82	1.8	-	80	-0.096	15.49	1.890
12	2.082	0.176	3.13	83	2.0	-	80	-0.096	15.34	2.131
13	2.258	0.176	3.12	83	1.8	-	80	-0.096	15.52	2.140
14	2.430	0.172	3.12	83	2.3	-	80	-0.094	15.63	1.973
15	2.605	0.175	3.12	83	2.2	-	81	-0.095	15.60	1.759
16	2.781	0.176	3.12	83	2.0	-	81	-0.094	15.77	1.661
17	2.956	0.175	3.11	83	2.0	-	81	-0.094	15.83	1.807
18	3.129	0.173	3.11	84	2.0	-	81	-0.094	15.69	2.252
19	3.302	0.173	3.10	84	2.3	-	81	-0.095	15.55	2.511
20	3.478	0.176	3.10	84	2.0	102	81	-0.093	15.58	2.358
21	3.653	0.175	3.09	84	1.7	-	81	-0.093	15.61	2.267
22	3.826	0.173	3.08	84	1.8	-	81	-0.093	15.52	2.248
23	3.998	0.172	3.08	85	1.8	-	82	-0.093	15.57	2.226
24	4.173	0.175	3.07	85	1.8	-	82	-0.091	15.45	2.338
25	4.348	0.175	3.06	85	2.3	-	82	-0.092	15.32	2.588
26	4.520	0.172	3.05	86	2.4	-	82	-0.090	15.22	2.621
27	4.692	0.172	3.05	86	2.0	-	82	-0.090	15.24	1.830
28	4.866	0.174	3.05	86	2.3	-	82	-0.091	15.16	0.885
29	5.041	0.175	3.05	86	2.1	-	82	-0.089	14.50	0.511
30	5.213	0.172	3.04	87	1.9	99	82	-0.087	12.14	0.031
31	5.385	0.172	3.05	87	2.2	-	82	-0.085	9.31	0.000

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	5.560	0.175	3.05	87	2.4	-	82	-0.084	8.32	0.002
33	5.735	0.175	3.05	87	2.4	-	82	-0.082	8.20	0.001
34	5.907	0.172	3.05	88	2.0	-	82	-0.082	8.17	0.000
35	6.079	0.172	3.05	88	2.3	-	82	-0.082	8.12	0.001
36	6.254	0.175	3.06	88	1.8	-	82	-0.080	8.09	0.000
37	6.430	0.176	3.06	88	2.3	-	82	-0.080	8.02	0.001
38	6.603	0.173	3.06	89	2.1	-	82	-0.078	7.90	0.000
39	6.775	0.172	3.05	89	1.9	-	82	-0.079	7.74	0.001
40	6.951	0.176	3.06	89	2.2	99	82	-0.078	7.73	0.001
41	7.127	0.176	3.06	90	2.1	-	82	-0.077	7.49	0.001
42	7.301	0.174	3.06	90	2.2	-	82	-0.079	7.45	0.001
43	7.473	0.172	3.06	90	2.4	-	82	-0.078	7.48	0.001
44	7.648	0.175	3.06	90	1.9	-	82	-0.078	7.43	0.002
45	7.824	0.176	3.06	91	2.3	-	82	-0.076	7.36	0.005
46	7.998	0.174	3.06	91	2.1	-	82	-0.076	7.37	0.001
47	8.174	0.176	3.06	91	1.9	-	82	-0.075	7.53	0.001
48	8.345	0.171	3.06	91	1.8	-	82	-0.079	7.60	0.002
49	8.522	0.177	3.07	92	1.9	-	82	-0.074	7.53	0.002
50	8.697	0.175	3.06	92	2.1	100	82	-0.076	7.52	0.002
51	8.870	0.173	3.06	92	2.2	-	82	-0.075	7.15	0.001
52	9.045	0.175	3.06	92	2.4	-	82	-0.074	7.07	0.004
53	9.221	0.176	3.06	92	2.3	-	82	-0.075	6.89	0.003
54	9.397	0.176	3.07	93	1.9	-	82	-0.075	6.86	0.002
55	9.572	0.175	3.07	93	2.0	-	82	-0.075	6.70	0.003
56	9.746	0.174	3.07	93	1.8	-	82	-0.074	6.66	0.002
57	9.923	0.177	3.07	93	2.0	-	82	-0.075	6.64	0.002
58	10.099	0.176	3.07	94	2.2	-	82	-0.074	6.59	0.002
59	10.275	0.176	3.08	94	2.1	-	82	-0.074	6.60	0.003
60	10.448	0.173	3.07	94	2.3	99	82	-0.072	6.43	0.004
61	10.624	0.176	3.08	94	2.4	-	82	-0.075	6.40	0.007
62	10.800	0.176	3.08	94	2.2	-	82	-0.073	6.32	0.003
63	10.976	0.176	3.08	95	2.1	-	82	-0.074	5.64	0.007

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	11.149	0.173	3.08	95	2.1	99	82	-0.074	5.56	0.008
Avg/Tot	11.149	0.174	3.04	87.4	2.0	100	81.4	-0.084	10.61	0.933

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
0	0.000		0.00	82	0.1		77
1	0.113	0.113	0.96	81	1.7	-	78
2	0.255	0.142	0.97	81	1.6	-	78
3	0.396	0.141	0.96	82	1.5	-	78
4	0.536	0.140	0.97	82	1.6	-	78
5	0.679	0.143	0.98	82	1.7	-	78
6	0.821	0.142	0.97	82	1.6	-	78
7	0.962	0.141	0.97	82	1.6	-	79
8	1.105	0.143	0.98	82	1.7	-	79
9	1.248	0.143	0.99	83	1.8	-	79
10	1.390	0.142	0.98	83	1.6	100	79
11	1.532	0.142	0.98	83	1.6	-	79
12	1.676	0.144	0.99	83	1.8	-	79
13	1.818	0.142	0.98	83	1.7	-	80
14	1.961	0.143	0.98	84	1.6	-	80
15	2.103	0.142	0.98	84	1.6	-	80
16	2.247	0.144	0.99	84	1.8	-	80
17	2.389	0.142	0.99	84	1.6	-	80
18	2.531	0.142	0.98	85	1.6	-	80
19	2.673	0.142	0.98	85	1.8	-	81
20	2.818	0.145	0.99	86	1.8	101	81
21	2.961	0.143	0.99	86	1.7	-	81
22	3.103	0.142	0.98	86	1.6	-	81
23	3.246	0.143	0.98	86	1.6	-	81
24	3.390	0.144	0.99	86	1.8	-	81
25	3.533	0.143	0.99	86	1.7	-	81
26	3.676	0.143	0.98	87	1.7	-	81
27	3.819	0.143	0.98	87	1.8	-	81
28	3.963	0.144	0.99	87	1.8	-	82
29	4.106	0.143	0.99	87	1.8	-	82
30	4.249	0.143	0.98	88	1.7	99	82
31	4.393	0.144	0.98	88	1.8	-	82

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
32	4.536	0.143	0.99	88	1.8	-	82
33	4.682	0.146	1.00	89	1.7	-	82
34	4.826	0.144	1.00	89	1.6	-	82
35	4.970	0.144	0.99	89	1.6	-	82
36	5.114	0.144	0.99	89	1.7	-	82
37	5.258	0.144	1.00	90	1.7	-	82
38	5.404	0.146	1.00	90	1.7	-	82
39	5.549	0.145	1.01	90	1.7	-	82
40	5.694	0.145	1.00	91	1.6	100	82
41	5.839	0.145	1.00	91	1.7	-	82
42	5.984	0.145	1.00	91	1.8	-	82
43	6.129	0.145	1.00	91	1.8	-	82
44	6.275	0.146	1.00	92	1.7	-	82
45	6.421	0.146	1.01	92	1.7	-	82
46	6.567	0.146	1.01	92	1.7	-	82
47	6.715	0.148	1.01	92	1.8	-	82
48	6.858	0.143	1.00	92	1.8	-	82
49	7.004	0.146	1.00	92	1.8	-	82
50	7.150	0.146	1.00	93	1.8	101	82
51	7.296	0.146	1.01	93	1.7	-	82
52	7.442	0.146	1.01	93	1.6	-	82
53	7.590	0.148	1.02	93	1.6	-	81
54	7.736	0.146	1.02	93	1.8	-	81
55	7.883	0.147	1.02	93	1.8	-	81
56	8.029	0.146	1.01	93	1.7	-	81
57	8.176	0.147	1.01	93	1.8	-	81
58	8.322	0.146	1.01	93	1.7	-	81
59	8.469	0.147	1.01	94	1.8	-	81
60	8.615	0.146	1.01	94	1.8	101	81
Avg/Tot	8.615	0.144	0.98	87.7	1.7	100	80.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 10

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	506	495	478	586	325	477.8	736.6
1	501	490	474	570	325	472.0	632.9
2	497	486	470	564	323	467.9	780.8
3	492	481	472	587	324	471.0	1012.0
4	486	478	474	619	323	476.0	1075.9
5	481	475	479	650	323	481.5	1100.6
6	477	474	483	678	323	487.0	1118.9
7	475	474	488	702	323	492.2	1131.4
8	474	475	492	722	322	497.0	1149.4
9	473	476	496	740	321	501.3	1167.8
10	474	478	501	756	321	506.0	1183.4
11	476	481	505	769	320	510.1	1191.6
12	478	484	509	780	319	514.1	1188.5
13	481	488	513	789	318	517.7	1192.7
14	483	491	517	797	317	521.0	1197.9
15	487	495	520	804	316	524.6	1200.9
16	491	500	524	812	314	528.1	1198.9
17	496	504	527	818	313	531.7	1195.7
18	500	509	531	823	312	534.8	1200.3
19	504	514	534	827	311	538.1	1203.4
20	509	520	538	830	310	541.1	1206.5
21	514	525	540	832	309	544.0	1213.9
22	519	530	543	834	308	546.8	1222.4
23	524	536	546	837	306	549.7	1229.0
24	528	542	549	838	305	552.5	1229.2
25	534	547	553	840	304	555.5	1227.8
26	538	552	556	842	303	558.4	1225.0
27	542	557	559	844	303	561.0	1231.8
28	547	562	561	844	302	563.3	1237.2
29	552	567	563	847	302	566.3	1226.2
30	558	572	564	844	302	567.7	1182.7
31	560	576	562	832	301	566.5	1117.0
32	564	580	560	816	301	564.1	1067.7
33	565	582	556	799	302	560.5	1036.6
34	566	582	552	782	302	556.6	1016.0
35	565	583	547	767	302	552.8	999.4
36	565	582	543	752	302	548.7	985.2
37	564	581	538	739	303	544.8	971.1
38	562	579	533	726	304	540.9	958.0
39	560	577	529	714	304	536.8	946.3
40	559	575	525	703	305	533.1	935.0
41	557	572	520	693	306	529.7	923.6
42	554	569	516	683	307	526.0	913.8
43	552	566	513	675	307	522.7	905.7
44	550	563	509	666	308	519.2	898.3
45	547	560	505	659	308	515.9	890.3
46	545	557	502	651	309	512.8	883.5
47	542	553	499	644	310	509.4	878.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

Stove ΔT: 10

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	539	550	496	638	310	506.4	875.0
49	537	547	493	632	311	503.8	871.3
50	534	544	490	626	311	500.9	866.1
51	532	541	488	621	312	498.5	858.2
52	530	538	485	616	312	496.1	851.3
53	527	535	483	610	313	493.6	844.2
54	524	532	481	605	313	491.1	838.4
55	523	529	479	600	314	488.9	834.3
56	519	525	477	596	314	486.3	830.3
57	517	522	475	592	314	484.2	825.6
58	514	519	473	588	315	481.9	821.5
59	512	516	472	584	315	479.7	817.8
60	509	513	470	580	315	477.2	814.1
61	506	510	468	577	315	475.0	810.1
62	503	507	466	573	315	472.8	806.2
63	500	504	464	569	315	470.6	800.0
64	498	501	462	565	315	468.1	793.1
Average	521.5	529.6	510.6	709.1	311.6	516.5	1011.9

LAB SAMPLE DATA - ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 2

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/19/2024

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G965	241.7	244.7	3.0
	B	G966	241.9	244.8	2.9
	C - 1st Hour	G967	241.4	244.2	2.8
	Amb	G968	241.2	241.3	0.1
Probes	**A**	15A	117239.3	117239.5	0.2
	B	15B	116752.3	116752.7	0.4
	C - 1st Hour	15C	116846.4	116846.8	0.4
O-rings	**A**	15A	3569.8	3570.7	0.9
	B	15B	3570.8	3571.3	0.5
	C - 1st Hour	15C	3396.6	3397.0	0.4

Placed in Dessicator on:	3/20 - 18:30

		Balance Audit (mg):	100.0		100.0					
			Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**		244.8	3/22 - 9:00	244.7	3/25 - 8:00				
	B		244.8	3/22 - 9:00	244.8	3/25 - 8:00				
	C - 1st Hour		244.2	3/22 - 9:00	244.2	3/25 - 8:00				
	Amb		241.3	3/22 - 9:00	241.3	3/25 - 8:00				
Probes	**A**		117239.7	3/22 - 9:00	117239.5	3/25 - 8:00				
	B		116752.7	3/22 - 9:00	116752.7	3/25 - 8:00				
	C - 1st Hour		116847.0	3/22 - 9:00	116846.8	3/25 - 8:00				
O-Rings	**A**		3570.7	3/22 - 9:00	3570.7	3/25 - 8:00				
	B		3571.3	3/22 - 9:00	3571.3	3/25 - 8:00				
	C - 1st Hour		3396.9	3/22 - 9:00	3397.0	3/25 - 8:00				

Train A Aggregate, mg:	**4.1**
Train B Aggregate, mg:	**3.8**
Train C Aggregate, mg:	**3.6**
Ambient, mg:	**0.1**

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 2 Test Date: 3/19/2024

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully Open
Targeted Burn Category: Cat IV

Preburn Notes

Time	Notes
15:05	Started fire with ~2 lbs of kindling
15:15	Added 4 additional lbs of kindling fuel
15:46	Loaded preburn fuel, closed door, air set to test setting
16:52	Leveled coal bed, zeroed scale in preparation of fuel loading

Test Notes

Test Burn Start Time: 16:53 Test Fuel Loaded by: 30 seconds
Door Closed: 35 seconds Air Control Set at: 0 seconds
Other Loading Notes: N/A

Time	Notes
16:53	Loaded fuel, closed door, air at test setting

Test Burn End Time: 17:57

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.98 CO (%): 4.300
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

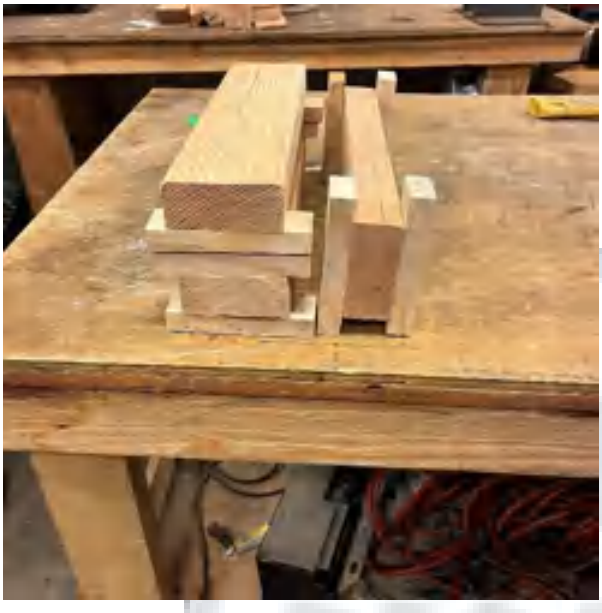
	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	9:20	9:26	9:23	16:15	16:18	16:23
CO_2	0.00	10.06	16.87	0.00	10.07	16.89
CO	0.000	2.525	2.285	0.006	2.541	4.295

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

Technician Signature: Date: 3/20/24

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 2 Test Date: 3/19/2024



Test Fuel Front View

Test Fuel Iso View

Test Fuel Loaded in Stove

Air Setting

Technician Signature: Date: 3/20/24

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 2 Test Date: 3/19/2024

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date:

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 3 Data Summary

Client:	Jotul
Model:	F602 V3
Job #:	24-268
Tracking #:	185
Test Date:	3/20/2024

Techician Signature

3/25/2024
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Burn Rate (kg/hr):	0.38

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	35.462	67.865	65.229	8.542
Average Gas Velocity in Dilution Tunnel (ft/sec)	18.6			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12641.0			
Average Gas Meter Temperature (°F)	67.1	87.6	92.1	80.6
Total Sample Volume (dscf)	35.907	66.126	63.060	8.379
Average Tunnel Temperature (°F)	75.9			
Total Time of Test (min)	365			
Total Particulate Catch (mg)	0.0	0.8	1.0	0.5
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000121	0.0000159	0.0000597
Total PM Emissions (g)	0.00	0.93	1.22	0.75
Particulate Emission Rate (g/hr)	0.00	0.15	0.20	0.75
Emissions Factor (g/kg)	-	0.40	0.53	-
Difference from Average Total Particulate Emissions (g)	-	0.14	0.14	-
Difference from Average Total Particulate Emissions (%)	-	13.4%	13.4%	
Difference from Average Emissions Factor (g/kg)	-	0.06	0.06	-

Final Average Results	
Total Particulate Emissions (g)	1.07
Particulate Emission Rate (g/hr)	0.18
Emissions Factor (g/kg)	0.47
HHV Efficiency (%)	85.5%
LHV Efficiency (%)	92.4%
CO Emissions (g/min)	0.02

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	72.9	OK
Face Velocity	< 30 ft/min	10.3	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:66.4/Max:67.9	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
Stove Surface ΔT	<126°F	29.9	OK

B415.1 Efficiency Results

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/20/24
Run:	3
Control #:	24-268
Test Duration:	365
Output Category:	1

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	85.5%	92.4%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	85.9%	92.8%

Output Rate (kJ/h)	6,319	5,994	**(Btu/h)**
Burn Rate (kg/h)	0.37	0.82	**(lb/h)**
Input (kJ/h)	7,394	7,014	**(Btu/h)**

Test Load Weight (dry kg)	2.27	5.00	**dry lb**
MC wet (%)	16.74		
MC dry (%)	20.10		
Particulate (g)	1.07		
CO (g)	9		
Test Duration (h)	6.08		

Emissions	**Particulate**	**CO**
g/MJ Output	0.03	0.22
g/kg Dry Fuel	0.47	3.80
g/h	0.18	1.42
g/min	0.00	0.02
lb/MM Btu Output	0.06	0.52

Air/Fuel Ratio (A/F)	14.81

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	7.00	22.4			
2x4	7.00	19.5			
2x4	7.00	19.1			
2x4	7.00	19.3			
2x4	7.00	20.7			
2x4	7.00	18.6			

Total Fuel Weight (lbs): 4.51
Average Moisture (%DB): 19.9

Firebox Volume (ft^3): 0.79
Total 2x4 Crib Weight, with spacers (lbs): 6.02
Total 4x4 Crib Weight, with spacers (lbs): 0.00
Total Wet Fuel Weight, with spacers (lbs): 6.02

Coal Bed Range (20-25%):
Min (lbs): 1.20
Max (lbs): 1.51

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	13.50	1.67	19.5	19.8	21.2	1.39
2x4	13.50	1.74	22.3	19.8	20.5	1.44
2x4	13.50	1.61	19.9	16.4	21.5	1.35

Total Dry Weight, no spacers (lbs): 4.18
Total Dry Weight, with spacers (lbs): 5.09

Spacer Moisture Readings (%DB)

11.9	10.0	10.7					
7.1	11.0	8.7					
8.6	8.7						
10.6	8.5						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	34.0	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.62	OK
2x4 Fuel Mix	35 - 65 % of total weight	N/A	N/A

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Jotul	Job #:	24-268
Model:	F602 V3	Tracking #:	185
Run #:	3	Technician:	SJB
Test Start Time:	12:38	Date:	3/20/2024

Total Sampling Time (min):	365	
Recording Interval (min):	1	
Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.005	(B)
Meter Box γ Factor:	1.004	(C)
Meter Box γ Factor:	1.013	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	3/18/2004	
Test Fuel Scale Audit (lbs)	5.00	
Platform Scale Audit (lbs)	5.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.86	29.88	29.87
Relative Humidity (%)	35.7	36.8	
Room Air Velocity (ft/min)	0	0	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		35.462	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.001	0.001	cfm @	-6	in. Hg
(B)	0.000	0.001	cfm @	-6	in. Hg
(C)	0.001	0.001	cfm @	-6	in. Hg
(Ambient)	0.000	0.000	cfm @	-6	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.062	68
2	0.074	68
3	0.090	68
4	0.070	68
5	0.054	68
6	0.078	68
7	0.102	68
8	0.088	68
Center	0.080	68

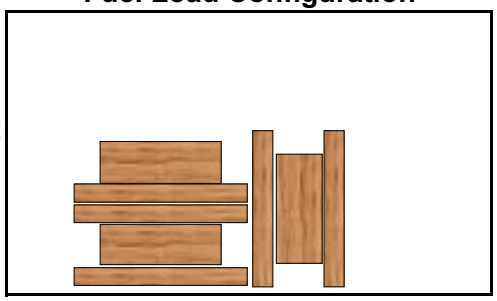
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.36	ft/sec
V_{scent}:	18.77	ft/sec
F_p:	0.978	[ratio]
Initial Tunnel Flow:	211.5	scf/min

Static Pressure: -0.130 in. H_2O

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Left



Firebox Right

Firebox Front View

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)	20.1

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Recording Interval (min): 1
Run Time (min): 129

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	5.30	-0.076	444	440	453	687	180	441.0	392	66
1	5.23	-0.076	450	444	453	680	184	442.0	358	66
2	5.13	-0.074	449	445	453	676	187	442.1	338	66
3	5.07	-0.072	452	446	453	672	190	442.4	325	66
4	5.00	-0.072	452	446	451	668	193	442.1	314	66
5	4.93	-0.069	450	445	449	662	196	440.4	305	66
6	4.87	-0.069	448	443	446	654	200	438.4	298	66
7	4.81	-0.066	446	441	443	646	202	435.8	290	66
8	4.75	-0.066	444	439	439	637	205	432.9	284	66
9	4.70	-0.065	441	437	435	629	208	430.1	278	66
10	4.65	-0.064	438	435	431	621	210	426.9	272	66
11	4.59	-0.064	434	433	427	613	212	423.7	268	66
12	4.54	-0.063	431	430	423	606	214	420.6	264	66
13	4.50	-0.062	426	428	418	598	215	416.9	259	66
14	4.45	-0.060	424	425	414	590	216	413.8	255	66
15	4.42	-0.060	420	422	410	582	217	410.2	250	66
16	4.38	-0.059	416	418	405	575	218	406.4	246	66
17	4.35	-0.057	413	414	401	569	219	403.2	242	66
18	4.31	-0.057	408	410	397	563	220	399.5	238	66
19	4.28	-0.058	405	407	393	555	221	396.0	235	66
20	4.24	-0.057	401	403	389	549	221	392.6	232	66
21	4.21	-0.056	397	399	385	543	221	389.0	228	66
22	4.19	-0.055	392	395	381	536	222	385.2	224	66
23	4.14	-0.054	390	391	377	530	221	381.8	221	66
24	4.11	-0.053	386	388	373	523	222	378.3	218	66
25	4.08	-0.052	383	384	369	518	222	375.1	214	66
26	4.05	-0.051	379	381	366	512	222	371.8	211	66
27	4.01	-0.053	377	378	362	506	222	368.8	208	66
28	3.98	-0.049	373	374	359	499	221	365.3	204	66
29	3.96	-0.048	369	371	355	495	220	362.0	200	66
30	3.93	-0.048	367	369	352	489	219	359.3	197	66
31	3.90	-0.046	365	366	349	485	219	356.8	194	66
32	3.87	-0.045	363	364	346	481	218	354.4	191	66
33	3.78	-0.054	361	362	346	475	218	352.2	267	66
34	3.69	-0.059	360	360	345	478	218	352.0	246	66
35	3.60	-0.059	358	357	344	489	217	353.0	239	66
36	3.52	-0.059	356	355	344	501	216	354.6	237	66
37	3.45	-0.058	354	354	345	512	215	355.8	235	66
38	3.38	-0.058	353	353	345	520	215	357.3	233	66
39	3.31	-0.056	353	352	345	528	214	358.4	233	66
40	3.24	-0.057	352	351	346	534	214	359.3	231	66
41	3.18	-0.056	351	351	346	540	213	360.1	230	66
42	3.12	-0.054	352	351	346	544	212	360.9	228	66
43	3.05	-0.055	353	351	346	546	211	361.6	226	66
44	2.99	-0.054	352	352	346	549	211	362.0	224	66

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Recording Interval (min): 1
Run Time (min): 129

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
45	2.93	-0.054	353	353	347	552	210	362.9	223	66
46	2.88	-0.054	354	354	346	553	209	363.3	221	66
47	2.82	-0.052	355	356	346	555	209	364.1	219	66
48	2.77	-0.052	356	357	346	556	208	364.6	217	66
49	2.71	-0.053	356	358	347	557	208	365.0	215	66
50	2.66	-0.052	357	360	347	557	207	365.5	213	66
51	2.60	-0.051	357	361	347	558	207	365.8	212	66
52	2.57	-0.049	359	363	347	558	206	366.4	210	66
53	2.52	-0.049	359	364	346	558	205	366.4	207	66
54	2.49	-0.047	361	365	346	557	204	366.5	204	66
55	2.45	-0.046	362	365	346	555	204	366.2	202	66
56	2.42	-0.047	364	366	345	552	204	366.0	200	66
57	2.38	-0.047	365	367	345	548	203	365.5	198	66
58	2.35	-0.046	367	367	344	545	203	365.2	196	67
59	2.33	-0.047	369	368	344	540	202	364.5	194	66
60	2.28	-0.046	370	368	344	538	201	364.0	194	67
61	2.25	-0.045	371	368	343	534	201	363.4	193	66
62	2.23	-0.046	372	368	343	531	201	362.8	191	66
63	2.19	-0.044	373	368	342	529	200	362.5	190	67
64	2.16	-0.043	374	368	342	526	199	361.9	189	66
65	2.15	-0.044	374	368	342	523	199	361.3	188	67
66	2.11	-0.044	373	368	341	520	199	360.3	186	67
67	2.09	-0.043	375	368	341	517	199	359.9	185	67
68	2.07	-0.044	375	368	341	513	198	358.9	184	67
69	2.04	-0.042	376	367	340	512	198	358.7	183	67
70	2.02	-0.045	374	367	340	508	198	357.2	182	67
71	1.98	-0.045	375	367	341	505	198	357.1	245	67
72	1.95	-0.044	376	367	340	497	198	355.4	219	67
73	1.92	-0.044	374	367	339	495	197	354.6	205	67
74	1.90	-0.042	373	367	339	492	197	353.4	196	67
75	1.89	-0.040	373	366	338	491	197	352.9	191	67
76	1.88	-0.040	371	365	337	489	197	351.9	188	67
77	1.86	-0.040	371	364	336	486	197	350.9	184	67
78	1.85	-0.039	370	363	335	483	197	349.7	181	67
79	1.85	-0.038	369	362	334	480	197	348.3	179	67
80	1.84	-0.038	368	360	333	476	197	346.8	176	67
81	1.83	-0.036	366	359	332	470	197	344.8	174	67
82	1.82	-0.037	364	358	330	466	198	343.1	172	67
83	1.82	-0.036	361	356	329	461	198	340.8	170	67
84	1.81	-0.037	360	354	327	455	198	338.8	168	67
85	1.80	-0.033	357	353	325	451	198	336.8	165	67
86	1.80	-0.035	355	351	324	446	199	335.0	164	67
87	1.79	-0.031	354	350	322	441	199	333.0	163	67
88	1.78	-0.033	351	348	321	437	199	331.1	161	67
89	1.77	-0.033	349	346	319	433	199	329.3	160	67

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Recording Interval (min): 1
Run Time (min): 129

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
90	1.77	-0.033	347	345	317	429	199	327.3	158	67
91	1.77	-0.033	345	343	316	425	200	325.7	157	67
92	1.76	-0.031	342	342	314	421	200	323.7	156	67
93	1.75	-0.031	340	340	312	417	200	321.8	155	67
94	1.75	-0.031	338	338	311	414	200	320.2	154	67
95	1.74	-0.030	337	337	309	410	201	318.6	153	67
96	1.74	-0.029	336	335	307	406	201	317.2	153	67
97	1.72	-0.031	334	334	306	404	202	315.8	152	67
98	1.72	-0.031	333	333	304	400	202	314.4	151	67
99	1.72	-0.029	331	332	303	397	203	313.0	150	67
100	1.71	-0.028	329	330	301	395	202	311.5	149	67
101	1.70	-0.028	328	329	300	392	202	310.2	148	67
102	1.70	-0.028	326	328	298	390	203	308.9	148	67
103	1.68	-0.029	325	327	297	388	203	307.7	147	67
104	1.70	-0.028	323	325	295	386	203	306.5	147	67
105	1.68	-0.033	321	324	295	381	203	304.8	183	67
106	1.66	-0.032	321	323	293	375	203	303.0	171	67
107	1.65	-0.034	320	322	292	373	204	302.1	165	67
108	1.64	-0.031	319	321	290	373	204	301.3	162	67
109	1.64	-0.034	318	320	289	373	204	300.7	161	67
110	1.63	-0.034	317	319	288	373	204	300.1	161	67
111	1.62	-0.034	315	318	287	374	204	299.3	161	67
112	1.60	-0.034	315	317	286	373	204	298.9	161	66
113	1.61	-0.034	314	316	285	373	204	298.3	161	67
114	1.58	-0.033	314	315	284	372	204	297.7	160	67
115	1.59	-0.033	313	314	283	372	205	297.3	160	67
116	1.58	-0.032	313	313	282	371	205	296.5	160	67
117	1.57	-0.032	312	312	281	370	205	295.9	160	67
118	1.57	-0.032	311	311	280	369	205	295.1	160	67
119	1.56	-0.031	311	310	279	368	204	294.5	159	67
120	1.55	-0.029	311	309	278	367	204	294.0	158	67
121	1.54	-0.032	309	308	278	365	205	293.1	158	67
122	1.54	-0.032	310	308	276	364	205	292.6	158	67
123	1.52	-0.030	309	307	276	363	205	291.9	157	67
124	1.52	-0.030	308	306	275	362	205	291.3	156	67
125	1.51	-0.031	308	305	274	361	205	290.6	156	67
126	1.51	-0.030	307	305	273	360	205	289.9	155	67
127	1.50	-0.031	307	304	272	359	205	289.5	155	67
128	1.49	-0.028	306	304	272	358	205	288.8	154	67
129	1.48	-0.030	305	303	271	356	205	287.9	154	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.079	0.01	71	0.1		6.01		80	193	69	67
1	0.113	0.113	0.078	2.92	71	1.1	-	6.00	-0.01	83	206	69	67
2	0.284	0.171	0.081	2.97	71	1.1	-	5.99	-0.01	79	185	69	67
3	0.453	0.169	0.080	3.02	71	1.1	-	5.94	-0.05	78	188	69	67
4	0.619	0.166	0.078	3.05	71	1.2	-	5.92	-0.02	77	175	69	67
5	0.791	0.172	0.079	3.08	71	1.1	-	5.89	-0.03	77	167	69	67
6	0.964	0.173	0.080	3.11	71	1.1	-	5.86	-0.03	76	163	69	67
7	1.134	0.170	0.080	3.12	71	1.2	-	5.83	-0.03	76	161	69	67
8	1.307	0.173	0.079	3.16	71	1.2	-	5.81	-0.02	76	160	69	67
9	1.483	0.176	0.080	3.18	71	1.1	-	5.77	-0.04	76	161	69	67
10	1.659	0.176	0.080	3.18	71	1.1	93	5.75	-0.02	76	161	69	67
11	1.831	0.172	0.081	3.20	72	1.2	-	5.71	-0.04	76	162	69	67
12	2.006	0.175	0.080	3.23	72	1.1	-	5.69	-0.02	76	162	69	67
13	2.184	0.178	0.080	3.24	72	1.2	-	5.66	-0.03	76	162	69	67
14	2.360	0.176	0.081	3.24	72	1.2	-	5.64	-0.02	76	162	69	67
15	2.534	0.174	0.080	3.25	72	1.1	-	5.61	-0.03	76	162	69	67
16	2.711	0.177	0.077	3.27	73	1.1	-	5.58	-0.03	76	162	69	67
17	2.889	0.178	0.079	3.27	73	1.1	-	5.55	-0.03	76	163	69	67
18	3.069	0.180	0.079	3.28	73	1.1	-	5.51	-0.04	76	162	70	67
19	3.246	0.177	0.078	3.29	73	1.1	-	5.48	-0.03	76	161	70	67
20	3.423	0.177	0.081	3.31	74	1.2	98	5.45	-0.03	76	161	70	67
21	3.602	0.179	0.080	3.32	74	1.2	-	5.42	-0.03	76	161	70	67
22	3.782	0.180	0.083	3.33	74	1.2	-	5.40	-0.02	76	161	70	67
23	3.961	0.179	0.081	3.33	75	1.1	-	5.37	-0.03	76	161	70	67
24	4.142	0.181	0.078	3.33	75	1.2	-	5.35	-0.02	76	160	70	67
25	4.317	0.175	0.079	3.34	75	1.2	-	5.32	-0.03	76	160	70	66
26	4.501	0.184	0.079	3.34	75	1.2	-	5.29	-0.03	76	160	70	67
27	4.680	0.179	0.080	3.37	76	1.2	-	5.26	-0.03	76	159	70	67
28	4.860	0.180	0.079	3.37	76	1.2	-	5.24	-0.02	76	159	70	67
29	5.038	0.178	0.080	3.35	76	1.2	-	5.21	-0.03	76	158	70	67
30	5.218	0.180	0.081	3.37	77	1.2	99	5.19	-0.02	76	158	70	67
31	5.403	0.185	0.079	3.39	77	1.2	-	5.16	-0.03	76	157	70	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
32	5.582	0.179	0.083	3.38	77	1.2	-	5.14	-0.02	76	158	70	67
33	5.764	0.182	0.080	3.39	77	1.2	-	5.10	-0.04	76	158	70	67
34	5.944	0.180	0.078	3.38	78	1.2	-	5.09	-0.01	76	158	70	67
35	6.125	0.181	0.081	3.39	78	1.2	-	5.06	-0.03	76	157	70	67
36	6.305	0.180	0.081	3.40	78	1.2	-	5.04	-0.02	76	157	70	67
37	6.488	0.183	0.083	3.40	78	1.1	-	5.01	-0.03	76	157	70	67
38	6.672	0.184	0.081	3.41	79	1.2	-	4.99	-0.02	76	156	70	67
39	6.855	0.183	0.081	3.41	79	1.2	-	4.97	-0.02	76	156	70	67
40	7.034	0.179	0.082	3.43	79	1.2	99	4.93	-0.04	76	156	70	67
41	7.216	0.182	0.083	3.41	80	1.2	-	4.91	-0.02	76	155	70	67
42	7.399	0.183	0.081	3.42	80	1.2	-	4.88	-0.03	76	156	70	67
43	7.582	0.183	0.082	3.43	80	1.2	-	4.85	-0.03	76	158	70	67
44	7.766	0.184	0.079	3.43	80	1.2	-	4.82	-0.03	76	158	70	67
45	7.950	0.184	0.081	3.43	81	1.2	-	4.79	-0.03	76	158	70	67
46	8.129	0.179	0.078	3.43	81	1.2	-	4.77	-0.02	76	157	70	67
47	8.316	0.187	0.080	3.43	81	1.2	-	4.75	-0.02	76	156	70	67
48	8.497	0.181	0.081	3.43	81	1.2	-	4.73	-0.02	76	155	70	67
49	8.681	0.184	0.080	3.45	81	1.2	-	4.70	-0.03	76	153	70	67
50	8.865	0.184	0.079	3.44	82	1.2	100	4.68	-0.02	76	152	70	66
51	9.049	0.184	0.081	3.45	82	1.2	-	4.66	-0.02	76	152	70	67
52	9.229	0.180	0.081	3.46	82	1.2	-	4.63	-0.03	76	151	70	67
53	9.413	0.184	0.081	3.45	82	1.2	-	4.62	-0.01	76	150	70	67
54	9.599	0.186	0.080	3.46	82	1.2	-	4.59	-0.03	76	149	70	67
55	9.783	0.184	0.081	3.46	83	1.2	-	4.58	-0.01	76	149	70	67
56	9.968	0.185	0.079	3.45	83	1.2	-	4.56	-0.02	76	148	70	67
57	10.153	0.185	0.082	3.47	83	1.2	-	4.53	-0.03	76	148	70	67
58	10.334	0.181	0.081	3.46	83	1.2	-	4.51	-0.02	76	148	70	67
59	10.518	0.184	0.080	3.47	83	1.2	-	4.48	-0.03	76	149	70	67
60	10.702	0.184	0.081	3.48	84	1.2	100	4.47	-0.01	76	149	70	67
61	10.887	0.185	0.079	3.48	84	1.2	-	4.44	-0.03	76	149	70	67
62	11.074	0.187	0.081	3.47	84	1.2	-	4.42	-0.02	76	149	70	67
63	11.259	0.185	0.083	3.47	84	1.2	-	4.39	-0.03	76	149	70	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
64	11.443	0.184	0.080	3.48	84	1.2	-	4.36	-0.03	76	149	70	67
65	11.625	0.182	0.082	3.48	84	1.2	-	4.35	-0.01	76	149	70	67
66	11.809	0.184	0.083	3.46	84	1.2	-	4.33	-0.02	76	149	70	67
67	11.996	0.187	0.081	3.48	85	1.2	-	4.30	-0.03	76	149	70	67
68	12.181	0.185	0.079	3.49	85	1.2	-	4.28	-0.02	76	149	70	67
69	12.371	0.190	0.082	3.48	85	1.2	-	4.27	-0.01	76	149	70	67
70	12.552	0.181	0.080	3.48	85	1.2	100	4.24	-0.03	75	148	70	67
71	12.736	0.184	0.079	3.48	85	1.2	-	4.22	-0.02	75	148	70	67
72	12.921	0.185	0.080	3.48	85	1.2	-	4.20	-0.02	75	148	70	67
73	13.104	0.183	0.080	3.50	85	1.2	-	4.18	-0.02	75	148	70	67
74	13.291	0.187	0.081	3.49	85	1.2	-	4.15	-0.03	76	148	70	67
75	13.477	0.186	0.083	3.48	86	1.2	-	4.13	-0.02	76	148	70	67
76	13.664	0.187	0.079	3.49	86	1.2	-	4.10	-0.03	76	149	70	67
77	13.850	0.186	0.082	3.49	86	1.2	-	4.08	-0.02	76	149	70	67
78	14.032	0.182	0.082	3.49	86	1.2	-	4.06	-0.02	76	150	70	67
79	14.218	0.186	0.081	3.50	86	1.2	-	4.03	-0.03	76	150	70	67
80	14.403	0.185	0.080	3.51	86	1.2	100	4.01	-0.02	76	150	70	67
81	14.590	0.187	0.081	3.50	86	1.2	-	3.99	-0.02	76	149	70	67
82	14.776	0.186	0.081	3.51	86	1.2	-	3.97	-0.02	76	149	70	67
83	14.963	0.187	0.080	3.50	86	1.2	-	3.94	-0.03	76	148	70	67
84	15.149	0.186	0.079	3.51	87	1.2	-	3.92	-0.02	76	148	70	67
85	15.333	0.184	0.080	3.50	87	1.2	-	3.89	-0.03	76	148	70	67
86	15.519	0.186	0.079	3.51	87	1.2	-	3.88	-0.01	76	147	70	67
87	15.703	0.184	0.081	3.51	87	1.2	-	3.85	-0.03	76	146	70	67
88	15.891	0.188	0.081	3.51	87	1.2	-	3.83	-0.02	76	145	70	67
89	16.078	0.187	0.079	3.52	87	1.2	-	3.81	-0.02	76	145	70	67
90	16.266	0.188	0.079	3.51	87	1.2	101	3.78	-0.03	76	145	70	67
91	16.450	0.184	0.080	3.51	87	1.2	-	3.77	-0.01	76	145	70	67
92	16.636	0.186	0.081	3.51	87	1.2	-	3.74	-0.03	76	145	70	67
93	16.821	0.185	0.081	3.51	87	1.2	-	3.72	-0.02	76	145	70	67
94	17.006	0.185	0.081	3.52	87	1.2	-	3.69	-0.03	76	146	70	67
95	17.194	0.188	0.080	3.52	87	1.2	-	3.67	-0.02	76	147	70	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
96	17.380	0.186	0.080	3.51	88	1.2	-	3.64	-0.03	76	148	70	67
97	17.568	0.188	0.082	3.50	88	1.2	-	3.62	-0.02	76	148	70	67
98	17.754	0.186	0.082	3.53	88	1.2	-	3.60	-0.02	76	149	70	67
99	17.941	0.187	0.080	3.52	88	1.2	-	3.57	-0.03	76	150	70	67
100	18.124	0.183	0.080	3.53	88	1.2	101	3.54	-0.03	76	151	70	67
101	18.311	0.187	0.081	3.52	88	1.2	-	3.51	-0.03	76	152	70	67
102	18.496	0.185	0.080	3.52	88	1.2	-	3.47	-0.04	76	152	70	67
103	18.685	0.189	0.079	3.52	88	1.2	-	3.44	-0.03	76	154	70	67
104	18.872	0.187	0.080	3.52	88	1.2	-	3.40	-0.04	76	155	71	67
105	19.060	0.188	0.078	3.51	88	1.2	-	3.38	-0.02	77	157	71	67
106	19.246	0.186	0.080	3.53	88	1.2	-	3.35	-0.03	77	157	71	67
107	19.431	0.185	0.081	3.51	88	1.2	-	3.31	-0.04	77	157	71	67
108	19.617	0.186	0.079	3.52	88	1.2	-	3.28	-0.03	77	157	71	67
109	19.802	0.185	0.079	3.52	88	1.2	-	3.25	-0.03	77	156	71	67
110	19.993	0.191	0.080	3.53	88	1.3	101	3.22	-0.03	77	156	71	67
111	20.177	0.184	0.079	3.53	88	1.2	-	3.20	-0.02	77	155	71	67
112	20.366	0.189	0.081	3.52	89	1.2	-	3.16	-0.04	77	154	71	67
113	20.552	0.186	0.080	3.53	89	1.2	-	3.14	-0.02	77	154	71	67
114	20.739	0.187	0.080	3.51	89	1.2	-	3.11	-0.03	77	154	71	67
115	20.923	0.184	0.079	3.53	89	1.2	-	3.08	-0.03	77	153	71	67
116	21.110	0.187	0.079	3.52	89	1.2	-	3.06	-0.02	77	153	71	67
117	21.296	0.186	0.080	3.53	89	1.2	-	3.03	-0.03	77	152	71	67
118	21.485	0.189	0.081	3.53	89	1.2	-	3.01	-0.02	77	151	71	67
119	21.672	0.187	0.079	3.53	89	1.2	-	2.98	-0.03	77	151	71	67
120	21.861	0.189	0.079	3.52	89	1.2	101	2.97	-0.01	77	150	71	67
121	22.046	0.185	0.081	3.54	89	1.2	-	2.94	-0.03	77	150	71	67
122	22.233	0.187	0.079	3.52	89	1.2	-	2.91	-0.03	76	150	71	67
123	22.418	0.185	0.080	3.53	89	1.2	-	2.90	-0.01	76	150	71	67
124	22.605	0.187	0.078	3.53	89	1.2	-	2.85	-0.05	77	152	71	67
125	22.792	0.187	0.080	3.53	89	1.2	-	2.84	-0.01	77	151	71	67
126	22.980	0.188	0.080	3.52	89	1.2	-	2.81	-0.03	77	151	71	67
127	23.168	0.188	0.080	3.52	89	1.2	-	2.78	-0.03	77	150	71	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
128	23.356	0.188	0.079	3.53	89	1.2	-	2.77	-0.01	77	150	71	67
129	23.543	0.187	0.082	3.52	89	1.2	-	2.75	-0.02	77	149	71	67
130	23.728	0.185	0.082	3.52	89	1.2	100	2.73	-0.02	77	148	71	67
131	23.915	0.187	0.080	3.54	89	1.2	-	2.70	-0.03	76	147	71	67
132	24.100	0.185	0.080	3.51	89	1.2	-	2.68	-0.02	77	147	71	67
133	24.289	0.189	0.079	3.52	89	1.2	-	2.66	-0.02	77	146	71	67
134	24.476	0.187	0.080	3.53	89	1.2	-	2.64	-0.02	77	145	71	67
135	24.668	0.192	0.082	3.54	89	1.2	-	2.62	-0.02	76	145	71	68
136	24.852	0.184	0.080	3.53	90	1.2	-	2.60	-0.02	76	144	71	67
137	25.040	0.188	0.079	3.53	89	1.2	-	2.59	-0.01	76	144	71	68
138	25.224	0.184	0.080	3.53	90	1.2	-	2.57	-0.02	76	143	71	68
139	25.412	0.188	0.079	3.54	90	1.2	-	2.55	-0.02	76	143	71	67
140	25.597	0.185	0.080	3.52	90	1.2	100	2.54	-0.01	76	143	71	67
141	25.787	0.190	0.081	3.53	90	1.2	-	2.51	-0.03	76	143	71	68
142	25.974	0.187	0.079	3.52	90	1.2	-	2.50	-0.01	76	142	71	68
143	26.163	0.189	0.079	3.52	90	1.2	-	2.48	-0.02	76	142	71	68
144	26.350	0.187	0.079	3.53	90	1.2	-	2.45	-0.03	76	141	71	67
145	26.538	0.188	0.080	3.53	90	1.2	-	2.44	-0.01	76	141	71	67
146	26.722	0.184	0.081	3.54	90	1.2	-	2.43	-0.01	76	142	71	68
147	26.910	0.188	0.081	3.54	90	1.2	-	2.40	-0.03	76	142	71	68
148	27.095	0.185	0.082	3.54	90	1.2	-	2.38	-0.02	76	142	71	67
149	27.285	0.190	0.080	3.53	90	1.2	-	2.37	-0.01	76	142	71	68
150	27.472	0.187	0.078	3.54	90	1.2	101	2.35	-0.02	76	141	71	67
151	27.662	0.190	0.081	3.53	90	1.2	-	2.33	-0.02	76	140	71	68
152	27.848	0.186	0.080	3.54	90	1.2	-	2.31	-0.02	76	140	71	68
153	28.037	0.189	0.080	3.54	90	1.2	-	2.30	-0.01	76	140	71	67
154	28.221	0.184	0.079	3.54	90	1.2	-	2.28	-0.02	76	140	71	67
155	28.409	0.188	0.080	3.54	90	1.2	-	2.25	-0.03	76	140	71	67
156	28.595	0.186	0.080	3.54	90	1.2	-	2.24	-0.01	76	140	71	67
157	28.784	0.189	0.081	3.54	90	1.2	-	2.22	-0.02	76	140	71	68
158	28.972	0.188	0.079	3.54	90	1.2	-	2.20	-0.02	76	140	71	68
159	29.161	0.189	0.080	3.53	90	1.2	-	2.18	-0.02	76	140	71	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
160	29.348	0.187	0.079	3.53	90	1.2	102	2.16	-0.02	76	139	71	68
161	29.537	0.189	0.081	3.54	90	1.2	-	2.15	-0.01	76	139	71	68
162	29.721	0.184	0.080	3.54	90	1.2	-	2.14	-0.01	76	139	71	67
163	29.909	0.188	0.081	3.54	90	1.2	-	2.10	-0.04	76	139	71	68
164	30.095	0.186	0.081	3.52	90	1.2	-	2.10	0.00	76	138	71	68
165	30.285	0.190	0.079	3.53	90	1.2	-	2.08	-0.02	76	138	71	68
166	30.472	0.187	0.081	3.53	90	1.2	-	2.07	-0.01	76	137	71	68
167	30.662	0.190	0.080	3.54	90	1.2	-	2.05	-0.02	76	137	71	68
168	30.849	0.187	0.083	3.53	90	1.2	-	2.03	-0.02	76	138	71	67
169	31.037	0.188	0.081	3.54	90	1.2	-	2.01	-0.02	76	138	71	67
170	31.223	0.186	0.083	3.53	90	1.2	100	1.99	-0.02	76	138	71	67
171	31.412	0.189	0.084	3.54	90	1.2	-	1.97	-0.02	76	137	71	67
172	31.596	0.184	0.083	3.51	90	1.2	-	1.96	-0.01	76	136	71	67
173	31.785	0.189	0.082	3.53	90	1.2	-	1.93	-0.03	76	136	71	67
174	31.973	0.188	0.083	3.53	90	1.2	-	1.93	0.00	76	136	71	67
175	32.162	0.189	0.083	3.54	90	1.2	-	1.91	-0.02	76	135	71	67
176	32.350	0.188	0.081	3.53	90	1.2	-	1.90	-0.01	76	134	71	67
177	32.537	0.187	0.080	3.55	90	1.2	-	1.89	-0.01	76	134	71	67
178	32.724	0.187	0.082	3.52	90	1.2	-	1.87	-0.02	76	134	71	67
179	32.910	0.186	0.081	3.54	90	1.2	-	1.85	-0.02	76	134	71	67
180	33.097	0.187	0.082	3.53	90	1.2	99	1.84	-0.01	76	134	71	67
181	33.285	0.188	0.082	3.54	90	1.2	-	1.83	-0.01	76	133	71	67
182	33.474	0.189	0.080	3.54	90	1.2	-	1.82	-0.01	76	133	71	67
183	33.662	0.188	0.082	3.55	90	1.2	-	1.81	-0.01	76	133	71	67
184	33.851	0.189	0.080	3.53	90	1.2	-	1.79	-0.02	76	133	71	67
185	34.038	0.187	0.081	3.54	91	1.2	-	1.79	0.00	76	133	71	67
186	34.225	0.187	0.081	3.53	90	1.2	-	1.77	-0.02	76	133	71	67
187	34.410	0.185	0.082	3.54	91	1.2	-	1.75	-0.02	76	133	71	67
188	34.599	0.189	0.080	3.54	91	1.2	-	1.75	0.00	76	133	71	68
189	34.789	0.190	0.080	3.55	90	1.2	-	1.74	-0.01	76	132	71	68
190	34.975	0.186	0.081	3.53	91	1.2	100	1.73	-0.01	76	132	71	67
191	35.163	0.188	0.081	3.54	90	1.2	-	1.71	-0.02	76	132	71	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
192	35.352	0.189	0.081	3.53	91	1.2	-	1.70	-0.01	76	131	71	68
193	35.539	0.187	0.080	3.55	91	1.2	-	1.69	-0.01	76	132	71	67
194	35.727	0.188	0.082	3.54	91	1.2	-	1.68	-0.01	76	131	71	68
195	35.913	0.186	0.079	3.53	91	1.2	-	1.67	-0.01	76	131	71	68
196	36.104	0.191	0.082	3.52	91	1.2	-	1.67	0.00	76	130	71	67
197	36.287	0.183	0.080	3.55	91	1.2	-	1.64	-0.03	76	130	71	67
198	36.476	0.189	0.083	3.54	91	1.2	-	1.64	0.00	76	129	71	68
199	36.664	0.188	0.079	3.55	91	1.2	-	1.62	-0.02	76	129	71	68
200	36.854	0.190	0.082	3.54	91	1.2	100	1.62	0.00	76	129	71	68
201	37.041	0.187	0.082	3.55	91	1.2	-	1.61	-0.01	76	129	71	68
202	37.229	0.188	0.082	3.53	91	1.2	-	1.59	-0.02	76	129	71	67
203	37.414	0.185	0.082	3.54	91	1.2	-	1.59	0.00	76	128	71	68
204	37.602	0.188	0.082	3.52	91	1.2	-	1.58	-0.01	76	128	71	68
205	37.788	0.186	0.080	3.53	91	1.2	-	1.57	-0.01	76	127	71	68
206	37.978	0.190	0.083	3.53	91	1.3	-	1.56	-0.01	76	127	71	68
207	38.166	0.188	0.082	3.54	91	1.2	-	1.55	-0.01	76	127	71	68
208	38.356	0.190	0.083	3.55	91	1.2	-	1.54	-0.01	76	126	71	68
209	38.543	0.187	0.081	3.54	91	1.2	-	1.54	0.00	76	126	71	68
210	38.732	0.189	0.081	3.54	91	1.2	100	1.53	-0.01	76	125	71	68
211	38.917	0.185	0.080	3.53	91	1.2	-	1.52	-0.01	76	125	71	68
212	39.104	0.187	0.080	3.55	91	1.2	-	1.52	0.00	76	125	71	68
213	39.291	0.187	0.082	3.53	91	1.2	-	1.50	-0.02	76	124	71	68
214	39.480	0.189	0.081	3.54	91	1.2	-	1.50	0.00	76	124	71	68
215	39.668	0.188	0.080	3.53	91	1.2	-	1.46	-0.04	81	188	71	68
216	39.857	0.189	0.079	3.54	91	1.2	-	1.43	-0.03	79	169	71	68
217	40.046	0.189	0.082	3.54	91	1.2	-	1.38	-0.05	77	165	71	68
218	40.233	0.187	0.081	3.54	91	1.2	-	1.34	-0.04	77	166	71	68
219	40.424	0.191	0.079	3.54	91	1.2	-	1.30	-0.04	77	170	71	68
220	40.606	0.182	0.081	3.53	91	1.2	100	1.27	-0.03	77	173	71	68
221	40.793	0.187	0.080	3.52	91	1.2	-	1.23	-0.04	77	174	71	68
222	40.981	0.188	0.082	3.54	91	1.2	-	1.20	-0.03	77	175	71	68
223	41.171	0.190	0.081	3.54	91	1.2	-	1.17	-0.03	77	175	71	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
224	41.358	0.187	0.081	3.54	91	1.2	-	1.16	-0.01	77	175	71	68
225	41.548	0.190	0.083	3.54	91	1.2	-	1.13	-0.03	78	173	71	68
226	41.735	0.187	0.080	3.55	91	1.2	-	1.11	-0.02	78	171	71	68
227	41.923	0.188	0.080	3.53	91	1.2	-	1.10	-0.01	78	169	71	68
228	42.109	0.186	0.081	3.54	91	1.2	-	1.09	-0.01	77	167	71	68
229	42.296	0.187	0.081	3.53	91	1.2	-	1.06	-0.03	77	165	71	68
230	42.483	0.187	0.081	3.55	91	1.2	100	1.05	-0.01	77	163	71	68
231	42.673	0.190	0.079	3.54	91	1.2	-	1.04	-0.01	77	161	71	68
232	42.861	0.188	0.080	3.54	91	1.2	-	1.02	-0.02	77	159	71	68
233	43.051	0.190	0.079	3.54	91	1.2	-	1.01	-0.01	77	159	71	68
234	43.238	0.187	0.081	3.54	91	1.2	-	1.01	0.00	77	158	71	68
235	43.426	0.188	0.080	3.54	91	1.2	-	0.99	-0.02	77	157	71	68
236	43.611	0.185	0.080	3.54	91	1.2	-	0.98	-0.01	77	157	71	68
237	43.800	0.189	0.082	3.54	91	1.2	-	0.97	-0.01	77	156	71	68
238	43.986	0.186	0.081	3.54	91	1.2	-	0.96	-0.01	77	156	71	68
239	44.177	0.191	0.082	3.55	91	1.2	-	0.94	-0.02	77	154	71	68
240	44.363	0.186	0.081	3.54	91	1.2	100	0.93	-0.01	77	153	71	68
241	44.553	0.190	0.081	3.54	91	1.2	-	0.92	-0.01	77	152	71	68
242	44.741	0.188	0.081	3.54	91	1.2	-	0.92	0.00	77	152	71	68
243	44.929	0.188	0.082	3.54	91	1.2	-	0.91	-0.01	77	151	71	68
244	45.116	0.187	0.082	3.53	91	1.2	-	0.89	-0.02	77	150	71	68
245	45.302	0.186	0.083	3.54	91	1.2	-	0.89	0.00	77	150	71	68
246	45.489	0.187	0.082	3.53	91	1.2	-	0.87	-0.02	77	149	71	68
247	45.677	0.188	0.083	3.55	91	1.3	-	0.86	-0.01	77	148	71	68
248	45.867	0.190	0.082	3.54	91	1.2	-	0.84	-0.02	77	148	71	68
249	46.054	0.187	0.080	3.54	91	1.2	-	0.83	-0.01	77	148	71	68
250	46.245	0.191	0.080	3.54	91	1.2	101	0.83	0.00	77	147	71	68
251	46.431	0.186	0.081	3.55	91	1.2	-	0.82	-0.01	77	146	71	68
252	46.620	0.189	0.081	3.54	91	1.2	-	0.81	-0.01	77	146	71	68
253	46.805	0.185	0.082	3.56	91	1.2	-	0.81	0.00	77	146	71	68
254	46.993	0.188	0.082	3.54	91	1.2	-	0.79	-0.02	77	145	71	68
255	47.180	0.187	0.082	3.55	91	1.2	-	0.78	-0.01	77	145	71	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
256	47.370	0.190	0.080	3.54	91	1.2	-	0.77	-0.01	77	145	71	68
257	47.558	0.188	0.081	3.55	91	1.2	-	0.77	0.00	77	145	71	68
258	47.748	0.190	0.080	3.55	91	1.2	-	0.76	-0.01	77	144	71	68
259	47.935	0.187	0.081	3.55	91	1.2	-	0.75	-0.01	77	144	71	68
260	48.124	0.189	0.082	3.55	91	1.2	100	0.74	-0.01	77	143	71	68
261	48.309	0.185	0.081	3.55	91	1.2	-	0.73	-0.01	77	143	71	68
262	48.497	0.188	0.080	3.55	91	1.3	-	0.73	0.00	77	143	71	68
263	48.684	0.187	0.081	3.54	91	1.2	-	0.71	-0.02	76	143	71	68
264	48.873	0.189	0.079	3.55	91	1.2	-	0.70	-0.01	76	143	71	68
265	49.062	0.189	0.081	3.55	91	1.2	-	0.70	0.00	76	143	71	68
266	49.251	0.189	0.081	3.55	91	1.2	-	0.69	-0.01	76	143	71	68
267	49.440	0.189	0.081	3.54	91	1.2	-	0.68	-0.01	76	143	71	68
268	49.627	0.187	0.082	3.54	91	1.2	-	0.67	-0.01	76	143	71	68
269	49.815	0.188	0.080	3.55	91	1.2	-	0.67	0.00	76	142	71	68
270	50.004	0.189	0.080	3.55	91	1.2	100	0.65	-0.02	76	142	71	68
271	50.189	0.185	0.081	3.55	91	1.2	-	0.64	-0.01	76	142	71	68
272	50.376	0.187	0.079	3.56	91	1.2	-	0.64	0.00	76	141	71	68
273	50.566	0.190	0.081	3.54	91	1.2	-	0.63	-0.01	76	142	71	68
274	50.754	0.188	0.082	3.56	91	1.2	-	0.63	0.00	76	141	71	68
275	50.944	0.190	0.080	3.54	91	1.2	-	0.62	-0.01	76	141	71	68
276	51.131	0.187	0.080	3.55	91	1.3	-	0.61	-0.01	76	141	71	68
277	51.320	0.189	0.081	3.55	91	1.2	-	0.60	-0.01	76	140	71	67
278	51.505	0.185	0.080	3.55	91	1.2	-	0.60	0.00	76	141	71	68
279	51.693	0.188	0.081	3.54	91	1.2	-	0.58	-0.02	76	140	71	67
280	51.879	0.186	0.081	3.54	91	1.2	100	0.57	-0.01	76	141	71	67
281	52.070	0.191	0.081	3.54	91	1.2	-	0.58	0.01	76	140	71	67
282	52.258	0.188	0.081	3.53	91	1.3	-	0.56	-0.02	76	140	71	67
283	52.448	0.190	0.081	3.55	91	1.2	-	0.56	0.00	76	140	71	67
284	52.636	0.188	0.082	3.54	91	1.2	-	0.54	-0.02	76	140	71	67
285	52.824	0.188	0.080	3.55	91	1.2	-	0.54	0.00	76	140	71	67
286	53.011	0.187	0.082	3.54	91	1.2	-	0.53	-0.01	76	139	71	67
287	53.197	0.186	0.082	3.54	91	1.3	-	0.52	-0.01	76	139	71	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
288	53.385	0.188	0.082	3.55	91	1.2	-	0.51	-0.01	76	139	71	67
289	53.572	0.187	0.081	3.54	91	1.2	-	0.51	0.00	76	140	71	67
290	53.762	0.190	0.081	3.54	91	1.2	100	0.50	-0.01	76	140	71	67
291	53.950	0.188	0.082	3.56	91	1.2	-	0.49	-0.01	75	140	71	67
292	54.140	0.190	0.082	3.54	91	1.2	-	0.50	0.01	76	140	71	67
293	54.328	0.188	0.081	3.55	91	1.2	-	0.47	-0.03	75	140	71	67
294	54.516	0.188	0.082	3.54	91	1.2	-	0.47	0.00	75	139	71	67
295	54.701	0.185	0.082	3.57	91	1.2	-	0.47	0.00	75	139	71	67
296	54.893	0.192	0.080	3.55	91	1.2	-	0.46	-0.01	75	139	71	67
297	55.076	0.183	0.082	3.54	91	1.2	-	0.45	-0.01	75	139	71	67
298	55.266	0.190	0.083	3.55	91	1.2	-	0.44	-0.01	75	139	71	67
299	55.454	0.188	0.083	3.55	91	1.2	-	0.43	-0.01	75	139	71	67
300	55.644	0.190	0.083	3.54	91	1.2	100	0.42	-0.01	75	139	71	67
301	55.832	0.188	0.081	3.54	91	1.3	-	0.41	-0.01	75	139	71	67
302	56.020	0.188	0.082	3.55	91	1.2	-	0.41	0.00	75	139	71	67
303	56.206	0.186	0.082	3.55	91	1.2	-	0.40	-0.01	75	140	71	67
304	56.393	0.187	0.083	3.55	91	1.2	-	0.39	-0.01	75	140	71	67
305	56.581	0.188	0.081	3.55	91	1.2	-	0.38	-0.01	75	140	71	67
306	56.769	0.188	0.080	3.54	91	1.2	-	0.37	-0.01	75	140	71	67
307	56.958	0.189	0.082	3.54	91	1.2	-	0.37	0.00	75	140	71	67
308	57.146	0.188	0.081	3.55	91	1.2	-	0.36	-0.01	75	139	71	67
309	57.336	0.190	0.082	3.54	91	1.2	-	0.35	-0.01	75	139	71	67
310	57.527	0.191	0.081	3.55	91	1.2	100	0.34	-0.01	75	139	71	67
311	57.712	0.185	0.081	3.56	91	1.2	-	0.34	0.00	75	139	71	67
312	57.898	0.186	0.081	3.56	91	1.2	-	0.33	-0.01	75	139	71	67
313	58.086	0.188	0.081	3.55	91	1.2	-	0.31	-0.02	75	139	71	67
314	58.273	0.187	0.082	3.55	91	1.2	-	0.31	0.00	75	139	71	67
315	58.463	0.190	0.081	3.54	91	1.2	-	0.31	0.00	75	139	71	67
316	58.650	0.187	0.083	3.56	91	1.2	-	0.30	-0.01	75	139	71	67
317	58.841	0.191	0.080	3.55	91	1.2	-	0.28	-0.02	75	139	71	67
318	59.028	0.187	0.079	3.55	91	1.2	-	0.27	-0.01	75	139	71	67
319	59.218	0.190	0.081	3.55	91	1.2	-	0.27	0.00	75	139	71	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
320	59.403	0.185	0.082	3.54	91	1.2	100	0.26	-0.01	75	139	71	67
321	59.591	0.188	0.082	3.54	91	1.3	-	0.25	-0.01	75	139	71	67
322	59.778	0.187	0.081	3.54	91	1.2	-	0.25	0.00	75	139	71	67
323	59.966	0.188	0.082	3.54	91	1.2	-	0.24	-0.01	75	139	71	67
324	60.156	0.190	0.081	3.54	91	1.2	-	0.23	-0.01	75	140	71	67
325	60.344	0.188	0.077	3.55	91	1.3	-	0.23	0.00	75	140	70	67
326	60.534	0.190	0.079	3.54	91	1.2	-	0.22	-0.01	75	140	70	67
327	60.721	0.187	0.081	3.57	91	1.2	-	0.22	0.00	75	141	70	67
328	60.910	0.189	0.081	3.54	91	1.2	-	0.21	-0.01	75	141	70	67
329	61.096	0.186	0.081	3.56	91	1.3	-	0.20	-0.01	75	141	70	67
330	61.284	0.188	0.080	3.54	91	1.2	100	0.20	0.00	75	141	70	67
331	61.471	0.187	0.081	3.55	91	1.2	-	0.19	-0.01	75	140	70	67
332	61.661	0.190	0.080	3.55	91	1.2	-	0.18	-0.01	75	141	70	67
333	61.849	0.188	0.081	3.55	91	1.2	-	0.19	0.01	75	141	70	67
334	62.040	0.191	0.079	3.55	91	1.2	-	0.18	-0.01	75	141	70	67
335	62.227	0.187	0.079	3.54	91	1.2	-	0.17	-0.01	75	141	70	67
336	62.416	0.189	0.079	3.55	91	1.2	-	0.17	0.00	75	141	70	67
337	62.602	0.186	0.082	3.53	91	1.2	-	0.17	0.00	75	141	70	67
338	62.789	0.187	0.080	3.54	91	1.2	-	0.17	0.00	75	141	70	67
339	62.976	0.187	0.081	3.54	91	1.2	-	0.16	-0.01	75	141	70	67
340	63.164	0.188	0.080	3.56	91	1.2	101	0.15	-0.01	75	142	70	67
341	63.354	0.190	0.079	3.54	91	1.2	-	0.14	-0.01	75	141	70	67
342	63.542	0.188	0.080	3.54	91	1.2	-	0.14	0.00	75	141	70	67
343	63.732	0.190	0.081	3.55	91	1.2	-	0.12	-0.02	75	142	70	67
344	63.919	0.187	0.080	3.55	91	1.3	-	0.13	0.01	75	142	70	67
345	64.108	0.189	0.080	3.54	91	1.2	-	0.13	0.00	75	142	70	67
346	64.293	0.185	0.079	3.56	91	1.2	-	0.12	-0.01	75	142	70	67
347	64.481	0.188	0.081	3.53	91	1.2	-	0.11	-0.01	75	142	70	67
348	64.668	0.187	0.082	3.56	91	1.2	-	0.11	0.00	75	142	70	67
349	64.858	0.190	0.079	3.54	91	1.2	-	0.11	0.00	75	142	70	67
350	65.046	0.188	0.081	3.55	91	1.2	101	0.10	-0.01	75	143	70	67
351	65.236	0.190	0.079	3.55	91	1.2	-	0.09	-0.01	75	143	70	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
352	65.423	0.187	0.079	3.54	91	1.2	-	0.09	0.00	75	142	70	67
353	65.613	0.190	0.081	3.55	91	1.2	-	0.08	-0.01	75	142	70	67
354	65.798	0.185	0.081	3.55	91	1.2	-	0.08	0.00	75	143	70	67
355	65.986	0.188	0.080	3.55	91	1.2	-	0.07	-0.01	75	143	70	67
356	66.172	0.186	0.081	3.54	91	1.2	-	0.06	-0.01	75	143	70	67
357	66.361	0.189	0.081	3.54	91	1.2	-	0.05	-0.01	74	143	70	67
358	66.550	0.189	0.079	3.54	91	1.2	-	0.04	-0.01	74	143	70	67
359	66.739	0.189	0.080	3.54	91	1.2	-	0.04	0.00	74	143	70	67
360	66.928	0.189	0.077	3.54	91	1.2	102	0.03	-0.01	75	143	70	67
361	67.115	0.187	0.080	3.54	91	1.2	-	0.02	-0.01	74	144	70	67
362	67.304	0.189	0.080	3.54	91	1.2	-	0.03	0.01	74	144	70	67
363	67.489	0.185	0.080	3.54	91	1.2	-	0.01	-0.02	74	144	70	67
364	67.677	0.188	0.079	3.53	91	1.2	-	0.01	0.00	74	145	70	67
365	67.865	0.188	0.080	3.56	91	1.2	101	0.00	-0.01	74	145	70	67
Avg/Tot	67.865	0.186	0.081	3.49	87.6	1.2	100			75.9	146.7	70.5	67.1

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.02	71	0.6		71	-0.033	3.77	0.087
1	0.121	0.121	3.10	71	1.8	-	71	-0.035	1.32	0.159
2	0.290	0.169	3.10	71	1.7	-	71	-0.041	2.30	0.343
3	0.463	0.173	3.09	71	2.1	-	71	-0.047	4.30	0.016
4	0.636	0.173	3.10	71	2.2	-	71	-0.039	5.40	0.009
5	0.805	0.169	3.10	71	2.2	-	71	-0.038	5.48	0.012
6	0.976	0.171	3.10	71	1.6	-	71	-0.038	5.84	0.011
7	1.150	0.174	3.11	71	1.7	-	71	-0.038	6.80	0.010
8	1.322	0.172	3.12	72	1.9	-	71	-0.039	6.84	0.010
9	1.492	0.170	3.12	72	1.9	-	71	-0.039	7.28	0.012
10	1.665	0.173	3.12	72	2.2	98	71	-0.040	7.35	0.010
11	1.838	0.173	3.12	72	1.6	-	71	-0.039	7.36	0.011
12	2.009	0.171	3.12	72	1.8	-	71	-0.039	7.22	0.010
13	2.180	0.171	3.13	73	2.2	-	71	-0.040	6.66	0.011
14	2.353	0.173	3.13	73	2.0	-	71	-0.038	7.05	0.010
15	2.527	0.174	3.13	73	2.1	-	71	-0.039	7.18	0.013
16	2.698	0.171	3.13	73	2.1	-	71	-0.040	7.42	0.011
17	2.869	0.171	3.13	74	2.2	-	71	-0.039	7.72	0.015
18	3.043	0.174	3.14	74	2.0	-	71	-0.039	7.84	0.011
19	3.217	0.174	3.13	74	1.8	-	71	-0.040	7.64	0.009
20	3.388	0.171	3.13	74	1.6	100	71	-0.039	6.82	0.016
21	3.561	0.173	3.13	75	1.8	-	71	-0.039	7.26	0.010
22	3.736	0.175	3.14	75	1.7	-	71	-0.038	7.27	0.016
23	3.910	0.174	3.14	75	2.1	-	71	-0.037	7.44	0.010
24	4.086	0.176	3.15	76	1.7	-	71	-0.039	7.92	0.007
25	4.255	0.169	3.15	76	2.2	-	71	-0.040	7.84	0.013
26	4.434	0.179	3.16	76	2.1	-	71	-0.038	7.52	0.011
27	4.605	0.171	3.16	77	2.0	-	71	-0.038	7.42	0.014
28	4.778	0.173	3.16	77	2.2	-	72	-0.038	7.36	0.012
29	4.952	0.174	3.16	77	2.2	-	72	-0.036	7.46	0.012
30	5.127	0.175	3.16	78	1.8	100	72	-0.038	7.43	0.011
31	5.306	0.179	3.17	78	1.6	-	72	-0.038	7.60	0.010

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	5.477	0.171	3.17	78	1.9	-	72	-0.036	7.94	0.009
33	5.650	0.173	3.17	79	2.1	-	72	-0.039	8.05	0.009
34	5.826	0.176	3.17	79	2.0	-	72	-0.037	7.76	0.011
35	6.002	0.176	3.17	79	1.8	-	72	-0.038	7.51	0.014
36	6.177	0.175	3.17	80	1.8	-	72	-0.036	7.42	0.011
37	6.350	0.173	3.18	80	2.0	-	72	-0.038	7.39	0.013
38	6.526	0.176	3.18	80	1.8	-	72	-0.038	7.40	0.010
39	6.702	0.176	3.17	81	2.1	-	72	-0.036	7.69	0.007
40	6.878	0.176	3.18	81	1.7	100	72	-0.037	7.94	0.014
41	7.052	0.174	3.18	81	1.8	-	72	-0.037	8.47	0.009
42	7.227	0.175	3.18	82	1.6	-	72	-0.037	9.11	0.008
43	7.404	0.177	3.18	82	2.2	-	72	-0.037	10.05	0.010
44	7.582	0.178	3.18	82	1.8	-	72	-0.036	9.49	0.011
45	7.756	0.174	3.19	82	2.2	-	72	-0.036	8.94	0.008
46	7.931	0.175	3.19	83	2.0	-	72	-0.038	7.89	0.011
47	8.111	0.180	3.19	83	1.8	-	72	-0.037	7.29	0.009
48	8.286	0.175	3.19	83	1.9	-	72	-0.035	7.33	0.009
49	8.461	0.175	3.20	83	2.0	-	72	-0.035	7.34	0.010
50	8.635	0.174	3.19	84	2.1	100	72	-0.036	7.02	0.014
51	8.812	0.177	3.19	84	1.8	-	72	-0.034	7.01	0.010
52	8.989	0.177	3.19	84	2.2	-	72	-0.035	6.94	0.011
53	9.168	0.179	3.19	85	1.9	-	72	-0.035	6.96	0.009
54	9.344	0.176	3.20	85	1.9	-	72	-0.033	7.00	0.007
55	9.519	0.175	3.19	85	2.2	-	72	-0.032	7.14	0.010
56	9.697	0.178	3.20	85	1.7	-	72	-0.033	7.61	0.007
57	9.874	0.177	3.20	86	1.8	-	72	-0.032	8.39	0.005
58	10.052	0.178	3.20	86	2.1	-	72	-0.033	9.02	0.007
59	10.227	0.175	3.20	86	1.9	-	72	-0.035	9.41	0.009
60	10.404	0.177	3.20	86	2.2	101	72	-0.033	9.18	0.009
61	10.583	0.179	3.21	86	2.1	-	72	-0.033	9.06	0.009
62	10.761	0.178	3.20	87	1.7	-	72	-0.032	9.00	0.012
63	10.938	0.177	3.21	87	2.0	-	72	-0.035	8.96	0.007

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	11.113	0.175	3.20	87	1.9	-	72	-0.035	8.83	0.011
65	11.290	0.177	3.20	87	1.7	-	72	-0.034	8.73	0.014
66	11.468	0.178	3.20	87	1.6	-	72	-0.034	8.70	0.014
67	11.648	0.180	3.21	88	2.0	-	72	-0.034	8.67	0.007
68	11.824	0.176	3.21	88	2.2	-	72	-0.033	8.50	0.004
69	12.003	0.179	3.22	88	1.9	-	72	-0.035	8.40	0.010
70	12.178	0.175	3.21	88	1.7	100	72	-0.033	8.27	0.009
71	12.357	0.179	3.21	88	1.7	-	72	-0.034	8.30	0.014
72	12.535	0.178	3.21	89	2.1	-	72	-0.035	8.15	0.009
73	12.712	0.177	3.21	89	2.1	-	72	-0.037	8.25	0.007
74	12.889	0.177	3.21	89	2.0	-	72	-0.037	8.04	0.006
75	13.068	0.179	3.21	89	2.1	-	72	-0.034	8.28	0.012
76	13.246	0.178	3.22	89	1.9	-	72	-0.034	8.91	0.008
77	13.425	0.179	3.22	89	1.8	-	72	-0.035	9.33	0.008
78	13.602	0.177	3.22	90	1.8	-	72	-0.036	9.43	0.014
79	13.780	0.178	3.22	90	1.7	-	72	-0.035	9.50	0.009
80	13.959	0.179	3.22	90	1.7	101	72	-0.034	9.56	0.008
81	14.138	0.179	3.22	90	1.8	-	72	-0.032	9.37	0.005
82	14.317	0.179	3.22	90	2.2	-	72	-0.036	9.46	0.008
83	14.493	0.176	3.22	90	1.8	-	72	-0.035	9.41	0.012
84	14.672	0.179	3.23	91	2.1	-	72	-0.032	9.26	0.007
85	14.852	0.180	3.23	91	1.9	-	72	-0.033	9.08	0.007
86	15.030	0.178	3.22	91	2.1	-	72	-0.035	9.02	0.008
87	15.209	0.179	3.23	91	2.0	-	72	-0.032	9.03	0.009
88	15.387	0.178	3.22	91	1.7	-	72	-0.033	9.11	0.007
89	15.565	0.178	3.23	91	1.7	-	72	-0.033	9.15	0.005
90	15.745	0.180	3.23	91	1.7	101	72	-0.031	9.30	0.007
91	15.924	0.179	3.23	91	1.6	-	72	-0.035	9.57	0.010
92	16.102	0.178	3.22	92	2.0	-	72	-0.032	9.83	0.006
93	16.281	0.179	3.23	92	2.2	-	72	-0.033	10.03	0.010
94	16.459	0.178	3.22	92	1.7	-	72	-0.033	10.25	0.005
95	16.638	0.179	3.23	92	2.1	-	72	-0.033	10.52	0.012

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	16.818	0.180	3.23	92	1.7	-	72	-0.032	10.75	0.013
97	16.997	0.179	3.22	92	1.7	-	72	-0.035	10.84	0.009
98	17.175	0.178	3.22	92	1.7	-	72	-0.032	11.47	0.010
99	17.353	0.178	3.23	92	1.6	-	72	-0.035	11.59	0.013
100	17.532	0.179	3.23	92	1.8	101	72	-0.036	11.55	0.022
101	17.712	0.180	3.23	92	2.1	-	72	-0.036	11.91	0.013
102	17.893	0.181	3.23	93	1.6	-	72	-0.037	12.17	0.038
103	18.071	0.178	3.22	93	1.7	-	72	-0.037	12.34	0.027
104	18.249	0.178	3.24	93	1.7	-	72	-0.037	12.47	0.018
105	18.428	0.179	3.23	93	1.7	-	72	-0.038	12.40	0.028
106	18.607	0.179	3.23	93	2.0	-	72	-0.038	12.26	0.020
107	18.788	0.181	3.23	93	2.2	-	72	-0.038	12.02	0.010
108	18.968	0.180	3.24	93	1.8	-	72	-0.039	11.79	0.008
109	19.144	0.176	3.23	93	1.6	-	72	-0.038	11.62	0.003
110	19.326	0.182	3.23	93	1.7	101	72	-0.036	11.40	0.007
111	19.504	0.178	3.24	93	2.1	-	72	-0.035	11.15	0.008
112	19.684	0.180	3.23	93	2.0	-	72	-0.035	10.88	0.010
113	19.863	0.179	3.23	93	1.9	-	72	-0.036	10.76	0.008
114	20.040	0.177	3.23	93	1.8	-	72	-0.038	10.46	0.004
115	20.220	0.180	3.23	94	1.9	-	72	-0.035	10.34	0.005
116	20.400	0.180	3.23	94	2.0	-	72	-0.037	10.28	0.005
117	20.581	0.181	3.23	94	1.7	-	72	-0.035	10.16	0.004
118	20.760	0.179	3.24	94	2.2	-	72	-0.035	10.08	0.009
119	20.937	0.177	3.23	94	2.1	-	72	-0.036	10.02	0.006
120	21.117	0.180	3.24	94	1.8	101	72	-0.037	9.93	0.008
121	21.297	0.180	3.24	94	2.1	-	72	-0.033	9.94	0.004
122	21.477	0.180	3.23	94	2.0	-	72	-0.035	10.12	0.006
123	21.657	0.180	3.24	94	2.1	-	72	-0.035	11.58	0.037
124	21.836	0.179	3.24	94	1.7	-	72	-0.035	11.59	0.131
125	22.015	0.179	3.24	94	2.1	-	72	-0.034	11.25	0.063
126	22.194	0.179	3.23	94	2.2	-	72	-0.036	10.30	0.006
127	22.374	0.180	3.23	94	1.6	-	72	-0.034	9.73	0.008

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
128	22.555	0.181	3.23	94	2.1	-	72	-0.034	9.44	0.007
129	22.735	0.180	3.23	94	2.1	-	72	-0.036	9.22	0.009
130	22.911	0.176	3.23	94	1.9	100	72	-0.035	9.25	0.008
131	23.091	0.180	3.23	94	1.7	-	72	-0.033	9.08	0.008
132	23.272	0.181	3.24	94	2.1	-	72	-0.034	9.02	0.005
133	23.454	0.182	3.24	95	2.2	-	72	-0.034	8.97	0.007
134	23.632	0.178	3.24	95	2.2	-	72	-0.034	8.88	0.007
135	23.814	0.182	3.24	95	2.0	-	72	-0.032	8.95	0.008
136	23.990	0.176	3.23	95	2.1	-	72	-0.033	8.83	0.008
137	24.171	0.181	3.24	95	2.1	-	72	-0.031	8.81	0.006
138	24.350	0.179	3.23	95	2.0	-	72	-0.031	8.92	0.007
139	24.530	0.180	3.23	95	1.6	-	72	-0.033	8.78	0.007
140	24.710	0.180	3.24	95	1.6	100	72	-0.031	8.75	0.009
141	24.889	0.179	3.24	95	1.8	-	72	-0.033	8.78	0.006
142	25.068	0.179	3.24	95	2.0	-	72	-0.032	8.74	0.006
143	25.248	0.180	3.22	95	1.9	-	72	-0.032	8.77	0.005
144	25.430	0.182	3.23	95	1.8	-	72	-0.031	8.71	0.005
145	25.609	0.179	3.23	95	1.9	-	72	-0.032	8.77	0.007
146	25.786	0.177	3.23	95	1.8	-	72	-0.033	8.83	0.006
147	25.966	0.180	3.23	95	2.2	-	72	-0.031	8.78	0.007
148	26.148	0.182	3.23	95	1.9	-	72	-0.033	8.86	0.006
149	26.329	0.181	3.24	95	1.9	-	72	-0.032	8.85	0.008
150	26.507	0.178	3.24	95	2.2	101	72	-0.029	8.86	0.007
151	26.685	0.178	3.23	95	1.9	-	72	-0.032	8.86	0.004
152	26.866	0.181	3.23	95	1.8	-	72	-0.033	8.92	0.005
153	27.047	0.181	3.24	95	1.9	-	72	-0.032	8.82	0.007
154	27.227	0.180	3.24	95	2.2	-	72	-0.031	8.93	0.005
155	27.407	0.180	3.24	95	2.1	-	72	-0.032	8.90	0.005
156	27.586	0.179	3.24	95	1.8	-	72	-0.033	8.95	0.006
157	27.765	0.179	3.24	95	1.7	-	72	-0.032	8.97	0.005
158	27.945	0.180	3.24	95	2.1	-	72	-0.030	8.97	0.007
159	28.125	0.180	3.24	95	1.7	-	72	-0.031	8.94	0.006

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
160	28.307	0.182	3.24	95	1.7	102	72	-0.032	9.03	0.004
161	28.486	0.179	3.25	95	2.0	-	72	-0.032	8.97	0.005
162	28.664	0.178	3.24	95	1.7	-	72	-0.030	9.04	0.007
163	28.844	0.180	3.24	95	2.2	-	72	-0.029	8.95	0.008
164	29.025	0.181	3.24	95	2.0	-	72	-0.032	9.01	0.005
165	29.206	0.181	3.24	95	2.1	-	72	-0.029	8.93	0.011
166	29.386	0.180	3.24	96	2.1	-	72	-0.029	9.02	0.005
167	29.565	0.179	3.23	96	1.6	-	72	-0.029	9.09	0.008
168	29.744	0.179	3.24	96	1.7	-	72	-0.031	9.03	0.006
169	29.924	0.180	3.24	96	2.1	-	72	-0.030	9.07	0.006
170	30.105	0.181	3.24	96	1.7	100	73	-0.030	9.07	0.010
171	30.289	0.184	3.24	96	1.7	-	72	-0.030	9.04	0.007
172	30.466	0.177	3.23	96	1.7	-	73	-0.028	8.97	0.006
173	30.643	0.177	3.23	96	1.9	-	72	-0.031	8.89	0.006
174	30.823	0.180	3.22	96	2.1	-	72	-0.029	8.82	0.004
175	31.005	0.182	3.24	96	2.1	-	72	-0.030	8.71	0.008
176	31.186	0.181	3.24	96	1.8	-	72	-0.029	8.61	0.006
177	31.365	0.179	3.24	96	2.2	-	72	-0.029	8.92	0.008
178	31.543	0.178	3.23	96	1.8	-	72	-0.030	9.31	0.003
179	31.723	0.180	3.24	96	1.7	-	72	-0.030	9.25	0.005
180	31.905	0.182	3.24	96	2.1	99	72	-0.028	9.23	0.007
181	32.085	0.180	3.24	96	2.1	-	72	-0.028	9.10	0.007
182	32.265	0.180	3.24	96	1.7	-	72	-0.028	9.02	0.007
183	32.445	0.180	3.24	96	1.7	-	72	-0.026	8.89	0.009
184	32.623	0.178	3.24	96	1.8	-	72	-0.029	8.78	0.009
185	32.803	0.180	3.24	96	2.0	-	72	-0.027	8.80	0.010
186	32.984	0.181	3.23	96	1.6	-	72	-0.029	8.78	0.011
187	33.166	0.182	3.23	96	2.2	-	72	-0.026	8.70	0.007
188	33.345	0.179	3.24	96	2.2	-	72	-0.027	8.62	0.007
189	33.526	0.181	3.23	96	1.7	-	72	-0.025	8.59	0.009
190	33.703	0.177	3.23	96	2.2	99	72	-0.028	8.54	0.009
191	33.884	0.181	3.23	96	2.0	-	72	-0.028	8.52	0.005

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
192	34.065	0.181	3.24	96	2.2	-	72	-0.026	8.40	0.008
193	34.244	0.179	3.24	96	2.0	-	72	-0.029	8.36	0.009
194	34.424	0.180	3.24	96	1.9	-	72	-0.024	8.32	0.010
195	34.603	0.179	3.24	96	2.1	-	72	-0.025	8.28	0.006
196	34.786	0.183	3.24	96	2.1	-	72	-0.026	8.31	0.007
197	34.964	0.178	3.23	96	2.0	-	72	-0.028	8.28	0.008
198	35.146	0.182	3.23	96	2.1	-	72	-0.028	8.19	0.008
199	35.326	0.180	3.24	96	2.2	-	72	-0.026	8.14	0.009
200	35.503	0.177	3.24	96	1.8	100	72	-0.024	8.12	0.007
201	35.682	0.179	3.24	96	1.6	-	72	-0.029	8.13	0.007
202	35.864	0.182	3.24	96	1.8	-	72	-0.025	8.05	0.010
203	36.046	0.182	3.24	96	1.6	-	72	-0.024	8.00	0.009
204	36.225	0.179	3.24	96	1.9	-	72	-0.025	7.96	0.007
205	36.404	0.179	3.24	96	1.6	-	72	-0.025	7.89	0.009
206	36.583	0.179	3.23	96	1.9	-	72	-0.026	7.86	0.006
207	36.764	0.181	3.24	96	1.7	-	72	-0.025	7.81	0.007
208	36.945	0.181	3.24	96	2.1	-	72	-0.025	7.75	0.008
209	37.126	0.181	3.24	96	1.8	-	72	-0.025	7.68	0.011
210	37.305	0.179	3.23	96	1.8	100	72	-0.026	7.67	0.008
211	37.483	0.178	3.24	96	2.1	-	73	-0.023	7.67	0.008
212	37.663	0.180	3.24	96	1.7	-	73	-0.023	7.65	0.007
213	37.845	0.182	3.24	96	1.8	-	72	-0.024	7.58	0.005
214	38.027	0.182	3.24	96	1.8	-	72	-0.024	7.58	0.011
215	38.205	0.178	3.24	96	1.7	-	73	-0.034	3.03	0.122
216	38.384	0.179	3.23	96	1.7	-	73	-0.034	14.94	0.551
217	38.564	0.180	3.23	96	2.1	-	73	-0.037	14.90	0.354
218	38.745	0.181	3.24	96	1.6	-	73	-0.039	14.80	0.446
219	38.928	0.183	3.24	96	1.6	-	73	-0.042	14.37	0.522
220	39.105	0.177	3.24	96	2.0	100	73	-0.040	14.14	0.246
221	39.285	0.180	3.24	96	1.7	-	73	-0.045	13.62	0.150
222	39.464	0.179	3.24	96	1.7	-	73	-0.045	13.18	0.203
223	39.644	0.180	3.24	96	1.7	-	73	-0.042	12.35	0.008

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
224	39.825	0.181	3.24	96	1.6	-	73	-0.041	11.08	0.006
225	40.006	0.181	3.23	96	2.0	-	73	-0.041	9.96	0.003
226	40.186	0.180	3.24	96	2.2	-	73	-0.039	8.70	0.005
227	40.363	0.177	3.24	96	2.0	-	73	-0.037	8.01	0.008
228	40.544	0.181	3.23	96	2.2	-	73	-0.037	7.95	0.004
229	40.725	0.181	3.23	96	1.7	-	73	-0.037	7.93	0.003
230	40.905	0.180	3.24	96	2.0	100	73	-0.034	8.10	0.005
231	41.085	0.180	3.24	96	1.8	-	73	-0.036	8.24	0.003
232	41.265	0.180	3.24	96	1.9	-	73	-0.033	8.33	0.002
233	41.445	0.180	3.24	96	2.2	-	73	-0.035	8.49	0.005
234	41.624	0.179	3.24	96	1.7	-	73	-0.033	8.57	0.006
235	41.805	0.181	3.23	96	1.9	-	73	-0.033	8.54	0.005
236	41.987	0.182	3.24	96	1.7	-	73	-0.030	8.51	0.005
237	42.167	0.180	3.25	96	2.1	-	73	-0.033	8.45	0.006
238	42.345	0.178	3.24	96	2.1	-	73	-0.034	8.40	0.003
239	42.528	0.183	3.24	96	2.0	-	73	-0.032	8.44	0.003
240	42.706	0.178	3.23	96	1.7	100	73	-0.032	8.44	0.005
241	42.887	0.181	3.24	96	1.7	-	73	-0.029	8.43	0.004
242	43.067	0.180	3.24	96	2.2	-	73	-0.033	8.40	0.007
243	43.246	0.179	3.23	96	1.7	-	73	-0.029	8.43	0.005
244	43.425	0.179	3.23	96	2.2	-	73	-0.030	8.49	0.006
245	43.605	0.180	3.24	96	1.6	-	73	-0.029	8.46	0.003
246	43.786	0.181	3.23	96	2.0	-	73	-0.030	8.48	0.005
247	43.968	0.182	3.23	96	1.9	-	73	-0.031	8.49	0.004
248	44.147	0.179	3.23	96	2.2	-	73	-0.031	8.56	0.004
249	44.325	0.178	3.23	96	1.8	-	73	-0.029	8.54	0.005
250	44.505	0.180	3.23	96	2.2	100	73	-0.027	8.57	0.005
251	44.687	0.182	3.24	96	2.1	-	73	-0.029	8.57	0.005
252	44.868	0.181	3.23	96	2.2	-	73	-0.030	8.57	0.003
253	45.047	0.179	3.24	96	2.2	-	73	-0.028	8.51	0.006
254	45.226	0.179	3.24	96	1.7	-	73	-0.028	8.57	0.005
255	45.406	0.180	3.24	96	2.0	-	73	-0.028	8.52	0.004

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
256	45.587	0.181	3.24	96	1.8	-	73	-0.027	8.53	0.005
257	45.767	0.180	3.24	96	1.7	-	73	-0.027	8.50	0.005
258	45.949	0.182	3.24	96	1.6	-	73	-0.027	8.48	0.008
259	46.128	0.179	3.24	96	1.9	-	73	-0.026	8.41	0.003
260	46.306	0.178	3.24	96	1.9	100	73	-0.027	8.25	0.007
261	46.486	0.180	3.23	97	1.7	-	73	-0.029	8.12	0.005
262	46.668	0.182	3.23	97	1.8	-	73	-0.024	8.03	0.004
263	46.850	0.182	3.24	97	1.7	-	73	-0.028	7.93	0.005
264	47.029	0.179	3.24	96	1.7	-	73	-0.028	7.90	0.005
265	47.207	0.178	3.23	96	1.7	-	73	-0.028	7.72	0.004
266	47.388	0.181	3.24	97	2.0	-	73	-0.029	7.55	0.007
267	47.569	0.181	3.24	97	1.7	-	73	-0.030	7.51	0.006
268	47.749	0.180	3.24	97	1.7	-	73	-0.029	7.41	0.005
269	47.930	0.181	3.24	97	1.6	-	73	-0.027	7.35	0.003
270	48.113	0.183	3.24	97	1.7	100	73	-0.029	7.37	0.006
271	48.288	0.175	3.24	97	2.1	-	73	-0.028	7.35	0.004
272	48.468	0.180	3.23	97	2.0	-	73	-0.030	7.36	0.004
273	48.650	0.182	3.24	97	1.8	-	73	-0.025	7.33	0.007
274	48.831	0.181	3.24	97	1.7	-	73	-0.028	7.34	0.003
275	49.010	0.179	3.23	97	1.7	-	73	-0.027	7.32	0.004
276	49.188	0.178	3.23	97	2.0	-	73	-0.029	7.28	0.008
277	49.369	0.181	3.23	97	1.6	-	73	-0.029	7.35	0.003
278	49.550	0.181	3.24	97	2.2	-	73	-0.028	7.30	0.004
279	49.731	0.181	3.24	97	1.7	-	73	-0.027	7.31	0.006
280	49.911	0.180	3.23	97	2.2	100	73	-0.028	7.33	0.007
281	50.091	0.180	3.24	97	2.1	-	73	-0.028	7.35	0.005
282	50.270	0.179	3.24	97	2.0	-	73	-0.028	7.37	0.006
283	50.450	0.180	3.24	97	1.9	-	73	-0.027	7.41	0.007
284	50.631	0.181	3.23	97	2.0	-	73	-0.027	7.45	0.004
285	50.813	0.182	3.23	97	1.7	-	73	-0.027	7.51	0.003
286	50.992	0.179	3.24	97	2.2	-	73	-0.028	7.52	0.004
287	51.170	0.178	3.24	97	1.7	-	73	-0.027	7.56	0.007

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
288	51.351	0.181	3.24	97	1.8	-	73	-0.028	7.52	0.002
289	51.532	0.181	3.23	97	1.7	-	73	-0.030	7.50	0.004
290	51.713	0.181	3.24	97	2.1	100	73	-0.027	7.42	0.003
291	51.893	0.180	3.24	97	2.1	-	73	-0.029	7.40	0.005
292	52.073	0.180	3.23	97	1.7	-	73	-0.027	7.40	0.005
293	52.252	0.179	3.24	97	1.7	-	73	-0.027	7.43	0.003
294	52.432	0.180	3.24	97	2.0	-	73	-0.028	7.42	0.004
295	52.613	0.181	3.24	97	1.8	-	73	-0.027	7.40	0.003
296	52.798	0.185	3.24	97	2.2	-	73	-0.027	7.53	0.004
297	52.975	0.177	3.25	97	2.2	-	72	-0.028	7.68	0.003
298	53.153	0.178	3.24	97	1.8	-	72	-0.029	7.69	0.004
299	53.333	0.180	3.24	97	1.9	-	72	-0.028	7.79	0.005
300	53.514	0.181	3.24	97	1.9	99	72	-0.028	7.86	0.004
301	53.695	0.181	3.24	97	1.7	-	72	-0.029	7.86	0.003
302	53.875	0.180	3.23	97	2.2	-	72	-0.030	7.92	0.004
303	54.055	0.180	3.24	97	2.2	-	72	-0.028	7.83	0.003
304	54.235	0.180	3.24	97	1.7	-	72	-0.027	7.78	0.007
305	54.414	0.179	3.24	97	1.9	-	72	-0.027	7.77	0.003
306	54.595	0.181	3.24	96	1.7	-	72	-0.027	7.64	0.003
307	54.777	0.182	3.24	96	1.8	-	72	-0.027	7.68	0.007
308	54.957	0.180	3.24	96	1.7	-	72	-0.029	7.70	0.005
309	55.135	0.178	3.24	96	2.1	-	72	-0.027	7.76	0.006
310	55.318	0.183	3.24	96	1.8	99	72	-0.028	7.83	0.005
311	55.496	0.178	3.24	96	2.2	-	72	-0.028	7.80	0.004
312	55.677	0.181	3.24	96	1.6	-	72	-0.029	7.86	0.002
313	55.857	0.180	3.24	96	1.8	-	72	-0.028	7.94	0.008
314	56.037	0.180	3.24	96	2.2	-	72	-0.028	8.02	0.003
315	56.217	0.180	3.25	96	1.7	-	72	-0.031	8.01	0.005
316	56.397	0.180	3.25	96	1.7	-	72	-0.028	8.00	0.005
317	56.578	0.181	3.25	96	1.7	-	72	-0.027	7.91	0.003
318	56.760	0.182	3.24	96	1.9	-	72	-0.027	7.90	0.002
319	56.940	0.180	3.25	96	2.2	-	72	-0.028	7.84	0.008

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
320	57.118	0.178	3.24	96	2.1	99	72	-0.029	7.80	0.004
321	57.298	0.180	3.24	96	1.6	-	72	-0.027	7.83	0.004
322	57.480	0.182	3.24	96	1.7	-	72	-0.027	7.84	0.005
323	57.660	0.180	3.25	96	2.0	-	72	-0.028	7.74	0.005
324	57.841	0.181	3.24	96	1.8	-	72	-0.029	7.14	0.006
325	58.021	0.180	3.24	96	1.7	-	72	-0.030	6.15	0.007
326	58.200	0.179	3.24	96	2.2	-	72	-0.030	5.87	0.004
327	58.380	0.180	3.25	96	1.9	-	72	-0.030	5.73	0.003
328	58.561	0.181	3.24	96	2.2	-	72	-0.031	5.66	0.004
329	58.743	0.182	3.24	96	2.1	-	72	-0.030	5.60	0.003
330	58.923	0.180	3.25	96	2.2	100	72	-0.028	5.51	0.004
331	59.101	0.178	3.24	96	1.9	-	72	-0.029	5.57	0.005
332	59.282	0.181	3.24	96	2.2	-	72	-0.030	5.54	0.003
333	59.463	0.181	3.25	96	2.0	-	72	-0.030	5.52	0.007
334	59.644	0.181	3.24	96	2.2	-	72	-0.030	5.42	0.005
335	59.824	0.180	3.24	96	1.7	-	72	-0.031	5.39	0.005
336	60.004	0.180	3.24	96	1.7	-	72	-0.031	5.31	0.004
337	60.184	0.180	3.24	96	1.8	-	72	-0.030	5.32	0.005
338	60.363	0.179	3.24	96	1.8	-	72	-0.030	5.32	0.004
339	60.545	0.182	3.24	96	2.1	-	72	-0.032	5.28	0.005
340	60.726	0.181	3.23	96	1.6	100	72	-0.030	5.26	0.005
341	60.906	0.180	3.24	96	1.7	-	72	-0.030	5.26	0.004
342	61.084	0.178	3.24	96	1.9	-	72	-0.030	5.23	0.005
343	61.264	0.180	3.23	96	1.7	-	72	-0.032	5.18	0.008
344	61.446	0.182	3.24	96	1.7	-	72	-0.031	5.10	0.003
345	61.626	0.180	3.24	96	2.1	-	72	-0.032	5.21	0.005
346	61.806	0.180	3.23	96	1.8	-	72	-0.028	5.26	0.007
347	61.986	0.180	3.24	96	1.9	-	72	-0.031	5.22	0.003
348	62.166	0.180	3.24	96	2.1	-	72	-0.030	5.24	0.003
349	62.346	0.180	3.24	96	1.8	-	72	-0.030	5.40	0.004
350	62.527	0.181	3.24	96	2.2	100	72	-0.030	5.52	0.003
351	62.708	0.181	3.23	96	1.9	-	72	-0.028	5.50	0.003

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
352	62.888	0.180	3.25	96	2.1	-	72	-0.029	5.66	0.003
353	63.066	0.178	3.24	96	2.2	-	72	-0.030	5.86	0.007
354	63.246	0.180	3.24	96	1.7	-	72	-0.031	5.95	0.007
355	63.428	0.182	3.24	96	1.8	-	72	-0.032	5.89	0.004
356	63.609	0.181	3.24	96	1.7	-	72	-0.029	5.98	0.008
357	63.789	0.180	3.24	96	1.7	-	72	-0.030	6.06	0.006
358	63.969	0.180	3.24	96	2.1	-	72	-0.033	6.13	0.002
359	64.148	0.179	3.25	96	1.7	-	72	-0.030	6.25	0.005
360	64.328	0.180	3.25	96	1.8	101	72	-0.028	6.29	0.005
361	64.509	0.181	3.25	96	2.2	-	72	-0.031	6.31	0.003
362	64.691	0.182	3.24	96	1.7	-	72	-0.031	6.42	0.003
363	64.871	0.180	3.25	96	2.1	-	71	-0.030	6.39	0.004
364	65.049	0.178	3.24	96	2.0	-	72	-0.031	6.45	0.005
365	65.229	0.180	3.24	96	2.0	100	71	-0.031	6.48	0.008
Avg/Tot	65.229	0.179	3.21	92.1	1.9	100	72.1	-0.032	8.25	0.016

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
0	0.000		0.00	74	0.0		69
1	0.112	0.112	0.92	74	1.6	-	69
2	0.247	0.135	0.91	74	1.7	-	69
3	0.384	0.137	0.93	74	1.5	-	70
4	0.520	0.136	0.92	74	1.5	-	70
5	0.658	0.138	0.94	74	1.7	-	70
6	0.795	0.137	0.93	75	1.6	-	70
7	0.934	0.139	0.95	75	1.6	-	70
8	1.072	0.138	0.94	75	1.7	-	70
9	1.210	0.138	0.95	75	1.8	-	70
10	1.350	0.140	0.96	76	1.6	97	70
11	1.489	0.139	0.95	76	1.8	-	70
12	1.630	0.141	0.97	76	1.8	-	70
13	1.769	0.139	0.96	76	1.7	-	70
14	1.909	0.140	0.96	76	1.8	-	70
15	2.050	0.141	0.97	77	1.6	-	70
16	2.190	0.140	0.96	77	1.6	-	70
17	2.330	0.140	0.97	77	1.8	-	70
18	2.472	0.142	0.98	77	1.6	-	70
19	2.613	0.141	0.97	78	1.7	-	70
20	2.753	0.140	0.97	78	1.6	99	70
21	2.895	0.142	0.98	78	1.6	-	70
22	3.036	0.141	0.97	78	1.8	-	70
23	3.177	0.141	0.97	78	1.7	-	70
24	3.322	0.145	0.98	78	1.6	-	70
25	3.462	0.140	0.98	79	1.7	-	70
26	3.606	0.144	0.98	79	1.7	-	70
27	3.745	0.139	0.98	80	1.6	-	70
28	3.889	0.144	0.99	80	1.7	-	70
29	4.031	0.142	0.99	80	1.7	-	70
30	4.174	0.143	0.98	81	1.6	100	70
31	4.319	0.145	0.99	81	1.7	-	70

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
32	4.461	0.142	1.00	81	1.7	-	70
33	4.605	0.144	1.00	82	1.8	-	70
34	4.748	0.143	1.00	82	1.6	-	70
35	4.892	0.144	0.99	82	1.7	-	70
36	5.036	0.144	1.01	82	1.7	-	70
37	5.181	0.145	1.01	83	1.6	-	70
38	5.326	0.145	1.01	83	1.7	-	70
39	5.471	0.145	1.00	83	1.7	-	70
40	5.615	0.144	1.00	83	1.7	100	70
41	5.760	0.145	1.01	84	1.6	-	70
42	5.906	0.146	1.02	84	1.6	-	70
43	6.052	0.146	1.02	85	1.6	-	70
44	6.197	0.145	1.02	85	1.7	-	70
45	6.343	0.146	1.02	85	1.6	-	70
46	6.489	0.146	1.01	85	1.7	-	70
47	6.637	0.148	1.01	85	1.7	-	70
48	6.780	0.143	1.01	86	1.7	-	70
49	6.926	0.146	1.02	85	1.7	-	70
50	7.074	0.148	1.03	86	1.8	102	70
51	7.221	0.147	1.03	86	1.8	-	70
52	7.367	0.146	1.03	86	1.8	-	70
53	7.514	0.147	1.03	87	1.6	-	70
54	7.661	0.147	1.03	87	1.8	-	70
55	7.807	0.146	1.02	87	1.6	-	70
56	7.954	0.147	1.02	87	1.8	-	70
57	8.101	0.147	1.02	87	1.7	-	70
58	8.248	0.147	1.02	87	1.6	-	70
59	8.395	0.147	1.02	87	1.8	-	70
60	8.542	0.147	1.03	87	1.7	102	70
Avg/Tot	8.542	0.142	0.97	80.6	1.6	100	70.1

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	306	303	271	353	205	287.5	532.5
1	304	302	270	345	205	285.1	439.0
2	304	301	268	338	205	283.3	438.1
3	303	300	267	336	206	282.4	490.4
4	303	299	266	336	206	282.0	548.1
5	301	298	265	337	206	281.3	588.3
6	298	296	264	340	205	280.6	622.4
7	297	294	263	343	206	280.5	647.8
8	295	292	262	347	205	280.3	660.2
9	291	290	262	351	205	279.8	671.2
10	289	288	261	354	205	279.4	681.1
11	287	287	260	356	205	278.9	690.7
12	285	285	259	360	205	278.7	696.0
13	284	283	259	362	205	278.3	694.0
14	281	281	258	362	204	277.3	689.8
15	280	280	257	363	204	276.6	686.8
16	277	278	256	364	203	275.7	685.3
17	275	277	255	365	203	274.9	684.9
18	273	276	254	365	202	273.9	686.9
19	272	274	253	367	201	273.4	688.3
20	270	273	252	368	201	272.6	687.8
21	269	272	251	368	200	271.9	685.2
22	267	270	250	368	199	270.9	683.7
23	265	269	249	369	199	270.2	683.6
24	264	268	248	369	198	269.6	686.0
25	263	268	247	369	197	268.9	690.5
26	262	267	246	370	196	268.2	695.5
27	261	266	245	371	196	267.6	699.5
28	260	265	244	372	195	267.1	704.0
29	259	265	244	373	194	266.7	708.5
30	258	264	243	373	193	266.4	710.6
31	257	264	242	375	193	266.0	710.7
32	255	264	241	375	192	265.5	709.8
33	254	263	241	376	191	265.0	711.5
34	254	263	240	376	190	264.6	712.2
35	253	263	239	377	189	264.3	709.6
36	252	263	239	377	189	263.8	706.2
37	251	263	238	376	188	263.2	703.2
38	250	263	237	376	187	262.7	700.7
39	249	263	237	376	186	262.0	695.6
40	249	263	236	375	185	261.4	690.3
41	248	263	235	374	184	260.9	685.8
42	248	263	234	374	184	260.5	687.9
43	247	264	234	374	183	260.1	695.5
44	246	264	233	376	182	260.3	706.1
45	246	265	233	377	182	260.3	716.1
46	246	265	232	377	181	260.1	717.1
47	245	266	232	378	180	260.1	710.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	245	266	231	378	180	259.9	703.1
49	245	266	231	377	179	259.6	698.1
50	245	266	230	377	178	259.2	693.4
51	245	266	230	376	178	259.0	689.3
52	245	266	229	375	177	258.4	684.1
53	244	266	229	374	177	257.9	678.7
54	244	266	229	373	176	257.4	674.7
55	244	266	228	372	175	256.8	668.1
56	243	265	227	371	174	256.1	657.9
57	243	265	227	370	174	255.8	654.6
58	243	266	226	368	174	255.3	658.3
59	243	266	226	368	173	255.1	663.1
60	242	267	225	368	172	255.0	664.5
61	242	267	225	369	172	254.9	666.0
62	242	268	225	369	171	254.8	668.0
63	242	269	224	369	171	254.9	672.1
64	241	269	224	370	171	255.0	677.6
65	242	270	224	371	170	255.2	683.2
66	242	271	224	372	170	255.7	688.4
67	241	272	224	374	169	255.9	691.5
68	241	272	224	375	169	256.2	694.4
69	242	273	224	376	169	256.7	696.3
70	241	273	225	377	168	256.8	696.2
71	240	273	225	378	168	256.7	696.6
72	241	274	225	378	168	257.1	697.5
73	242	274	225	378	167	257.3	700.3
74	242	274	225	378	167	257.3	701.5
75	243	274	225	378	167	257.4	696.9
76	243	274	225	378	166	257.2	690.8
77	243	274	225	378	166	257.2	686.8
78	243	274	225	378	166	257.1	685.0
79	244	273	225	378	165	257.1	683.0
80	244	273	225	379	165	257.1	681.0
81	244	273	226	379	164	257.1	679.9
82	246	272	226	380	164	257.5	677.2
83	245	272	226	380	164	257.3	674.9
84	246	272	226	381	164	257.5	671.8
85	248	271	226	381	163	257.7	668.7
86	247	271	226	381	163	257.5	666.1
87	248	270	226	380	163	257.3	665.0
88	250	270	226	380	162	257.6	664.3
89	250	270	226	380	162	257.5	665.4
90	251	269	226	380	162	257.6	667.6
91	252	269	226	381	162	257.7	671.0
92	253	268	226	381	161	257.8	676.1
93	253	268	226	382	161	258.0	681.3
94	254	268	226	383	161	258.4	686.4
95	255	268	226	384	161	258.7	690.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	254	268	226	386	161	258.8	694.9
97	257	267	226	387	160	259.5	699.8
98	258	267	227	389	160	260.1	707.3
99	259	268	227	391	160	260.9	716.8
100	261	268	227	393	160	262.1	725.0
101	263	269	228	396	160	263.2	733.0
102	265	271	229	399	160	264.5	737.6
103	266	272	229	403	159	265.9	741.7
104	268	274	230	406	159	267.5	746.8
105	270	276	231	410	159	269.1	751.2
106	271	277	232	413	158	270.4	754.5
107	273	279	233	416	158	272.0	756.5
108	275	281	234	419	158	273.4	756.0
109	276	283	235	420	158	274.6	753.4
110	277	285	236	422	158	275.6	749.8
111	278	287	237	423	158	276.6	746.1
112	280	289	238	424	157	277.6	743.8
113	281	291	239	424	157	278.4	743.9
114	282	293	240	424	157	279.2	744.7
115	282	294	241	425	157	279.8	746.3
116	284	296	242	426	157	280.7	747.6
117	285	297	243	426	157	281.3	747.6
118	286	298	244	425	157	281.9	746.2
119	286	299	245	426	157	282.3	743.6
120	288	299	245	425	157	282.9	741.5
121	289	300	246	426	157	283.4	742.3
122	291	301	247	426	157	284.1	746.1
123	291	301	248	427	157	284.7	750.1
124	292	302	249	429	157	285.8	751.9
125	293	303	250	430	157	286.6	748.2
126	294	304	251	431	157	287.3	742.7
127	295	305	252	431	157	287.9	741.6
128	295	306	253	431	157	288.3	741.1
129	296	306	254	431	157	288.7	738.4
130	297	307	254	430	157	288.9	734.8
131	298	307	255	429	157	289.3	730.2
132	298	308	255	428	157	289.0	726.0
133	300	308	256	427	157	289.4	721.4
134	300	308	256	426	157	289.3	717.7
135	299	308	257	424	157	289.0	713.5
136	300	308	257	423	157	289.3	709.7
137	299	308	258	422	157	288.7	706.1
138	300	308	258	420	157	288.7	703.4
139	300	308	259	419	157	288.6	700.9
140	300	308	259	417	157	288.4	698.4
141	301	308	259	416	157	288.3	696.0
142	300	308	259	415	158	288.0	693.1
143	300	308	260	413	158	287.8	689.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	299	308	260	412	158	287.5	686.4
145	299	308	260	412	158	287.3	686.2
146	299	308	260	411	158	287.2	686.8
147	298	308	261	411	158	287.0	686.3
148	297	308	261	410	158	286.5	684.7
149	297	308	261	408	157	286.2	682.7
150	297	308	261	407	157	286.1	681.1
151	297	308	261	407	158	286.1	679.4
152	297	308	261	406	158	285.8	677.8
153	297	307	261	405	158	285.5	676.3
154	296	307	261	405	158	285.4	675.4
155	296	307	261	404	158	285.2	675.3
156	297	307	261	403	158	285.2	674.3
157	296	307	262	403	158	285.0	672.9
158	295	307	262	402	158	284.6	671.4
159	296	307	262	402	158	284.7	669.6
160	296	307	262	401	158	284.7	668.4
161	296	306	262	400	158	284.5	665.9
162	296	306	262	400	158	284.2	665.1
163	296	306	262	399	158	283.9	663.2
164	296	306	261	399	158	283.9	664.2
165	297	305	262	397	158	283.7	664.9
166	296	305	262	398	158	283.7	667.0
167	297	304	262	397	158	283.6	668.4
168	297	303	262	398	158	283.5	670.0
169	297	302	262	397	157	283.1	669.6
170	297	301	262	397	157	282.8	667.8
171	297	300	262	397	157	282.3	666.0
172	297	300	262	397	157	282.4	662.0
173	297	299	262	396	157	282.1	658.2
174	298	299	262	395	157	282.1	654.1
175	297	298	262	395	157	281.8	649.1
176	299	298	262	394	158	281.8	647.4
177	299	297	262	393	158	281.6	656.6
178	298	296	262	395	158	281.8	669.8
179	296	296	262	397	158	281.7	681.5
180	295	295	262	399	158	281.9	687.6
181	294	295	263	401	158	282.0	689.7
182	294	294	263	402	158	282.2	688.5
183	293	294	263	403	158	282.2	685.9
184	292	294	264	403	158	282.1	681.9
185	291	293	264	403	158	281.8	678.6
186	290	293	264	403	158	281.6	674.0
187	290	292	264	403	158	281.4	670.0
188	289	292	264	403	158	281.0	666.4
189	287	292	263	402	159	280.5	663.1
190	286	292	263	401	159	280.1	657.0
191	287	291	263	400	159	280.0	653.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	285	291	262	399	159	279.4	650.6
193	285	291	262	398	159	279.0	646.0
194	285	291	262	397	159	278.5	640.7
195	285	290	261	395	159	278.1	636.5
196	284	290	261	394	159	277.6	630.3
197	283	290	261	393	159	277.1	626.4
198	283	290	260	391	159	276.6	620.1
199	281	289	260	390	159	275.9	615.5
200	281	289	259	389	160	275.4	611.9
201	281	289	259	388	159	275.0	606.9
202	280	288	258	386	159	274.4	602.1
203	280	288	257	385	160	273.9	596.5
204	279	288	257	384	160	273.3	591.4
205	279	287	256	382	160	272.8	585.0
206	278	287	256	380	160	272.0	578.9
207	278	286	255	379	160	271.5	572.8
208	276	286	255	377	160	270.5	567.5
209	277	286	254	375	160	270.2	561.9
210	276	285	253	373	160	269.6	555.8
211	275	285	253	372	160	269.0	550.1
212	275	285	252	370	160	268.4	546.7
213	275	284	252	369	160	267.8	540.8
214	274	284	251	367	160	267.1	537.1
215	273	283	252	362	160	266.1	514.5
216	274	283	252	360	161	265.8	567.3
217	273	284	251	365	160	266.7	664.5
218	272	285	252	373	160	268.6	736.0
219	272	287	253	385	160	271.5	776.7
220	273	288	255	396	160	274.5	796.6
221	274	290	257	407	160	277.5	811.4
222	275	291	259	417	160	280.3	831.6
223	276	293	261	424	160	282.8	836.9
224	280	294	262	429	160	285.1	830.4
225	281	296	264	431	160	286.4	819.2
226	283	298	264	432	160	287.4	805.0
227	284	299	265	431	160	287.9	788.9
228	287	301	265	428	160	288.4	771.6
229	289	302	266	426	161	288.5	757.7
230	291	303	266	423	161	288.6	747.3
231	293	304	266	420	161	288.6	740.7
232	294	305	266	418	161	288.8	736.6
233	295	305	266	417	161	288.7	734.4
234	294	306	266	415	162	288.4	732.2
235	298	306	266	413	162	289.0	728.7
236	298	306	266	412	163	288.8	724.2
237	298	307	265	410	163	288.6	719.7
238	300	307	265	408	163	288.6	713.6
239	300	307	265	406	163	288.3	706.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	301	307	265	404	164	288.1	700.3
241	301	306	265	402	164	287.8	693.6
242	302	306	265	400	165	287.5	687.4
243	302	306	265	397	166	287.3	681.1
244	303	306	265	395	166	286.9	675.1
245	303	306	265	393	166	286.6	669.6
246	304	306	264	391	167	286.4	665.0
247	304	305	264	389	167	285.9	661.0
248	304	305	264	388	168	285.7	657.9
249	304	305	264	386	168	285.3	654.6
250	303	305	264	385	169	284.8	651.1
251	305	304	264	383	169	284.9	647.8
252	305	304	263	382	169	284.7	644.9
253	303	304	263	381	170	284.1	642.0
254	304	304	263	379	170	284.0	639.5
255	305	304	263	378	171	284.1	637.2
256	305	304	263	377	171	283.9	634.9
257	306	304	263	376	172	283.9	633.1
258	306	304	263	375	172	283.8	631.7
259	305	304	262	373	173	283.3	630.6
260	306	303	262	372	173	283.4	630.5
261	305	303	262	372	173	283.1	630.5
262	305	303	262	371	174	282.9	629.0
263	304	303	262	371	174	282.7	626.8
264	305	302	262	369	174	282.5	624.3
265	304	302	262	369	175	282.1	622.4
266	304	302	262	367	175	281.8	620.7
267	303	301	262	366	176	281.5	618.9
268	302	301	261	366	175	281.1	616.9
269	302	300	261	364	176	280.7	614.8
270	301	300	261	364	176	280.4	612.7
271	301	299	261	362	177	280.0	611.1
272	300	299	261	362	177	279.6	610.8
273	299	298	260	361	177	279.0	610.8
274	299	298	260	359	177	278.8	610.7
275	298	297	260	359	178	278.4	610.4
276	298	297	260	358	178	278.1	609.8
277	297	296	259	357	178	277.6	608.5
278	296	296	259	356	178	277.2	606.5
279	296	295	259	356	178	276.9	604.5
280	295	295	259	355	179	276.4	603.1
281	295	294	258	354	179	276.1	601.6
282	294	294	258	353	179	275.6	600.3
283	294	293	258	352	179	275.3	599.2
284	294	293	257	352	179	275.0	598.1
285	293	292	257	351	180	274.6	596.6
286	292	292	257	351	180	274.3	595.4
287	292	292	256	350	180	274.0	594.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
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Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	292	291	256	349	180	273.8	594.4
289	291	291	256	349	180	273.3	593.9
290	291	290	256	348	180	273.2	593.3
291	292	290	255	348	181	273.1	592.6
292	291	289	255	347	181	272.6	591.9
293	291	289	255	347	181	272.6	591.3
294	291	289	255	346	181	272.3	590.6
295	290	289	254	346	181	272.0	591.3
296	291	288	254	346	181	272.1	592.6
297	290	288	254	345	182	271.8	594.8
298	289	288	254	345	182	271.6	596.3
299	290	288	254	345	182	271.6	597.8
300	289	288	254	345	182	271.5	599.5
301	289	288	253	345	182	271.4	600.2
302	290	288	253	346	182	271.6	600.8
303	290	288	253	346	182	271.5	600.8
304	290	288	253	346	182	271.5	600.5
305	288	288	253	346	182	271.3	599.9
306	289	288	253	346	182	271.5	598.8
307	289	288	253	345	181	271.3	597.6
308	288	288	253	345	181	271.2	596.4
309	288	288	253	345	182	271.1	595.9
310	289	288	253	344	182	271.2	595.7
311	288	288	253	344	182	271.2	595.6
312	289	289	253	344	181	271.3	594.9
313	288	289	253	344	181	271.0	594.5
314	288	289	253	344	181	271.1	594.5
315	289	289	253	344	181	271.3	594.7
316	289	289	253	344	182	271.3	595.5
317	288	289	253	344	181	271.3	596.9
318	289	290	254	344	181	271.6	598.3
319	289	290	254	345	182	271.7	598.8
320	289	290	254	344	181	271.6	599.6
321	289	290	254	345	181	271.7	600.1
322	288	290	254	345	181	271.8	600.4
323	288	290	254	345	182	271.7	600.6
324	288	290	254	345	181	271.7	600.3
325	288	290	254	345	181	271.9	600.3
326	288	290	254	344	181	271.7	599.9
327	288	290	254	344	181	271.6	598.8
328	288	290	254	343	182	271.3	597.4
329	288	290	254	343	181	271.1	596.7
330	286	290	254	343	181	270.9	595.6
331	286	289	254	342	181	270.6	594.4
332	285	289	254	342	181	270.2	593.0
333	285	288	254	341	181	269.9	591.6
334	285	288	254	340	181	269.6	589.9
335	284	288	254	339	181	269.2	587.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

Stove ΔT: 30

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	283	287	253	339	182	268.8	586.1
337	282	287	253	338	181	268.2	584.5
338	282	286	253	337	182	267.9	585.0
339	281	285	253	337	181	267.4	586.4
340	280	285	252	336	181	267.0	587.3
341	279	284	252	336	181	266.6	587.7
342	279	284	252	335	181	266.0	587.6
343	277	283	251	335	181	265.5	587.0
344	276	282	251	334	181	264.9	586.3
345	276	281	251	333	181	264.4	585.9
346	275	281	250	333	181	263.8	585.9
347	273	280	250	332	180	263.1	585.7
348	272	279	250	332	180	262.5	585.4
349	272	278	249	331	180	262.2	585.5
350	271	277	249	331	180	261.7	586.4
351	270	277	249	331	179	261.1	587.1
352	269	276	248	331	180	260.6	587.9
353	268	275	248	331	179	260.2	589.5
354	267	275	248	331	179	259.8	591.5
355	266	274	248	331	179	259.4	592.7
356	266	273	247	331	179	259.1	593.4
357	266	273	247	331	178	258.9	594.3
358	265	272	247	331	178	258.6	596.1
359	264	272	247	332	178	258.3	597.9
360	264	271	247	332	178	258.2	600.1
361	263	271	246	332	177	257.8	602.4
362	262	270	246	332	177	257.6	604.5
363	262	270	246	332	177	257.5	606.1
364	262	270	246	333	176	257.5	607.5
365	262	270	246	334	176	257.5	608.4
Average	280.1	288.0	250.7	377.9	171.5	273.6	658.5

LAB SAMPLE DATA - ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 3

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/20/2024

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G969	240.4	241.0	0.6
	B	G970	242.4	243.2	0.8
	C - 1st Hour	G971	241.4	241.7	0.3
	Amb	G972	241.4	241.4	0.0
Probes	**A**	1A	115627.0	115627.0	0.0
	B	1B	115902.2	115902.3	0.1
	C - 1st Hour	1C	116432.8	116432.8	0.0
O-rings	**A**	1A	3569.0	3569.2	0.2
	B	1B	3557.4	3557.5	0.1
	C - 1st Hour	1C	4167.4	4167.6	0.2

Placed in Dessicator on:	3/20 - 19:00

Balance Audit (mg):		100.0		100.0					
		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	241.1	3/22 - 9:00	241.0	3/25 - 8:00				
	B	243.1	3/22 - 9:00	243.2	3/25 - 8:00				
	C - 1st Hour	241.6	3/22 - 9:00	241.7	3/25 - 8:00				
	Amb	241.5	3/22 - 9:00	241.4	3/25 - 8:00				
Probes	**A**	115627.0	3/22 - 9:00	115627.0	3/25 - 8:00				
	B	115902.3	3/22 - 9:00	115902.3	3/25 - 8:00				
	C - 1st Hour	116432.9	3/22 - 9:00	116432.8	3/25 - 8:00				
O-Rings	**A**	3569.2	3/22 - 9:00	3569.2	3/25 - 8:00				
	B	3557.6	3/22 - 9:00	3557.5	3/25 - 8:00				
	C - 1st Hour	4167.6	3/22 - 9:00	4167.6	3/25 - 8:00				

Train A Aggregate, mg:	**0.8**
Train B Aggregate, mg:	**1.0**
Train C Aggregate, mg:	**0.5**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 3 Test Date: 3/20/2024

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully Closed
Targeted Burn Category: Cat I

Preburn Notes

Time	Notes
9:20	Started fire with ~2 lbs of kindling
9:35	Added 4 additional lbs of kindling fuel
10:10	Pulled remaining fuel forward for uniform charcoalization
10:28	Loaded preburn fuel, closed door, air set to test setting
11:00	Pulled fuel in the back towards to front to ensure uniform charcoalization
12:37	Leveled coal bed, zeroed scale in preparation of fuel loading

Test Notes

Test Burn Start Time: 12:38 Test Fuel Loaded by: 40 seconds
Door Closed: 45 seconds Air Control Set at: 180 seconds
Other Loading Notes: N/A

Time	Notes
12:38	Loaded fuel, closed door, air fully open
12:41	Set air to test setting
16:12	Less than 0.1 lb consumed in last 10 minutes, so door was opened and remaining fuel was pulled forward, door open less than 10 seconds.

Test Burn End Time: 18:43

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.98 CO (%): 4.300
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	9:32	9:38	9:35	18:50	18:52	18:55
CO_2	0.00	10.06	16.91	-0.05	10.00	16.87
CO	0.003	2.544	4.298	0.006	2.520	4.294

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

Technician Signature: Date: 3/21/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 3 Test Date: 3/20/2024

Test Fuel Front View

Test Fuel Iso View

Test Fuel Loaded in Stove

Air Setting

Technician Signature: _____ Date: 3/21/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 3 Test Date: 3/20/2024

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date: 3/21/2024

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 4 Data Summary

Client:	Jotul
Model:	F602 V3
Job #:	24-268
Tracking #:	185
Test Date:	3/21/2024

Techician Signature

3/26/2024
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Burn Rate (kg/hr):	1.50

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	6.936	14.459	14.050	8.346
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.1			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12546.5			
Average Gas Meter Temperature (°F)	69.1	79.3	81.1	81.9
Total Sample Volume (dscf)	7.013	14.328	13.885	8.184
Average Tunnel Temperature (°F)	96.5			
Total Time of Test (min)	81			
Total Particulate Catch (mg)	0.1	2.5	2.5	2.0
Particulate Concentration, dry-standard (g/dscf)	0.0000143	0.0001745	0.0001801	0.0002444
Total PM Emissions (g)	0.24	2.71	2.81	2.89
Particulate Emission Rate (g/hr)	0.18	2.01	2.08	2.89
Emissions Factor (g/kg)	-	1.34	1.38	-
Difference from Average Total Particulate Emissions (g)	-	0.05	0.05	-
Difference from Average Total Particulate Emissions (%)	-	1.7%	1.7%	
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	2.76
Particulate Emission Rate (g/hr)	2.05
Emissions Factor (g/kg)	1.36
HHV Efficiency (%)	70.8%
LHV Efficiency (%)	76.6%
CO Emissions (g/min)	2.33

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	77.4	OK
Face Velocity	< 30 ft/min	10.1	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min:68.4/Max:69.6	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
Stove Surface ΔT	<126°F	58.1	OK

B415.1 Efficiency Results

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/21/24
Run:	4
Control #:	24-268
Test Duration:	81
Output Category:	3

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	70.8%	76.6%
Combustion Efficiency	93.2%	93.2%
Heat Transfer Efficiency	76.0%	82.2%

Output Rate (kJ/h)	20,710	19,646	**(Btu/h)**
Burn Rate (kg/h)	1.48	3.25	**(lb/h)**
Input (kJ/h)	29,235	27,733	**(Btu/h)**

Test Load Weight (dry kg)	1.99	4.39	**dry lb**
MC wet (%)	16.20		
MC dry (%)	19.33		
Particulate (g)	2.76		
CO (g)	189		
Test Duration (h)	1.35		

Emissions	**Particulate**	**CO**
g/MJ Output	0.10	6.74
g/kg Dry Fuel	1.39	94.64
g/h	2.05	139.66
g/min	0.03	2.33
lb/MM Btu Output	0.23	15.67

Air/Fuel Ratio (A/F)	12.37

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	7.00	23.4	2x4	7.00	20.7
2x4	7.00	22.6			
2x4	7.00	19.8			
2x4	7.00	18.7			
2x4	7.00	20.9			
2x4	7.00	22.1			
2x4	7.00	21.8			
2x4	7.00	19.6			
Total Fuel Weight (lbs):		6.72	Average Moisture (%DB):		21.1

Firebox Volume (ft^3):	0.79
Total 2x4 Crib Weight, with spacers (lbs):	5.25
Total 4x4 Crib Weight, with spacers (lbs):	0.00
Total Wet Fuel Weight, with spacers (lbs):	5.25

Coal Bed Range (20-25%):
Min (lbs): 1.05
Max (lbs): 1.31

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	13.50	1.41	19.9	18.6	19.3	1.18
2x4	13.50	1.43	19.2	20.1	18.7	1.20
2x4	13.50	1.46	20.2	18.7	19.3	1.22
Total Dry Weight, no spacers (lbs):						3.60
Total Dry Weight, with spacers (lbs):						4.47

Spacer Moisture Readings (%DB)

11.1	7.5	12.0					
10.3	9.1	10.5					
8.5	8.3						
9.2	7.6						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	29.3	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	6.65	OK
2x4 Fuel Mix	35 - 65 % of total weight	N/A	N/A

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Jotul	Job #:	24-268
Model:	F602 V3	Tracking #:	185
Run #:	4	Technician:	SJB
Test Start Time:	11:55	Date:	3/21/2024

Total Sampling Time (min):	81	
Recording Interval (min):	1	
Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.005	(B)
Meter Box γ Factor:	1.004	(C)
Meter Box γ Factor:	1.013	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	3/18/2004	
Test Fuel Scale Audit (lbs)	5.00	
Platform Scale Audit (lbs)	5.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.94	29.93	29.94
Relative Humidity (%)	35.7	34.9	
Room Air Velocity (ft/min)	0	0	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		6.936	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.001	cfm @	-6	in. Hg
(B)	0.001	0.002	cfm @	-6	in. Hg
(C)	0.001	0.000	cfm @	-6	in. Hg
(Ambient)	0.001	0.000	cfm @	-6	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.066	69
2	0.074	69
3	0.092	69
4	0.068	69
5	0.050	69
6	0.078	69
7	0.106	69
8	0.084	69
Center	0.080	69

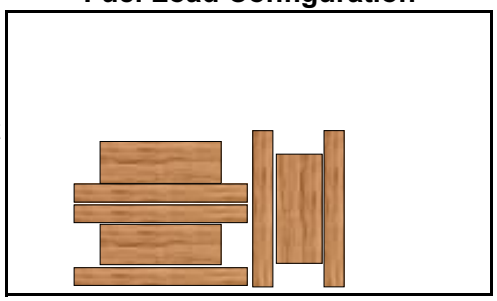
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.33	ft/sec
V_{scent}:	18.76	ft/sec
F_p:	0.977	[ratio]
Initial Tunnel Flow:	211.3	scf/min

Static Pressure: -0.130 in. H_2O

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Left



Firebox Right

Firebox Front View

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)	19.3

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Recording Interval (min): 1
Run Time (min): 82

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	5.34	-0.087	410	415	398	634	176	406.3	419	67
1	5.19	-0.089	412	414	402	657	179	413.0	434	67
2	5.03	-0.092	415	413	408	680	183	420.1	448	67
3	4.87	-0.092	417	412	415	702	187	426.7	458	67
4	4.69	-0.092	420	412	421	720	190	432.6	464	67
5	4.53	-0.093	422	411	426	735	193	437.4	471	67
6	4.36	-0.094	424	412	431	747	196	442.0	476	67
7	4.20	-0.095	429	412	436	759	199	447.0	480	67
8	4.04	-0.093	432	413	440	767	202	450.9	482	67
9	3.87	-0.094	437	414	444	777	205	455.2	485	67
10	3.71	-0.093	441	416	448	785	208	459.3	486	67
11	3.56	-0.092	446	418	451	793	210	463.4	486	67
12	3.43	-0.093	452	420	454	800	213	467.7	487	67
13	3.29	-0.092	457	423	458	805	215	471.4	484	67
14	3.17	-0.090	463	425	461	810	217	475.0	483	67
15	3.05	-0.091	469	428	464	813	218	478.4	480	67
16	2.93	-0.090	475	430	466	815	219	481.1	479	67
17	2.82	-0.089	479	433	468	815	222	483.2	476	67
18	2.71	-0.090	484	436	470	816	224	485.8	474	67
19	2.62	-0.088	489	439	471	815	226	488.2	470	67
20	2.52	-0.087	492	443	473	812	228	489.4	467	67
21	2.42	-0.088	497	446	474	810	229	491.2	465	67
22	2.33	-0.086	501	450	476	811	231	493.7	465	68
23	2.23	-0.088	503	454	477	811	233	495.7	465	68
24	2.14	-0.086	508	457	479	811	235	498.2	462	68
25	2.05	-0.085	513	461	481	808	237	499.8	457	68
26	1.98	-0.085	515	464	482	804	239	500.9	454	68
27	1.90	-0.084	518	468	483	799	241	501.8	450	68
28	1.84	-0.084	520	472	484	792	243	502.1	445	68
29	1.78	-0.083	523	476	484	783	245	502.1	441	68
30	1.73	-0.082	524	480	483	772	248	501.3	434	68
31	1.68	-0.081	525	484	482	760	250	500.0	428	68
32	1.63	-0.084	525	488	480	752	252	499.4	423	68
33	1.57	-0.081	525	491	479	744	254	498.5	420	68
34	1.52	-0.082	525	494	478	739	256	498.4	419	68
35	1.46	-0.081	525	496	477	734	258	498.1	418	68
36	1.40	-0.080	525	499	476	729	261	497.9	419	68
37	1.37	-0.080	526	502	475	724	263	497.6	416	68
38	1.33	-0.080	524	504	473	715	265	496.0	411	68
39	1.29	-0.080	524	506	470	706	267	494.8	407	68
40	1.25	-0.078	524	508	468	696	269	493.0	401	68
41	1.22	-0.079	521	509	465	685	271	490.3	396	68
42	1.20	-0.077	518	510	463	675	273	487.6	393	68
43	1.18	-0.077	515	509	460	665	275	484.9	390	68
44	1.15	-0.077	511	509	457	655	276	481.4	386	68

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Recording Interval (min): 1
Run Time (min): 82

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
45	1.13	-0.075	507	508	455	644	277	478.3	381	68
46	1.11	-0.074	502	506	452	635	278	474.5	377	68
47	1.09	-0.073	500	504	449	625	279	471.2	374	68
48	3.05	-0.074	494	502	447	609	280	466.0	379	68
49	2.97	-0.080	488	498	444	601	281	462.3	375	68
50	2.85	-0.084	483	494	443	609	282	462.2	394	68
51	2.74	-0.082	481	490	444	624	283	464.7	409	68
52	2.64	-0.084	480	487	446	637	284	466.7	417	68
53	2.56	-0.085	479	484	447	645	285	467.8	420	68
54	2.47	-0.083	478	481	448	651	286	468.5	422	68
55	2.38	-0.085	478	479	449	655	285	469.1	422	68
56	2.29	-0.081	476	477	450	658	286	469.4	421	68
57	2.20	-0.083	477	477	451	660	286	470.1	422	68
58	2.12	-0.083	477	476	452	663	286	470.9	420	68
59	2.04	-0.084	478	477	454	665	286	472.0	419	68
60	1.97	-0.082	480	477	456	667	287	473.3	419	68
61	1.89	-0.081	481	478	458	668	287	474.3	418	68
62	1.82	-0.081	484	480	459	669	287	475.7	416	68
63	1.75	-0.082	486	481	461	669	287	476.7	416	68
64	1.67	-0.081	488	483	463	671	287	478.3	415	68
65	1.61	-0.083	489	485	465	673	287	479.7	415	68
66	1.55	-0.081	490	487	467	677	287	481.5	414	68
67	1.49	-0.080	493	489	469	677	287	482.8	413	68
68	1.43	-0.081	494	491	470	677	287	484.0	411	68
69	1.39	-0.078	497	492	472	674	287	484.4	406	68
70	1.36	-0.079	498	494	472	669	287	483.8	401	68
71	1.33	-0.078	499	494	472	661	287	482.5	397	68
72	1.28	-0.076	500	495	471	654	287	481.4	392	69
73	1.26	-0.078	501	495	470	645	288	479.8	386	69
74	1.23	-0.075	500	495	469	638	287	477.7	382	68
75	1.20	-0.074	498	494	468	629	287	475.1	378	68
76	1.17	-0.075	499	493	466	622	286	473.2	375	68
77	1.15	-0.075	499	492	465	615	288	471.7	371	69
78	1.12	-0.074	496	491	463	608	288	469.3	369	69
79	1.11	-0.072	496	489	461	602	288	467.2	366	68
80	1.09	-0.072	492	487	460	596	289	464.8	365	68
81	1.07	-0.072	490	485	457	589	289	462.0	363	68
82	1.06	-0.073	487	482	455	585	289	459.6	361	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.080	0.01	70	0.1		5.24		99	377	70	69
1	0.113	0.113	0.081	2.91	70	1.2	-	5.21	-0.03	100	355	70	69
2	0.280	0.167	0.083	2.96	71	1.2	-	5.12	-0.09	96	351	70	69
3	0.450	0.170	0.084	3.00	71	1.2	-	4.96	-0.16	96	382	70	68
4	0.617	0.167	0.083	3.04	71	1.2	-	4.82	-0.14	97	415	71	69
5	0.788	0.171	0.081	3.07	71	1.2	-	4.67	-0.15	97	440	71	69
6	0.962	0.174	0.081	3.09	71	1.2	-	4.52	-0.15	98	456	71	69
7	1.134	0.172	0.081	3.11	71	1.2	-	4.36	-0.16	98	466	71	69
8	1.304	0.170	0.083	3.14	71	1.2	-	4.21	-0.15	99	474	71	69
9	1.478	0.174	0.084	3.16	71	1.2	-	4.04	-0.17	100	478	71	69
10	1.654	0.176	0.081	3.18	71	1.2	96	3.89	-0.15	100	481	72	69
11	1.828	0.174	0.082	3.19	72	1.2	-	3.71	-0.18	101	485	72	69
12	2.001	0.173	0.083	3.21	72	1.2	-	3.54	-0.17	101	488	72	69
13	2.178	0.177	0.084	3.22	72	1.2	-	3.36	-0.18	102	491	72	69
14	2.356	0.178	0.084	3.24	72	1.2	-	3.21	-0.15	102	490	72	69
15	2.532	0.176	0.083	3.24	73	1.2	-	3.04	-0.17	102	489	72	69
16	2.706	0.174	0.083	3.25	73	1.2	-	2.89	-0.15	102	488	72	69
17	2.883	0.177	0.083	3.26	73	1.2	-	2.75	-0.14	102	488	73	69
18	3.062	0.179	0.084	3.26	73	1.2	-	2.60	-0.15	102	489	73	69
19	3.239	0.177	0.084	3.27	74	1.3	-	2.45	-0.15	102	487	73	69
20	3.414	0.175	0.082	3.27	74	1.2	101	2.31	-0.14	102	487	73	69
21	3.593	0.179	0.082	3.27	74	1.3	-	2.17	-0.14	102	485	73	69
22	3.770	0.177	0.082	3.28	75	1.3	-	2.04	-0.13	102	485	73	69
23	3.950	0.180	0.081	3.30	75	1.3	-	1.92	-0.12	101	483	73	69
24	4.131	0.181	0.083	3.30	75	1.3	-	1.79	-0.13	101	481	73	69
25	4.304	0.173	0.084	3.31	75	1.2	-	1.68	-0.11	101	479	73	69
26	4.483	0.179	0.083	3.31	76	1.3	-	1.56	-0.12	101	478	74	69
27	4.662	0.179	0.083	3.30	76	1.3	-	1.44	-0.12	101	476	74	69
28	4.841	0.179	0.082	3.30	76	1.3	-	1.32	-0.12	101	475	74	69
29	5.018	0.177	0.082	3.31	77	1.3	-	1.20	-0.12	101	474	74	69
30	5.194	0.176	0.084	3.29	77	1.3	101	1.10	-0.10	101	474	74	69
31	5.375	0.181	0.082	3.30	77	1.3	-	1.00	-0.10	101	474	74	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
32	5.556	0.181	0.084	3.31	78	1.3	-	0.93	-0.07	100	470	74	69
33	5.735	0.179	0.082	3.32	78	1.3	-	0.87	-0.06	100	464	74	69
34	5.910	0.175	0.081	3.31	78	1.3	-	0.80	-0.07	99	457	74	69
35	6.089	0.179	0.083	3.32	78	1.3	-	0.76	-0.04	99	449	74	69
36	6.269	0.180	0.081	3.32	79	1.3	-	0.72	-0.04	99	441	74	70
37	6.451	0.182	0.083	3.32	79	1.4	-	0.69	-0.03	98	433	74	69
38	6.630	0.179	0.081	3.33	79	1.3	-	0.67	-0.02	98	425	74	70
39	6.808	0.178	0.082	3.34	80	1.3	-	0.64	-0.03	98	419	74	70
40	6.989	0.181	0.082	3.34	80	1.3	101	0.61	-0.03	98	413	74	70
41	7.167	0.178	0.081	3.34	80	1.4	-	0.58	-0.03	97	408	74	70
42	7.350	0.183	0.082	3.34	80	1.3	-	0.57	-0.01	97	403	74	70
43	7.530	0.180	0.082	3.35	81	1.3	-	0.56	-0.01	96	398	74	69
44	7.708	0.178	0.082	3.35	81	1.3	-	0.54	-0.02	96	394	74	70
45	7.888	0.180	0.081	3.35	81	1.3	-	0.52	-0.02	96	390	74	69
46	8.069	0.181	0.084	3.35	81	1.3	-	0.50	-0.02	96	386	75	69
47	8.256	0.187	0.082	3.36	82	1.3	-	0.49	-0.01	95	383	75	70
48	8.434	0.178	0.082	3.38	82	1.4	-	0.47	-0.02	95	380	75	70
49	8.612	0.178	0.083	3.37	82	1.3	-	0.45	-0.02	95	377	75	69
50	8.792	0.180	0.082	3.36	82	1.3	101	0.43	-0.02	95	375	75	70
51	8.975	0.183	0.084	3.37	83	1.3	-	0.42	-0.01	95	373	75	70
52	9.158	0.183	0.083	3.38	83	1.3	-	0.40	-0.02	95	370	75	70
53	9.340	0.182	0.082	3.37	83	1.3	-	0.38	-0.02	94	367	75	69
54	9.524	0.184	0.082	3.38	83	1.3	-	0.36	-0.02	94	364	75	69
55	9.701	0.177	0.082	3.37	83	1.3	-	0.36	0.00	94	362	75	69
56	9.882	0.181	0.084	3.39	84	1.3	-	0.34	-0.02	94	359	75	69
57	10.065	0.183	0.082	3.37	84	1.4	-	0.33	-0.01	93	357	75	69
58	10.252	0.187	0.083	3.39	84	1.3	-	0.31	-0.02	93	355	75	69
59	10.432	0.180	0.082	3.39	84	1.3	-	0.29	-0.02	93	353	75	69
60	10.611	0.179	0.082	3.40	84	1.4	101	0.29	0.00	93	351	75	69
61	10.792	0.181	0.082	3.39	85	1.3	-	0.27	-0.02	93	350	75	69
62	10.976	0.184	0.081	3.39	85	1.4	-	0.25	-0.02	92	349	75	69
63	11.160	0.184	0.083	3.39	85	1.4	-	0.24	-0.01	93	348	75	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
64	11.343	0.183	0.082	3.40	85	1.3	-	0.23	-0.01	93	346	75	69
65	11.526	0.183	0.083	3.40	85	1.3	-	0.21	-0.02	92	344	75	69
66	11.706	0.180	0.085	3.40	85	1.3	-	0.20	-0.01	92	343	75	69
67	11.892	0.186	0.083	3.41	86	1.3	-	0.18	-0.02	92	341	75	69
68	12.073	0.181	0.082	3.41	86	1.3	-	0.18	0.00	92	340	75	69
69	12.257	0.184	0.082	3.41	86	1.4	-	0.16	-0.02	92	339	75	69
70	12.441	0.184	0.082	3.41	86	1.3	101	0.13	-0.03	92	337	75	69
71	12.624	0.183	0.084	3.41	86	1.3	-	0.13	0.00	92	336	75	69
72	12.805	0.181	0.083	3.41	86	1.3	-	0.12	-0.01	91	335	75	69
73	12.987	0.182	0.083	3.40	86	1.3	-	0.10	-0.02	91	333	75	69
74	13.173	0.186	0.081	3.41	87	1.4	-	0.08	-0.02	91	332	75	69
75	13.357	0.184	0.080	3.42	87	1.3	-	0.07	-0.01	91	330	75	69
76	13.541	0.184	0.083	3.41	87	1.3	-	0.06	-0.01	91	329	75	69
77	13.725	0.184	0.083	3.42	87	1.3	-	0.04	-0.02	90	327	75	69
78	13.905	0.180	0.081	3.41	87	1.4	-	0.03	-0.01	91	327	75	69
79	14.088	0.183	0.080	3.42	87	1.3	-	0.02	-0.01	91	325	75	69
80	14.277	0.189	0.082	3.42	87	1.3	101	0.02	0.00	91	325	75	69
81	14.459	0.182	0.085	3.43	88	1.3	100	0.00	-0.02	90	324	75	69
Avg/Tot	14.459	0.179	0.082	3.27	79.3	1.3	100			96.5	406.7	73.6	69.1

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.01	71	0.5		73	-0.069	4.78	0.046
1	0.119	0.119	3.12	71	2.0	-	73	-0.071	1.71	0.111
2	0.289	0.170	3.11	71	2.1	-	73	-0.078	5.26	0.031
3	0.462	0.173	3.11	71	1.9	-	73	-0.085	13.39	0.122
4	0.635	0.173	3.12	71	2.1	-	74	-0.088	14.33	0.499
5	0.804	0.169	3.12	71	1.7	-	74	-0.090	14.94	0.838
6	0.976	0.172	3.11	71	1.7	-	74	-0.090	15.48	0.949
7	1.150	0.174	3.12	71	1.9	-	74	-0.094	15.15	1.137
8	1.322	0.172	3.13	72	2.2	-	74	-0.093	15.07	1.722
9	1.492	0.170	3.14	72	2.2	-	74	-0.090	14.93	1.980
10	1.665	0.173	3.13	72	2.0	99	74	-0.094	14.93	2.431
11	1.838	0.173	3.13	72	2.1	-	75	-0.092	14.68	2.656
12	2.009	0.171	3.13	72	1.8	-	75	-0.096	14.60	3.207
13	2.180	0.171	3.13	73	2.2	-	75	-0.093	14.50	3.137
14	2.353	0.173	3.13	73	2.1	-	75	-0.091	14.51	2.694
15	2.527	0.174	3.14	73	1.9	-	75	-0.091	14.48	2.385
16	2.698	0.171	3.13	74	1.7	-	75	-0.092	14.66	2.195
17	2.869	0.171	3.13	74	2.0	-	75	-0.092	14.72	2.364
18	3.042	0.173	3.13	74	1.8	-	76	-0.092	14.67	2.383
19	3.216	0.174	3.12	74	1.7	-	76	-0.092	14.72	2.157
20	3.386	0.170	3.12	75	1.9	102	76	-0.093	14.83	1.899
21	3.562	0.176	3.13	75	1.7	-	76	-0.091	14.82	1.742
22	3.733	0.171	3.13	75	1.7	-	76	-0.090	14.72	1.535
23	3.907	0.174	3.13	76	1.7	-	76	-0.090	14.61	1.415
24	4.081	0.174	3.12	76	2.2	-	76	-0.090	14.57	1.355
25	4.251	0.170	3.13	76	1.8	-	76	-0.089	14.73	1.312
26	4.426	0.175	3.12	77	1.7	-	76	-0.089	14.83	1.338
27	4.599	0.173	3.13	77	1.8	-	76	-0.087	14.79	1.527
28	4.770	0.171	3.12	77	1.9	-	77	-0.089	14.51	1.651
29	4.943	0.173	3.11	78	1.9	-	77	-0.089	14.44	1.528
30	5.117	0.174	3.12	78	2.1	101	77	-0.088	15.07	0.876
31	5.291	0.174	3.11	78	1.8	-	77	-0.088	14.93	0.655

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	5.462	0.171	3.10	79	2.2	-	77	-0.086	14.34	0.412
33	5.635	0.173	3.11	79	1.8	-	77	-0.085	12.84	0.020
34	5.810	0.175	3.11	79	1.8	-	77	-0.081	11.46	0.014
35	5.983	0.173	3.11	80	2.1	-	77	-0.083	10.19	0.011
36	6.155	0.172	3.11	80	2.3	-	77	-0.081	9.29	0.012
37	6.328	0.173	3.12	81	2.0	-	77	-0.081	8.77	0.014
38	6.504	0.176	3.12	81	1.8	-	77	-0.081	8.24	0.008
39	6.677	0.173	3.12	81	1.7	-	77	-0.079	7.87	0.011
40	6.852	0.175	3.12	81	2.2	100	77	-0.078	7.56	0.011
41	7.023	0.171	3.12	82	1.7	-	77	-0.076	7.17	0.011
42	7.199	0.176	3.12	82	1.7	-	77	-0.076	6.63	0.012
43	7.373	0.174	3.12	82	2.0	-	77	-0.077	6.47	0.012
44	7.546	0.173	3.13	83	1.7	-	77	-0.075	6.46	0.009
45	7.720	0.174	3.14	83	1.7	-	77	-0.077	6.45	0.013
46	7.896	0.176	3.13	83	1.8	-	77	-0.075	5.99	0.015
47	8.074	0.178	3.13	84	1.7	-	77	-0.075	5.87	0.017
48	8.244	0.170	3.13	84	1.7	-	77	-0.071	6.07	0.012
49	8.418	0.174	3.13	84	2.2	-	77	-0.073	6.11	0.016
50	8.594	0.176	3.14	85	2.0	100	77	-0.074	6.19	0.014
51	8.771	0.177	3.14	85	2.3	-	77	-0.073	6.09	0.013
52	8.945	0.174	3.14	85	2.2	-	77	-0.073	6.05	0.023
53	9.119	0.174	3.14	85	2.2	-	77	-0.074	5.59	0.012
54	9.298	0.179	3.14	86	2.0	-	77	-0.073	5.56	0.012
55	9.472	0.174	3.14	86	1.7	-	77	-0.071	5.66	0.016
56	9.647	0.175	3.14	86	1.7	-	77	-0.072	5.47	0.016
57	9.821	0.174	3.15	86	2.0	-	77	-0.072	5.54	0.019
58	9.998	0.177	3.14	87	1.8	-	77	-0.072	5.60	0.021
59	10.173	0.175	3.15	87	2.0	-	77	-0.069	5.58	0.021
60	10.349	0.176	3.16	87	1.7	100	77	-0.069	5.49	0.021
61	10.522	0.173	3.16	87	1.7	-	77	-0.071	5.45	0.022
62	10.698	0.176	3.14	88	2.1	-	77	-0.070	5.39	0.025
63	10.875	0.177	3.16	88	1.8	-	77	-0.069	5.30	0.024

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	11.052	0.177	3.16	88	2.3	-	77	-0.071	5.28	0.023
65	11.227	0.175	3.16	88	1.7	-	77	-0.068	5.28	0.024
66	11.402	0.175	3.16	88	2.3	-	77	-0.070	5.29	0.023
67	11.582	0.180	3.17	89	1.7	-	77	-0.070	5.31	0.021
68	11.757	0.175	3.16	89	2.1	-	77	-0.068	5.32	0.022
69	11.932	0.175	3.16	89	1.8	-	77	-0.069	5.35	0.024
70	12.106	0.174	3.16	89	2.2	100	77	-0.069	5.38	0.022
71	12.282	0.176	3.16	90	2.0	-	77	-0.071	5.42	0.022
72	12.460	0.178	3.16	90	2.2	-	77	-0.069	5.43	0.023
73	12.638	0.178	3.17	90	1.7	-	77	-0.067	5.05	0.025
74	12.813	0.175	3.17	90	2.2	-	77	-0.069	4.98	0.025
75	12.988	0.175	3.16	90	2.1	-	77	-0.068	4.99	0.023
76	13.167	0.179	3.17	90	1.7	-	77	-0.066	4.99	0.022
77	13.344	0.177	3.17	91	1.7	-	77	-0.067	4.95	0.023
78	13.520	0.176	3.17	91	1.9	-	77	-0.068	4.94	0.027
79	13.695	0.175	3.17	91	1.7	-	77	-0.067	4.93	0.024
80	13.875	0.180	3.17	91	1.7	100	77	-0.068	4.94	0.025
81	14.050	0.175	3.17	91	1.7	98	77	-0.067	4.96	0.022
Avg/Tot	14.050	0.173	3.10	81.1	1.9	100	76.3	-0.079	9.24	0.624

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
0	0.000		0.00	74	0.0		72
1	0.107	0.107	0.90	75	1.7	-	72
2	0.242	0.135	0.90	75	1.7	-	72
3	0.377	0.135	0.91	75	1.8	-	72
4	0.511	0.134	0.90	75	1.7	-	72
5	0.647	0.136	0.92	75	1.7	-	73
6	0.781	0.134	0.91	75	1.6	-	73
7	0.918	0.137	0.93	76	1.7	-	73
8	1.053	0.135	0.93	76	1.7	-	73
9	1.191	0.138	0.93	76	1.8	-	73
10	1.326	0.135	0.93	77	1.8	98	74
11	1.465	0.139	0.94	77	1.7	-	74
12	1.601	0.136	0.93	77	1.6	-	74
13	1.740	0.139	0.94	77	1.7	-	74
14	1.877	0.137	0.93	78	1.7	-	74
15	2.016	0.139	0.95	78	1.7	-	75
16	2.153	0.137	0.94	78	1.6	-	75
17	2.291	0.138	0.95	78	1.8	-	75
18	2.429	0.138	0.94	78	1.7	-	75
19	2.567	0.138	0.94	79	1.7	-	75
20	2.706	0.139	0.95	79	1.6	101	75
21	2.846	0.140	0.94	79	1.6	-	76
22	2.983	0.137	0.95	79	1.8	-	76
23	3.120	0.137	0.94	80	1.7	-	76
24	3.261	0.141	0.95	80	1.8	-	76
25	3.398	0.137	0.94	81	1.8	-	76
26	3.536	0.138	0.95	81	1.7	-	76
27	3.676	0.140	0.95	81	1.6	-	76
28	3.814	0.138	0.94	81	1.7	-	76
29	3.955	0.141	0.96	82	1.8	-	76
30	4.093	0.138	0.95	82	1.6	100	76
31	4.232	0.139	0.95	82	1.6	-	76

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
32	4.372	0.140	0.96	82	1.6	-	77
33	4.511	0.139	0.95	83	1.7	-	77
34	4.652	0.141	0.96	83	1.7	-	77
35	4.791	0.139	0.96	84	1.9	-	77
36	4.931	0.140	0.95	84	1.8	-	77
37	5.073	0.142	0.97	84	1.8	-	77
38	5.213	0.140	0.96	84	1.7	-	77
39	5.353	0.140	0.96	85	1.9	-	77
40	5.497	0.144	0.97	85	1.8	101	77
41	5.636	0.139	0.97	86	1.7	-	77
42	5.777	0.141	0.96	85	1.7	-	77
43	5.919	0.142	0.98	86	1.6	-	77
44	6.061	0.142	0.98	86	1.9	-	77
45	6.202	0.141	0.97	86	1.7	-	77
46	6.344	0.142	0.98	87	1.8	-	77
47	6.490	0.146	0.98	87	1.7	-	77
48	6.629	0.139	0.97	87	1.8	-	77
49	6.771	0.142	0.97	88	1.8	-	77
50	6.914	0.143	0.99	88	1.8	101	77
51	7.057	0.143	0.99	88	1.7	-	77
52	7.199	0.142	0.98	88	1.9	-	77
53	7.342	0.143	0.98	88	1.7	-	77
54	7.487	0.145	0.98	88	1.9	-	77
55	7.629	0.142	0.99	89	1.7	-	77
56	7.772	0.143	0.98	88	1.8	-	77
57	7.914	0.142	0.98	88	1.7	-	77
58	8.060	0.146	0.99	89	1.7	-	77
59	8.202	0.142	0.99	88	1.9	-	77
60	8.346	0.144	0.99	89	1.6	102	76
Avg/Tot	8.346	0.139	0.94	81.9	1.7	100	75.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Stove ΔT: 58

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	487	480	452	576	290	456.9	712.6
1	483	477	451	562	290	452.5	651.5
2	479	473	448	554	290	448.6	728.5
3	473	468	447	565	291	448.6	944.9
4	467	464	449	598	292	453.9	1074.0
5	464	461	452	632	292	460.1	1121.8
6	462	458	457	664	292	466.5	1153.5
7	458	456	461	692	292	471.8	1163.7
8	455	454	465	713	292	475.9	1164.0
9	452	454	468	731	292	479.3	1163.5
10	451	454	471	744	292	482.5	1159.8
11	451	455	474	755	292	485.1	1157.5
12	451	457	476	764	291	487.8	1164.6
13	452	458	479	773	291	490.4	1171.6
14	453	461	481	780	290	492.7	1164.4
15	456	463	483	785	290	495.2	1159.4
16	459	466	484	789	289	497.3	1159.0
17	463	469	485	793	288	499.7	1162.7
18	466	472	487	796	287	501.8	1163.3
19	470	476	488	800	287	503.9	1165.1
20	474	479	489	802	286	506.1	1168.1
21	480	483	490	806	286	509.0	1170.4
22	485	487	492	808	285	511.2	1173.4
23	489	492	493	811	284	513.6	1175.2
24	494	496	494	811	284	515.6	1175.6
25	499	500	495	813	283	518.2	1178.0
26	505	505	496	816	283	521.0	1181.1
27	509	510	497	817	283	523.2	1183.5
28	514	516	499	821	282	526.2	1186.2
29	519	521	500	823	282	529.2	1190.4
30	523	526	502	828	282	532.2	1206.7
31	528	531	504	834	282	535.7	1213.9
32	533	536	506	839	282	539.2	1240.0
33	537	541	507	837	282	540.9	1219.2
34	541	545	507	828	283	540.4	1165.1
35	544	548	505	815	283	539.0	1116.0
36	547	551	503	800	283	536.7	1076.5
37	549	553	501	784	283	534.1	1048.9
38	551	555	498	770	283	531.2	1020.5
39	552	556	495	755	284	528.3	996.8
40	550	556	492	742	285	524.8	977.2
41	550	555	489	729	285	521.5	961.4
42	548	554	486	716	286	517.9	944.6
43	545	552	483	704	286	514.0	930.5
44	542	550	480	692	287	510.0	918.3
45	538	547	476	681	287	505.8	906.9
46	534	544	473	670	288	501.8	894.0
47	529	540	469	659	289	497.4	881.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Stove ΔT: 58

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	526	536	466	650	290	493.3	873.1
49	521	532	462	641	290	489.3	866.6
50	516	528	459	632	291	485.2	860.1
51	513	524	456	624	292	481.8	852.4
52	508	520	453	617	292	478.0	844.2
53	505	516	450	609	292	474.2	832.2
54	499	512	447	601	292	470.1	820.3
55	495	508	444	595	292	466.7	816.6
56	490	504	441	588	292	463.1	815.2
57	485	499	438	582	292	459.1	812.3
58	482	494	435	576	292	455.7	808.1
59	477	490	433	570	292	452.0	802.1
60	473	486	430	565	291	448.9	794.5
61	469	482	427	560	291	445.7	787.8
62	465	478	425	555	291	442.6	782.2
63	461	474	422	549	291	439.5	776.2
64	457	471	420	544	290	436.4	770.2
65	453	467	418	540	290	433.5	764.8
66	450	464	416	535	289	430.9	760.3
67	447	461	414	531	289	428.1	756.4
68	444	458	412	527	288	425.7	752.4
69	441	455	410	523	288	423.4	748.7
70	438	453	408	519	287	420.8	745.4
71	435	450	407	516	286	418.6	742.6
72	433	448	405	512	285	416.5	740.0
73	431	445	403	508	285	414.6	735.8
74	428	443	402	505	284	412.4	730.8
75	426	441	400	502	283	410.3	727.3
76	424	439	399	499	282	408.4	724.2
77	422	436	397	496	281	406.4	721.1
78	420	434	396	493	281	404.5	718.5
79	418	432	394	490	279	402.6	715.9
80	416	429	393	487	279	400.7	713.2
81	414	427	391	484	278	398.8	710.9
Average	483.4	490.7	457.9	665.8	287.2	477.0	956.4

LAB SAMPLE DATA - ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 4

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G973	241.0	242.4	1.4
	B	G974	241.4	243.0	1.6
	C - 1st Hour	G975	241.2	242.8	1.6
	Amb	G976	241.1	241.2	0.1
Probes	**A**	2A	116057.4	116057.6	0.2
	B	2B	116173.8	116174.1	0.3
	C - 1st Hour	2C	116428.8	116428.8	0.0
O-rings	**A**	2A	3554.1	3555.0	0.9
	B	2B	3573.1	3573.7	0.6
	C - 1st Hour	2C	3391.5	3391.9	0.4

Placed in Dessicator on:	3/21 - 13:30

Balance Audit (mg):		100.0		100.0					
		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	242.4	3/25 - 8:00	242.4	3/26 - 8:00				
	B	243.1	3/25 - 8:00	243.0	3/26 - 8:00				
	C - 1st Hour	242.9	3/25 - 8:00	242.8	3/26 - 8:00				
	Amb	241.2	3/25 - 8:00	241.2	3/26 - 8:00				
Probes	**A**	116057.5	3/25 - 8:00	116057.6	3/26 - 8:00				
	B	116174.2	3/25 - 8:00	116174.1	3/26 - 8:00				
	C - 1st Hour	116428.7	3/25 - 8:00	116428.8	3/26 - 8:00				
O-Rings	**A**	3554.8	3/25 - 8:00	3555.0	3/26 - 8:00				
	B	3573.7	3/25 - 8:00	3573.7	3/26 - 8:00				
	C - 1st Hour	3391.9	3/25 - 8:00	3391.9	3/26 - 8:00				

Train A Aggregate, mg:	**2.5**
Train B Aggregate, mg:	**2.5**
Train C Aggregate, mg:	**2.0**
Ambient, mg:	**0.1**

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 4 Test Date: 3/21/2024

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): 0.150" open from Fully Closed
Targeted Burn Category: Cat III

Preburn Notes

Time	Notes
9:25	Started fire with ~2 lbs of kindling
9:40	Added 4 additional lbs of kindling fuel
10:18	Pulled remaining fuel forward for uniform charcoalization
10:32	Loaded preburn fuel, closed door, air set to test setting
11:20	Coal bed was too low and not at an hour of preburn, added 3 additional preburn pieces to firebox
11:55	Leveled coal bed, zeroed scale in preparation of fuel loading

Test Notes

Test Burn Start Time: 11:55 Test Fuel Loaded by: 30 seconds
Door Closed: 35 seconds Air Control Set at: 0 seconds
Other Loading Notes: N/A

Time	Notes
11:55	Loaded fuel, closed door, air set to test setting

Test Burn End Time: 13:16

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.98 CO (%): 4.300
Mid Gas CO_2 (%): 10.06 CO (%): 2.538

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	9:53	9:58	9:55	18:15	18:20	18:22
CO_2	-0.03	10.04	16.94	0.04	10.09	16.88
CO	0.001	2.520	4.299	0.009	2.545	4.316

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

Technician Signature: Date: 3/22/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 4 Test Date: 3/21/2024

Test Fuel Front View

Test Fuel Iso View

Test Fuel Loaded in Stove

Air Setting

Technician Signature: _____ Date: 3/22/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 4 Test Date: 3/21/2024

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date: 3/22/2024

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 5 Data Summary

Client:	Jotul
Model:	F602 V3
Job #:	24-268
Tracking #:	185
Test Date:	3/21/2024

Techician Signature

3/26/2024
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Burn Rate (kg/hr):	1.07

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	9.048	21.305	20.519	8.577
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12638.1			
Average Gas Meter Temperature (°F)	71.3	85.9	89.1	86.2
Total Sample Volume (dscf)	9.107	20.855	19.979	8.342
Average Tunnel Temperature (°F)	90.2			
Total Time of Test (min)	116			
Total Particulate Catch (mg)	0.0	1.0	0.8	0.7
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000480	0.0000400	0.0000839
Total PM Emissions (g)	0.00	1.17	0.98	1.06
Particulate Emission Rate (g/hr)	0.00	0.61	0.51	1.06
Emissions Factor (g/kg)	-	0.57	0.47	-
Difference from Average Total Particulate Emissions (g)	-	0.10	0.10	-
Difference from Average Total Particulate Emissions (%)	-	9.0%	9.0%	
Difference from Average Emissions Factor (g/kg)	-	0.05	0.05	-

Final Average Results	
Total Particulate Emissions (g)	1.07
Particulate Emission Rate (g/hr)	0.56
Emissions Factor (g/kg)	0.52
HHV Efficiency (%)	79.5%
LHV Efficiency (%)	86.0%
CO Emissions (g/min)	0.26

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	78.9	OK
Face Velocity	< 30 ft/min	10.2	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:70.1/Max:72.4	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
Stove Surface ΔT	<126°F	18.8	OK

B415.1 Efficiency Results

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/21/24
Run:	5
Control #:	24-268
Test Duration:	116
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	79.5%	86.0%
Combustion Efficiency	99.2%	99.2%
Heat Transfer Efficiency	80.2%	86.7%

Output Rate (kJ/h)	16,500	15,652	**(Btu/h)**
Burn Rate (kg/h)	1.05	2.31	**(lb/h)**
Input (kJ/h)	20,742	19,676	**(Btu/h)**

Test Load Weight (dry kg)	2.02	4.46	**dry lb**
MC wet (%)	16.60		
MC dry (%)	19.91		
Particulate (g)	1.07		
CO (g)	31		
Test Duration (h)	1.93		

Emissions	**Particulate**	**CO**
g/MJ Output	0.03	0.96
g/kg Dry Fuel	0.53	15.14
g/h	0.56	15.85
g/min	0.01	0.26
lb/MM Btu Output	0.08	2.23

Air/Fuel Ratio (A/F)	12.50

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)		Size	Length (in)	Moisture Content (% DB)
2x4	7.00	19.8				
2x4	7.00	23.1				
2x4	7.00	22.5				
2x4	7.00	19.6				
2x4	7.00	20.1				
2x4	7.00	18.9				
2x4	7.00	20.3				
2x4	7.00	18.6				
Total Fuel Weight (lbs):		5.64		Average Moisture (%DB):		20.4

Firebox Volume (ft^3):	0.79
Total 2x4 Crib Weight, with spacers (lbs):	5.35
Total 4x4 Crib Weight, with spacers (lbs):	0.00
Total Wet Fuel Weight, with spacers (lbs):	5.35

Coal Bed Range (20-25%):
Min (lbs): 1.07
Max (lbs): 1.34

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	13.50	1.46	21.9	19.0	19.5	1.22
2x4	13.50	1.41	18.9	19.1	19.5	1.18
2x4	13.50	1.43	19.3	20.4	21.6	1.19
					Total Dry Weight, no spacers (lbs):	3.59
					Total Dry Weight, with spacers (lbs):	4.55

Spacer Moisture Readings (%DB)

7.5	10.9	7.5					
8.8	12.0	11.1					
7.6	9.3						
10.9	7.4						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	29.1	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	6.77	OK
2x4 Fuel Mix	35 - 65 % of total weight	N/A	N/A

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Jotul	Job #:	24-268
Model:	F602 V3	Tracking #:	185
Run #:	5	Technician:	SJB
Test Start Time:	16:00	Date:	3/21/2024

Total Sampling Time (min):	116	
Recording Interval (min):	1	
Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.005	(B)
Meter Box γ Factor:	1.004	(C)
Meter Box γ Factor:	1.013	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	3/18/2004	
Test Fuel Scale Audit (lbs)	5.00	
Platform Scale Audit (lbs)	5.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.90	29.95	29.93
Relative Humidity (%)	31.6	35.8	
Room Air Velocity (ft/min)	0	0	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		9.048	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.002	0.001	cfm @	-6	in. Hg
(B)	0.001	0.000	cfm @	-6	in. Hg
(C)	0.000	0.000	cfm @	-6	in. Hg
(Ambient)	0.001	0.000	cfm @	-6	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.062	68
2	0.074	68
3	0.090	68
4	0.070	68
5	0.054	68
6	0.078	68
7	0.102	68
8	0.088	68
Center	0.080	68

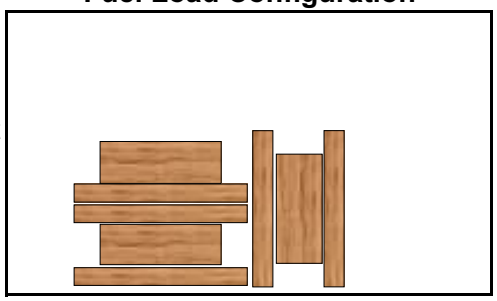
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.34	ft/sec
V_{scent}:	18.75	ft/sec
F_p:	0.978	[ratio]
Initial Tunnel Flow:	211.7	scf/min

Static Pressure: -0.130 in. H_2O

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Left



Firebox Right

Firebox Front View

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)	19.9

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Recording Interval (min): 1
Run Time (min): 85

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	6.27	-0.082	443	448	445	598	238	434.3	422	70
1	6.12	-0.086	443	450	447	614	239	438.6	410	70
2	5.97	-0.086	441	449	452	644	242	445.4	416	70
3	5.84	-0.087	439	446	456	669	244	450.7	420	70
4	5.70	-0.087	438	444	459	690	246	455.3	422	70
5	5.57	-0.087	435	441	462	706	248	458.1	424	70
6	5.43	-0.089	434	438	463	719	249	460.7	426	70
7	5.30	-0.088	432	436	464	729	251	462.4	428	70
8	5.16	-0.089	431	434	465	738	252	464.2	430	70
9	5.02	-0.090	431	433	466	747	254	466.2	434	70
10	4.88	-0.090	431	432	467	757	255	468.3	437	70
11	4.73	-0.087	433	432	467	764	257	470.3	438	70
12	4.60	-0.088	434	432	467	770	257	471.9	437	70
13	4.48	-0.088	434	433	466	776	258	473.4	436	70
14	4.36	-0.087	436	433	466	780	259	474.8	435	70
15	4.24	-0.087	438	435	465	781	260	475.7	434	70
16	4.12	-0.084	441	436	465	783	260	476.9	432	70
17	4.01	-0.086	442	437	464	785	261	477.9	429	70
18	3.89	-0.087	446	439	464	786	261	479.1	427	70
19	3.78	-0.086	448	440	464	789	261	480.3	425	70
20	3.67	-0.084	450	442	463	790	261	481.3	424	70
21	3.58	-0.086	452	444	463	791	261	482.3	423	70
22	3.47	-0.084	455	446	464	791	261	483.3	421	71
23	3.38	-0.084	456	448	463	792	261	484.1	417	71
24	3.29	-0.082	461	450	463	790	261	484.9	412	71
25	3.21	-0.081	463	452	462	785	261	484.6	407	71
26	3.14	-0.081	467	455	461	781	261	484.6	404	71
27	3.06	-0.079	469	457	459	775	260	484.0	400	71
28	2.99	-0.079	472	459	457	767	260	483.3	395	71
29	2.92	-0.078	477	462	456	760	260	483.0	391	71
30	2.87	-0.077	480	464	454	752	260	482.1	385	71
31	2.81	-0.076	484	467	452	743	260	481.2	380	71
32	2.77	-0.076	487	469	450	733	260	479.8	375	71
33	2.73	-0.074	490	471	448	721	260	478.0	369	71
34	2.67	-0.074	490	473	445	711	260	475.9	363	71
35	2.64	-0.074	494	475	443	701	260	474.4	359	71
36	2.59	-0.073	496	476	441	692	261	473.2	356	71
37	2.55	-0.073	496	477	439	684	261	471.3	353	71
38	2.51	-0.072	497	477	437	676	261	469.6	350	71
39	2.46	-0.072	497	478	435	669	261	468.1	347	71
40	2.42	-0.071	496	478	434	665	262	466.7	345	71
41	2.38	-0.071	497	479	432	658	262	465.6	344	71
42	2.33	-0.070	496	478	431	654	262	464.3	341	71
43	2.29	-0.070	493	478	430	649	262	462.4	339	71
44	2.26	-0.071	494	478	429	645	263	461.5	336	71

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Recording Interval (min): 1
Run Time (min): 85

			Temperatures (°F)							
Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H_2O)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
45	2.20	-0.072	492	477	428	637	263	459.5	367	71
46	2.13	-0.075	490	476	429	644	264	460.4	356	71
47	2.07	-0.074	488	473	430	657	264	462.6	354	71
48	2.01	-0.073	485	472	431	667	265	463.8	355	71
49	1.96	-0.073	485	469	432	671	265	464.3	354	71
50	1.91	-0.072	483	468	432	671	265	463.8	351	71
51	1.87	-0.071	480	466	432	669	266	462.6	350	71
52	1.82	-0.072	480	465	432	667	266	461.7	346	71
53	1.77	-0.070	477	464	431	663	266	460.2	344	71
54	1.74	-0.071	476	464	430	659	266	459.1	340	71
55	1.71	-0.071	475	464	429	655	267	458.0	337	71
56	1.67	-0.069	471	465	428	650	267	456.3	335	71
57	1.62	-0.069	471	465	427	644	268	455.1	331	71
58	1.61	-0.069	470	466	425	639	268	453.7	328	71
59	1.58	-0.068	469	466	424	632	269	451.8	325	71
60	1.57	-0.064	467	465	422	626	269	449.6	322	71
61	1.53	-0.066	466	465	420	618	270	447.5	318	71
62	1.52	-0.065	465	464	417	610	270	445.2	315	71
63	1.50	-0.065	463	462	415	603	271	442.8	311	71
64	1.49	-0.063	461	461	413	596	272	440.3	308	71
65	1.47	-0.063	459	458	410	588	272	437.4	305	71
66	1.46	-0.063	457	456	408	580	273	434.6	300	71
67	1.45	-0.062	456	454	405	573	274	432.2	297	71
68	1.42	-0.062	453	452	402	565	275	429.4	294	71
69	1.41	-0.061	452	449	400	558	276	427.0	292	71
70	1.41	-0.059	451	447	398	552	277	424.9	290	71
71	1.38	-0.060	449	444	396	547	277	422.7	286	71
72	1.37	-0.060	447	442	393	542	279	420.6	284	71
73	1.35	-0.058	445	440	391	538	280	418.7	283	71
74	1.34	-0.059	444	437	389	533	281	416.7	282	71
75	1.33	-0.058	441	435	388	529	281	414.7	280	71
76	1.31	-0.056	440	433	385	523	282	412.6	277	71
77	1.30	-0.058	438	430	384	519	282	410.5	275	71
78	1.29	-0.058	435	428	382	515	283	408.4	274	71
79	1.28	-0.057	435	425	380	510	283	406.7	271	71
80	1.26	-0.058	432	423	378	506	284	404.5	270	71
81	1.25	-0.058	430	421	376	503	285	402.8	268	71
82	1.25	-0.057	427	418	375	499	285	400.8	267	71
83	1.23	-0.058	426	416	373	496	285	399.0	266	71
84	1.22	-0.055	423	413	372	492	285	396.8	264	71
85	1.22	-0.057	421	411	370	488	285	394.9	263	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.080	0.01	76	0.1		5.35		92	274	73	71
1	0.158	0.158	0.080	3.02	76	1.2	-	5.32	-0.03	95	282	73	71
2	0.326	0.168	0.078	3.06	76	1.2	-	5.29	-0.03	91	263	74	71
3	0.499	0.173	0.082	3.09	76	1.2	-	5.23	-0.06	89	262	74	71
4	0.674	0.175	0.082	3.11	76	1.2	-	5.15	-0.08	89	273	74	71
5	0.845	0.171	0.082	3.14	76	1.2	-	5.08	-0.07	89	284	74	71
6	1.018	0.173	0.084	3.16	76	1.2	-	5.00	-0.08	89	295	74	71
7	1.195	0.177	0.082	3.17	76	1.2	-	4.90	-0.10	89	303	74	71
8	1.372	0.177	0.084	3.19	76	1.2	-	4.82	-0.08	89	310	74	71
9	1.546	0.174	0.081	3.20	76	1.2	-	4.74	-0.08	89	317	74	71
10	1.721	0.175	0.083	3.23	76	1.2	96	4.65	-0.09	90	319	74	71
11	1.901	0.180	0.084	3.24	76	1.2	-	4.56	-0.09	89	322	74	71
12	2.081	0.180	0.084	3.27	77	1.2	-	4.47	-0.09	90	324	74	71
13	2.259	0.178	0.083	3.28	77	1.2	-	4.40	-0.07	90	326	74	71
14	2.435	0.176	0.083	3.30	77	1.2	-	4.31	-0.09	90	328	75	71
15	2.613	0.178	0.083	3.29	77	1.2	-	4.22	-0.09	90	329	75	71
16	2.794	0.181	0.085	3.31	77	1.2	-	4.13	-0.09	90	330	75	71
17	2.975	0.181	0.083	3.32	78	1.2	-	4.05	-0.08	90	332	75	71
18	3.155	0.180	0.084	3.34	78	1.3	-	3.95	-0.10	90	335	75	71
19	3.333	0.178	0.083	3.34	78	1.2	-	3.85	-0.10	91	341	75	71
20	3.512	0.179	0.082	3.34	78	1.2	99	3.74	-0.11	91	345	75	71
21	3.694	0.182	0.083	3.35	79	1.2	-	3.64	-0.10	91	347	75	71
22	3.877	0.183	0.083	3.36	79	1.3	-	3.55	-0.09	91	349	75	71
23	4.058	0.181	0.083	3.36	79	1.2	-	3.45	-0.10	91	351	75	71
24	4.236	0.178	0.084	3.36	80	1.3	-	3.34	-0.11	91	352	75	71
25	4.416	0.180	0.083	3.37	80	1.2	-	3.25	-0.09	91	353	75	71
26	4.600	0.184	0.085	3.37	80	1.3	-	3.15	-0.10	91	353	75	72
27	4.784	0.184	0.084	3.38	80	1.2	-	3.06	-0.09	91	354	75	71
28	4.968	0.184	0.083	3.40	81	1.2	-	2.96	-0.10	92	355	76	71
29	5.145	0.177	0.085	3.40	81	1.3	-	2.87	-0.09	92	356	76	72
30	5.327	0.182	0.085	3.40	81	1.3	99	2.77	-0.10	92	356	76	71
31	5.510	0.183	0.084	3.40	82	1.3	-	2.68	-0.09	92	357	76	72

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
32	5.693	0.183	0.084	3.40	82	1.2	-	2.60	-0.08	92	358	76	72
33	5.878	0.185	0.083	3.40	82	1.2	-	2.50	-0.10	92	359	76	72
34	6.061	0.183	0.085	3.41	82	1.3	-	2.41	-0.09	93	361	76	72
35	6.241	0.180	0.083	3.40	83	1.3	-	2.32	-0.09	92	363	76	71
36	6.423	0.182	0.084	3.42	83	1.3	-	2.23	-0.09	92	363	76	72
37	6.610	0.187	0.082	3.41	83	1.3	-	2.15	-0.08	92	365	76	72
38	6.791	0.181	0.083	3.42	83	1.3	-	2.08	-0.07	93	366	76	72
39	6.977	0.186	0.083	3.42	84	1.3	-	1.99	-0.09	93	369	76	72
40	7.160	0.183	0.084	3.44	84	1.3	99	1.92	-0.07	93	369	76	72
41	7.341	0.181	0.082	3.42	84	1.3	-	1.84	-0.08	93	368	76	72
42	7.525	0.184	0.083	3.43	84	1.3	-	1.76	-0.08	93	367	76	72
43	7.708	0.183	0.084	3.44	85	1.3	-	1.70	-0.06	93	367	76	72
44	7.893	0.185	0.083	3.43	85	1.3	-	1.63	-0.07	93	365	76	72
45	8.079	0.186	0.083	3.44	85	1.3	-	1.57	-0.06	93	363	76	72
46	8.262	0.183	0.081	3.44	85	1.2	-	1.49	-0.08	93	361	76	72
47	8.446	0.184	0.084	3.44	86	1.3	-	1.42	-0.07	93	361	76	72
48	8.630	0.184	0.084	3.45	86	1.3	-	1.36	-0.06	93	359	77	72
49	8.813	0.183	0.081	3.43	86	1.3	-	1.32	-0.04	93	358	77	72
50	8.999	0.186	0.083	3.46	86	1.3	100	1.27	-0.05	93	355	77	72
51	9.185	0.186	0.082	3.46	86	1.3	-	1.20	-0.07	92	354	77	72
52	9.370	0.185	0.082	3.45	87	1.3	-	1.17	-0.03	92	352	77	72
53	9.555	0.185	0.082	3.45	87	1.3	-	1.12	-0.05	92	350	77	72
54	9.737	0.182	0.082	3.46	87	1.3	-	1.06	-0.06	93	349	77	72
55	9.922	0.185	0.083	3.45	87	1.3	-	1.02	-0.04	93	348	77	72
56	10.107	0.185	0.082	3.46	87	1.3	-	0.97	-0.05	92	346	77	72
57	10.293	0.186	0.082	3.47	88	1.3	-	0.93	-0.04	93	345	77	72
58	10.481	0.188	0.083	3.46	88	1.3	-	0.90	-0.03	92	343	77	72
59	10.665	0.184	0.082	3.46	88	1.3	-	0.87	-0.03	93	340	77	72
60	10.851	0.186	0.083	3.47	88	1.3	101	0.84	-0.03	92	339	77	72
61	11.033	0.182	0.084	3.48	88	1.3	-	0.80	-0.04	92	336	77	72
62	11.219	0.186	0.082	3.46	88	1.3	-	0.77	-0.03	92	334	77	72
63	11.405	0.186	0.083	3.48	89	1.3	-	0.74	-0.03	92	332	77	72

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
64	11.591	0.186	0.082	3.46	89	1.3	-	0.71	-0.03	92	330	77	72
65	11.779	0.188	0.082	3.48	89	1.3	-	0.69	-0.02	92	328	77	72
66	11.965	0.186	0.081	3.48	89	1.3	-	0.67	-0.02	92	326	77	72
67	12.151	0.186	0.083	3.47	89	1.3	-	0.65	-0.02	91	324	77	72
68	12.333	0.182	0.083	3.48	89	1.3	-	0.63	-0.02	91	322	77	72
69	12.520	0.187	0.083	3.48	89	1.3	-	0.60	-0.03	91	320	77	72
70	12.706	0.186	0.082	3.49	90	1.3	101	0.59	-0.01	91	317	77	72
71	12.893	0.187	0.082	3.48	90	1.3	-	0.56	-0.03	91	315	77	72
72	13.081	0.188	0.081	3.48	90	1.3	-	0.54	-0.02	90	312	77	72
73	13.267	0.186	0.082	3.47	90	1.3	-	0.52	-0.02	90	310	77	72
74	13.454	0.187	0.082	3.49	90	1.3	-	0.51	-0.01	90	307	77	72
75	13.637	0.183	0.082	3.49	90	1.3	-	0.49	-0.02	91	306	77	72
76	13.824	0.187	0.081	3.48	90	1.3	-	0.48	-0.01	90	305	77	72
77	14.009	0.185	0.082	3.49	90	1.3	-	0.46	-0.02	90	303	77	72
78	14.198	0.189	0.081	3.49	91	1.3	-	0.45	-0.01	90	302	77	72
79	14.385	0.187	0.083	3.50	91	1.2	-	0.44	-0.01	90	301	77	72
80	14.573	0.188	0.081	3.50	91	1.3	102	0.41	-0.03	90	300	77	72
81	14.758	0.185	0.081	3.50	91	1.3	-	0.40	-0.01	90	299	77	72
82	14.945	0.187	0.081	3.50	91	1.3	-	0.37	-0.03	90	297	77	71
83	15.129	0.184	0.081	3.49	91	1.3	-	0.37	0.00	90	296	77	71
84	15.316	0.187	0.081	3.50	91	1.3	-	0.35	-0.02	90	295	77	71
85	15.503	0.187	0.082	3.50	91	1.3	-	0.35	0.00	90	293	77	71
86	15.691	0.188	0.083	3.49	91	1.3	-	0.32	-0.03	89	292	77	71
87	15.879	0.188	0.083	3.50	91	1.3	-	0.31	-0.01	89	291	77	71
88	16.066	0.187	0.082	3.50	91	1.3	-	0.29	-0.02	89	289	77	71
89	16.254	0.188	0.082	3.51	91	1.3	-	0.28	-0.01	89	288	77	71
90	16.439	0.185	0.082	3.51	92	1.3	101	0.26	-0.02	89	287	77	71
91	16.626	0.187	0.082	3.50	92	1.3	-	0.25	-0.01	89	286	77	71
92	16.811	0.185	0.080	3.49	92	1.3	-	0.24	-0.01	88	284	77	71
93	17.000	0.189	0.083	3.51	92	1.3	-	0.23	-0.01	88	284	77	71
94	17.187	0.187	0.083	3.51	92	1.3	-	0.22	-0.01	88	282	77	71
95	17.376	0.189	0.081	3.51	92	1.3	-	0.20	-0.02	88	281	76	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
96	17.562	0.186	0.082	3.50	92	1.3	-	0.19	-0.01	88	280	76	71
97	17.750	0.188	0.081	3.51	92	1.3	-	0.18	-0.01	88	279	76	71
98	17.935	0.185	0.082	3.51	92	1.3	-	0.17	-0.01	88	277	76	71
99	18.122	0.187	0.084	3.51	92	1.3	-	0.16	-0.01	88	276	76	71
100	18.307	0.185	0.082	3.51	92	1.3	101	0.14	-0.02	88	275	76	71
101	18.497	0.190	0.082	3.51	92	1.3	-	0.14	0.00	87	275	76	70
102	18.684	0.187	0.082	3.51	92	1.3	-	0.13	-0.01	87	273	76	71
103	18.873	0.189	0.082	3.51	92	1.3	-	0.12	-0.01	87	272	76	71
104	19.060	0.187	0.083	3.50	92	1.3	-	0.11	-0.01	87	271	76	70
105	19.248	0.188	0.084	3.51	92	1.3	-	0.10	-0.01	87	269	76	70
106	19.432	0.184	0.083	3.52	92	1.3	-	0.08	-0.02	87	269	76	70
107	19.620	0.188	0.082	3.51	92	1.3	-	0.07	-0.01	87	267	76	70
108	19.806	0.186	0.082	3.52	92	1.3	-	0.07	0.00	87	266	76	70
109	19.995	0.189	0.083	3.49	92	1.3	-	0.05	-0.02	86	265	76	70
110	20.182	0.187	0.083	3.52	92	1.3	101	0.05	0.00	86	263	76	70
111	20.372	0.190	0.082	3.50	92	1.3	-	0.04	-0.01	86	261	76	70
112	20.558	0.186	0.082	3.52	93	1.3	-	0.04	0.00	86	260	76	70
113	20.746	0.188	0.083	3.51	93	1.3	-	0.02	-0.02	86	258	76	70
114	20.931	0.185	0.083	3.53	93	1.3	-	0.02	0.00	86	257	76	70
115	21.119	0.188	0.084	3.51	93	1.3	-	0.01	-0.01	86	255	76	70
116	21.305	0.186	0.083	3.53	93	1.3	100	0.00	-0.01	86	253	76	70
Avg/Tot	21.305	0.184	0.083	3.39	85.9	1.3	100			90.2	316.5	75.9	71.3

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.01	78	0.5		76	-0.054	3.66	0.076
1	0.127	0.127	3.17	78	1.9	-	76	-0.055	1.28	0.109
2	0.302	0.175	3.18	78	1.8	-	76	-0.059	2.83	0.008
3	0.477	0.175	3.18	78	2.1	-	76	-0.062	5.57	0.005
4	0.652	0.175	3.19	78	1.9	-	76	-0.066	9.21	0.005
5	0.824	0.172	3.18	78	2.0	-	76	-0.067	10.47	0.003
6	0.999	0.175	3.17	78	1.9	-	76	-0.069	11.69	0.006
7	1.175	0.176	3.17	78	1.8	-	76	-0.071	12.38	0.011
8	1.350	0.175	3.18	78	2.0	-	76	-0.070	12.87	0.068
9	1.522	0.172	3.17	78	2.1	-	77	-0.070	12.80	0.005
10	1.697	0.175	3.17	78	2.2	99	77	-0.072	12.81	0.006
11	1.872	0.175	3.17	78	2.1	-	77	-0.071	13.01	0.004
12	2.048	0.176	3.17	78	1.7	-	77	-0.072	12.89	0.003
13	2.221	0.173	3.18	79	1.7	-	77	-0.071	13.00	0.002
14	2.396	0.175	3.18	79	1.7	-	77	-0.071	12.99	0.002
15	2.572	0.176	3.17	79	2.2	-	77	-0.071	13.09	0.003
16	2.748	0.176	3.18	79	1.8	-	77	-0.071	13.05	0.001
17	2.922	0.174	3.18	80	2.1	-	77	-0.073	13.07	0.003
18	3.095	0.173	3.17	80	1.7	-	77	-0.073	14.11	0.062
19	3.272	0.177	3.18	80	1.8	-	77	-0.073	15.19	0.559
20	3.449	0.177	3.18	80	2.1	101	77	-0.075	15.18	0.747
21	3.623	0.174	3.18	81	1.9	-	77	-0.075	15.22	0.686
22	3.796	0.173	3.18	81	2.0	-	77	-0.075	15.27	0.707
23	3.971	0.175	3.17	81	1.7	-	77	-0.075	15.23	0.627
24	4.148	0.177	3.17	81	1.9	-	77	-0.076	15.17	0.573
25	4.324	0.176	3.17	82	1.9	-	77	-0.074	15.21	0.613
26	4.497	0.173	3.17	82	2.2	-	77	-0.074	15.17	0.468
27	4.672	0.175	3.17	82	2.2	-	78	-0.075	15.08	0.444
28	4.853	0.181	3.18	83	2.2	-	78	-0.074	15.14	0.436
29	5.027	0.174	3.18	83	1.8	-	78	-0.074	15.16	0.478
30	5.202	0.175	3.18	83	1.9	100	78	-0.074	15.15	0.530
31	5.376	0.174	3.18	84	1.8	-	78	-0.074	15.22	0.602

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	5.553	0.177	3.17	84	1.9	-	78	-0.075	15.16	0.713
33	5.730	0.177	3.18	84	1.9	-	78	-0.074	15.12	0.736
34	5.906	0.176	3.18	84	2.2	-	78	-0.075	15.24	0.671
35	6.079	0.173	3.17	85	1.7	-	78	-0.077	14.98	0.439
36	6.256	0.177	3.17	85	2.2	-	78	-0.074	14.53	0.294
37	6.436	0.180	3.18	85	1.8	-	78	-0.076	14.48	0.232
38	6.610	0.174	3.17	86	2.2	-	78	-0.075	14.48	0.204
39	6.785	0.175	3.18	86	1.7	-	78	-0.076	14.45	0.123
40	6.961	0.176	3.18	86	2.1	99	78	-0.075	14.22	0.041
41	7.138	0.177	3.18	86	1.7	-	78	-0.075	13.76	0.004
42	7.317	0.179	3.18	87	2.0	-	78	-0.075	13.45	0.003
43	7.492	0.175	3.18	87	2.2	-	78	-0.075	13.56	0.004
44	7.667	0.175	3.18	87	2.3	-	78	-0.073	13.23	0.001
45	7.843	0.176	3.18	88	1.8	-	78	-0.073	12.90	0.001
46	8.021	0.178	3.18	88	1.8	-	78	-0.073	12.59	0.002
47	8.200	0.179	3.18	88	2.3	-	79	-0.073	12.46	0.002
48	8.376	0.176	3.18	88	1.7	-	79	-0.073	12.23	0.001
49	8.552	0.176	3.19	89	2.3	-	79	-0.072	11.92	0.001
50	8.729	0.177	3.18	89	1.9	100	79	-0.072	11.75	0.002
51	8.907	0.178	3.18	89	1.7	-	79	-0.072	11.50	0.001
52	9.085	0.178	3.18	89	1.9	-	79	-0.070	11.19	0.001
53	9.260	0.175	3.18	90	1.7	-	79	-0.073	10.80	0.002
54	9.438	0.178	3.18	90	1.9	-	79	-0.071	10.93	0.001
55	9.616	0.178	3.19	90	1.9	-	79	-0.073	10.70	0.001
56	9.795	0.179	3.19	90	1.9	-	79	-0.070	10.43	0.001
57	9.972	0.177	3.18	91	1.8	-	79	-0.071	10.06	0.002
58	10.148	0.176	3.19	91	1.9	-	79	-0.072	9.82	0.001
59	10.325	0.177	3.19	91	2.3	-	79	-0.069	9.62	0.001
60	10.505	0.180	3.20	91	2.2	100	79	-0.070	9.36	0.002
61	10.684	0.179	3.19	91	1.7	-	79	-0.072	9.07	0.001
62	10.861	0.177	3.20	92	1.8	-	79	-0.069	8.86	0.003
63	11.036	0.175	3.19	92	1.7	-	79	-0.067	8.74	0.000

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	11.214	0.178	3.20	92	1.7	-	79	-0.067	8.63	0.002
65	11.393	0.179	3.20	92	1.7	-	79	-0.067	8.52	0.003
66	11.573	0.180	3.20	92	1.7	-	79	-0.067	8.36	0.002
67	11.750	0.177	3.20	93	2.0	-	79	-0.066	8.26	0.001
68	11.926	0.176	3.20	93	1.8	-	79	-0.065	7.99	0.003
69	12.104	0.178	3.20	93	1.9	-	79	-0.064	7.78	0.002
70	12.283	0.179	3.20	93	2.3	100	79	-0.067	7.59	0.003
71	12.463	0.180	3.20	93	2.3	-	79	-0.064	7.54	0.002
72	12.641	0.178	3.19	94	2.2	-	79	-0.065	7.54	0.002
73	12.817	0.176	3.20	94	2.1	-	79	-0.067	7.55	0.002
74	12.996	0.179	3.20	94	2.2	-	79	-0.065	7.57	0.002
75	13.175	0.179	3.20	94	1.9	-	79	-0.063	7.53	0.003
76	13.355	0.180	3.21	94	2.1	-	79	-0.063	7.57	0.004
77	13.532	0.177	3.20	94	2.0	-	79	-0.063	7.57	0.001
78	13.710	0.178	3.21	94	2.1	-	79	-0.062	7.06	0.002
79	13.888	0.178	3.20	95	2.0	-	79	-0.063	7.03	0.003
80	14.067	0.179	3.20	95	2.1	101	79	-0.061	7.02	0.002
81	14.248	0.181	3.20	95	1.9	-	79	-0.061	7.02	0.004
82	14.426	0.178	3.20	95	2.2	-	79	-0.064	7.05	0.004
83	14.603	0.177	3.21	95	2.2	-	79	-0.061	7.03	0.002
84	14.781	0.178	3.21	95	1.7	-	79	-0.064	6.82	0.000
85	14.961	0.180	3.21	95	1.7	-	79	-0.062	6.74	0.003
86	15.142	0.181	3.21	95	1.9	-	79	-0.061	6.75	0.002
87	15.320	0.178	3.21	96	2.0	-	79	-0.062	6.77	0.002
88	15.496	0.176	3.21	96	2.2	-	78	-0.061	6.67	0.002
89	15.675	0.179	3.21	96	1.7	-	78	-0.062	6.63	0.003
90	15.856	0.181	3.21	96	2.2	101	78	-0.061	6.61	0.004
91	16.037	0.181	3.21	96	2.0	-	78	-0.062	6.62	0.003
92	16.215	0.178	3.22	96	2.2	-	78	-0.060	6.76	0.003
93	16.392	0.177	3.22	96	2.0	-	78	-0.060	6.71	0.003
94	16.571	0.179	3.22	96	2.0	-	78	-0.060	6.75	0.005
95	16.752	0.181	3.22	96	1.9	-	78	-0.060	6.70	0.002

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	16.933	0.181	3.21	96	1.7	-	78	-0.061	6.78	0.005
97	17.111	0.178	3.22	96	2.0	-	78	-0.060	5.73	0.002
98	17.288	0.177	3.21	96	1.9	-	78	-0.061	5.64	0.003
99	17.468	0.180	3.22	97	1.8	-	78	-0.059	5.53	0.005
100	17.648	0.180	3.22	97	1.7	100	78	-0.059	5.48	0.004
101	17.828	0.180	3.21	97	2.1	-	78	-0.060	5.41	0.004
102	18.007	0.179	3.21	97	1.7	-	78	-0.060	5.39	0.003
103	18.186	0.179	3.21	97	2.0	-	78	-0.061	5.38	0.005
104	18.364	0.178	3.21	97	2.2	-	78	-0.061	5.36	0.004
105	18.544	0.180	3.22	97	2.2	-	78	-0.059	5.29	0.004
106	18.724	0.180	3.21	97	1.8	-	78	-0.059	5.27	0.007
107	18.904	0.180	3.21	97	1.8	-	78	-0.059	5.18	0.008
108	19.083	0.179	3.21	97	1.7	-	78	-0.058	5.13	0.003
109	19.261	0.178	3.21	97	1.9	-	78	-0.057	5.15	0.004
110	19.440	0.179	3.22	97	1.7	100	78	-0.055	5.12	0.004
111	19.620	0.180	3.21	97	2.0	-	78	-0.055	5.14	0.002
112	19.802	0.182	3.21	97	2.3	-	78	-0.056	5.14	0.004
113	19.981	0.179	3.21	97	1.8	-	78	-0.057	4.85	0.003
114	20.158	0.177	3.22	97	1.7	-	78	-0.057	4.86	0.003
115	20.337	0.179	3.21	97	2.2	-	78	-0.055	4.86	0.002
116	20.519	0.182	3.22	98	1.9	99	78	-0.054	4.90	0.004
Avg/Tot	20.519	0.177	3.17	89.1	1.9	100	77.9	-0.067	9.69	0.098

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
0	0.000		0.00	80	0.0		75
1	0.113	0.113	0.94	80	1.6	-	75
2	0.251	0.138	0.95	80	1.7	-	75
3	0.390	0.139	0.94	80	1.6	-	75
4	0.528	0.138	0.95	80	1.7	-	75
5	0.669	0.141	0.96	80	1.7	-	75
6	0.808	0.139	0.96	81	1.6	-	75
7	0.948	0.140	0.96	81	1.6	-	75
8	1.089	0.141	0.97	81	1.6	-	75
9	1.229	0.140	0.96	81	1.8	-	75
10	1.370	0.141	0.97	81	1.6	98	75
11	1.511	0.141	0.97	81	1.6	-	75
12	1.651	0.140	0.96	82	1.6	-	75
13	1.792	0.141	0.97	82	1.6	-	75
14	1.934	0.142	0.97	82	1.7	-	76
15	2.074	0.140	0.96	82	1.8	-	76
16	2.215	0.141	0.97	82	1.6	-	76
17	2.358	0.143	0.98	83	1.7	-	76
18	2.499	0.141	0.97	83	1.7	-	76
19	2.640	0.141	0.98	83	1.6	-	76
20	2.783	0.143	0.99	83	1.8	100	76
21	2.925	0.142	0.98	84	1.6	-	76
22	3.067	0.142	0.98	84	1.7	-	76
23	3.209	0.142	0.99	84	1.6	-	76
24	3.353	0.144	0.99	84	1.6	-	76
25	3.496	0.143	0.99	85	1.7	-	76
26	3.639	0.143	0.98	85	1.6	-	76
27	3.782	0.143	0.99	85	1.6	-	76
28	3.929	0.147	1.00	86	1.6	-	76
29	4.070	0.141	1.00	86	1.7	-	76
30	4.214	0.144	0.99	86	1.6	100	76
31	4.357	0.143	0.99	87	1.8	-	76

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

	Particulate Sampling Data						
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)
32	4.502	0.145	1.00	87	1.7	-	77
33	4.647	0.145	1.01	87	1.8	-	77
34	4.791	0.144	1.00	88	1.6	-	77
35	4.936	0.145	1.00	88	1.8	-	77
36	5.080	0.144	0.99	88	1.6	-	77
37	5.227	0.147	1.00	88	1.8	-	77
38	5.370	0.143	1.01	89	1.7	-	77
39	5.515	0.145	1.01	89	1.6	-	77
40	5.660	0.145	1.01	89	1.7	100	77
41	5.805	0.145	1.00	90	1.6	-	77
42	5.949	0.144	1.00	89	1.8	-	77
43	6.094	0.145	1.01	90	1.7	-	77
44	6.240	0.146	1.01	90	1.8	-	77
45	6.386	0.146	1.02	90	1.6	-	77
46	6.532	0.146	1.01	90	1.8	-	77
47	6.677	0.145	1.01	91	1.7	-	77
48	6.823	0.146	1.01	91	1.7	-	77
49	6.968	0.145	1.00	91	1.8	-	77
50	7.114	0.146	1.01	92	1.6	101	77
51	7.260	0.146	1.01	92	1.7	-	77
52	7.407	0.147	1.02	92	1.7	-	78
53	7.553	0.146	1.02	92	1.6	-	78
54	7.699	0.146	1.02	92	1.8	-	78
55	7.846	0.147	1.02	92	1.6	-	78
56	7.992	0.146	1.01	92	1.7	-	78
57	8.138	0.146	1.01	92	1.8	-	78
58	8.284	0.146	1.01	92	1.7	-	78
59	8.431	0.147	1.01	92	1.6	-	78
60	8.577	0.146	1.02	92	1.8	101	78
Avg/Tot	8.577	0.143	0.97	86.2	1.6	100	76.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Stove ΔT: 19

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	419	408	367	475	285	390.8	550.8
1	415	406	367	471	285	388.8	557.1
2	414	403	364	461	285	385.3	582.4
3	407	399	362	460	284	382.5	665.5
4	403	396	360	467	284	381.9	761.3
5	400	393	360	478	284	383.0	815.2
6	397	390	361	495	282	385.0	851.0
7	393	388	362	517	282	388.3	888.8
8	390	387	364	538	281	391.9	929.2
9	389	386	366	556	280	395.2	956.0
10	387	385	368	571	279	397.9	966.1
11	387	385	369	584	278	400.6	974.6
12	386	385	371	593	277	402.3	981.3
13	386	386	372	602	276	404.3	992.5
14	386	387	372	607	275	405.5	1001.0
15	388	389	373	614	274	407.4	1007.4
16	389	390	374	619	273	408.8	1010.9
17	390	392	374	624	271	410.3	1009.5
18	391	394	375	630	270	412.1	1033.6
19	393	397	376	642	269	415.4	1065.1
20	395	400	378	654	268	419.1	1081.1
21	398	404	380	666	267	422.8	1088.9
22	400	407	383	675	266	426.1	1092.4
23	403	411	385	682	264	429.0	1094.7
24	407	415	387	690	263	432.5	1097.1
25	412	419	389	697	262	435.7	1102.9
26	415	423	391	703	261	438.5	1107.5
27	419	427	393	708	260	441.3	1107.5
28	423	431	395	713	259	444.1	1110.0
29	427	435	397	717	258	446.8	1111.7
30	432	439	399	722	257	449.8	1114.3
31	435	443	402	726	256	452.3	1119.7
32	438	446	404	731	255	454.8	1125.1
33	442	450	407	735	254	457.5	1132.6
34	446	454	409	738	253	459.9	1140.9
35	448	458	411	742	253	462.4	1146.2
36	452	463	413	743	252	464.4	1149.8
37	454	467	415	744	251	466.3	1153.6
38	459	471	418	747	251	468.9	1155.2
39	461	476	420	749	250	471.2	1154.2
40	464	480	422	751	250	473.4	1145.4
41	467	484	424	752	249	475.1	1129.6
42	470	487	426	751	249	476.7	1118.3
43	474	491	427	750	249	478.0	1102.6
44	476	493	429	748	248	479.0	1090.2
45	477	496	431	746	248	479.5	1079.8
46	481	498	433	744	248	480.6	1071.6
47	483	500	434	740	247	481.0	1067.4

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Stove ΔT: 19

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	485	502	436	738	248	481.8	1061.4
49	487	504	438	736	248	482.2	1052.7
50	487	505	439	733	247	482.2	1046.5
51	490	506	441	729	247	482.3	1040.8
52	493	507	442	725	247	482.7	1031.4
53	492	508	443	720	247	481.9	1013.6
54	494	508	444	715	247	481.6	1000.0
55	494	509	445	710	247	481.0	988.5
56	496	509	446	708	247	481.1	979.2
57	496	509	447	703	248	480.5	971.9
58	498	509	447	697	248	479.7	961.7
59	497	508	448	693	248	478.7	949.0
60	496	508	448	687	248	477.4	936.2
61	496	507	448	681	248	476.0	923.5
62	496	506	448	676	249	474.9	912.4
63	497	505	447	669	249	473.4	902.6
64	496	504	446	662	250	471.7	893.6
65	495	502	446	656	250	469.6	887.0
66	496	501	445	649	250	468.0	881.1
67	494	499	443	643	251	465.9	874.6
68	494	497	442	637	251	464.3	867.3
69	494	495	441	631	252	462.3	859.6
70	492	493	439	624	252	460.1	851.8
71	491	491	438	618	253	457.9	844.0
72	489	488	436	612	253	455.7	837.1
73	488	486	434	606	254	453.6	830.9
74	487	484	433	599	255	451.5	825.4
75	486	482	431	593	256	449.6	820.4
76	485	480	430	587	256	447.3	816.0
77	484	477	428	582	256	445.6	812.0
78	482	475	427	577	257	443.5	808.3
79	481	473	426	573	257	442.0	804.9
80	479	470	424	568	258	439.9	802.4
81	477	468	423	564	258	438.1	800.3
82	475	466	422	560	259	436.2	798.5
83	473	464	420	556	259	434.5	795.6
84	472	461	419	553	260	432.8	788.3
85	468	459	417	548	260	430.5	782.6
86	466	456	416	543	260	428.2	778.7
87	465	454	414	540	261	426.6	776.1
88	462	451	412	536	262	424.5	774.1
89	460	448	410	533	262	422.6	773.3
90	458	446	409	530	263	420.9	771.2
91	455	443	407	526	263	418.6	769.0
92	454	440	405	523	263	416.9	768.5
93	451	438	403	520	264	415.1	767.6
94	449	435	402	517	264	413.4	765.8
95	448	433	400	514	265	411.9	763.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

Stove ΔT: 19

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	445	431	398	511	265	410.0	761.8
97	444	429	397	508	266	408.6	755.1
98	441	427	395	505	266	406.6	749.5
99	439	424	393	502	266	404.9	745.4
100	436	422	392	499	266	403.0	741.7
101	433	420	390	496	267	401.0	738.0
102	429	417	388	493	267	398.9	734.5
103	427	415	386	490	267	396.9	731.7
104	423	412	385	487	267	394.8	728.9
105	422	410	383	484	267	393.1	725.7
106	418	408	381	481	267	391.0	722.4
107	415	405	380	478	267	389.0	718.7
108	412	403	378	476	267	387.1	716.5
109	410	400	377	473	266	385.3	717.1
110	407	398	375	471	266	383.2	716.1
111	404	396	374	468	266	381.4	713.8
112	402	394	372	465	266	379.6	710.4
113	398	391	370	462	265	377.4	705.0
114	398	389	369	460	265	376.0	699.8
115	395	387	367	457	265	373.9	696.3
116	392	385	365	454	264	372.0	694.3
Average	446.1	446.5	405.6	608.4	260.7	433.5	904.0

LAB SAMPLE DATA - ASTM E2515

Client: Jotul
Model: F602 V3
Run #: 5

Job #: 24-268
Tracking #: 185
Technician: SJB
Date: 3/21/2024

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G977	240.6	241.1	0.5
	B	G978	241.3	241.9	0.6
	C - 1st Hour	G979	241.7	242.2	0.5
	Amb	G980	241.7	241.7	0.0
Probes	**A**	3A	115880.5	115880.6	0.1
	B	3B	116120.5	116120.5	0.0
	C - 1st Hour	3C	116618.1	116618.2	0.1
O-rings	**A**	3A	3580.5	3580.9	0.4
	B	3B	3569.2	3569.4	0.2
	C - 1st Hour	3C	3623.5	3623.6	0.1

Placed in Dessicator on:	3/21 - 18:30

		Balance Audit (mg):	100.0		100.0					
			Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**		241.1	3/25 - 8:00	241.1	3/26 - 8:00				
	B		242.0	3/25 - 8:00	241.9	3/26 - 8:00				
	C - 1st Hour		242.3	3/25 - 8:00	242.2	3/26 - 8:00				
	Amb		241.8	3/25 - 8:00	241.7	3/26 - 8:00				
Probes	**A**		115880.5	3/25 - 8:00	115880.6	3/26 - 8:00				
	B		116120.4	3/25 - 8:00	116120.5	3/26 - 8:00				
	C - 1st Hour		116618.1	3/25 - 8:00	116618.2	3/26 - 8:00				
O-Rings	**A**		3581.0	3/25 - 8:00	3580.9	3/26 - 8:00				
	B		3569.4	3/25 - 8:00	3569.4	3/26 - 8:00				
	C - 1st Hour		3623.6	3/25 - 8:00	3623.6	3/26 - 8:00				

Train A Aggregate, mg:	**1.0**
Train B Aggregate, mg:	**0.8**
Train C Aggregate, mg:	**0.7**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 5 Test Date: 3/21/2024

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): 0.090" open from Fully Closed
Targeted Burn Category: Cat II

Preburn Notes

Time	Notes
13:40	Started fire with ~2 lbs of kindling
13:50	Added 4 additional lbs of kindling fuel
14:34	Loaded preburn fuel, closed door, air set to test setting
15:18	Pulled fuel in the back towards to front to ensure uniform charcoalization
15:59	Leveled coal bed, zeroed scale in preparation of fuel loading

Test Notes

Test Burn Start Time: 16:00 Test Fuel Loaded by: 40 seconds
Door Closed: 45 seconds Air Control Set at: 0 seconds
Other Loading Notes: N/A

Time	Notes
16:00	Loaded fuel, closed door, air at test setting

Test Burn End Time: 17:56

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.98 CO (%): 4.300
Mid Gas CO_2 (%): 10.06 CO (%): 2.538

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	9:53	9:58	9:55	18:15	18:20	18:22
CO_2	-0.03	10.04	16.94	0.04	10.09	16.88
CO	0.001	2.520	4.299	0.009	2.545	4.316

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

Technician Signature: Date: 3/22/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 5 Test Date: 3/21/2024

Test Fuel Front View

Test Fuel Iso View

Test Fuel Loaded in Stove

Air Setting

Technician Signature: Date: 3/22/2024

ASTM E2780 Wood Heater Run Sheets

Client: Jotul Job Number: 24-268 Tracking #: 185
Model: F602 V3 Run Number: 5 Test Date: 3/21/2024

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date: 3/22/2024

ASTM E2515 - Glass Fiber Filters

Date:	3/4/24	3/6/24	-	-			
Time:	12:15	0015	-	-			
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00933	239.1	239.3	-	-	A	24-273	#5
G00934	239.7	239.9	-	-	A	"	"
G00935	239.0	238.9	-	-	A	24-274	#1
G00936	239.0	239.0	-	-	A	"	"
G00937	240.4	240.4	-	-	A	"	"
G00938	238.5	238.4	-	-	A	"	"
G00939	240.9	240.9	-	-	A	24-274	#2
G00940	239.5	239.6	-	-	A	"	"
G00941	239.2	239.1	-	-	A	"	"
G00942	240.0	240.0	-	-	A	"	"
G00943	239.4	240.1	-	-	A	24-274	#3
G00944	238.5	238.5	-	-	A	"	"
G00945	239.5	239.4	-	-	A	"	"
G00946	240.0	239.9	-	-	A	"	"
G00947	238.5	238.5	-	-	A	24-274	#4
G00948	239.6	239.6	-	-	A	"	"

Date:	3/11/24	3/12/24					
Time:	11:00	13:30					
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00949	239.7	239.5	-	-	A	24-274	#4
G00950	238.8	238.6	-	-	A	"	"
G00951	238.1	237.9	-	-	A	24-274	#5
G00952	240.4	240.5	-	-	A	"	"
G00953	239.8	239.7	-	-	A	"	"
G00954	241.2	241.2	-	-	A	"	"
G00955	240.1	239.9	-	-	A	24-274	#6
G00956	239.6	239.7	-	-	A	"	"
G00957	240.4	240.2	-	-	A	"	"
G00958	238.0	238.6	-	-	A	"	"
G00959	238.6	238.5	-	-	A		
G00960	238.3	238.2	-	-	A		
G00961	240.5	240.4	-	-	A	24-269	#1
G00962	239.7	239.5	-	-	A	"	"
G00963	240.0	239.9	-	-	A		
G00964	239.8	239.6	-	-	A	↓	↓

ASTM E2515 - Glass Fiber Filters

Date:	3/18/24	3/19/24					
Time:	12:30	8:30					
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00965	241.6	241.7	–	–	SB	24-268	#2
G00966	241.8	241.9	–	–	SB	↓	↓
G00967	241.2	241.4	–	–	SB		
G00968	241.3	241.2	–	–	SB		
G00969	240.4	240.4	–	–	SB	24-[illegible]	#3
G00970	242.6	242.4	–	–	SB	↓	↓
G00971	241.2	241.4	–	–	SB		
G00972	241.3	241.4	–	–	SB		
G00973	240.9	241.0	–	–	SB	24-268	#4
G00974	241.4	241.4	–	–	SB	↓	↓
G00975	241.4	241.2	–	–	SB		
G00976	241.1	241.1	–	–	SB		
G00977	240.6	240.6	–	–	SB	24-268	#5
G00978	241.2	241.3	–	–	SB	↓	↓
G00979	241.7	241.7	–	–	SB		
G00980	241.5	241.7	–	–	SB		

Date:	3/21/24	3/22/24					
Time:	16:20	11:00					
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00981	241.6	241.5	–	–	JB		
G00982	240.5	240.6	–	–	JB		
G00983	240.7	240.6	–	–	JB		
G00984	242.0	241.9	–	–	JB		
G00985	241.7	241.6	–	–	JB		
G00986	242.9	242.9	–	–	JB		
G00987	250.5	250.5	–	–	JB		
G00988	240.5	240.6	–	–	JB		
G00989	231.4	231.3	–	–	JB		
G00990	239.9	239.9	–	–	JB		
G00991	240.5	240.4	–	–	JB		
G00992	241.2	241.3	–	–	JB		
G00993	241.1	241.2	–	–	JB		
G00994	241.4	241.5	–	–	JB		
G00995	240.5	240.5	–	–	JB		
G00996	241.4	241.4	–	–	JB		

ASTM E2515 - Probe Samples 11-20

Date:	3/11	3/12	3/13/24				
Time:	11:00	14:00	0900				
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
11A	116867.2	116866.8	116886.8	-	A	24-274	#4
11B	117340.8	117340.5	117340.4	-	A		
11C	116186.5	116186.3	-	-	A		
12A	116707.4	116707.0	117706.9	-	A	24-274	#5
12B	117773.5	117773.0	117772.9	-	A		
12C	117173.0	117172.3	117172.3	-	A		
13A	117315.6	117314.7	117314.6	-	A	24-274	#6
13B	116942.2	116941.1	116941.2	-	A		
13C	115650.7	115649.7	115649.8	-	A		
14A	116633.4	116633.1	116633.0	-	A	24-268	#1
14B	116619.6	116618.7	116618.8	-	A		
14C	116530.4	116529.5	116529.9	-	A		
15A	117239.7	117239.2	117239.3	-	A	24-268	#2
15B	116752.9	116752.3	116752.3	-	A		
15C	116847.1	116846.9	-	-	A		

Date:							
Time:							
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
16A							
16B							
16C							
17A							
17B							
17C							
18A							
18B							
18C							
19A							
19B							
19C							
20A							
20B							
20C							

ASTM E2515 - Probe Samples 1-10

Date:	3/18/24	3/19/24					
Time:	13:00	8:30					
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
1A	115826.8	115627.0	—	—	SB	24-268	#3
1B	115902.1	115902.2	—	—	SB		
1C	116432.9	116432.8	—	—	SB		
2A	116057.3	116057.4	—	—	SB	24-268	#4
2B	116173.6	116173.8	—	—	SB		
2C	116428.9	116428.8	—	—	SB		
3A	115880.5	115880.5	—	—	SB	24-268	#5
3B	116120.4	116120.5	—	—	SB		
3C	116618.1	116618.1	—	—	SB		
4A	116022.6	116022.6	—	—	SB		
4B	116182.0	116181.8	—	—	SB		
4C	116997.2	116997.3	—	—	SB		
5A	116757.4	116757.3	—	—	SB		
5B	116875.5	116875.4	—	—	SB		
5C	115855.2	115855.0	—	—	SB		

Date:							
Time:							
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
6A							
6B							
6C							
7A							
7B							
7C							
8A							
8B							
8C							
9A							
9B							
9C							
10A							
10B							
10C							

ASTM E2515 - O-Ring Samples 11-20

Date:	3/11/24	3/12/24	3/13/24				
Time:	11:00						
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
11A	3472.4	3423.3	34234	-	A	24-274	#4
11B	4232.3	4233.8	4233.9	-	A		
11C	3588.46	3588.8	-	-	A		
12A	3585.8	3586.3	35864	-	A	24-274	#5
12B	3550.4	3550.6	-	-	A		
12C	3616.0	3616.2	-	-	A		
13A	3596.1	3596.0	-	-	A	24-274	#6
13B	3642.1	3642.3	-	-	A		
13C	4409.6	4409.7	-	-	A		
14A	3367.1	3367.1	-	-	A	24-288	#1
14B	3341.9	3342.1	-	-	A		
14C	3444.9	3444.8	-	-	A		
15A	3570.0	3569.7	3569.8	-	A	24-28	#2
15B	3570.9	3570.8		-	A		
15C	3396.7	3396.6	-	-	A		

Date:							
Time:							
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
16A							
16B							
16C							
17A							
17B							
17C							
18A							
18B							
18C							
19A							
19B							
19C							
20A							
20B							
20C							

ASTM E2515 - O-Ring Samples 1-10

Date:	3/18/24	3/19/24					
Time:	12:30	8:30					
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
1A	3569.0	3569.0	–	–	JB	24-268	#3
1B	3557.4	3557.4	–	–	JB		
1C	4167.3	4167.4	–	–	JB		
2A	3554.1	3554.1	–	–	JB	24-28	#4
2B	3573.0	3573.1	–	–	JB		
2C	3391.5	3391.5	–	–	JB		
3A	3580.6	3580.5	–	–	JB	24-28	#5
3B	3569.1	3569.2	–	–	JB		
3C	3623.4	3623.5	–	–	JB		
4A	3377.0	3377.0	–	–	JB		
4B	3580.6	3580.6	–	–	JB		
4C	3373.0	3373.0	–	–	JB		
5A	3536.3	3536.4	–	–	JB		
5B	3532.2	3532.2	–	–	JB		
5C	3376.8	3376.7	–	–	JB		

Date:							
Time:							
	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
6A							
6B							
6C							
7A							
7B							
7C							
8A							
8B							
8C							
9A							
9B							
9C							
10A							
10B							
10C							

Sample Calculations – ASTM E2780 & E2515

Client: Jotul
Model: F602 V3
Run: 1

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

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

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

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

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

BR – Dry burn rate, kg/hr

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

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

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

m_n – Total particulate matter collected, mg

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

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_R – Particulate emissions for test run, g/hr

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

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

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

Where,

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

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

Sample Calculation:

FM_S = 9.5 %

M_{Swb} = 1.0 lbs

0.4536 = Conversion factor from lbs to kg

M_{Sdb} = [(1.0 x 0.4536) (100/(100 + 9.5)

M_{Sdb} = **0.43** kg

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

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

Where,

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

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

Sample Calculation (test fuel piece 1):

MC_{Pnwb} = 1.41

FM_{CPn} = 20.3

= 1.4 (100/(100+ 20.3)

= 1.2 lbs

Total dry crib weight, excluding spacers = 3.46 lbs

M_{Cdb} = **1.57** kg

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

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

Where,

V_C = Volume of fuel crib, ft^3

Sample calculation:

V_C = 212.6 in^3
1728 = conversion from in^3 to ft^3

D_{Cdb} = 3.46 / 212.6 * 1728

= **28.16** lbs/ft^3

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

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

Sample calculation:

$$M_{FTAdb} = 0.43 + 1.57$$

$$= \mathbf{2.00} \text{ kg}$$

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

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

Where,

θ = Total length of test run, min

Sample Calculation:

M_{Bdb} = 2.00 kg
θ = 174 min

$$BR = \frac{60 \times 2}{174}$$

BR = **0.69** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (9)

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

Where:

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

Sample calculation:

$$Fp = \frac{18.56}{18.98} = 0.978$$

$$V_s = 0.978 \times 85.49 \times 0.99 \times 0.286 \times \left(\frac{84.5 + 460}{\left(29.86 + \frac{-0.13}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **18.87** ft/s

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

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

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

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

Where:

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

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 18.87 \times 0.1963 \times \frac{528}{84.5 + 460} \times \frac{29.86 + \frac{-0.13}{13.6}}{29.92}$$

Q_{sd} = **12644.9** dscf/hr

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

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

Where:

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

Sample Calculation:

Using equation for Train A:

$$V_{m(std)} = 17.64 \times 31.857 \times 1.004 \times \frac{\left(29.86 + \frac{3.39}{13.6}\right)}{(85.9 + 460)}$$

$V_{m(std)}$ = **31.113** dscf

Using equation for Train B:

$$V_{m(std)} = 17.64 \times 30.694 \times 1.005 \times \frac{\left(29.86 + \frac{3.15}{13.6}\right)}{(89.0 + 460)}$$

$V_{m(std)}$ = **29.820** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 15.35 \times 1.013 \times \frac{\left(\underline{29.855} + \frac{0.00}{13.6}\right)}{(69.5 + 460)}$$

$V_{m(std)}$ = **15.463** dscf

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

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg
m_f = mass of particulate matter from filters, mg
m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train A:

m_n = 0.2 + 0.7 + 0.2

m_n = **1.1** mg

Using equation for Train B:

m_n = 0.1 + 0.7 + 0.2

m_n = **1** mg

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

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

Where:

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

Sample calculation:

For Train A:

$$C_s = 0.001 \times \frac{1.1}{31.11}$$

C_s = **0.00004** g/dscf

For Train B

$$C_s = 0.001 \times \frac{1.0}{29.82}$$

C_s = **0.00003** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{15.46}$$

C_r = **0.000000** g/dscf

E_T – Total Particulate Emissions, g
ASTM E2515 equation (15)

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

Where:

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

Sample calculation:

For Train A

E_T = (0.000035 - 0.000000) x 12644.9 x 174 /60

E_T = **1.30** g

For Train B

E_T = (0.000034 - 0.000000) x 12644.9 x 174 /60

E_T = **1.23** g

Average

E = **1.26** g

PR - Proportional Rate Variation

ASTM E2515 equation (16)

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

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, min

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

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

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

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

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

T_m = Absolute average dry gas meter temperature, ^oR

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

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

Sample calculation (for the first 10-min interval of Train 1):

$$PR = \left(\frac{174 \times 1.703 \times 18.87 \times (86.4 + 460) \times (85.9 + 460)}{10 \times 31.857 \times 19.02 \times (84.5 + 460) \times (71.9 + 460)} \right) \times 100$$

PR = **95** %

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

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

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

E_T (Dual train average) = 1.26 g

θ = 174 min

$PM_R = 60 \times (1.26 / 174)$

PM_R = **0.44** g/hr

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

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

Sample Calculation:

E_T (Dual train average) = 1.26 g

M_{Bdb} = 2.00 kg

PM_F = 1.26 / 2.00

PM_F = **0.63** g/kg

Stack Loss Efficiency and CO emissions calculations are done in accordance with CSA B415.1, using the password protected excel spreadsheet provided with the test standard. No alterations or alternative calculations are used for determining efficiency or CO emissions. The following pages are a sample of the calculations page from the B415.1 Spreadsheet (V2_4 - Dated April 15, 2010).

Manufacturer:	Jotul
Model:	F602 V3
Date:	03/19/24
Run:	1
Control #:	24-268
Test Duration:	**174** min

	HHV	LHV
Eff	**80.86%**	**87.40%**
Comb Eff	**99.40%**	**99.40%**
HT Eff	**81.35%**	**87.93%**
Output	**10,854**	**kJ/h**
Burn Rate	**0.68**	**kg/h**
Grams CO	**25**	**g**
Input	**13,422**	**kJ/h**
MC wet	**16.72**	

Note: In the “Input data”, "Calc. % O_2", "Fuel Properties", and “Mass Balance” columns, [e], [d], [g], [a]. [b], [c], [h], [u], [w], [j], and [k] refer to their respective variables in Clauses 13.7.3 to 13.7.5.

Ultimate CO_2

$CO_{2\text{-ult}}$ 19.64

F_0

1.061

Overall Heating Efficiency:	80.86%	Air Fue		
Combustion Efficiency:	99.40%	Dry Molecular W		
Heat Transfer Efficiency:	81.35%	Dry Moles Exhaus		
		Air Fuel Ratio		
Heat Output:	10,296 Btu/h		10,854	kJ/h
Heat Input:	12,732 Btu/h		13,422	kJ/h
Burn Duration:	2.90	h		
Burn Rate:	1.49	lb/h	0.678	kg/h
Stack Temp:	251.1 Deg. F		121.7	Deg. C

Averages	**0.06**	**8.39**	**1.70**	**20.38**	**11.96**	**121.90**	**20.80**	**100.1%**	**81.1%**	**#DIV/0!**	**16.30**	**0.63**
INPUT DATA			**Oxygen Calculation**			**Input Data**		**Combust**	**Heat**	**Net**	**Air**	**Wet Wt**
Elapsed Time	**Weight Remaining (kg)**	**% CO [e]**	**% CO_2 [d]**	**Excess Air EA**	**Total O_2**	**Calc. % O_2 [g]**	**Flue Gas (°C)**	**Room Temp (°C)**	**Eff %**	**Transfer %**	**Eff %**	**Fuel Ratio**	**Now Wt**
0	2.36	0.03	6.56	198.2%	20.51	13.93	158.1	20.3	100.3%	75.9%	76.1%	18.0	2.36
1	2.35	0.12	1.41	1184.7%	20.84	19.37	148.7	20.3	97.3%	35.9%	35.0%	77.8	2.35
2	2.32	0.02	5.48	257.7%	20.58	15.09	136.5	20.3	100.6%	76.0%	76.5%	21.6	2.32
3	2.29	0.02	8.65	126.6%	20.37	11.71	137.1	20.3	100.2%	80.6%	80.8%	13.7	2.29
4	2.25	0.02	12.22	60.6%	20.13	7.91	141.6	20.3	100.1%	82.7%	82.8%	9.7	2.25
5	2.21	0.01	12.43	57.8%	20.12	7.68	146.7	20.2	100.1%	82.5%	82.6%	9.6	2.21
6	2.17	0.19	13.60	42.5%	20.03	6.34	152.2	20.2	99.0%	82.6%	81.8%	8.6	2.17
7	2.14	0.06	13.25	47.6%	20.06	6.79	155.2	20.2	99.8%	82.4%	82.2%	8.9	2.14
8	2.09	0.02	12.97	51.3%	20.08	7.11	157.2	20.1	100.1%	82.1%	82.2%	9.2	2.09
9	2.06	0.02	13.10	49.7%	20.07	6.96	158.7	20.2	100.0%	82.1%	82.1%	9.1	2.06
10	2.02	0.02	13.06	50.2%	20.08	7.01	159.6	20.2	100.1%	82.1%	82.1%	9.1	2.02
11	1.98	0.02	13.08	49.9%	20.07	6.98	160.3	20.3	100.0%	82.0%	82.0%	9.1	1.98
12	1.95	0.01	13.10	49.8%	20.07	6.97	160.4	20.3	100.1%	82.0%	82.1%	9.1	1.95
13	1.91	0.01	13.15	49.3%	20.07	6.92	160.3	20.2	100.1%	82.1%	82.1%	9.1	1.91
14	1.87	0.02	13.47	45.7%	20.05	6.57	161.3	20.2	100.0%	82.1%	82.2%	8.8	1.87
15	1.83	0.05	13.83	41.5%	20.02	6.16	162.1	20.2	99.8%	82.3%	82.1%	8.6	1.83
16	1.79	0.03	13.84	41.5%	20.02	6.16	162.4	20.1	99.9%	82.2%	82.2%	8.6	1.79
17	1.76	0.06	13.78	41.9%	20.03	6.22	162.4	20.2	99.8%	82.2%	82.0%	8.6	1.76
18	1.72	0.10	13.82	41.2%	20.02	6.16	162.0	20.2	99.5%	82.2%	81.8%	8.6	1.72
19	1.68	0.16	13.92	39.5%	20.01	6.01	162.4	20.2	99.2%	82.2%	81.5%	8.4	1.68
20	1.64	0.22	14.02	37.9%	20.00	5.87	161.2	20.2	98.8%	82.3%	81.3%	8.3	1.64
21	1.61	0.26	14.16	36.2%	19.99	5.69	161.2	20.2	98.6%	82.4%	81.2%	8.2	1.61
22	1.57	0.26	14.12	36.6%	19.99	5.74	160.5	20.2	98.6%	82.4%	81.2%	8.3	1.57
23	1.53	0.36	14.27	34.3%	19.97	5.53	160.1	20.2	98.0%	82.4%	80.8%	8.1	1.53
24	1.49	0.48	14.47	31.4%	19.95	5.25	159.9	20.3	97.4%	82.5%	80.4%	7.9	1.49
25	1.46	0.48	14.41	31.9%	19.96	5.30	160.2	20.3	97.4%	82.5%	80.3%	7.9	1.46
26	1.42	0.45	14.56	30.8%	19.95	5.16	160.0	20.3	97.5%	82.5%	80.5%	7.9	1.42
27	1.38	0.50	14.60	30.1%	19.94	5.09	160.6	20.3	97.3%	82.5%	80.3%	7.8	1.38
28	1.35	0.43	14.82	28.8%	19.93	4.90	160.8	20.3	97.7%	82.6%	80.7%	7.8	1.35
29	1.31	0.44	14.85	28.5%	19.93	4.86	160.8	20.3	97.6%	82.6%	80.7%	7.7	1.31
30	1.28	0.41	14.84	28.8%	19.93	4.89	160.8	20.4	97.8%	82.6%	80.8%	7.8	1.28
31	1.24	0.50	14.88	27.7%	19.92	4.79	161.2	20.5	97.3%	82.6%	80.4%	7.7	1.24
32	1.21	0.63	14.91	26.4%	19.91	4.69	161.3	20.6	96.7%	82.6%	79.8%	7.6	1.21
33	1.18	0.86	14.92	24.5%	19.90	4.55	162.2	20.6	95.5%	82.5%	78.7%	7.5	1.18
34	1.13	0.98	14.96	23.2%	19.89	4.43	163.8	20.6	94.9%	82.3%	78.1%	7.4	1.13
35	1.10	0.93	15.00	23.4%	19.89	4.43	163.3	20.4	95.2%	82.4%	78.4%	7.4	1.10
36	1.07	0.70	15.10	24.3%	19.90	4.44	163.1	20.5	96.3%	82.5%	79.5%	7.5	1.07
37	1.03	0.26	14.72	31.1%	19.95	5.10	161.4	20.6	98.6%	82.6%	81.5%	7.9	1.03

el Ratio (A/F)	
Weight (M_d)	29.82
st Gas (N_r):	502.74
o (A/F)	14.48

%HC 0.88

Combustion Efficiency:	99.40%		
Total Input (kJ):	38,924	36,917	(Btu)
Total Output (kJ):	31,476	29,853	(Btu)
Efficiency:	80.86%		
Total CO (g):	24.73		

Moisture of Wood (wet basis):	16.7206
Initial Dry Weight Wt_{do} (kg):	1.96
Moisture Content Dry	20.08

Load Weight (kg):	**2.36**			
Fuel Heating	**HHV**	**LHV**		**HHV**
Value in kj/kg - CV:	**19,810**	**18,329**	Btu/lb	**8522.5**

73.49	0.54	72.27	38967	4.06	6.87	2.74	19810.00	16.72	79.59	21.11	2.08	7.16	-0.01	0.21	40.71
% Wet	Dry Wt.	% Dry		Fuel Properties				Mw	Mass Balance					kg Wood per	
Consumed	Now	Comsumed	Total	Carbon	Hydrogen	Oxygen	Calorific	Moisture	(moles/100 mole dry flue gas)					100 mole dfp	
x	Wt_{dn}	y	Input	/12= [a]	/1= [b]	/16= [c]	Value	Fuel Burnt	[h]	[u]	[w]	[j]	[k]	Nk	CO_2
0.00	1.96	0.00	0	4.06	6.87	2.74	19810.00	16.72	79.48	21.08	1.62	5.59	-0.02	0.16	40.75
0.38	1.96	0.38	374	4.06	6.87	2.74	19810.00	16.72	79.10	20.98	0.37	1.31	-0.01	0.04	38.10
1.54	1.93	1.54	487	4.06	6.87	2.74	19810.00	16.72	79.41	21.06	1.35	4.67	-0.02	0.13	40.86
2.88	1.91	2.88	636	4.06	6.87	2.74	19810.00	16.72	79.62	21.12	2.13	7.35	-0.02	0.21	40.81
4.81	1.87	4.81	674	4.06	6.87	2.74	19810.00	16.72	79.86	21.18	3.01	10.36	-0.01	0.30	40.79
6.35	1.84	6.35	599	4.06	6.87	2.74	19810.00	16.72	79.87	21.19	3.06	10.54	-0.01	0.30	40.80
7.88	1.81	7.88	599	4.06	6.87	2.74	19810.00	16.72	79.88	21.19	3.40	11.64	0.02	0.34	40.20
9.42	1.78	9.42	674	4.06	6.87	2.74	19810.00	16.72	79.91	21.20	3.28	11.26	0.00	0.33	40.63
11.35	1.74	11.35	674	4.06	6.87	2.74	19810.00	16.72	79.91	21.20	3.19	10.99	-0.01	0.32	40.79
12.88	1.71	12.88	599	4.06	6.87	2.74	19810.00	16.72	79.92	21.20	3.23	11.11	-0.01	0.32	40.77
14.42	1.68	14.42	599	4.06	6.87	2.74	19810.00	16.72	79.92	21.20	3.22	11.07	-0.01	0.32	40.79
15.96	1.65	15.96	599	4.06	6.87	2.74	19810.00	16.72	79.91	21.20	3.22	11.09	-0.01	0.32	40.77
17.50	1.62	17.50	599	4.06	6.87	2.74	19810.00	16.72	79.92	21.20	3.23	11.10	-0.01	0.32	40.80
19.04	1.59	19.04	599	4.06	6.87	2.74	19810.00	16.72	79.92	21.20	3.24	11.14	-0.01	0.32	40.81
20.58	1.56	20.58	636	4.06	6.87	2.74	19810.00	16.72	79.94	21.20	3.32	11.42	-0.01	0.33	40.79
22.31	1.53	22.31	674	4.06	6.87	2.74	19810.00	16.72	79.95	21.21	3.42	11.75	0.00	0.34	40.67
24.04	1.49	24.04	636	4.06	6.87	2.74	19810.00	16.72	79.96	21.21	3.42	11.74	0.00	0.34	40.73
25.58	1.46	25.58	636	4.06	6.87	2.74	19810.00	16.72	79.94	21.21	3.41	11.71	0.00	0.34	40.65
27.31	1.43	27.31	636	4.06	6.87	2.74	19810.00	16.72	79.93	21.20	3.43	11.77	0.00	0.34	40.50
28.85	1.40	28.85	599	4.06	6.87	2.74	19810.00	16.72	79.91	21.20	3.47	11.89	0.01	0.35	40.31
30.38	1.37	30.38	599	4.06	6.87	2.74	19810.00	16.72	79.89	21.19	3.51	12.02	0.02	0.35	40.11
31.92	1.34	31.92	599	4.06	6.87	2.74	19810.00	16.72	79.88	21.19	3.56	12.17	0.03	0.35	40.00
33.46	1.31	33.46	636	4.06	6.87	2.74	19810.00	16.72	79.88	21.19	3.55	12.13	0.03	0.35	40.00
35.19	1.27	35.19	636	4.06	6.87	2.74	19810.00	16.72	79.85	21.18	3.61	12.32	0.04	0.36	39.70
36.73	1.24	36.73	599	4.06	6.87	2.74	19810.00	16.72	79.81	21.17	3.70	12.57	0.06	0.37	39.35
38.27	1.21	38.27	599	4.06	6.87	2.74	19810.00	16.72	79.80	21.17	3.68	12.53	0.06	0.37	39.33
39.81	1.18	39.81	599	4.06	6.87	2.74	19810.00	16.72	79.82	21.17	3.71	12.63	0.06	0.37	39.43
41.35	1.15	41.35	599	4.06	6.87	2.74	19810.00	16.72	79.81	21.17	3.73	12.70	0.06	0.37	39.30
42.88	1.12	42.88	599	4.06	6.87	2.74	19810.00	16.72	79.85	21.18	3.77	12.83	0.05	0.37	39.52
44.42	1.09	44.42	561	4.06	6.87	2.74	19810.00	16.72	79.85	21.18	3.78	12.87	0.06	0.38	39.49
45.77	1.07	45.77	561	4.06	6.87	2.74	19810.00	16.72	79.86	21.18	3.77	12.84	0.05	0.37	39.57
47.31	1.04	47.31	561	4.06	6.87	2.74	19810.00	16.72	79.83	21.17	3.80	12.94	0.07	0.38	39.32
48.65	1.01	48.65	561	4.06	6.87	2.74	19810.00	16.72	79.77	21.16	3.85	13.05	0.08	0.38	38.96
50.19	0.98	50.19	636	4.06	6.87	2.74	19810.00	16.72	79.67	21.13	3.91	13.21	0.12	0.39	38.31
51.92	0.94	51.92	636	4.06	6.87	2.74	19810.00	16.72	79.62	21.12	3.96	13.33	0.14	0.39	37.97
53.46	0.91	53.46	561	4.06	6.87	2.74	19810.00	16.72	79.65	21.13	3.95	13.32	0.13	0.39	38.13
54.81	0.89	54.81	524	4.06	6.87	2.74	19810.00	16.72	79.75	21.15	3.92	13.26	0.10	0.39	38.76
56.15	0.86	56.15	487	4.06	6.87	2.74	19810.00	16.72	79.92	21.20	3.70	12.64	0.03	0.37	40.02

Moisture Content M_{Cwb}: 16.72064

Dry kg : 1.96
CA: 49
HY: 7
OX: 43.9

LHV
7885.2

74.15	**0.20**	**-0.09**	**446.82**	**34.70**	**11.15**	**395.05**	**4006.36**	**3024.18**	**2943.03**	**2909.94**	**3836.80**	**3522.52**	**293.95**	**28478.85**	**34828.45**
Moles per kg of Dry Wood					**Moisture**	**Stack Temp**	**Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent**						**Room Temp**		
O_2	**CO**	**HC**	**N_2**	**H_2O**	**Present**	**K**	**CO_2**	**O_2**	**CO**	**N_2**	**CH_4**	**H_2O**	**K**	**CO_2**	**O_2**
86.54	0.18	-0.11	493.74	34.75	11.15	431.26	5517.83	4139.31	4021.91	3978.02	5340.80	4811.82	293.48	224.83	358.23
521.88	3.10	-0.39	2131.52	35.30	11.15	421.82	5122.02	3850.11	3742.82	3701.57	4940.76	4478.53	293.48	195.16	2009.28
112.61	0.12	-0.16	592.52	34.85	11.15	409.65	4618.05	3480.37	3385.63	3347.84	4434.71	4051.83	293.43	188.68	391.93
55.23	0.08	-0.08	375.61	34.68	11.15	410.26	4643.36	3498.99	3403.63	3365.67	4460.03	4073.34	293.43	189.49	193.25
26.40	0.05	-0.03	266.64	34.59	11.15	414.76	4830.13	3636.22	3536.25	3496.99	4647.10	4231.78	293.43	197.04	95.99
25.21	0.05	-0.03	262.16	34.59	11.15	419.82	5044.87	3793.87	3688.58	3647.84	4862.50	4413.77	293.32	205.83	95.64
18.74	0.56	0.05	236.17	34.42	11.15	425.37	5274.96	3962.16	3851.03	3808.74	5094.65	4607.78	293.37	212.07	74.25
20.82	0.18	-0.01	245.14	34.54	11.15	428.32	5400.50	4053.96	3939.65	3896.51	5221.36	4713.61	293.32	219.45	84.39
22.36	0.05	-0.03	251.39	34.58	11.15	430.37	5488.93	4118.59	4002.02	3958.30	5310.69	4788.11	293.26	223.90	92.11
21.68	0.07	-0.02	248.74	34.57	11.15	431.82	5545.43	4159.61	4041.54	3997.46	5368.36	4835.28	293.37	226.08	90.17
21.88	0.05	-0.03	249.56	34.58	11.15	432.71	5582.83	4186.88	4067.84	4023.51	5406.30	4866.68	293.37	227.73	91.61
21.76	0.07	-0.02	249.04	34.57	11.15	433.43	5611.12	4207.40	4087.61	4043.10	5435.21	4890.28	293.43	228.74	91.55
21.71	0.04	-0.03	248.93	34.58	11.15	433.59	5618.14	4212.51	4092.54	4047.98	5442.34	4896.16	293.43	229.21	91.44
21.49	0.03	-0.03	248.12	34.58	11.15	433.48	5615.57	4210.74	4090.85	4046.30	5439.53	4894.16	293.37	229.16	90.47
19.90	0.05	-0.02	242.07	34.57	11.15	434.48	5657.70	4241.43	4120.44	4075.62	5482.30	4929.49	293.37	230.75	84.41
18.12	0.15	-0.01	235.02	34.54	11.15	435.21	5690.25	4265.23	4143.42	4098.38	5515.17	4956.93	293.32	231.40	77.27
18.13	0.10	-0.01	235.23	34.55	11.15	435.59	5708.76	4278.80	4156.53	4111.36	5533.77	4972.59	293.26	232.50	77.57
18.33	0.17	0.00	235.79	34.53	11.15	435.54	5704.31	4275.46	4153.29	4108.15	5529.45	4968.71	293.32	231.86	78.39
18.05	0.30	0.01	234.33	34.49	11.15	435.15	5687.91	4263.52	4141.78	4096.75	5512.79	4954.97	293.32	230.37	76.94
17.41	0.46	0.04	231.42	34.44	11.15	435.54	5704.31	4275.46	4153.29	4108.15	5529.45	4968.71	293.32	229.94	74.43
16.78	0.64	0.07	228.51	34.39	11.15	434.32	5650.67	4236.31	4115.51	4070.73	5475.17	4923.60	293.37	226.64	71.08
16.08	0.73	0.08	225.60	34.36	11.15	434.32	5652.79	4237.95	4117.11	4072.31	5477.11	4925.52	293.32	226.11	68.15
16.28	0.73	0.08	226.32	34.36	11.15	433.65	5622.59	4215.85	4095.78	4051.19	5446.65	4900.04	293.37	224.89	68.61
15.38	0.99	0.12	222.17	34.28	11.15	433.21	5603.87	4202.22	4082.63	4038.16	5427.66	4884.34	293.37	222.47	64.63
14.27	1.30	0.17	217.04	34.19	11.15	433.04	5592.63	4193.83	4074.50	4030.12	5416.66	4874.62	293.48	220.05	59.83
14.48	1.31	0.17	217.81	34.19	11.15	433.32	5604.32	4202.36	4082.72	4038.26	5428.53	4884.43	293.48	220.44	60.84
13.98	1.23	0.16	216.16	34.21	11.15	433.15	5599.42	4198.88	4079.39	4034.95	5423.34	4880.46	293.43	220.78	58.68
13.71	1.34	0.17	214.81	34.18	11.15	433.71	5622.81	4215.92	4095.83	4051.24	5447.09	4900.09	293.43	220.99	57.79
13.07	1.14	0.15	212.97	34.23	11.15	433.98	5632.40	4222.81	4102.45	4057.80	5457.03	4907.99	293.48	222.61	55.18
12.94	1.18	0.15	212.39	34.22	11.15	433.98	5632.40	4222.81	4102.45	4057.80	5457.03	4907.99	293.48	222.40	54.64
13.05	1.10	0.14	213.04	34.24	11.15	433.93	5627.95	4219.47	4099.20	4054.59	5452.71	4904.10	293.54	222.72	55.07
12.66	1.32	0.17	210.91	34.18	11.15	434.32	5640.10	4228.14	4107.51	4062.83	5465.47	4914.01	293.65	221.78	53.53
12.25	1.64	0.22	208.39	34.08	11.15	434.48	5645.01	4231.62	4110.84	4066.14	5470.67	4917.98	293.71	219.90	51.83
11.69	2.20	0.30	204.61	33.92	11.15	435.37	5680.37	4257.27	4135.55	4090.62	5506.79	4947.47	293.76	217.60	49.78
11.25	2.49	0.35	202.09	33.83	11.15	436.98	5750.45	4308.38	4184.85	4139.46	5577.85	5006.34	293.71	218.37	48.49
11.26	2.35	0.33	202.52	33.87	11.15	436.48	5735.69	4297.92	4174.84	4129.53	5562.20	4994.42	293.54	218.72	48.40
11.41	1.81	0.25	204.71	34.03	11.15	436.21	5719.74	4286.13	4163.42	4118.22	5546.40	4980.76	293.65	221.70	48.90
13.88	0.71	0.08	217.33	34.36	11.15	434.59	5647.58	4233.39	4112.53	4067.82	5473.48	4919.99	293.76	226.04	58.75

SUMS					AVERAGE	SUMS						
9801.30	211448.26	-14195.44	288400.11	92704.48	3722.66	7448.30	234.62	7213.67	31518.22	234.43	24.73	-0.27
Energy Losses (kJ/kg of Dry Fuel)					Total							
Flue Gas Constituent					Loss	Total	Chemical	Sensible and	Total	Chem	Grams Produced	
CO	N_2	CH_4	H_2O Comb	H_2O Fuel MC	Rate	Loss	Loss 1	Latent Loss	Output	Loss 2	CO	HC
51.70	1964.11	-101.17	1695.06	544.12	4736.88	0.00	0	0.00	0	0	0.00	0.00
888.53	7889.96	-347.23	1710.12	540.40	12886.23	243.46	10	233.41	131	10	1.64	-0.12
34.19	1983.66	-146.51	1673.53	535.64	4661.12	114.48	-3	117.23	372	-3	0.08	-0.06
22.97	1264.18	-69.04	1665.96	535.88	3802.70	122.13	-1	123.61	514	-1	0.07	-0.04
15.31	932.43	-31.03	1667.36	537.65	3414.74	116.12	-1	116.66	558	-1	0.05	-0.02
13.17	956.32	-30.30	1673.58	539.68	3453.91	104.41	-1	104.92	494	-1	0.04	-0.02
160.29	899.51	45.93	1672.01	541.85	3605.91	109.00	6	102.84	490	6	0.47	0.02
52.81	955.18	-5.96	1681.30	543.03	3530.19	120.05	2	118.48	554	2	0.18	0.00
14.45	995.09	-25.65	1686.02	543.86	3529.76	120.04	0	120.42	554	0	0.05	-0.02
19.66	994.34	-22.29	1687.28	544.38	3539.62	107.00	0	107.08	492	0	0.06	-0.01
14.34	1004.12	-25.00	1688.66	544.73	3546.19	107.20	0	107.52	492	0	0.04	-0.01
20.58	1006.90	-22.00	1689.15	545.00	3559.91	107.61	0	107.66	491	0	0.06	-0.01
12.52	1007.66	-25.59	1689.75	545.06	3550.05	107.31	0	107.71	492	0	0.04	-0.01
9.80	1003.95	-26.50	1689.78	545.04	3541.70	107.06	-1	107.56	492	-1	0.03	-0.01
14.78	986.59	-21.96	1690.50	545.43	3530.51	113.39	0	113.62	523	0	0.05	-0.01
43.89	963.21	-6.15	1689.72	545.74	3545.10	120.56	1	119.29	553	1	0.15	0.00
28.72	967.11	-13.07	1691.02	545.91	3529.77	113.37	0	112.88	523	0	0.09	-0.01
49.12	968.66	-4.09	1689.90	545.87	3559.72	114.33	1	112.91	522	1	0.15	0.00
85.02	959.99	12.65	1687.60	545.72	3598.30	115.57	3	112.47	521	3	0.27	0.01
133.05	950.70	35.41	1685.59	545.87	3655.00	110.48	5	105.46	488	5	0.39	0.02
183.14	930.22	59.10	1681.45	545.37	3697.00	111.75	7	104.52	487	7	0.54	0.03
210.00	918.69	72.32	1680.07	545.39	3720.74	112.47	8	104.04	486	8	0.62	0.04
210.67	916.88	72.35	1679.19	545.11	3717.71	119.40	9	110.42	517	9	0.66	0.04
285.16	897.14	107.51	1674.82	544.93	3796.65	121.94	12	109.48	514	12	0.89	0.06
373.17	874.69	149.14	1669.94	544.82	3891.65	117.64	16	102.04	481	16	1.10	0.08
376.09	879.56	150.17	1670.17	544.93	3902.20	117.96	16	102.24	481	16	1.11	0.08
352.14	872.18	140.00	1671.14	544.89	3859.81	116.68	15	101.98	482	15	1.04	0.08
384.04	870.23	154.89	1670.19	545.11	3903.22	117.99	16	101.89	481	16	1.13	0.08
328.48	864.18	130.54	1673.11	545.19	3819.30	115.45	14	101.74	483	14	0.97	0.07
337.53	861.83	134.84	1672.64	545.19	3829.08	108.51	13	95.29	453	13	0.93	0.07
315.53	863.78	124.68	1673.62	545.15	3800.55	107.70	12	95.38	454	12	0.87	0.06
378.51	856.88	153.88	1670.77	545.26	3880.62	109.97	15	95.07	451	15	1.05	0.08
470.26	847.36	196.19	1666.29	545.31	3997.14	113.28	19	94.61	448	19	1.30	0.10
632.68	836.99	270.83	1659.14	545.63	4212.66	135.30	29	106.63	501	29	1.98	0.16
715.76	836.53	309.21	1656.94	546.29	4331.60	139.12	33	106.60	497	33	2.24	0.18
676.15	836.32	291.20	1658.51	546.16	4275.44	121.16	27	94.08	440	27	1.87	0.15
518.92	843.06	219.50	1665.88	546.01	4063.97	107.49	19	88.20	416	19	1.34	0.10
203.00	884.08	72.31	1679.88	545.33	3669.39	90.12	7	83.44	396	7	0.49	0.03

Appendix B: Labels & Manuals

JØTUL

Manufactured by /
Manufacturé par:
Jøtul North America, Inc.
55 Hutcherson Dr.
Gorham, ME U.S.A.

Listed Solid Fuel Room Heater & Fireplace for use in the United States and Canada.
Inscrite Heater solides Salle de carburant et Cheminée pour une utilisation aux États-Unis et au Canada.

Certified to: / Certifié norme: UL 1482, ULC-S627 and ULC-S628.
Intertek Testing Laboratories, Inc.
Middleton, WI U.S.A
Refer to the Intertek Directory of Building Products (https://bpdirectory.intertek.com) for detailed information.

Reportez-vous au répertoire des produits de construction d'Intertek (https://bpdirectory.intertek.com) pour obtenir des informations détaillées.

Intertek
W/N 03641

Model Modéle: **Jøtul F 602 V3**

Serial No. Nu. de Série: [redacted]

DO NOT REMOVE THIS LABEL.
NE PAS ENLEVER CETTE ÉTIQUETTE.

Manufacture Date / Date du Manufacturier

2024	2025	2026	2027	2028	2029
1	2	3	4	5	6
7	8	9	10	11	12

- **FOR USE WITH SOLID WOOD FUEL ONLY.**
- Install and use only in accordance with the Installation and Operating Instructions manual. In absence of local codes, installation must meet minimum requirements of NFPA 211 in the U.S. and CAN/CSA-B365 in Canada. Always contact your local building or fire officials about restrictions and installation inspections in your area.
- Do not connect this appliance to a chimney flue serving another appliance.
- This heater must be installed on the legs provided - the space beneath the heater may not be obstructed.
- Do not use a grate or elevate the fire - build wood fire directly on hearth.
- Risk of smoke or flame spillage - operate only with door fully closed, or fully open with optional screen in place.
- **DO NOT OVERFIRE -** If heater or chimney connector glows, you are overfiring.
- Chimney connector must be 6" dia. 24 MSG black or 26 MSG blued steel.
- Chimney must be a minimum 6" dia. factory-built, listed UL 103HT or lined masonry in the U.S. or listed ULC S629 factory-built or lined masonry in Canada.
- When passing the chimney or chimney connector through a combustible wall, always consult the Installation and Operating Manual, NFPA 211 or CAN/CSA-B 365 and your local codes.
- **INSPECT AND CLEAN CHIMNEY FREQUENTLY -** Under certain conditions of use, creosote buildup may occur rapidly.
- **NOTE:** Replace glass only with ceramic glass supplied by the manufacturer or distributor of this appliance.
- The catalytic combustor is fragile. Handle carefully. The performance of the catalytic device or its durability has not been evaluated as part the certification. Replace only with Jøtul Catalytic Combustor 158375. See manual for warranty.

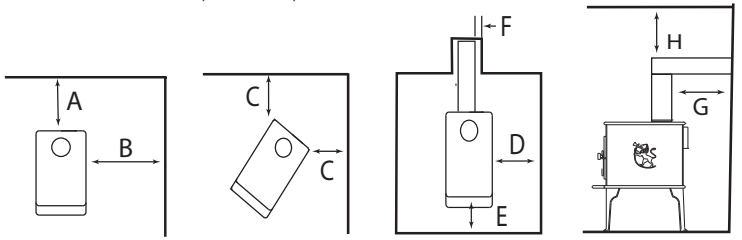
- **POUR L'USAGE AVEC LE BOIS SOLIDE SEULEMENT.**
- Installez et utilisez seulement en accord avec les instructions d'insatllation et d'operation du manufacturier et des codes locaux. Dans l'absence des codes locaux, l'installation doit être conforme aux exiggences de NFPA 211 aux États-Unis, et Can/CSA B365 au Canada. Référez vous aux instructions du manufacturier et des codes locaux pour les précautions exigées pour passer une cheminée travers un mur ou un plafond combustibles.
- Ne connectez pas ce poêla à une cheminée servant un autre appariel.
- Cet appareil doit être installé sur les jambes fournis - l'espace sous le poêle ne peut pasêtre obstruées.
- U'utilisez pas un atre et n'élevez pas le feu. Édifiez le bois de feu directement ur le foyer.
- Risque de fumée ou de déversement de flammes - avec la porte fermée ne fonctionnent. que, ou avec écran optionnelle complètement ouverte en place.
- NE PAS SURCHAUFFER: Si le poêle ou la cheminée commence à rougeoyer, c'est a cause du fait que vous suchauffez le poêle.
- Le connecteur de cheminée doit être de 6 "dia. 24 MSG noir ou acier 26 MSG bleui.
- La cheminée doit être au minimum de 6 po de diamètre fabriquée en usine, de la maçonnerhomologué UL 103HT ou doublé aux États-Unis ou ULC S629 énumérés fabriqués en usine, ou revêtues de maçonnerie au Canada.
- Lors du passage de la cheminée ou tuyau de cheminée à travers un mur, toujours consulter le manuel d'installation et d'exploitation, NFPA 211 ou CAN / CSA-B 365 et les codes locaux.
- PRÉVENEZ LES FEUX DE CRÉOSOTE: Inspectez et nettoyez le cheminée fréquemment. Sous certaines conditions d'usage, lerésidu de créosote peut se faire rapidement.
- NOTE: Remlacez la vitre seulement avec de la céramique fournie par l'usine.
- La chambre de combustion catalytique est fragile. Manipulez avec soin. Les performances du dispositif catalytique ou sa durabilité n'ont pas été évaluées dans le cadre de la certification. Remplacez-le uniquement par le brûleur catalytique Jøtul 158375. Voir le manuel pour la garantie.

Minimum Clearances to Combustibles:
Minimum des Surfaces Combutibles:
A: 13 1/2" / 345 mm
B: 21" / 535 mm
C: 13" / 330 mm

Floor Protection / Protection de Plancher:
The stove must be placed on a non-combustible floor protector that extends:
Le poêle doit être placé sur un protecteur de plancher incombustible qui s'étend:
D: 8" / 200 mm
E: 16" U.S.
18 po. CAN. 460 mm

Minimum Clearances from Chimney Connector to Combustibles:
Dégagements Minimaux à Partir du Connecteur de Cheminée à Combustibles:
F: 2" / 50 mm
G: 18"/ 457 mm
H: 18"/ 457 mm

See installation manual for other options.
Consultez le manuel d'installation pour d'autres options.



CAUTION: Hot while in operation. Do not touch. Keep children, clothing, and furniture away. Contact may cause burns - See instruction manual.

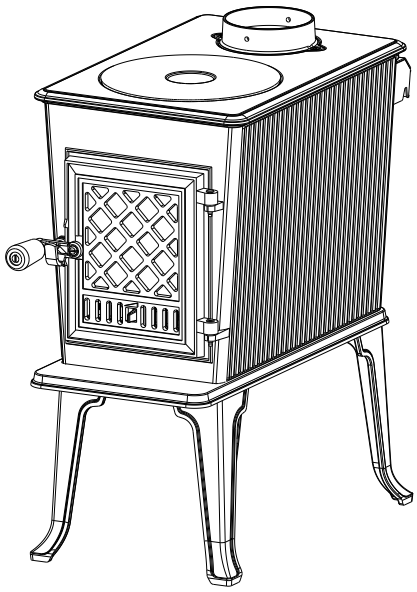
AVEC: Chaud pendant le fonctionnement. Ne touchez as. Tenir les enfants,les vêtements et les meubles à l' écart. Le contact peut causer des brûlures cutanées. Voir la plaque signalétique et les instructions.

226578

U.S. ENVIRONMENTAL PROTECTION AGENCY - CERTIFIED TO COMPLY WITH 2020 PARTICULATE EMISSIONS STANDARDS USING CRIB WOOD.
CERTIFIED EMISSION VALUE 1.4 g/hr.
CERTIFIED CO EMISSIONS VALUE 1.3 g/min.
EPA test method 28R.
EPA CERTIFIED TESTING BY PFS-TECO COMPANY
CLACKAMAS, OR U.S.A.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information.
It is against federal regulations to operate this wood heater in a manner inconsistent with the operation instructions in the owner's manual.
Ce poêle à bois doit être inspecté et réparé périodiquement pour un fonctionnement correct. Consultez le manuel du propriétaire pour plus d'informations. Il est contraire à la réglementation fédérale de faire fonctionner ce poêle à bois de manière incompatible avec les instructions de fonctionnement du manuel du propriétaire.

Jøtul F 602 V3



Jøtul F 602 V3

Catalytic Wood Heater

Classic and Clean Face Models

Installation and Operating Instructions for the United States and Canada

- **The Jøtul F 602 V3 wood stove is listed to burn solid wood only. Do not burn any other fuels.**
- **Read this entire manual before you install and use this appliance.**
- **Save these instructions for future reference and make them available to anyone using or servicing this wood heater.**
- **This wood heater contains a catalytic combustor that requires periodic inspection and maintenance for proper operation. See this manual for specific maintenance information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in this owner's manual, or if the catalytic element is deactivated or removed.**

Une version française de ce manuel est disponible auprès de votre revendeur et sur le site www. jotul.ca.

JØTUL

Table of Contents

Accessories

The following accessories, specifically designed for the Jøtul F 602 V3 wood stove, are available from your Jøtul authorized dealer.

Rear Heatshield - HS-50

A stove rear heatshield has been specifically designed for the Jøtul F 602 V3 to reduce clearances off the rear of the stove to combustible materials. Use of the heatshield ***does not*** affect the clearance off the sides of the appliance.
See pages 14-15 for specific clearance requirements. Complete installation instructions are supplied with the heatshield.
No other type of heatshield may be used.

Fresh Air Adaptor - 156408

Must be used with Rear Heatshield
Provision for outside air may be required by your local building codes.
The fresh air adaptor includes a 3 inch adapter used to connect an air duct directly to the stove combustion chamber. The following additional materials will be required:

A. The appropriate length of metallic flex pipe for a conduit of the outside air.
B. A rain/weather resistant cap for the outside of the house.
C. A rodent screen - that is no larger than 1/4”(6,4mm) mesh.

Follow the instructions provided with the kit.
Please be aware that provision of outside air to support combustion will not necessarily eliminate performance issues associated with negative pressure within the home or chimney system.

Stove-top Thermometer - 5002

You can use a magnetic stove-top thermometer in conjunction with the catalytic combustor monitor to help achieve optimal stove performance.

Stove Gloves, pair - 157363

Heavy duty, flame retardant, with full gauntlet.

Universal Gasket Kit - 157050

This kit includes all the gasket material and instructions required to maintain the seal integrity of your wood stove.

Replacement Catalyst -******

Combustion Monitor - 226609

Standards

The Jøtul F 602 V3 solid fuel heater has been tested and listed to ANSI/UL 1482 in the U.S. and
ANSI ULC-S627 in Canada.
Certified Safety Tests performed by
Intertek Testing Services, Middleton, WI U.S.A.

Manufactured by
Jøtul North America, Inc.
55 Hutcherson Drive
Gorham, Maine 04038, U.S.A.

This heater meets the 2020 U.S. Environmental Protection Agency's emission limits for wood heaters manufactured after May 15, 2020.

This manual describes the installation and operation of the Jøtul F 602 V3 catalytic equipped wood heater. This heater meets the 2020 U.S. Environmental Protection Agency's crib wood emission limits for wood heaters sold after May 15, 2020. Under specific test conditions, this heater has been shown to deliver heat at rates ranging from 13,726 to 35,722 Btu/hr.

Check Building Codes

Your city, town, county or province may require a building permit to install a solid fuel burning appliance.

In the U.S., the National Fire Protection Association's Code, NFPA 211, *Standards for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances*, or similar regulations, may apply to the installation of a solid fuel burning appliance in your area.

Always consult your local building inspector or authority having jurisdiction to determine what regulations apply in your area.

Combustion Specifications

Heat Output Range:[1]	7,000 to 25,000 BTU/hr. (2.0-7.3 kW)	
Heating Capacity:[2]	Up to 800 sq. ft.	
Maximum Burn Time:[2]	Up to 5 hours	
EPA Efficiency:[3]	**HHV:** 76.7%*	**LHV:** 82.9%
CO Emissions:[4]	1.3 g/min.	
Particulate Emissions:[5]	1.4 g/hr.	

Fuel: Up to 16" Logs (508 mm)

1 **Heat Output Range** results are determined during specific emissions tests established by the EPA.

2 **Heating Capacity and Maximum Burn Time** will vary depending on design of home, chimney, climate, wood type and operation.

3 **EPA Validated Efficiency:**
High Heat Value and Low Heat Value efficiencies are determined per the CSA B415.1-10 test method. The difference between the HHV and LHV is how the energy in the exhaust gas water vapor is accounted for.

LHV efficiency assumes all the water vapor in combustion gases was condensed and the heat from such was recovered and transferred to the dwelling. HHV calculations do not assume all water vapor is condensed, therefore the HHV value is less than the LHV value.

4 **Carbon Monoxide Emissions** rate results from Test Method CSA B415.1-10.

5 **Particulate Emissions** rate is obtained using EPA Test Method 28-R.

EPA Certified Emissions Tests performed by
PFS-TECO, Portland, OR U.S.A.

PFS® US

Safety Notices

- **BURN SOLID, NATURAL WOOD FUEL ONLY. DO NOT BURN ANY OTHER FUEL.**
- **DO NOT USE CHEMICALS OR FLUIDS TO START A FIRE. DO NOT BURN GARBAGE OR FLAMMABLE FUELS.**
- **DO NOT USE A GRATE OR ELEVATE THE FIRE. BUILD THE FIRE DIRECTLY ON THE HEARTH.**
- **IF THIS ROOM HEATER IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTRUCTIONS IN THIS MANUAL. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR LOSS OF LIFE.**
- **CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.**
- **ANY EXISTING CHIMNEY SYSTEM MUST BE INSPECTED BEFORE INSTALLATION OF THIS APPLIANCE.**
- **DO NOT CONNECT THIS STOVE TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.**
- **EXTREMELY HOT WHILE IN OPERATION! KEEP CHILDREN, CLOTHING, AND FURNITURE AWAY. CONTACT WILL CAUSE SKIN BURNS. USE A CHILD GUARD SCREEN TO PREVENT ACCIDENTAL CONTACT BY SMALL CHILDREN.**
- **INSTALL CO SMOKE DETECTORS IN THE LIVING AREA AND BEDROOMS OF YOUR HOME. TEST THEM REGULARLY AND INSTALL FRESH BATTERIES TWICE ANNUALLY.**

  WHEN INSTALLED IN THE SAME ROOM AS THE STOVE, A SMOKE OR CARBON MONOXIDE DETECTOR SHOULD BE LOCATED AS FAR FROM THE STOVE AS POSSIBLE TO PREVENT THE ALARM SOUNDING WHEN ADDING FUEL.
- **Avoid creating a low pressure condition in the room where the stove is operating. Be aware that operation of an exhaust fan or clothes dryer can create a low pressure area and consequently promote flow reversal through the stove and chimney system. In some cases, the optional Outside Air Kit #154335 can be used to alleviate this condition. The chimney and building, however, always work together as a system - provision of outside air, directly or indirectly to an atmospherically vented appliance will not guarantee proper chimney performance. Consult your local Jøtul authorized dealer regarding specific installation/performance issues.**
- **Jøtul strongly recommends that this stove be installed by a professional solid fuel technician, or that you consult one if you do the work yourself. Also, consult your insurance company regarding any other specific requirements.**

NOTE: It is normal for a new, painted stove to emit odor and smoke during initial fires, depending upon temperatures over time. This is caused by the curing of high temperature paint and manufacturing materials. This condition can be alleviated by opening a window or door to provide additional ventilation. See Break-in Procedure, Sect. 5.6 for details.

See Sect. 5.0 of this manual for important information regarding the safe, proper, and most efficient operation of your stove.

Always follow the guidelines presented in this manual when installing, operating, and maintaining this appliance and make this manual available to anyone using or servicing the stove.

DO NOT OVERFIRE THIS HEATER.
THE MAXIMUM RECOMMENDED OPERATING TEMPERATURE OF THE COMBUSTOR IS 1600°F (870°C). DAMAGE CAN OCCUR TO THE COMBUSTOR IF IT EXCEEDS 1750°F (954°C) FOR EVEN BRIEF PERIODS OF TIME.

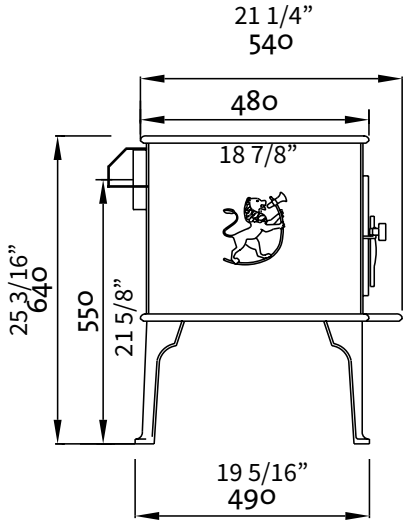
WARNING: DO NOT OVER-FIRE THIS HEATER. IF ANY PART OF THE STOVE OR CHIMNEY CONNECTOR GLOWS, WITH THE EXCEPTION OF THE COMBUSTOR, YOU ARE OVER-FIRING. A HOUSE FIRE OR SERIOUS DAMAGE TO THE STOVE OR CHIMNEY COULD RESULT. ATTEMPTS TO ACHIEVE HEAT OUTPUT RATES THAT EXCEED HEATER DESIGN SPECIFICATIONS CAN RESULT IN PERMANENT DAMAGE AND VOID YOUR WARRANTY ON THE STOVE AND ITS COMPONENTS.

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

1. Installation

If this solid fuel room heater is not properly installed, a house fire may result. For your safety, follow the installation directions. Use only specified components. The use of makeshift components MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR LOSS OF LIFE. Contact the local building or fire officials about restrictions and installation inspection requirements in your area.

Fig. 1.1



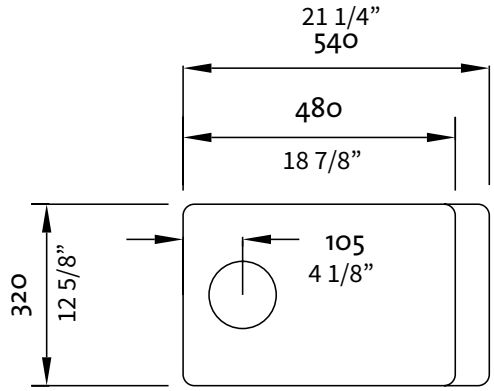
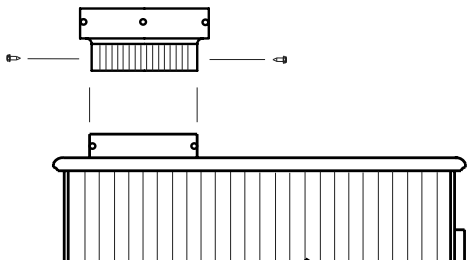


Fig. 21 **Dripless Adaptor Installation**



1.1 Assembly Before Installation

2.1 Inspect Contents

Inspect the stove for damage. Contact your dealer immediately if any damage is found. Do not install the stove if any damage is evident.

Contents:
- Door Knob Kit (Installed on Stove)
- Dripless Pipe Adaptor
- Smoke Outlet (Installed on Stove)
- Hardware Kit
- Bottom Heat Shield (Installed on Stove)
- Combustor Probe

2.2 Smoke Outlet Position

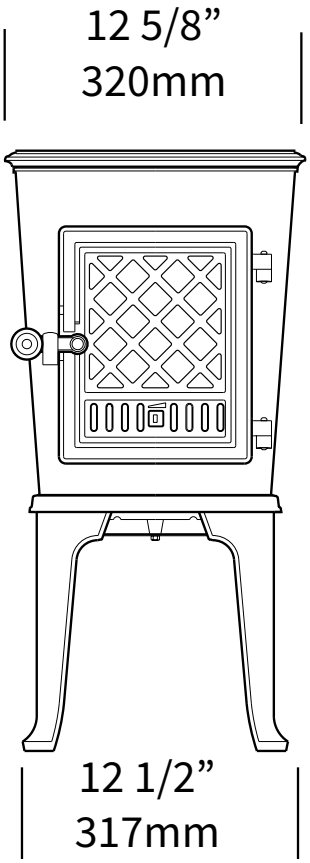
The Smoke Outlet may be installed in either a top-exit or rear-exit position. For Top Exit, use the pre-installed screws to secure the smoke outlet to the top plate.
For Rear Exit, first remove the screws and 10mm nuts that attach the rear cover plate to the back plate. Reach through the top outlet to access the nuts. Use these same fasteners to attach the outlet to the stove. Secure the cover plate to the top plate using the pre-installed screws.

2.3 Dripless Pipe Adaptor Installation

The Dripless Pipe Adaptor is to be installed in the smoke outlet. Secure adaptor to outlet using screws provided.

- INSTALL ACCESSORIES BEFORE LOCATING THE STOVE IN THE FINAL POSITION. Use the instructions provided with those kits.

Fig. 1.2

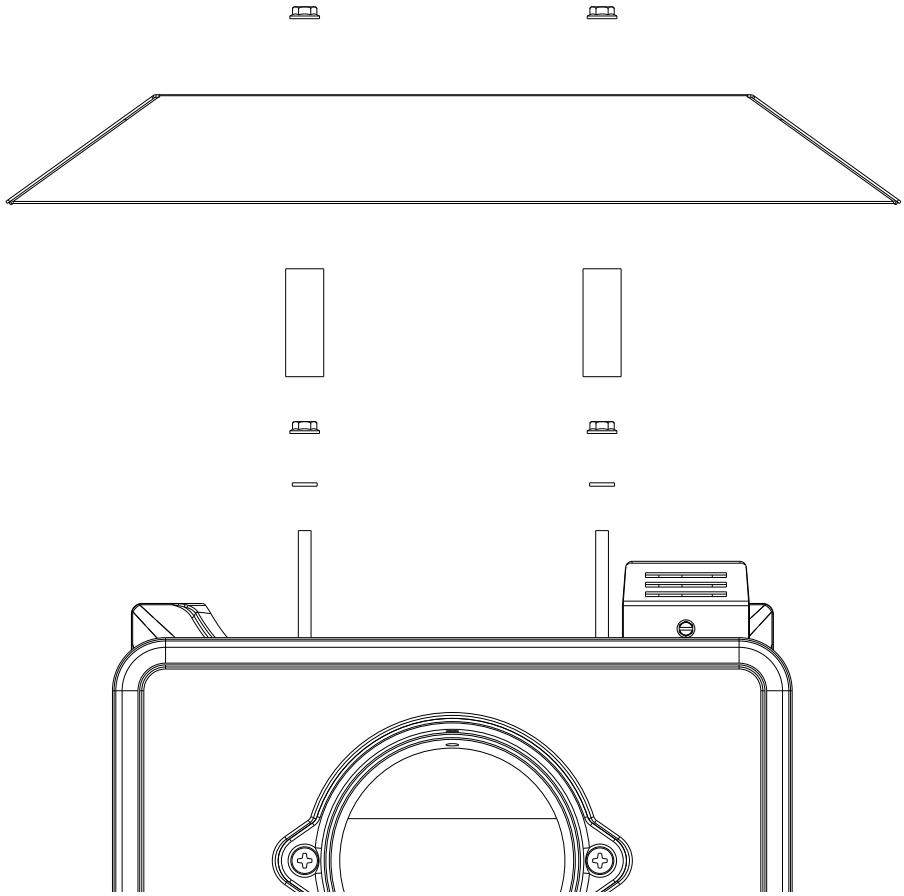


1.4 Rear Heatshield Installation

The F 602 V3 Heat Shield can only be used in the top exit mode. In order to install the heat shield, the flue collar must first be moved from the rear to the top, and the outlet cover moved from the top to the rear.

Kit Contents:

1. Remove the two smoke outlet cover screws and remove the cover from the top of the stove.
2. Reaching through the outlet opening, use the 10 mm wrench and screwdriver to remove the flue collar nuts and screws. Keep the nuts for later use.
3. Install the flue collar on the top of the stove using the screws previously removed.
4. Place the outlet cover on the back of the stove and insert the two M6 x 60 bolts from this kit through the back plate from the inside of the stove. Secure the cover using the two washers and nuts from this kit.
5. Install the two spacers over the M6 x 80 screws. Secure the heat shield to the bolts using the two nuts previously removed in Step 2.

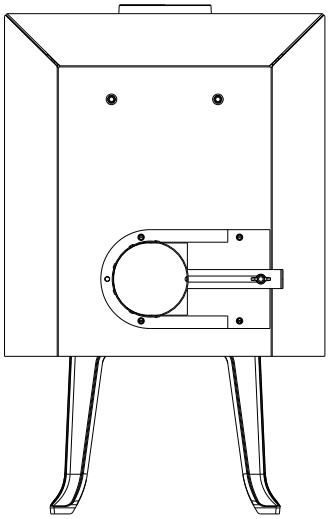


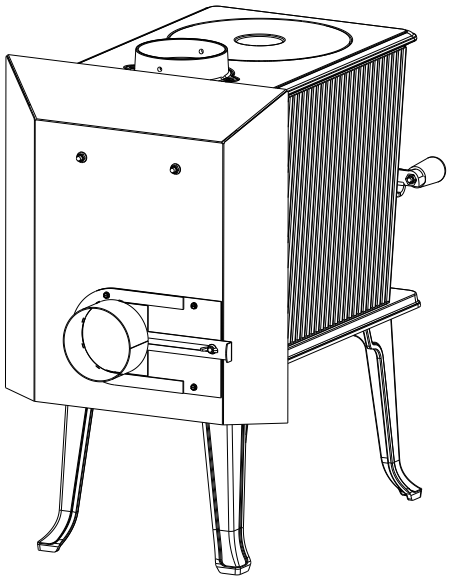
1.5 Fresh Air Adaptor Installation

Kit Contents:
• #8 x 1/2” Sheet Metal Screws (4)
• Fresh Air Adaptor Valve Assembly
Materials Required:
• 4” dia. flexible metallic conduit for fresh air
• Weather resistant wall termination cap
• 1/4” mesh rodent screen
• 3 self-tapping sheet metal screws
or 4” dia. hose clamp

Tools Required to install all of the above:
• 1/4 in. socket driver
• spade screwdriver
• power drill
• 1/8” dia. drill bit
• 4” dia. sheet metal hole saw

The adaptor valve assembly simply attaches to the back of the heat shield using the sheet metal screws provided. Orient the valve assembly as shown in the illustration. Heat shields incorporate the necessary duct and fastener holes. Twist the air duct knock-out to remove it.





2. Chimney and Chimney Connector Requirements

2.1 Chimney Connector

The chimney connector is a single walled pipe used to connect the stove to the chimney. For use with the Jøtul F 602 V3, the chimney connector **must** be 6" (152mm) in diameter, with a minimum thickness of 24 gauge black steel. Attach the flue collar to the chimney connection using 2 self-drilling screws found in the miscellaneous kit.

- Aluminum and Galvanized steel pipe is not acceptable for use with the Jøtul F 602 V3. These materials cannot withstand the extreme temperatures of a wood fire and can give off toxic fumes when heated.
- **Do not use the connector pipe as a chimney.**
- Each chimney connector or stove pipe section must be installed to the stove flue collar and to each other with the male (crimped) end toward the stove. **See figure 2.1.** This prevents any amount of condensed or liquid creosote from running down the outside of the pipe or the stove top.
- All joints must be secured with three sheet metal screws.
- For the best performance the chimney connector should be as short and direct as possible, with no more than two 90° elbows.
- **The maximum horizontal run is 36" (915mm) and a recommended total length of stove pipe should not exceed 10 feet.**
- Horizontal runs must slope upward 1/4" (6,35mm) per foot toward the chimney.
- Where passage through a wall or partition of combustible construction is desired, the installation must conform with NFPA 211 and is also addressed in this manual.

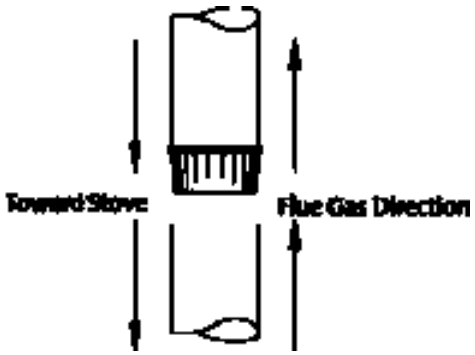


Fig. 2.1. Chimney connector assembly.

- No part of the chimney connector may pass through an attic or roof space, closet or other concealed space, or through a floor or ceiling.
- All sections of the chimney connectors must be accessible for cleaning.
- Where passage through a wall or partition of combustible construction is desired, the installation must conform with NFPA 211 and is also addressed in this manual.
- **Do not connect this unit to a chimney flue servicing another appliance.**

2.2 General Chimney Requirements

Canada Only: This fireplace insert must be installed with a continuous chimney liner of 6" diameter extending from the fireplace insert to the top of the chimney. The chimney liner must conform to the Class 3 requirements of CAN/ULC-S635, Standard for Lining Systems for Existing Masonry or Factory-Built Chimneys and Vents, or to the requirements of CAN/ULC-S640, Standard for Lining Systems for New Masonry Chimneys.

The F 602 V3 is approved for use with:

1. A code-approved masonry chimney and flue liner.
2. A prefabricated chimney complying with the requirements for Type HT (2100°F) chimneys per UL 103 .

An existing chimney system must pass a UL 1482 Level II inspection conducted by a qualified technician or building official.

The chimney flue size should not be less than the cross-sectional area of the stove flue collar, and not more than three times greater than the cross-sectional area of the flue collar.

NOTE: Consult your local code authority to determine what building and fire codes apply in your area before installing your new stove. Your local inspector has final authority in approving your installation.

Chimney Considerations

When choosing a chimney type and location in the house, keep this in mind: it is the chimney that makes the stove work, **not** the stove that makes the chimney work. The chimney allows the temperature difference between inside and outside air to create suction, called "draft", which pulls air through the stove necessary to support combustion. Since draft is the force which moves air from the stove up through the chimney, its strength is critical to proper stove function. Besides air pressure differential, draft strength is affected other factors including:

- chimney condition and height
- surrounding construction, other buildings
* nearby trees, local geography
- wind conditions and climate

Any of the preceding conditions can adversely affect performance. Weak or erratic draft can cause "back puffing"- a condition when smoke leaks into the room through the stove or chimney connector joints. Poor draft will also make it difficult to maintain a steady, controlled burn and lead to creosote accumulation in the chimney or combustor.

A short, masonry chimney on the exterior of a house will promote poor performance. This is because it will be difficult to initiate and maintain temperatures warm enough to sustain adequate draft. In extremely cold northern areas, it may be necessary to reline the chimney or extend its height to help improve performance. Conversely, a tall, masonry chimney inside the house will warm more quickly and retain heat longer.

On the other hand, overly strong draft can also cause a different set of issues such as excessive temperatures and short burn times

Ideally, whether masonry or prefabricated, the chimney should be centrally located inside the house where it will be least affected by exterior conditions and the stove's radiant heat can be most evenly dispersed.

The following guidelines give the necessary chimney requirements based on the national code, ANSI-NFPA 211. However, many local codes differ from the national code to take into account climate, altitude, or other factors.

Any chimney construction that penetrates the air barrier of a wall or ceiling/roof to the outside must be sealed in accordance to local building codes.

2.3 Masonry Chimneys

A masonry chimney must conform to the following guidelines:

- The chimney flue size should not be less than the cross-sectional area of the stove flue collar.
- The cross-sectional area of the flue of a chimney with no walls exposed to the outside below the roofline shall not be more than three times the cross-sectional area of the stove flue collar.
- The cross-sectional area of a chimney flue having one or more walls exposed to the outside below the roofline shall not be more than two times the cross-sectional area of the stove flue collar.
- Larger chimney flues should be relined with a listed or code approved liner.
- The masonry chimney must have a fireclay liner or equivalent, with a minimum thickness of 5/8" (16mm) and must be installed with refractory mortar. There must be at least 1/4" (6,35mm) air space between the flue liner and chimney wall.
- The fireclay flue liner must have a nominal size of 8" X 8", and should not be larger than 8" X 12". If a round fireclay liner is to be used it must have a minimum inside diameter of 6" (157mm) and not larger than 8" (208mm) in diameter.
- If a chimney with larger dimensions is to be used, it should be relined with an appropriate liner that is code approved.
- The masonry wall of the chimney, if brick or modular block, must be a minimum of 4"(106mm) nominal thickness. A mountain or rubble stone wall must be at least 12" (310mm) thick.
- A newly-built chimney must conform to local codes and in their absence must recognize national regulations. When using an existing chimney, it must be inspected by a licensed professional chimney sweep, fire official, or code officer, to ensure that the chimney is in proper working order.
- No other appliance can be vented into the same flue.
- An airtight clean-out door should be located at the base of the chimney.

This stove shall not be installed in a factory-built fireplace.

2.4 Prefabricated Chimneys

A prefabricated metal chimney must be tested and listed for use with solid fuel burning appliances to High Temperature (HT) Chimney Standard UL 103 for the U.S and ULC S629 in Canada.

The manufacturer's installation instructions must be followed precisely. Always maintain the proper clearance to combustibles as established by the pipe manufacturer. This clearance is usually a minimum of 2" (56mm), although it may vary by manufacturer or for certain chimney components.

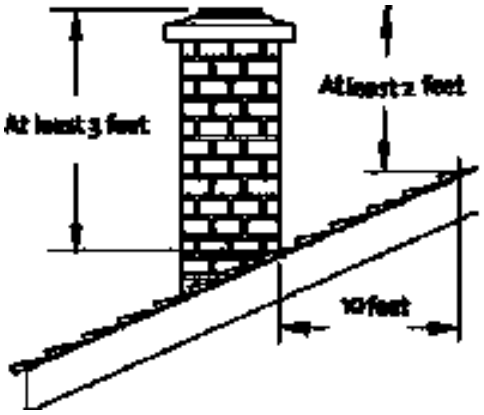
2.5 Chimney Height

The minimum chimney height is 15 feet (4.57 m). The chimney must also be at least 3 feet higher than the highest point where it passes through the roof and at least 2 feet higher than the highest part of the roof or structure that is within 10 feet of the chimney, measured horizontally. **See figure 2.2.**

Chimneys shorter than 14 feet may not provide adequate draft. This could result in smoke spilling into the room from the stove when loading the stove, or when the door is open. In addition, inadequate draft can cause back puffing, which is a build up of gases inside the firebox.

Other times, chimney height can create excessive draft which can cause high stove temperatures and short burn times. Excessive drafts can be corrected by installing a butterfly damper. If you suspect you have a draft problem, consult your dealer.

Fig. 2.2. Chimney height; 3 / 2 / 10 Rule.



2.6 Wall Pass-throughs

When your installation unavoidably requires the chimney connector to pass through a combustible wall to reach the chimney, always consult your local building officials, and be sure any materials to be used have been tested and listed for wall pass-throughs.

In the U.S:

The National Fire Protection Association's publication, NFPA 211, Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances permits four methods for passing through a combustible wall. Before proceeding with any method be sure to consult with your local building officials to discuss any local code requirements.

Common Method:

- When passing through a combustible wall to a masonry chimney this method requires the removal of all combustible materials from at least 12" (310mm) around the chimney connectors proposed location. With a 6" (157mm)round liner the minimum area required would be 31" x 31" (792x792mm) square.
- The space is then filled with at least 12" (310mm)of brick around a fireclay liner. Remember, the liner must be ASTM C35 or equivalent, with a minimum wall thickness of 5/8" (16mm).
- It is important to remember to locate the pass-through at least 18"(457mm) from the ceiling for proper clearance to combustibles.
- It will be necessary to cut wall studs, install headers, and construct a sill frame to maintain the proper dimensions and to support the weight of the brick.
- The bricks must be solid brick with a minimum of 3 1/4 " (83mm) thick 4" (106mm) nominal).
- Refractory mortar must be used at the junction of the chimney and the pass-through liner. The pass-through liner must not penetrate the chimney liner beyond the inner surface of the chimney liner. Use extreme care when constructing the hole in the chimney liner, the tiles can shatter easily. **See figure 2.3.**

Consult your local building inspector and authorized Jøtul Dealer for other approved wall pass-through methods.

3. Connecting to the Chimney

3.1 Masonry Chimney Thimble

When connecting the stove to a masonry chimney through a “thimble” (the opening through the chimney wall to the flue), the thimble must be lined with ceramic tile or metal and be securely cemented in place. See fig. 2.3.

- The chimney connector/stove pipe must slide completely inside the thimble to the inner surface or the flue liner. A slip-connector may be used to permit adjustability and ease maintenance / cleaning access. See fig. 3.1.
- The connector pipe or thimble sleeve must not protrude into the flue liner where it could restrict the free flow of exhaust gas and cause poor stove performance.
- The chimney connector should be sealed at the thimble with refractory cement and each connector joint must be secured with three sheet metal screws.
- **Do not connect this stove to a chimney flue servicing another appliance of any kind**.

In Canada:

The installation must conform to CAN/CSA-B365, Installation Code for Solid Fuel Burning Appliances and Equipment. Before proceeding be sure to consult your local building inspector.
Common Method:
This method requires the removal of all combustible materials from at least 18” around the chimney connector’s proposed location. A 6” round liner requires a minimum opening 43” x 43” square.
Locate the pass-through at least 18” from combustible ceiling materials.
The space that is cleared of combustible materials must remain empty. Sheet metal panels can be used to cover the area. However, when using a panel on both sides of the wall, each cover must be installed on noncombustible spacers at least 1” from the wall. If one panel of sheet metal is to be used it may be installed flush to the wall. See section 5.3.1 and 5.3.2 of CSA - B365. Consult your local building inspector, authorized Jøtul Dealer, NFPA 211 in the U.S. or CSA-B635 in Canada for other approved wall pass-through methods.

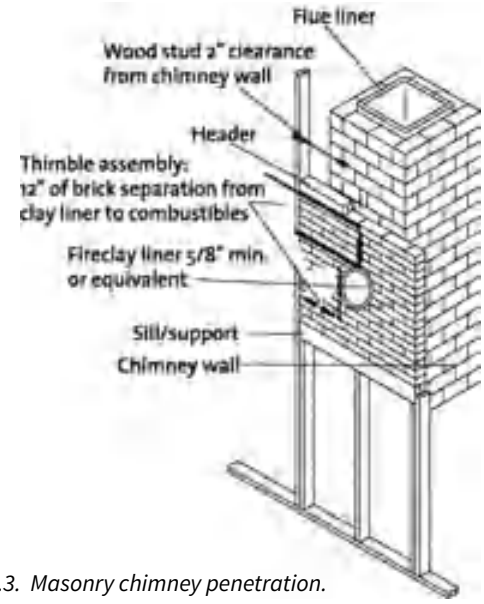
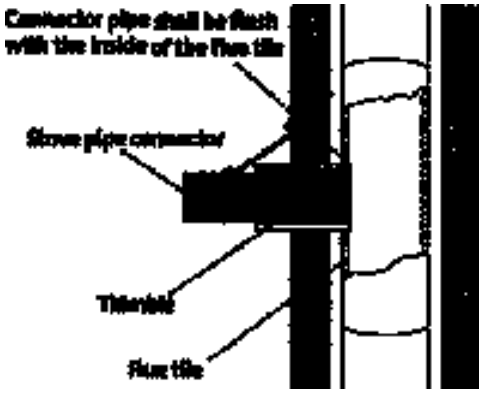


Fig. 2.3. Masonry chimney penetration.

Fig.3.1. Chimney thimble components.

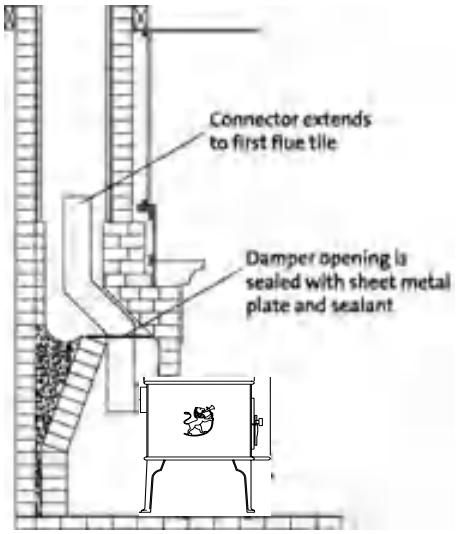


3.2 Hearthmount Into a Masonry Fireplace

Consult your local building inspector for codes on fireplace installation. The Jøtul F 602 V3 has a rear exit flue collar height of 21 5/8" (550 mm) when installed with standard legs.

- The NFPA 211 standard (12.4.5.1) requires that **a masonry flue serving a wood-burning appliance must be sealed off from room air.** This can be accomplished by two methods:
  1) Replace the fireplace damper with a fixed steel plate through which the connector pipe must extend from the stove to the chimney flue tile. See figure 3.2. Alternatively, the flue may be sealed off by installing a non-combustible plate at the fireplace opening. In either case, the block-off plate and connector pass-through must be sealed using high-temperature or other appropriate sealant. Jøtul recommends a block-off plate installed in any fireplace damper area for improved heat efficiency.
  2) Install a full, listed chimney liner from the stove to a direct connection at a sealed chimney cap. Your Jøtul dealer can recommend an approved system.
- See Section 2.3 on page 7 for cross-sectional flue size requirements related to interior *vs* exterior chimneys.
- If the chimney liner is too large to accommodate the stove, a code-approved relining system must be installed to resize the flue.
- The fireplace installation must also conform to the tested clearances to surrounding trim and mantels. See clearance specifications on pages 14-15. In addition, a fireplace installation must also comply with the floor protection guidelines specified on page 11.

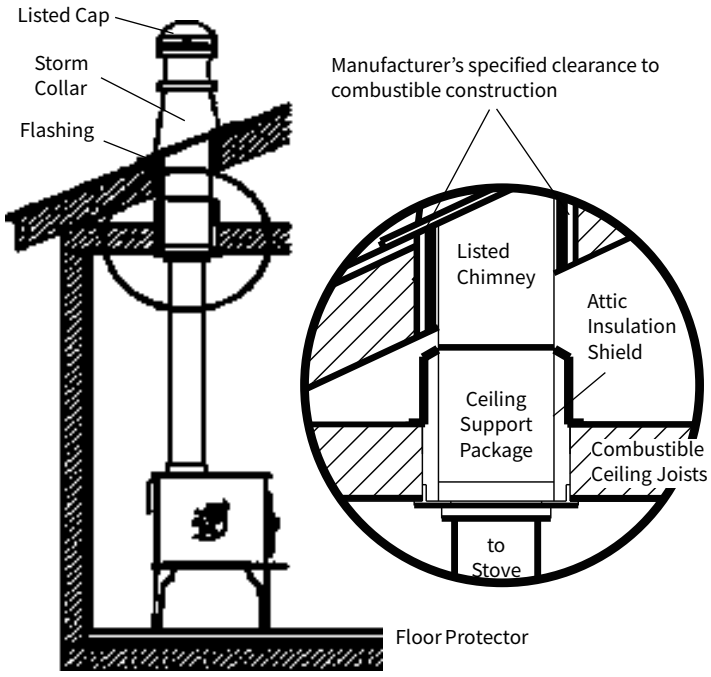
Fig. 3.2. Fireplace chimney construction.



3.3 Prefabricated Chimneys

The Jøtul F 602 V3 may be connected to a prefabricated metal chimney following the pipe manufacture's instructions. Use all required components. Most manufacturers offer an adaptor that attaches to the bottom section of the metal chimney and permits the connector pipe to be secured to it using three sheet metal screws. See figure 3.3.

Fig. 3.3. Prefabricated chimney components.



DO NOT INSTALL IN ANY FIREPLACE.
The F 602 V3 may be vented through a masonry fireplace as described above but the stove must be installed IN FRONT of the fireplace opening.

4. Clearances to Combustibles

4.1 Floor Protection Requirements

The F* 602 V3 *requires a listed UL 1618 floor protection as specified below in any installation unless installed on concrete over earth.

* The supplied bottom heat shield must be installed on the stove.

- Floor protection under the stove must be composed of continuous, non-combustible materials for protection against sparks and embers.

* Individual sections of floor protection must be mortared or otherwise sealed together to prevent spark penetration to combustible floor materials. Any carpeting must be removed from under the floor protection.

- **Alcove Installations:** In addition to the Bottom Heat Shield, floor protection must include materials having a minimum R-value of 1.6. See section 4.2, to determine various material R-values.

In the U.S.:

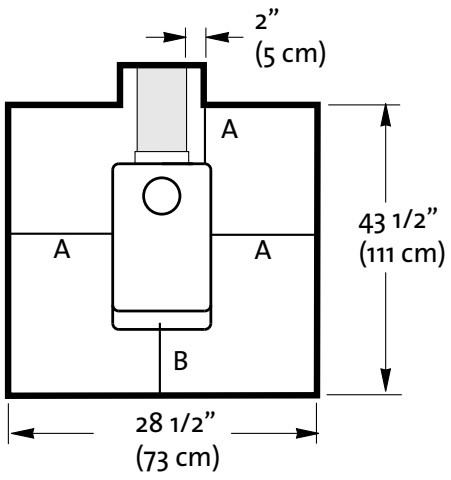
The hearth protection surface must extend continuously in front of the stove:

- A minimum of **16".**
- A minimum of 6" on each side (measured from the opening of the front door).

This will result in a minimum floor protection of

33"W X 40"D . See figure 4.1.

Fig. 4.1. F 602 V3 Hearth Dimensions USA. A is 6" B is 16"



In Canada:

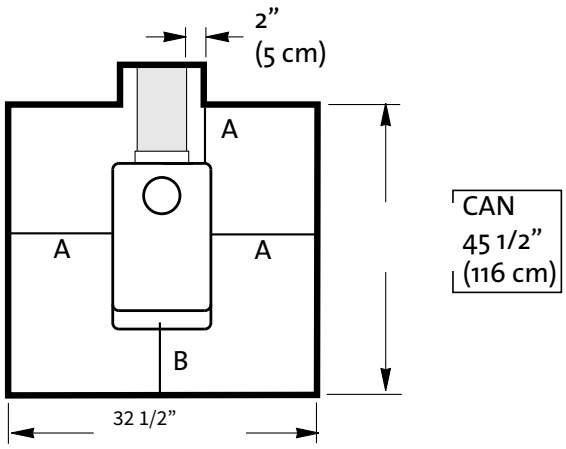
The hearth protection surface must extend continuously in front of the stove:

- A minimum of **18" (457mm**)
- A minimum of **8" (200mm**) on the side and back of the stove (measured from side and back panels).

This will result in a minimum floor protection of

41"W X 48"D (1041mm x 1219mm). See figure 4.2.

Fig. 4.2. F 602 V3 Hearth Dimensions Canada. A is 8" B is 16"



For a rear vent installation, the floor protection must also extend under the stove pipe a minimum of **2" (50mm)** beyond either side of the pipe in both the U.S. and Canada. Figs. 4.1 and 4.2.

4.2 Alternate Floor Protection

All floor protection materials must be non-combustible ie. metal, brick, stone, mineral fiber boards). Any combustible material may not be used.

The easiest means of determining if a proposed alternate floor material meets requirements listed in this manual is to follow this procedure.

R-value = thermal resistance
k-value = thermal conductivity
C-value = thermal conductance

1. Convert the specification to R-value;
   - **a.** If R-value is given, no conversion is needed.
   - **b.** If k-value is given with a required thickness (T) in inches: R=1/k X T.
   - **c.** If C-value is given: R=1/C.

2. Determine the R-value of the proposed alternate floor protector.
   a. Use the formula in Step 1 to convert values not expressed as "R".
   b. For multiple layers, add R-values of each layer to determine overall R-value.
3. If the overall R-value of the system is greater than the R-value of the specified floor protector, the alternate is acceptable.

Example:
The specified floor protector should be 3/4" thick material with a k-factor of 0.84. The proposed alternate is 4" brick with a C-factor of 1.25 over 1/8" mineral board with a k-factor of 0.29.

Step A. Use formula above to convert specifications to R-value. R=1/k X T= 1/.84 X .75 = .893

Step B. Calculate R of proposed system.
4" brick of C-1.25, therefore
R brick = 1/C = 1/1.25 = 0.80.
1/8" mineral board of k = 0.29 therefore
R mineral board = 1/.29 X 0.125 = 0.431

Total R = R brick + R mineral board=
0.8 + 0.431=1.231

Step C. Compare proposed system R = 1.231 to specified R of 0.893. Since R is greater than required, the system is acceptable.

Definitions:
Thermal conductance =

$$C = \frac{Btu}{(hr)(ft^2)(F)} = \frac{W}{(m^2)(K)}$$

Thermal conductivity =

$$k = \frac{Btu}{(hr)(ft^2)(F)} = \frac{W}{(m^2)(K)} = \frac{(Btu)}{(hr)(ft)(F)}$$

Thermal resistance =

$$R = \frac{Btu}{(hr)(ft^2)(F)} = \frac{(m^2)(K)}{W} = \frac{(Btu)(inch)}{(hr)(ft^2)(F)}$$

Alcoves require use of a bottom heat shield and hearth protection having a minimum R-value of 1.6.

4.3 Clearances to Walls and Ceilings

The following clearances have been tested to UL and ULC standards and are the minimum clearances specifically established for the F 602 V3.

The following diagrams give the required clearances you must maintain when installing the F 602 V3 near combustible surfaces. **See pages 14-15**.

A combustible surface is anything that can burn (i.e. sheet rock, wall paper, wood, fabrics etc.). These surfaces are not limited to those that are visible and also include materials that are behind non-combustible materials.

If you are not sure of the combustible nature of a material, consult your local fire officials. Contact your local building officials about restrictions and installation requirements in your area.

"Fire Resistant" materials are considered combustible; they are difficult to ignite, but will burn. "Fire-rated" sheet rock is also considered combustible.

Ventilation and air circulation within the clearance space must be maintained. DO NOT BLOCK OFF AIRFLOW AROUND THE CLEARANCE SPACE!

4.4 Using Shields to Reduce Clearances

Pipe shields: When using listed pipe shields to reduce the connector clearance to combustibles, it must start 1"(25,4mm) above the lowest exposed point of the connect pipe and extend vertically a minimum of 25" (635mm) above the top surface of the stove.

Double wall pipe: Listed double wall pipe is an acceptable alternative to connector pipe heatshields.

Wall-Mounted Protection: When reducing clearances through the use of wall mounted protection:

Refer to NFPA 211, Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, for acceptable materials, proper sizing and construction guidelines.

Jøtul F 602 V3 Rear Heatshield Kit HS-50

This shield is specifically approved for use to reduce clearances on this appliance only. No other heat shield may be used.

See pages 14-15 for complete clearance specifications and diagrams.

NOTE: Accessories approved for clearance reduction have been developed by many manufacturers. Be sure that any accessory you choose has been tested and listed by an independent laboratory and carries the laboratory's testing mark. Follow all of the manufacturer's instructions.

Always contact your local building inspector or fire officials about restriction and requirements in your area. Your local officials have final authority for installation approval.

4.5 Alcove Installation

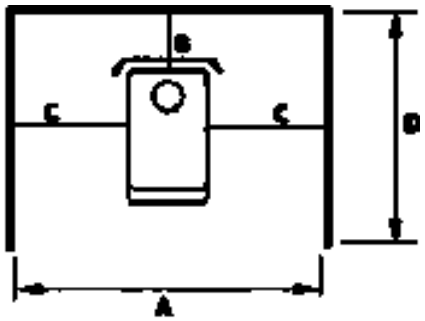
This appliance may be installed in an alcove provided: (**See figures 4.4 and 4.5.)**

1. The stove must be installed with listed, double-wall pipe.
2. In a protected alcove installation both side walls and rear wall must be protected per NFPA 211. The wall protection must be elevated 1”(24,5mm) from the floor and at least 1” (24,5mm)off the combustible wall to allow for cooling air-flow.
3. The height of the wall protection including the bottom air space must be 48”(1219mm).
4. Clearance specifications are designated between the stove plates and the combustible wall surface.
5. Hearth protection material must consist of:
   a) a UL/ULC listed Type II Thermal Floor Protector or,
   b) material having a minimum r value of 1.6 **(see section 4.2)**.
6. Minimum ceiling height in an unprotected installation, off the top of the stove is 41”(1041 mm). The minimum ceiling height off the top of the stove in a *protected* ceiling installation is 15”(380mm).

Fig. 4.4. Alcove unprotected wall clearances.

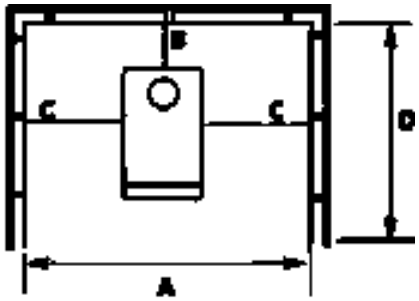
Fig. 12 **Alcove Installation**

Double wall pipe and stove heat shield



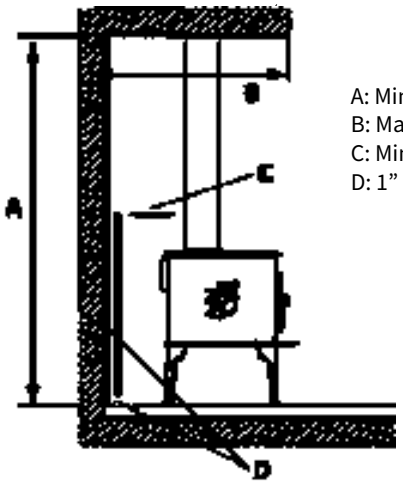
A: 55” - (140 cm)
B: 15” - (39,5 cm)
C: 21” - (53,5 cm)
D: 48” - (122 cm)

Fig. 4.5. Alcove protected wall clearances are designated between the stove surfaces and the combustible wall surface.

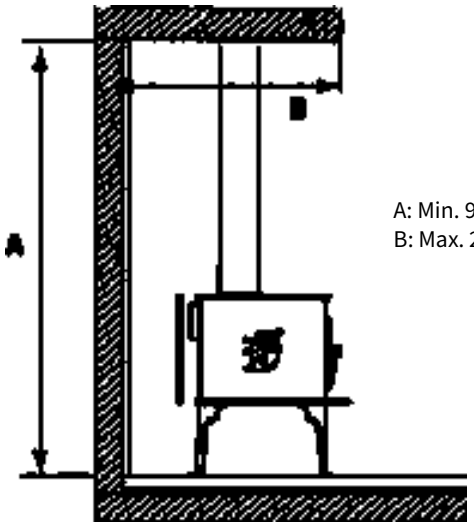


A: 41” - (104 cm)
B: 8” - (20,5cm)
C: 14” - (36 cm)
D: 48” - (122 cm)

Fig. 15 **Alcove with wall protection**



A: Min. 96” - (244 cm)
B: Max. 48” - (122 cm)
C: Min. 41” - (104 cm)
D: 1” - (2,5 cm)



A: Min. 96” - (244 cm)[1]
B: Max. 24” - (61 cm)[1]

Stove clearances Top vent/vertical	**Unprotected surfaces**			**Protected surfaces (NFPA 211)**		
	Side	**Rear**	**Corner**	**Side**	**Rear**	**Corner**
Single wall pipe W/out rear heatshield	21” 535mm	13.5” 345mm	13” 330mm	13” 330mm	11” 280mm	9” 230mm
Single wall pipe With rear heatshield	21” 535mm	11” 280mm	11” 280mm	13” 330mm	11” 280mm	9” 230mm
Shielded single wall pipe With rear heatshield	21” 535mm	9” 230mm	9” 230mm	13” 330mm	8” 205mm	8” 205mm
Double wall pipe With rear heatshield	24” 610mm	9” 230mm	9” 230mm	13” 330mm	8” 205mm	8” 205mm
Double wall pipe W/out rear heatshield	24” 610mm	15” 380mm	15” 380mm	12” 305mm	8” 205mm	8” 205mm

Connector Pipe	**Unprotected surface Vertical installation**	**Protected surface (NFPA 211) Vertical installation**
Single wall pipe	18” 460mm	6” 150mm
Double wall pipe	pipe mfgr.listing	pipe mfgr.listing

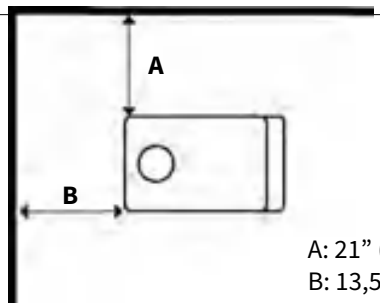
Connector Pipe	**Unprotected surface Horizontal installation**	**Protected surface (NFPA 211) Horizontal installation**
Single wall pipe	18” 460mm	9” 230mm
Double wall pipe	pipe mfgr.listing	pipe mfgr.listing

Minimum alcove dimensions:

	Unprotected surface Vertical venting. Assumes top exit:	**Protected surface (NFPA 211) Vertical venting Assumes top exit:**
Minimum alcove width	55” (1400mm)	41” (1040 mm)
Maximum alcove depth	48” (1220mm)	48” (1220 mm)
Height above the top of the stove	71” (1805mm)	71” (1805 mm)

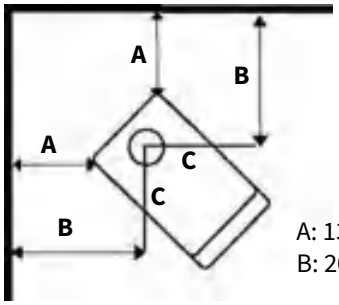
Clearance to Adjacent Combustibles

Fig. 8



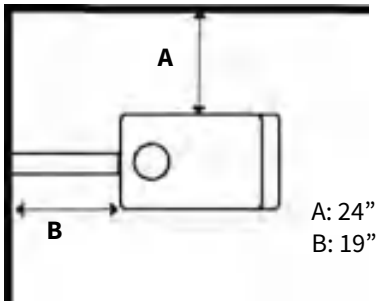
A: 21” (53,5cm)
B: 13,5 ” (34,5 cm)

Fig. 9



A: 13” (33,5 cm)
B: 20 1/4” (51,5cm)

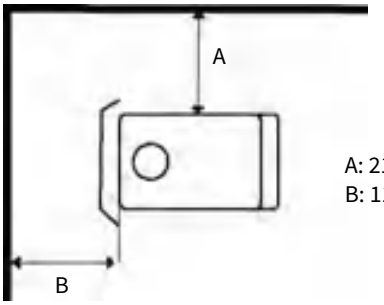
Fig. 10



A: 24” (61 cm)
B: 19” (48,3cm)

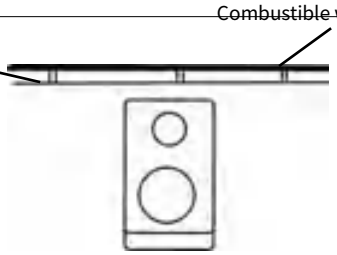
Fig. 11 **Rear Heat Shield to reduce clearance**

Single wall pipe, top exit only



A: 21” - (53,5 cm)
B: 11” -(28 cm)

Fig. 16 **Parallel installation with wall shield**

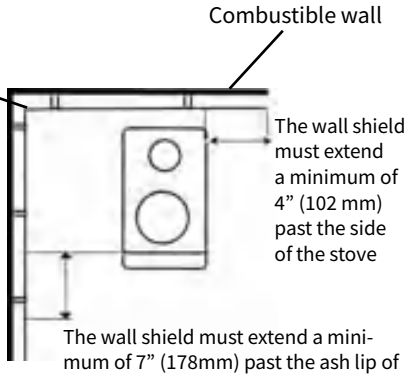


Wall shield

- Must be 27” wide and centered behind the stove.
- Must be 1” off the wall and 1” off the floor.
- With single wall pipe, the shield must be 49” high measured off the floor.
- With double wall pipe, the shield must be 37” high measured off the floor.

* (Measurements in centimeters pertain to Canada.)

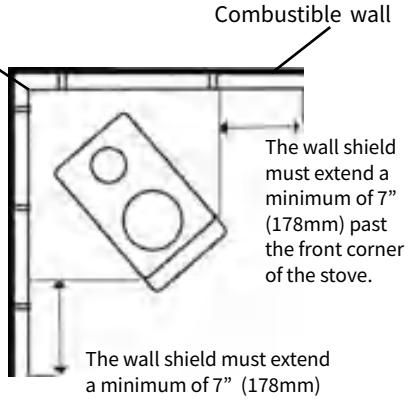
Fig. 17 **Parallel installation in a corner with wall shield**



Wall Shield

- Must be 1” off the wall and 1” off the floor.
- With single wall pipe, the shield must be 49” high measured off the floor.
- With double wall pipe, the shield must be 37” high measured off the floor.
- Both shields **MUST** extend and join in the corner.

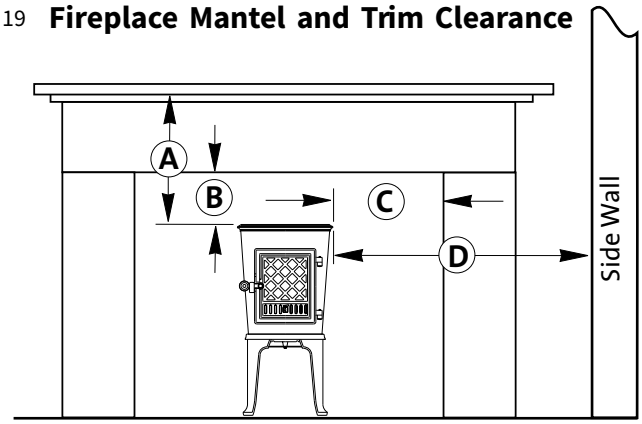
Fig. 18 **Corner installation with wall shield**



Wall Shield

- Must be 1” off the wall and 1” off the floor.
- With single wall pipe, the shield must be 49”.
- With the double wall pipe, the shield must be 37” high.
- Both shields **MUST** extend and join in the corner.

Fig. 19 **Fireplace Mantel and Trim Clearance**



A: Unit to 8" Wide Mantel - 30 in. (76 cm)
B: Unit to Top Trim - 21 in. (53.5 cm)
C: Unit to Side Trim - 18 in. (46 cm)
D: Unit to Side Wall - 24 in. (61 cm)

5. Operation

Please read the following section completely before building a fire in your new Jøtul F 602 V3.

DO NOT OVERFIRE THIS HEATER.
THE MAXIMUM RECOMMENDED OPERATING TEMPERATURE OF THE COMBUSTOR IS 1600°F (870°C). DAMAGE CAN OCCUR TO THE COMBUSTOR IF IT EXCEEDS 1750°F (954°C) FOR EVEN BRIEF PERIODS OF TIME.

5.1 Combustion Efficiency

The Jøtul F 602 V3 has an EPA test **High Heating Value (HHV) efficiency rate of 76%**. There are, however, aspects of efficiency that you should be aware of in order to get the most from your stove. Operation habits and fuel moisture can have a significant effect on efficiency. Poorly seasoned wood having a higher than optimum moisture content, can reduce the amount of energy transferred to the living area as a result of the energy expended to evaporate the excess fuel moisture in order for the wood to burn. Operational habits - such as not building a robust kindling fire to readily ignite the larger fuel pieces - can result in an inefficient, smoldering fire. Additionally, most modern wood heaters' optimum performance and efficiency are at the medium to medium-low burn rates.

The location of the stove can also have a significant effect on heating efficiency, primarily in regard to distribution of the heat. For example, a wood heater centrally located in an open living area, will likely provide better circulation of heat than will a stove located in a room adjacent to the larger living area.

WARNING: OPERATE THIS APPLIANCE ONLY WITH THE DOOR FULLY CLOSED. OPERATION WITH THE DOOR LEFT PARTIALLY OPEN MAY CAUSE OVERFIRING. Also, if doors are left partially open, combustion gas and flame may be drawn out of the stove, creating risks from both fire and smoke.

WARNING: Door glass is fragile. Take care to not strike the glass or slam the door during operation.

5.2 Minimize Carbon Monoxide Emissions

Testing the F 602 V3 to CSA B415.1-10 resulted in a carbon monoxide emission rate of **1.3 grams per minute**. There are properties related to CO generation that you should be aware of. Most means of combustion produce CO, including wood fire. You can greatly reduce CO levels by maintaining a well-established fire and avoiding operation that produces a smouldering, smoky fire. We highly recommend that a CO monitor (detector) be installed in the same room as the stove. The monitor should be located as far away as possible from the stove to avoid alerts when the doors are opened.

5.3 Wood Fuel and Performance

Use dry wood.

The F 602 V3 is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air-dried, seasoned hardwoods, as opposed to softwoods, green or freshly cut hardwoods. Wood that has been air-dried for a period of 6 to 14 months will provide the cleanest, most efficient heat. Wood seasoned more than 2 years will burn too quickly to take advantage of the stove's low end efficiency strength.

A seasoned log will have many check marks (cracks) through the ends and be lighter than an unseasoned log which will show few or no check marks.

We recommend using a moisture meter that incorporates probes to determine the moisture content of your wood. Meters are available at your dealer or local hardware store. For purposes of home heating, your fuel should have a moisture content between 12 - 20% on the meter gauge. Wood with higher moisture content will burn, however, very inefficiently. Most of its heat value will be lost through evaporation, driving water out of the wood. Worse, that moisture will condense as creosote in the relatively cool chimney flue, increasing the potential for a chimney fire and weak draft strength. ***Use of unseasoned wood defeats the purpose of any modern wood-burning stove.***

Store your wood in a dry location outside of the combustible clearance area stated previously in this manual.

BURN UNTREATED WOOD ONLY. DO NOT BURN:

- Coal;
- Garbage;
- Synthetic fuel or logs;
- Material containing rubber, including tires;
- Material containing plastics;
- Waste petroleum products, asphalt products, paints, paint thinners or solvents;
- Materials containing asbestos;
- Construction or demolition debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Lawn clippings or yard waste;
- Salt water driftwood or other previously salt-water; saturated materials;
- Unseasoned wood;
- Colored paper, or
- Paper products, junk mail, cardboard, plywood, or particle board. *(The prohibition against burning these materials does not include the use of fire starters made from paper, cardboard, saw dust, wax or similar substances for the purpose of starting a fire.)*
- • **Burning of any of the materials listed above can result in the release of toxic fumes including carbon monoxide, cause smoke, or render the heater ineffective. Carbon monoxide poisoning can cause headache, dizziness, loss of consciousness and death.**
- **IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IF THE CATALYTIC ELEMENT IS DEACTIVATED OR REMOVED.**
- **NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR "FRESHEN-UP" THE FIRE. ALWAYS KEEP SUCH LIQUIDS AWAY FROM THE HEATER AT ALL TIMES.**
- **NOTE: Prevent logs from resting directly on the glass panel. Logs should be spaced off of the glass enough to promote unrestricted air flow within the firebox.**

WARNING*:* Do not operate with broken glass.

WARNING: DO NOT OVER-FIRE THIS HEATER. IF ANY PART OF THE STOVE OR CHIMNEY CONNECTOR GLOWS, WITH THE EXCEPTION OF THE COMBUSTOR, YOU ARE OVER-FIRING. A HOUSE FIRE OR SERIOUS DAMAGE TO THE STOVE OR CHIMNEY COULD RESULT. ATTEMPTS TO ACHIEVE HEAT OUTPUT RATES THAT EXCEED HEATER DESIGN SPECIFICATIONS CAN RESULT IN PERMANENT DAMAGE AND VOID YOUR WARRANTY ON THE STOVE AND ITS COMPONENTS.

5.4 F 602 V3 Control Functions

The F 602 V3 is designed to support efficient combustion and optimal heat transfer by directing air to the fire through two separate channels; **Primary and Secondary**. See figure 5.1.

Primary Air is manually regulated by a sliding valve located in the load door under the glass pane which remains slightly open. The valve position controls the volume of primary air entering the firebox and thereby affects fire intensity, heat output and burn time. Primary air is directed to the main body of the fire through that air inlet.

Secondary air is automatically regulated to promote combustion of volatile gas that would otherwise be exhausted to the atmosphere unburned. The secondary air inlet is located at the back of the stove where a temperature-sensitive bimetal coil continuously varies the volume of air introduced to fire. This air is preheated as it passes over the back and top of the firebox, directed to the secondary combustion baffle and delivered to the catalytic combustor.

Fig. 5.2. Primary air lever settings

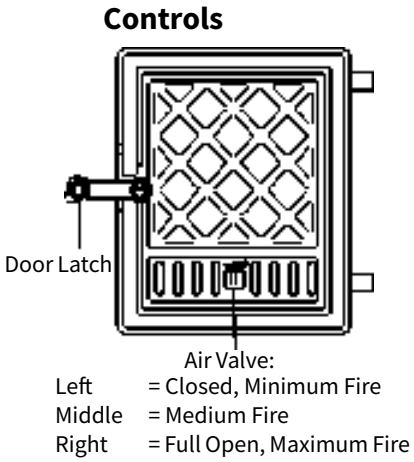


Fig. 5.3. Stove-top Thermometer locations

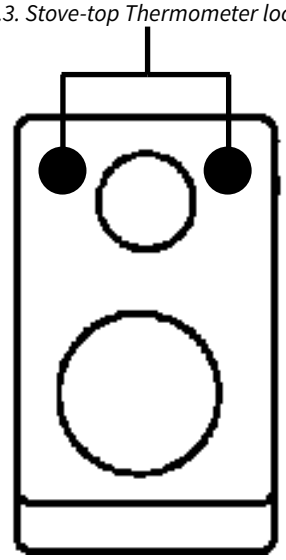
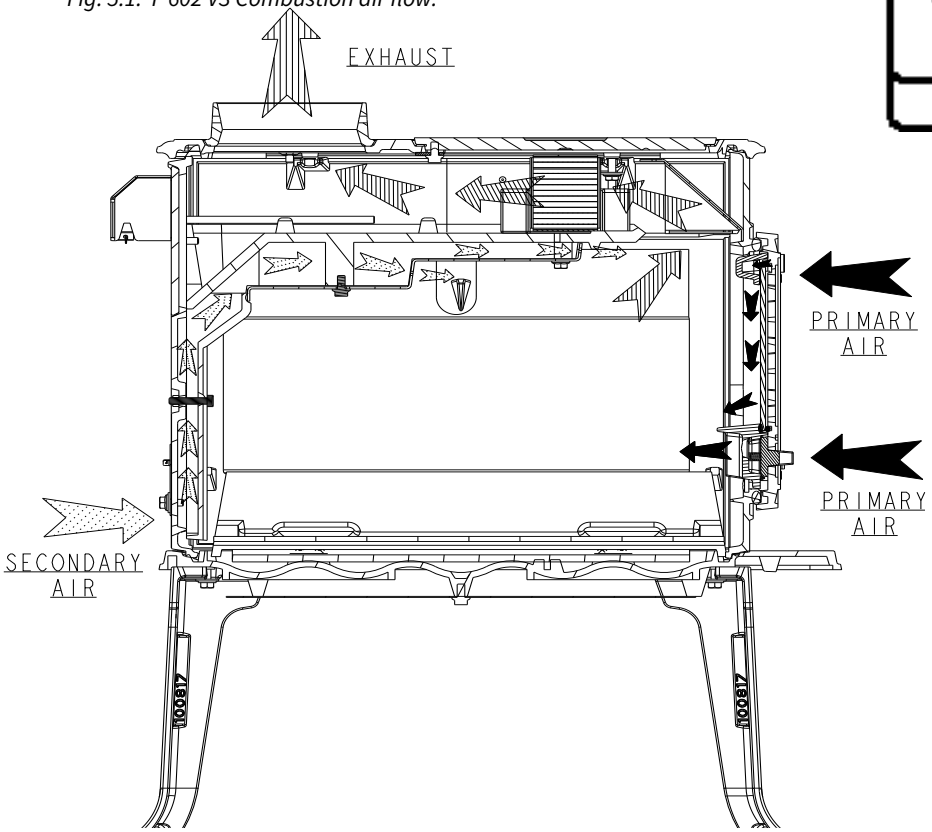


Fig. 5.1. F 602 V3 Combustion air flow.



The combustor maintains the high temperatures necessary to burn volatile gas that would otherwise pass unburned into the atmosphere. When the combustor is functioning, no smoke will be observed exiting the chimney. This is evidence that the stove is operating in the so-called ”sweet-spot” wherein optimum efficiency is realized.

Secondary air is always available to the secondary combustion baffle and the catalytic combustor. The automatic control valve functions to provide the appropriate amount of secondary air relative to maintaining optimal clean combustion.

When first starting or reviving the fire: the primary control lever should be set to the far right position, which permits the maximum amount of air into the stove. The greater the amount of air entering the stove, the hotter and faster the fire will burn.

Moving the lever to the left reduces the airflow into the stove and thereby prolonging the fire at a lower heat output. See figure 5.2.

Control Settings and Performance

Use the table below as a guide to achieve the best performance from your stove.

Burn Rate	**Air Control Setting**
Low	Fully to the Left
Medium	Middle
High	Fully to the Right

The valve should be set at Full Open (Right) for the first five minutes of the Low and Medium burn rates.

5.5 Use of a Stove-top Thermometer

Determining the primary air setting for the best overall performance for your particular needs and installation will be established over time and experience. Each installation has unique characteristics that affect stove performance. You should use a stove-top thermometer to monitor the status of the fire. Place the thermometer on the stove top, in either rear corner. See figure 5.3. Generally speaking, once the stove temperature has reached 400°F - 600°F (204°C -316°C), the air control may be set in a mid-range position to allow adequate oxygen to support efficient combustion throughout the burn cycle. Temperatures of 700-800 for short periods of time will not harm the stove, but prolonged periods of time in that temperature range can damage the stove. Use of the stove top thermometer is the best way to monitor how your stove is performing.

5.6 Using the Combustor Monitor

Each installation has unique physical and environmental characteristics that will affect stove performance. Other variables affecting combustion efficiency are cordwood species and moisture content. Taking those variables into consideration, you should use the integrated Combustor Monitor to maintain the fire in the most efficient manner tailored to your specific needs and installation configuration.

You can readily monitor combustion efficiency by noting the temperature indicated on the Combustor Monitor shown in figure 5.4. Follow this procedure to install the Combustor Monitor:

1. Remove the set screw on the right side panel of stove using a 3mm hex key as shown in figure. 5.5.
2. Take the magnet off of Combustor Monitor and replace it in the correct orientation as shown in figures 5.6-5.8.

Fig. 5.4. Combustor Monitor, PN 226609

Fig. 5.5.

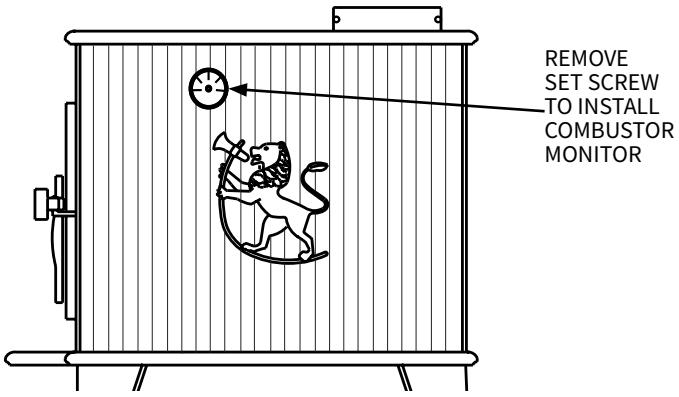


Fig. 5.6. Remove magnet from current orientation

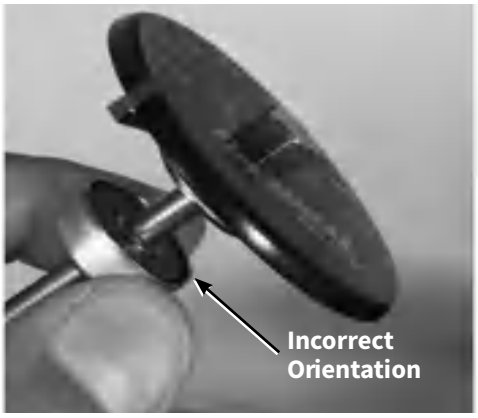


Fig. 5.7. Orient magnet

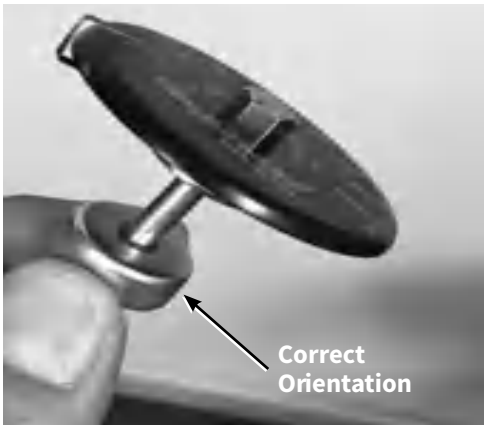
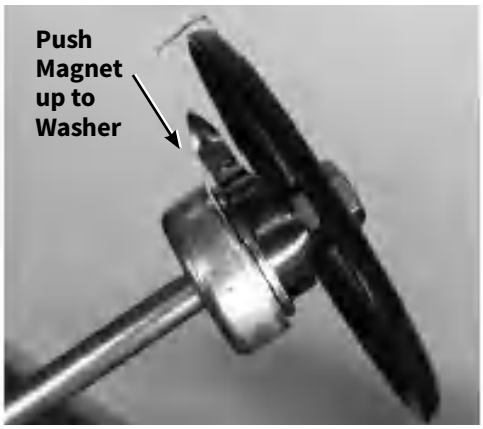


Fig. 5.8. Final position of magnet



3. Insert the Combustor Monitor fully into the hole with the magnet attaching to the cast iron side plate as shown in figure 5.5.

Seated within the right side directly behind the catalytic element, the Combustor Monitor accurately responds to combustion activity. Secondary combustion takes place at temperatures between 500°F (260°C) and 1200°F (260°C - 649°C).

The primary air valve should remain at the fully open setting, (to the Right), at least until the monitor registers 500°F (260°C). Maintain that temperature for 15-20 minutes before adjusting the primary air lever to Medium Low - Medium High settings. The optimum temperature range for most efficient combustion is between 500°F and 800° (260°C -371°C). Chimney draft should be in the .05 - 1.0 w.c. range. The so-called “sweet spot” combustion zone is best maintained at those temperatures. However it is not uncommon for combustion temperatures to reach over 1,400°F (760°C).

Visual Monitoring

Evidence of efficient combustion can be observed in three distinct ways:

1. At temperatures over 500° F, look up through the door glass to the steel baffle and catalytic element at the top of the firebox. As exhaust gases ignite, jets of flame can be seen projecting from the baffle ports and the catalyst will glow vividly red.
2. Little or no smoke will be seen flowing from the chimney flue outside of the house.
3. If the stove has been properly operated, brushing the chimney flue will produce mostly fly ash. Little or no creosote accumulation will be evident.

5.7 Stove Break-In Procedure

The Jøtul F 602 V3 is constructed of cast iron plates and sealed with stove furnace cement. Cast iron, while very durable, expands and contracts as it is heated and cooled. This type of construction requires the stove to be “broken-in” gradually so that thermal expansion does not occur too quickly. This process is accomplished by burning a short series of small-to-medium fires as described below.

1. Fully open the primary air valve. Light a small fire of newspaper and kindling. Only allow the stovetop thermometer to reach a surface temperature of 200°F (93° C). Maintain the fire at that level for approximately 1 hour and allow the stove to cool to room temperature.
2. Light a second fire, allowing the stove to reach a maximum surface temperature of 400°F (204°C) for 1 hour.

3. Cool the stove to room temperature.
4. Light a third fire and gradually allow the stove to reach and maintain a surface temperature of 500°F (260°C).
5. Cool stove to room temperature. This completes the "break-in" procedure.

NOTE: Keep the stove under 400°F (204°C) surface temperature during any "break-in fire", with the exception of the last "break-in" fire. If the temperature exceeds 400°F, move the primary air control lever all the way to the left to minimize the air supply. It is normal for the stove top temperature will continue to climb until the fuel burns down somewhat. Once the fire is out and the stove has cooled to room temperature, continue the break-in procedure. **Never attempt to reduce the temperature by removing burning logs from the fire.**

5.8 Starting and Maintaining a Fire

Burn only solid wood directly on the bottom of the stove. Do not elevate the fire in any way.

Top-Down Fire Building - See figure 5.9.

The Top-Down method minimizes start-up smoke and more quickly establishes strong draft through the chimney.

1. With the primary air control lever in the full open position *(to the right)*, place two short 1/4-split logs on the firebox floor, perpendicular to the rear wall, about 6 inches apart.
2. Place kindling across the base logs.
3. Place one or two smaller logs on top of the kindling.
4. Place newspaper between the two bottom logs under the kindling. Light the news paper and close the door. Continue to add kindling and small logs as necessary to build the fire. Keep the air control fully open until the fire is well-established.

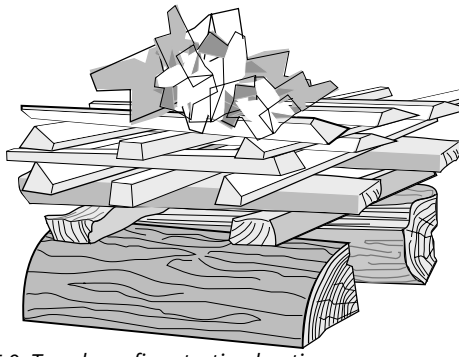


Fig.5.9. Top-down fire-starting log tier.

5.9 Creosote and Soot Formation and the Need for Removal

When wood is burned slowly or when burning green wood, it produces tar and other organic vapors which combine with expelled moisture to form creosote. These creosote vapors condense in the relatively cool chimney flue of a slow burning fire. The creosote that accumulates in the flue is highly flammable and is the fuel of chimney fires. To prevent a chimney fire, the creosote needs to be removed by sweeping the chimney and flue connector.

The frequency of sweeping will depend on how you operate your stove. An accumulation of 1/4" or more on the sides of the flue or connector is considered hazardous and should be removed.

In the event that creosote in your chimney or flue connector ignites, the resulting fire is often accompanied by a roaring noise and a crackling sound as flakes of burned creosote break loose. If you suspect you are having a chimney fire, immediately close the primary air control and make sure the stove door is closed. Call the fire department and get everyone safely out of the house.

Do not attempt to extinguish the fire in the stove. Doing so can make the matter worse by supplying additional oxygen , which will accelerate the fire in the chimney. When the roaring and crackling has subsided, resist the temptation to open the door to check the fire. The fire may have suffocated, but could rekindle when you open the door. After a chimney fire, do not use your stove until the chimney and the flue connector has been cleaned and inspected to ensure that no damage has occurred.

5.10 Adding Fuel

Reload the stove while a bed of hot embers still exists, Follow this procedure:

- Always wear gloves when tending to the stove.
- Push the air control lever to the full open position (far right).
- To minimize any smoke spillage, open the door slightly before opening fully. This will allow air flow to stabilize within the firebox and chimney flue.
- Use a stove tool or poker to distribute the hot embers equally around the firebox and away from the air inlet ports at the front center of the firebox floor.
- Load the fuel, usually with smaller logs first.
- Close the door and secure the latch tightly.
- Wait 5 – 10 minutes before adjusting the primary air to the desired heat output setting. (If there remains at least a 2" thick ember bed when reloading, it may be possible to close the door and immediately adjust the air control setting).
- DO NOT over-load the stove. Do not load the wood higher than the holes on the air baffle. For safety and best appearance, maintain a traditional three log configuration.

6. Maintenance

Regular maintenance will prolong the life of your stove and ensure satisfactory performance.

Warning: Use only Jøtul authorized parts. Do NOT use substitute glass.

6.1 Annual Stove Inspection

- Empty stove of all soot and ashes. Only use a vacuum for this job if the vacuum is specifically designed to handle ashes.
- Inspect the stove seams. Use a utility light to inspect the stove inside and out for cracks or leaks. Replace all cracked parts and repair any cement leaks with furnace cement. Always wear safety gloves when handling the ash pan.
- Inspect the Catalytic Combustor. See section 6.7.

6.2 Ash removal

Always use stove gloves and a long-handled shovel to clear hot ashes. Ash removal will be required every day or two during normal operation and is most easily done when the fire has burned down to coals. Use a shovel to push coals first to one side, shovel out the exposed ash, and then repeat on the other side. Spread the remaining hot coals evenly across the firebox floor to quickly ignite a new fire.

Store ashes in a metal container with a tight fitting lid and use it exclusively to store ashes. The closed container should be placed outdoors, well away from all combustible materials, pending final disposal. Regardless of how the ashes are finally disposed, they should be kept in the closed container until all cinders have thoroughly cooled.

6.3 Chimney System

The Jøtul F 602 V3 is designed to burn cleanly and efficiently when used according to the guidelines in this manual. In order to maintain proper performance, you should inspect the chimney and chimney connector at the beginning of each heating season and then every other month during the heating season.

Clean the chimney whenever creosote and fly ash accumulation exceeds 1/4 inch in any part of the system. Chimney brushes are available from your local Jøtul dealer or hardware supply store. Your dealer can also refer you to a reputable, professional chimney sweep who will have all the equipment to ensure a complete and proper job. Failure to keep the chimney system free of creosote and build-up could result in a serious chimney fire.

6.5 Glass Care

Cleaning

While the air wash and high temperatures of normal operation will combine to keep the glass free of heavy deposits, it will occasionally be necessary to clean carbon and fly ash off the glass. If allowed to remain for an extended period of time, these deposits can eventually cause the glass surface to become etched and cloudy.

- **USE ONLY AMMONIA-FREE, NON-ABRASIVE STOVE GLASS CLEANER**
- **DO NOT ATTEMPT TO CLEAN HOT GLASS.**
- **CLEAN GLASS ONLY AT ROOM TEMPERATURE.**

Ceramic Glass Replacement 226852

Warning: Use only Jøtul authorized parts. Do NOT use substitute glass.

The glass can be replaced with the door still mounted to the stove or the door can be removed and placed on a flat working surface.

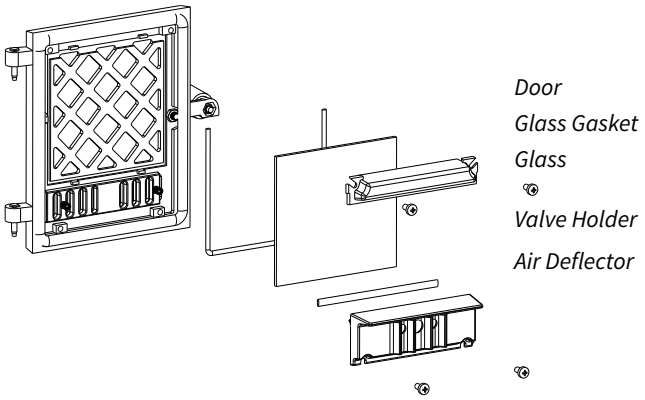
The replacement glass gasket is self-adhesive. Measure enough gasket to go from the upper right corner of the glass, down the right side, across the bottom and back up to the upper left corner and then add about 2-1/2".

NOTE: THE TOP OF THE GLASS IS NOT GASKETED. This allows a small amount of air to enter through that area to help keep the glass clean.

- Peel off about 10" of the self-adhesive backing strip. Leaving about 1-1/4"of gasket "tail" overlapping, apply the gasket to the groove on the door, making sure that the adhesive is facing the door.
- Press the gasket firmly in place.
- Peel off the remaining adhesive backing and apply the remaining gasket, again leaving a "tail" at the upper left corner.
- Press the gasket firmly in place.
- Center the glass panel left and right on top of the gasket. Slide the glass toward the bottom of the door until it contacts the stops.
- Hold the glass in place with your hand and wrap the gasket "tails" over the top of the glass and down the outer edges. You will have to twist the gasket so the adhesive will face the glass. Press the "tails" firmly on the glass.
- Replace the air control slide and the upper and lower retainer manifolds and screws.

Glass retainers should be tightened gradually, following an alternating pattern similar to tightening vehicle lug nuts. Do not over-tighten. It may be necessary to retighten once again after the stove has been burned and the new gasket has seated.

Fig. 6.1. Door glass components.



6.6 Gaskets

Check door and glass panel gaskets for tightness. To check the seal of the front door, close and latch the door on a dollar bill and slowly try to pull the dollar bill free. If it can be easily removed, the seal is too loose. Check several spots around the door, and repeat the procedure on the ash pan door as well.

Gasket Replacement

Universal Wood Stove Gasket Kit #157050 is available from your dealer to replace all the gaskets in the F 602 V3. Self-adhesive gaskets do not require cement for installation.

1. Use pliers and a putty knife to remove the old gasket from the door.
2. Thoroughly clean the channel with a wire brush.
3. Apply a small bead of cement to the channel.
4. Gently press the new gasket into the cement to seat it in the channel. Close and latch the door and then reopen. Wipe any excess cement squeezed out from around the gasket.

F 602 V3 Gaskets

Description	Size	Length
Front Door	3/8 in.	6 ft.
Glass	1/4 in.	2 ft.
Valve Holder	3/16 in.	6 in.
Cook Plate	1/8x5/16 in.	3 ft.

6.7 Combustion System Maintenance

WARNING: BURNING JUNK MAIL OR COPIOUS AMOUNTS OF NEWSPRINT TO START THE FIRE CAN ACCELERATE FLY ASH COLLECTION ON THE COMBUSTOR AND NECESSITATE MORE FREQUENT CLEANING OF THE COMBUSTOR.

While catalytic combustor element is extremely durable, you can prolong its service life with routine inspections. The combustor itself is self-cleaning to an extent, however, fly ash will eventually accumulate within the element and upper combustion chamber. If you suspect combustor system performance is lagging, perform the following confirmation test.

1. Burn the fire at medium to high settings for two or three hours at over 500°F to build a full bed of coals.
2. Set primary air at medium to medium low.
3. Confirm that monitor temperatures remain at 500°F or higher. If the monitor temperature falls, the combustor may need to be cleaned or replaced.
4. Repeat this test 2-3 times to confirm that the combustor is **not** functioning properly.

   A non-functioning catalytic combustor must be replaced.

Regular Combustor Inspection

It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. A non-functioning combustor will result a loss of heating efficiency, and an increase in creosote and emissions.

Fig. 6.2. Use a soft brush to clean the combustor.

Following is a list of items that should be checked on a periodic basis:

- The combustor should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. The combustor can be visually inspected for damage and fly ash accumulation simply by opening the front door and looking up at the catalyst located above the secondary combustion baffle. Use a flashlight or head lamp to aid inspection.
- Use a soft brush to sweep any fly ash or other loose debris from the combustor cells. Figure 6.2.
- A shop vacuum may be used to carefully remove debris from within individual cell bodies. Use caution as the cell material is fragile.
- Inspect the combustor element for catalyst cell collapse and the insulation panels for surface degradation. Replace damaged components as they are critical to the proper functioning of the stove. Replacement parts are available from your authorized Jøtul dealer.

6.8 Combustor Replacement

Tools Required:

- 10 mm socket wrench with extension
- Work gloves

The combustor components are accessed by removal of the cook plate which is secured to the top plate by one M6 flange nut, figure. 6.3.

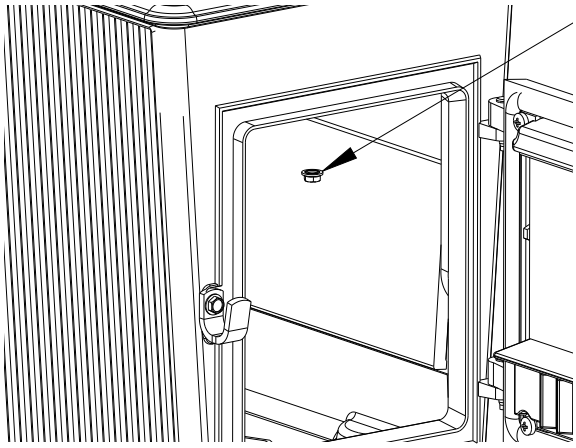


Fig. 6.3. Remove both top plate nuts located inside the front door opening.

Use the following instructions for combustor replacement:

1. Use the 10mm socket wrench with extension to remove the M6 flange nut located behind the exhaust diverter inside the stove as in figure 6.3.
3. Lift the front of the cookplate and pull forward to remove.
4. Wearing gloves, use both hands to carefully remove the Insulation Gasket from the firebox. Figure 6.6.
5. Simply lift the catalytic combustor to remove it from the compartment channel. Figure 6.7.
6. Remove the Left and Right Side Refractory Members and Expansion Gasket from the combustion chamber. Figure 6.8.
7. Reassemble the catalytic combustion components in the reverse order used to remove them.

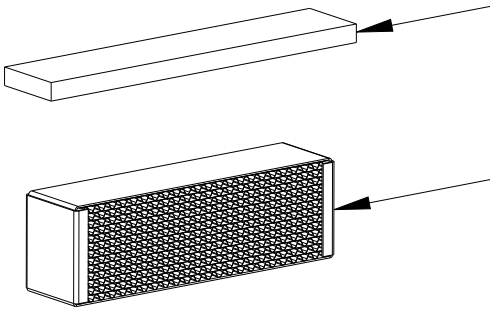


Fig. 6.6. Insulation gasket

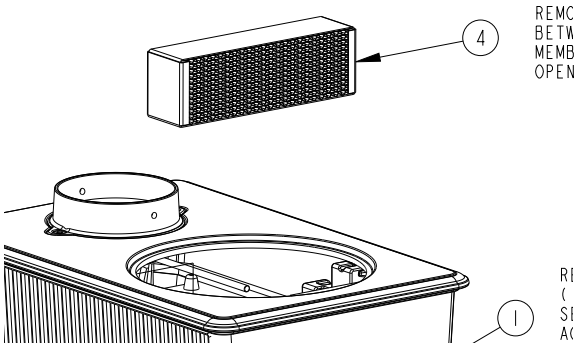


Fig. 6.7. Lift combustor from the chamber.

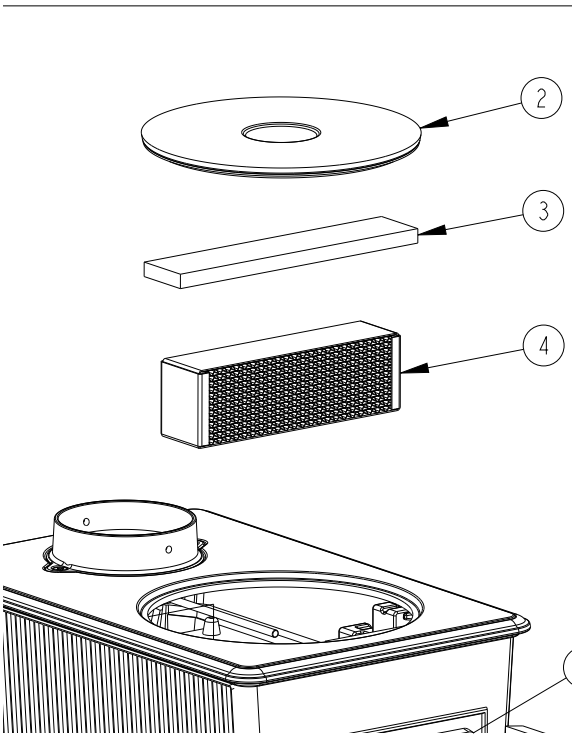


Fig.6.5. Remove the cook plate from stove.

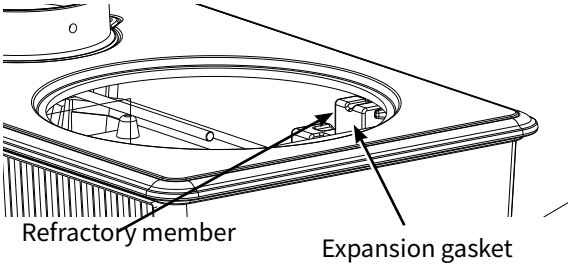
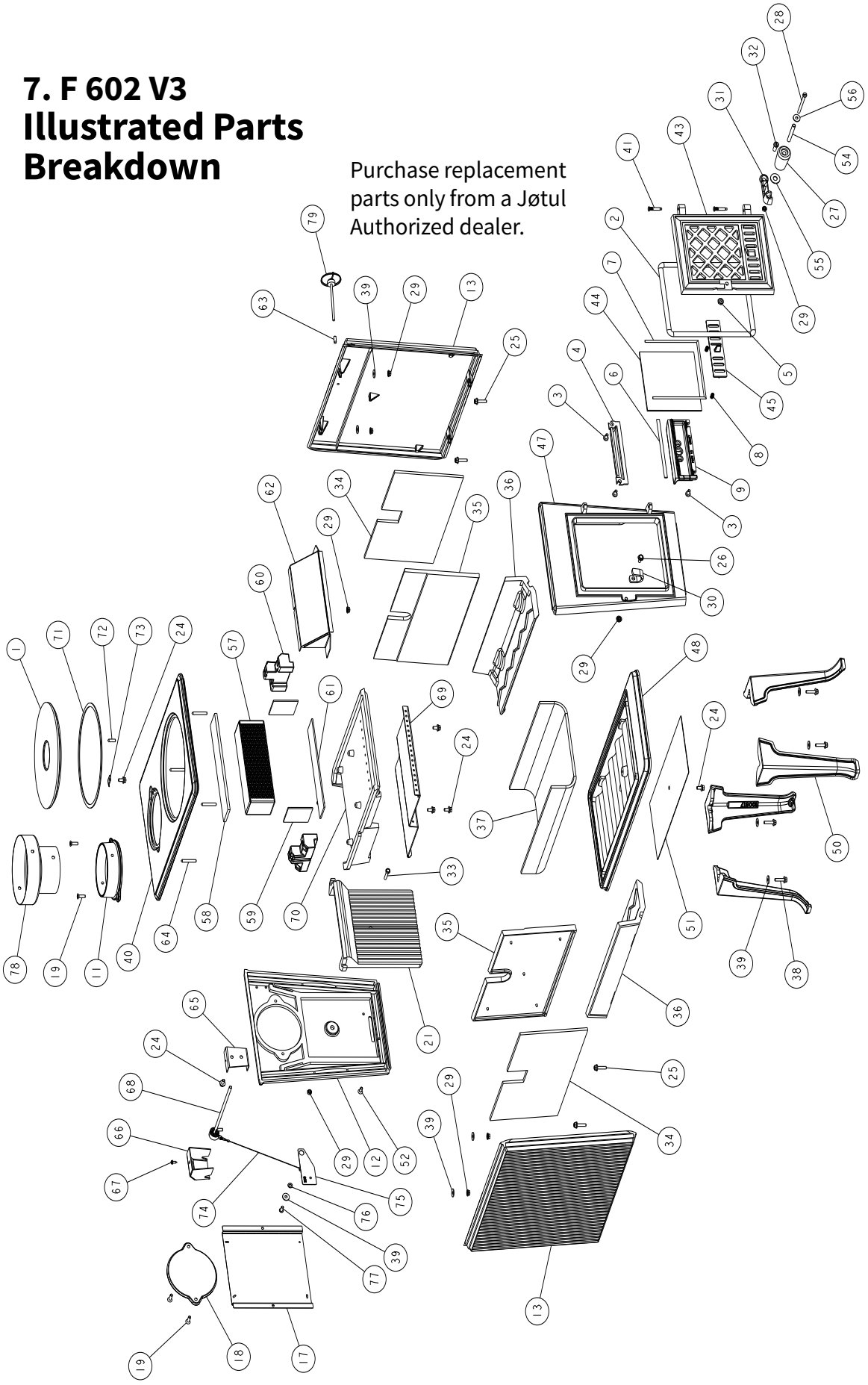


Fig. 6.8. Left and Right Side insulation panel removal and replacement.

7. F 602 V3 Illustrated Parts Breakdown

Purchase replacement parts only from a Jøtul Authorized dealer.



7. F 602 V3 Parts List

No.	Description	Part No.
1.	Cook Plate, F 602 V3	105056
2.	Gasket, Round, LD2-375	225695
3.	Screw, M6 x 12, Phillips Pan Head	118042
4.	Air Deflector	103153
5.	Nut, Lock, M8x1.25	9931
6.	Gasket, Round, LD2-187 (3/16” D)	200028
7.	Gasket, Round, LD2-250 (1/4” D)	129644
8.	Spring, Air Valve	128427
9.		105057
10.	Screw, Hex Hd Self-drill, #8 x 1.25”	118205
11.	Smoke Outlet	101559
12.	Back Panel	10356892
13.	Side Plate	10166992
17.	SN Plate Bracket	225736
18.	Outlet Cover	101698
19.	Screw, Flt Hd, Hex Drive, M6X20	118236
21.	Rear Burn Plate/Air Manifold	103462
22.	Air Chamber, Complete	
24.	Bolt, Hex Hd Serr Flange M6x12 Blk	117130
25.	Bolt, Hex Hd Serr Flange M6 x 25	118019
26.	Bolt, Hex Head Serr Flange M6x16	99625
27	Wooden Knob, Black	124852
28.	Screw, Phillips Pan Head, M6 x 70	117825
29.	Nut, M6 Serrated Flange	117968
30.	Latch Hook	120013
31.	Door Handle	
32.	Screw, M8x25, Flat Head, Hex Drive	116960
33.	Bolt, Hex Cap, M6x30	9906
34.	Insulating Blanket, Side	225666
35.	Side Burn Plate	10346512
36.	Bottom Burnplate	10346612
37.	Insulating Blanket, Bottom	128510
38.	Bolt, Hex Hd Serr Flange M6 x 25	118019
39.	Washer, Fndr, 6.4mm ID x18mm OD	120004
40.	Top plate	10166792
41.	Hinge pin, New Style, Black	127075
42.	Door, Complete w/Glass, Gasket & Knob	
43.	Door, Front	103152
44.	Glass, Ceramic	128101
45.	Air Slider	10315592
47.	Front panel	10168392
48.	Bottom Plate	10166592
50.	Leg	10081792
51.	Bottom Heatshield	128571
52.	Screw, Flat Head Phillips M6 X 12	117976
54.	Sleeve, 8mm ODX6.2 mm IDX62mm	129930
55.	Washer, Insulating	124853
56.	Washer, Fndr, 6.4mm ID x 18mm OD	127105
57.		158375
58.		227160
59.		227162
60.		227150
61.		227161
62.		227164
63.	6x6 set screw	117706
65.		227105
66.		227110
67.	Screw, #8 x1/2	117917
68.	Bimetallic Coil Assembly	158178
69.		227158
70.	Baffle Plate	103461
71.		
72.	Set Screw, M6 x 20	117835
73.		227163
74.		227159
75.		227146
76.	Washer, Flt M6X12mm ODX1.6mm	117947
77.	Screw, M6 x 14, Bttn Head, Hex Skt	118215
78.	Adapter, Dripless	124817
79.	Catalyst Temperature Probe	226609

8. Jøtul F 602 V3 Woodburning Product Warranty

Effective January 1, 2019

This warranty policy applies to wood-burning products identified by Jøtul trade name, as set forth below.

A. LIMITED LIFETIME WARRANTY, parts only:
Jøtul North America Inc. (JØTUL) warrants, to the original retail purchaser, that those baffle and air manifold components of the Jøtul Stove or Fireplace Insert specified above will be free of defects in material and workmanship for the life of the product. This warranty is subject to the terms, exclusions and limitations set forth below.

B. LIMITED FIVE YEAR WARRANTY - Cast Iron and Steel Components:
JØTUL warrants, to the original retail purchaser, that those components of the Jøtul Stove or Fireplace Insert specified above will be free of defects in material and workmanship for a period of five (5) years from the date of purchase. This warranty is subject to the terms, exclusions and limitations set forth below.

C. LIMITED TWO YEAR WARRANTY - Enamel Finish:
JØTUL warrants, to the original retail purchaser, the enamel finish on cast iron components of the Jøtul Stove or Fireplace Insert specified above against peeling or fading for a period of two (2) years from the date of purchase. This warranty is subject to the terms, exclusions and limitations set forth below.

D. LIMITED ONE YEAR WARRANTY - Electrical Components (blowers, thermostatic switches, combustion monitor):
JØTUL warrants, to the original retail purchaser, that those components of the Jøtul Stove or Fireplace Insert specified above will be free of defects in material and workmanship for a period of one (1) year from the date of purchase. This warranty is subject to the terms, exclusions, and limitations set forth below:

JØTUL will repair or replace (including parts & labor), at its option, any of the above components determined by JØTUL to be covered by this warranty. You must, at your own expense, arrange to deliver or ship the component to an authorized Jøtul or Scan dealer and arrange for pickup or delivery of the component after repairs have been made. If, upon inspection, JØTUL determines that the component is covered by this warranty, the repair or replacement will be made as set forth above. This warranty is not transferable and is extended only to, and is solely for the benefit of, the original retail purchaser of the Jøtul Stove or Fireplace Insert. This paragraph sets forth the sole remedy available under this warranty in the event of any defect in the Jøtul or Scan Stove or Fireplace.

The warranty period for any replaced component will be the remaining unexpired portion of the warranty period for the original component.

Please retain your dated sales receipt in your records as proof of purchase.

Exclusions and Limitations

Notice: This warranty is void if installation or service is performed by someone other than an authorized installer or service agency, or if installation is not in conformance with the installation and operating instructions contained in this owner's manual or local and/or national fire and building regulations. A listing of local authorized installers, service agencies and gas suppliers can be obtained from the National Fireplace Institute at http://www.nficertified.org/.

This warranty does not cover the following:

1. Repair or replacement of parts that are subject to normal wear and tear during the warranty period or to parts that may require replacement in connection with normal maintenance. These parts include catalytic combustor*, paint, gaskets, burn plates, baffles, air manifolds, firebricks, fire grates, or glass (glass is only warranted against thermal breakage).
   ** The catalytic combustor is separately warranted by Jøtul North America, Inc. and secondarily by Applied Ceramics. See next page for warranty information and instructions.*
2. Damage due to incorrect installations not in conformance with the installation instructions contained in this owner's manual or local and/or national fire and building regulations.
3. Damage, including damage to enamel surfaces, caused by improper operation, over-firing, and/or misuse. Improper operation, such as burning the stove with the ash door open, can damage the stove. Over-firing occurs when any part of the stove glows red. Over-firing can also be identified by warped plates, rust-colored cast iron, paint pigment that has turned dusty white, or bubbling, cracking and discoloration of the enamel finish. Misuse includes, without limitation, use that is not in conformance with the operating instructions contained in this owner's manual.
4. Damage due to service performed by an installer or service agency, unless otherwise agreed to in writing by JØTUL.
5. Damage caused by unauthorized modification, use or repair.
6. Costs incurred by travel time and/or loss of service.
7. Labor or other costs associated with the repair of components beyond the warranty period.
8. Damage incurred while the Jøtul or Scan Stove or Fireplace is in transit.

IN NO EVENT SHALL JØTUL, ITS PARENT COMPANY, SHAREHOLDERS, AFFILIATES, OFFICERS, EMPLOYEES, AGENTS OR REPRESENTATIVES BE LIABLE OR RESPONSIBLE TO YOU FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR OTHER SIMILAR DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR DAMAGES TO A STRUCTURE OR ITS CONTENTS, ARISING UNDER ANY THEORY OF LAW WHATSOEVER. ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WRITTEN WARRANTY. EXCEPT AS EXPRESSLY SET FORTH HEREIN, JØTUL MAKES NO ORAL, WRITTEN OR OTHER WARRANTY WITH RESPECT TO JØTUL OR SCAN STOVES OR FIREPLACES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on the length of implied warranties. Therefore, the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

JØTUL reserves the right to discontinue, modify or change the materials used to produce the Jøtul stove or fireplace. JØTUL shall have the right to replace any defective component with substitute components determined by JØTUL to be of substantially equal quality and price.
The dollar value of JØTUL's liability for breach of this warranty shall be limited exclusively to the cost of furnishing a replacement component. JØTUL shall not in any event be liable for the cost of labor expended by others in connection with any defective component. Any costs or expenses beyond those expressly assumed by JØTUL under the terms of this warranty shall be the sole responsibility of the owner(s) of the Jøtul or stove or fireplace.

No dealer, distributor, or other person is authorized to modify, augment, or extend this limited warranty on behalf of JØTUL. **NO MODIFICATION OR CHANGE TO THIS WARRANTY WILL BE EFFECTIVE UNLESS IT IS MADE IN A WRITTEN DOCUMENT MANUALLY SIGNED BY AN AUTHORIZED OFFICER OF JØTUL.**

An authorized installer may have been provided with certain information related particularly to the Jøtul or stove or fireplace; however, no authorized installer or other person who may service the appliance is an agent of JØTUL. No inference should be made that JØTUL has tested, certified, or otherwise pronounced any person as qualified to install or service the appliance. JØTUL shall not be liable or otherwise responsible for any error or omission by a person installing or servicing a Jøtul or stove or fireplace.

If you believe your Jøtul stove or fireplace is defective, you should contact your nearest authorized Jøtul dealer, who will process a warranty claim. **IN ORDER TO QUALIFY FOR WARRANTY COVERAGE, JØTUL MUST RECEIVE NOTICE OF A POSSIBLE DEFECT WITHIN SIXTY (60) DAYS OF THE DATE THE DEFECT IS FIRST DISCOVERED, OR REASONABLY COULD HAVE BEEN DISCOVERED.**

This warranty is given by Jøtul North America, Inc.,
55 Hutcherson Drive, Gorham, Maine 04038 USA

Jøtul North America 10 Year Catalytic Combustor Warranty for the F 602 V 3

Jøtul North America warrants to the original purchaser from the date of installation a replacement Jøtul High Flow catalytic combustor for the first 2 years against manufacture defects. The following condition must be met for the warranty to take effect:

1) A copy of the original bill of sale that includes place and date of purchase must be submitted with the warranty claim.

2) The original steel combustor must not have been mechanically abused, nor must the wrong fuels have been used in the appliance.

If after the two years the Jøtul High Flow catalytic combustor fails to function, the prorated warranty will allow replacement at the following special price schedule:

Year 3	70 percent off current retail price
Year 4	60 percent off current retail price
Year 5	50 percent off current retail price
Year 6	40 percent off current retail price
Year 7	30 percent off current retail price
Year 8	20 percent off current retail price
Year 9	10 percent off current retail price
Year 10	10 percent off current retail price

Conditions 1 and 2 also apply to the prorated portion of the warranty. The original purchaser will receive one catalytic combustor set forth above during the warranty period. A replacement catalytic combustor received under the prorated period is warrantied from the original date of unit purchase. If the original owner purchases a new catalytic combustor at the current retail price, the warranty will begin from the time of that purchase. The consumer will be responsible for any removal and / or service related to the replacement of the catalytic combustor.

BURN UNTREATED WOOD ONLY. DO NOT BURN:

- Coal;
- Garbage;
- Synthetic fuel or logs;
- Material containing rubber, including tires;
- Material containing plastics;
- Waste petroleum products, asphalt products, paints, paint thinners or solvents;
- Materials containing asbestos;
- Construction or demolition debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Lawn clippings or yard waste;
- Salt water driftwood or other previously salt-water; saturated materials;
- Unseasoned wood;
- Colored paper, or
- Paper products, junk mail, cardboard, plywood, or particle board. *(The prohibition against burning these materials does not include the use of fire starters made from paper, cardboard, saw dust, wax or similar substances for the purpose of starting a fire.)*

• Burning of any of the materials listed above can result in the release of toxic fumes, cause smoke, or render the catalytic combustor permanently damaged and ineffective.

Jøtul pursues a policy of continuous product development. Products supplied may therefore differ in specification, color and type of accessories from those illustrated and described in this manual.

For Your Records...

Record the following information to help your dealer determine what you will need should your stove ever require parts or service.
The serial number and manufacturing date are indicated on the permanent label located on the back of the stove. You may also wish to attach your sales receipt to this manual for future reference.

Model: Jøtul F 602 V3

Serial Number:

Purchase Date:

Dealer:

Jøtul North America Inc.
55 Hutcherson Drive
Gorham, Maine 04038
USA

Jøtul AS
P.o. box 1411
N-1602 Fredrikstad,
Norway

www.jotul.us

Phone:

Installed by:

Date:

139946_
August 2023

Appendix C: Calibrations

Established 1974

QUALITY CONTROL SERVICES

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

A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0182484A0912013i231228

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**
lbs	0.01	QC033	12/28/23	12/14/22	12/2024

FUNCTIONAL CHECKS

SHIFT TEST	LIHEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 100 Tol: 0.05	Test Wt: HB44 Tol: HB44	Test Wt: 100 Tol: 0.01	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 19.3°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
400	399.87	400.01	0.006
200	200.00	200.00	0.005
100	100.02	100.02	0.005
75	75.02	75.02	0.005
50	50.02	50.02	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	7/18/22	7/2024	20221688

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

12/28/23: RH-42.5%

Report prepared/reviewed by: R.A. **Date:** 12-28-23 **Technician:** C.Call

Signature: Chris Call

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.

Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-60
Lab ID #:	53
Serial #:	1902130
Calibration Date:	2/1/2024
Calibration Expiration:	8/1/2024
Barometric Pressure:	29.34 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	NI	Aquatech	Dwyer
Model:	SK25DA	NI-9213	DBX2	475
Lab ID#:	47	215	202	174
Calibration Expiration Date:	4/17/2024	2/28/2024	5/23/2024	4/21/2024
Calibration γ Factor:	0.9988			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate 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)	152.041	148.633	164.152
Standard DGM Temperature (°F)	74.0	75.0	75.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.491	5.416	6.003
DGM Temperature (°F)	96.0	98.0	100.0
DGM Pressure (in H_2O)	4.55	1.83	2.90
Net Volume for Standard DGM (ft^3)	5.369	5.249	5.797
Net Volume for DGM (ft^3)	5.491	5.416	6.003

Dry Gas Meter γ Factor	1.005	1.005	1.002
γ Factor Deviation From Average	1.005	1.005	1.002

Average Gas Meter γ 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:

Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-60
Lab ID #:	54
Serial #:	1902133
Calibration Date:	2/1/2024
Calibration Expiration:	8/1/2024
Barometric Pressure:	29.34 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	NI	Aquatech	Dwyer
Model:	SK25DA	NI-9213	DBX2	475
Lab ID#:	47	215	202	174
Calibration Expiration Date:	4/17/2024	2/28/2024	5/23/2024	4/21/2024
Calibration γ Factor:	0.9988			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate 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)	148.890	148.972	150.647
Standard DGM Temperature (°F)	75.0	75.0	75.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.418	5.418	5.520
DGM Temperature (°F)	101.0	101.0	101.0
DGM Pressure (in H_2O)	3.96	4.95	2.02
Net Volume for Standard DGM (ft^3)	5.258	5.261	5.320
Net Volume for DGM (ft^3)	5.418	5.418	5.520

Dry Gas Meter γ Factor	1.006	1.005	1.004
γ Factor Deviation From Average	1.006	1.005	1.004

Average Gas Meter γ Factor: 1.005

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

CAL-CERT CALIBRATION CERTIFICATION
www.Cal-Cert.com
Toll Free 800-[illegible]
Address 5777 SE International Way Milwaukie, OR [illegible]
Local [illegible]
A2LA ACCREDITED CERT #4986.01

Report #:	33086-203325-4525	**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

Calibration Date:	February 26, 2024	**Reference:**	ASME B40.100
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport Industries	**Temperature:**	64 °F
Type:	Pressure Transducer	**Humidity:**	36% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	54B
Capacity:	1 PSI	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 1.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading PSI	Standard As Found PSI	Standard Verification Reading #1 PSI	Error PSI	Standard Verification Reading #2 PSI	Error PSI	Tolerance PSI	Expanded Uncertainty ± PSI
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005
0.10	0.10	0.10	0.00	0.10	0.00	0.01	0.005
0.25	0.25	0.25	0.00	0.25	0.00	0.01	0.006
0.50	0.50	0.50	0.00	0.50	0.00	0.01	0.014
0.75	0.75	0.75	0.00	0.74	-0.01	0.01	0.018
1.00	1.00	1.00	0.00	0.99	-0.01	0.01	0.013
0.75	0.76	0.76	0.01	0.76	0.01	0.01	0.005
0.50	0.50	0.50	0.00	0.51	0.01	0.01	0.015
0.25	0.25	0.25	0.00	0.26	0.01	0.01	0.017
0.10	0.11	0.11	0.01	0.11	0.01	0.01	0.008
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005

Manufacturer: Newport Industries **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.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-203325-4525

Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION
www.Cal-Cert.com
Toll Free
Address
Local
A2LA ACCREDITED CERT #4986.01

Report #:	33086-203326-4525		**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

Calibration Date:	February 26, 2024	**Reference:**	ASME B40.100
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport Industries	**Temperature:**	64 °F
Type:	Pressure Transducer	**Humidity:**	36% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	54C
Capacity:	5 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 5.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± 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	0.48	-0.02	0.05	0.045
1.25	1.25	1.25	0.00	1.23	-0.02	0.05	0.036
2.50	2.49	2.49	-0.01	2.49	-0.01	0.05	0.006
3.75	3.74	3.74	-0.01	3.74	-0.01	0.05	0.007
5.00	4.98	4.98	-0.02	4.99	-0.01	0.05	0.026
3.75	3.74	3.74	-0.01	3.74	-0.01	0.05	0.023
2.50	2.50	2.50	0.00	2.49	-0.01	0.05	0.014
1.25	1.26	1.26	0.01	1.24	-0.01	0.05	0.042
0.50	0.51	0.51	0.01	0.50	0.00	0.05	0.04
0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.005

Manufacturer: Newport Industries **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.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-203326-4525

Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-60
Lab ID #:	55
Serial #:	1902130
Calibration Date:	2/5/2024
Calibration Expiration:	8/5/2024
Barometric Pressure:	29.39 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	NI	Aquatech	Dwyer
Model:	SK25DA	NI-9213	DBX2	475
Lab ID#:	47	215	202	174
Calibration Expiration Date:	4/17/2024	2/28/2024	5/23/2024	4/21/2024
Calibration γ Factor:	0.9988			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate 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)	202.311	156.489	164.235
Standard DGM Temperature (°F)	72.0	72.0	74.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	7.085	5.526	5.749
DGM Temperature (°F)	77.0	77.0	78.0
DGM Pressure (in H_2O)	0.00	0.00	0.0
Net Volume for Standard DGM (ft^3)	7.145	5.526	5.800
Net Volume for DGM (ft^3)	7.085	5.526	5.749

Dry Gas Meter γ Factor	1.017	1.008	1.015
γ Factor Deviation From Average	1.017	1.008	1.015

Average Gas Meter γ Factor: 1.013

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:

Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-50-DIR
Lab ID #:	203
Serial #:	A2204292
Calibration Date:	2/2/2024
Calibration Expiration:	8/2/2024
Barometric Pressure:	29.55 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	NI	Aquatech	Dwyer
Model:	SK25DA	NI-9213	DBX2	475
Lab ID#:	47	215	202	174
Calibration Expiration Date:	4/17/2024	2/28/2024	5/23/2024	4/21/2024
Calibration γ Factor:	0.9988			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate 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)	137.050	146.311	151.880
Standard DGM Temperature (°F)	67.0	66.0	67.0
Standard DGM Pressure (in H_2O)	0.0	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.006	5.317	5.489
DGM Temperature (°F)	88.0	86.0	88.0
DGM Pressure (in H_2O)	1.06	1.52	2.81
Net Volume for Standard DGM (ft^3)	4.840	5.167	5.364
Net Volume for DGM (ft^3)	5.006	5.317	5.489

Dry Gas Meter γ Factor	1.001	1.004	1.008
γ Factor Deviation From Average	1.001	1.004	1.008

Average Gas Meter γ 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

CAL-CERT CALIBRATION CERTIFICATION
www.Cal-Cert.com
Toll Free 800-[illegible]
Address 5777 SE International Way Milwaukie, OR [illegible]
Local [illegible]
A2LA ACCREDITED CERT #4986.01

Report #:	33086-203319-4525		**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

Calibration Date:	February 26, 2024	**Reference:**	ASME B40.100
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	65 °F
Type:	Pressure Transducer	**Humidity:**	36% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	203B
Capacity:	1 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 1.00 **Range Resolution:** 0.001 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.000	0.000	0.000	0.00	0.000	0.00	0.01	0.0005
0.100	0.098	0.098	0.00	0.099	0.00	0.01	0.0036
0.250	0.252	0.252	0.00	0.250	0.00	0.01	0.0055
0.500	0.502	0.502	0.00	0.499	0.00	0.01	0.0065
0.750	0.751	0.751	0.00	0.748	0.00	0.01	0.0086
1.000	1.001	1.001	0.00	0.998	0.00	0.01	0.0068
0.750	0.752	0.752	0.00	0.749	0.00	0.01	0.0073
0.500	0.501	0.501	0.00	0.499	0.00	0.01	0.0065
0.250	0.251	0.251	0.00	0.250	0.00	0.01	0.0024
0.100	0.103	0.103	0.00	0.101	0.00	0.01	0.0057
0.000	0.001	0.001	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.
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.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-203319-4525

Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION
www.Cal-Cert.com
Toll Free 800-[illegible]
Address 5777 SE International Way Milwaukie, OR [illegible]
Local [illegible]

A2LA ACCREDITED CERT #4986.01

Report #:	33086-203320-4525	**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

Calibration Date:	February 26, 2024	**Reference:**	ASME B40.100
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	66 °F
Type:	Pressure Transducer	**Humidity:**	38% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	203C
Capacity:	5 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 5.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± 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	0.038
1.25	1.25	1.25	0.00	1.22	-0.03	0.05	0.067
2.50	2.48	2.48	-0.02	2.47	-0.03	0.05	0.021
3.75	3.72	3.72	-0.03	3.71	-0.04	0.05	0.043
5.00	5.00	5.00	0.00	4.99	-0.01	0.05	0.045
3.75	3.72	3.72	-0.03	3.71	-0.04	0.05	0.034
2.50	2.49	2.49	-0.01	2.47	-0.03	0.05	0.05
1.25	1.23	1.23	-0.02	1.23	-0.02	0.05	0.008
0.50	0.50	0.50	0.00	0.49	-0.01	0.05	0.018
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).

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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.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-203320-4525

Report and Certificate of Calibration

CAL-CERT
CALIBRATION CERTIFICATION

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
888-780-4100
714-696-5500

www.Cal-Cert.com

Report #:	30452-28785-3646	**Customer PO#:**	1100
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-00051 | Electrical Meter | Fluke | SN: 9663004 | Cal: 01/10/2023 | Due: 01/10/2024 | Vendor: Fluke | Report #: EVL861119
LP-01333 | Electrical Meter | IET Labs, Inc. | SN: E3-1842499 | Cal: 01/19/2023 | Due: 01/31/2024 | Vendor: Transcat Calibration Lab | Report #: 5-G584Z-20-1
LP-01347 | Thermo-Hygrometer | Comark | SN: 06210350163 | Cal: 04/18/2023 | Due: 04/30/2024 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 28945-67214-3646

Instrument Data

Calibration Date:	August 9, 2023	**Reference:**	Manufactures Tolerances
Recommended Due Date:	August 9, 2024	**Cal-Cert Procedure:**	CP-080
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Delmhorst	**Temperature:**	74 °F
Type:	Resistivity Meter	**Humidity:**	36% RH
Model Number:	MCS-1	**Asset #:**	#094
Serial #:	#094	**Service Location:**	Cal-Cert Lab
Capacity:	120 Megaohms	**As Found:**	Pass
Tolerance:	3.00 % of indication	**As Left:**	Pass

Instrument Range: 120 Megaohms **Resolution:** 0.001 **Mode Verified:** Resistance

Standard Reading	UUT As Found	UUT Reading #1	Error	UUT Reading #2	Error
0.000	0.000	0.000	0.000	0.000	0.000
1.100	1.095	1.095	-0.005	1.095	-0.005
54.545	54.719	54.719	0.173	54.719	0.173
0.000	0.000	0.000	0.000	0.000	0.000

Expanded Uncertainty± **2.50 Megaohms**

Remarks:

100Mohm std Parallel with 120Mohm UUT= 54.545Mohms

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.

Service Engineer:	Brent Enbysk	**Date:**	August 9, 2023
Technical Manager:	Marshall Doyle	**Signature:**	

DICK MUNNS COMPANY
LIQUID & GAS FLOW CALIBRATION

ISO 17025:2017
ACCREDITED LABORATORY
Cert# CL-122

IAS ACCREDITED
Calibration Laboratory

CERTIFICATE OF CALIBRATION

CUSTOMER:	**PFS-TECO :** CLACKAMAS, OR	**CALIBRATION DATE:**	05/23/2023
PO NUMBER:	1097	**CALIBRATION DUE:**	05/23/2024
INST. MANUFACTURER:	DWYER	**PROCEDURE:**	T.O.33K6-4-1769-1
INST. DESCRIPTION:	VELOMETER	**CALIBRATION FLUID:**	AIR @ 14.7 PSIA 70°F
MODEL NUMBER:	471	**RECEIVED CONDITION:**	WITHIN MFG. SPECS.
SERIAL NUMBER:	CP288559 ID# 095	**LEFT CONDITION:**	WITHIN MFG. SPECS.
RATED ACCURACY:	SEE NOTES BELOW.	**AMBIENT CONDITIONS:**	763mm HGA 53% RH 71°F
UNCERTAINTY GIVEN:	± 0.43% RD ; k=2	**CERTIFICATE FILE #:**	490265.2023

NOTES: ± 3.0% FS (0-500 / 0-1500) ** ± 4.0% F.S. (0-5000) **± 5.0% F.S. (0-15000) ** ± 2 °F

Q.MANUAL IM 2.0 REV 2020.2 DATEO 7-27-2020

DECISION RULE: SIMPLE ACCEPTANCE. MEASUREMENT UNCERTAINTIES NOT TAKEN INTO CONSIDERATION WHEN DETERMINING PASS/FAIL

UUT INDICATED FT/MIN	DM.STD. ACTUAL FT/MIN	UUT INDICATED DEG. F	DM STD. ACTUAL DEG. F
74	77	0 TO 200°F	0 TO 200°F
118	121	45.0	44.5
253	259	73.9	73.2
491	502	100.3	99.8
515	525		
1028	1049		
1492	1526		
502	514		
3145	3224		
4993	5135		
6892	7061		
14821	15229		

STANDARDS USED:		
A310: TEMP. STANDARD | ± 0.024 F | TRACE# 1649766843	DUE	02/09/2024
A800: FLOW-DYNE SONIC NOZZLE SYSTEM | 0 – 1086 CFM ± 0.46% RD. | TRACE# 144613547, 1424683640, 1583314714	DUE	12/10/2023

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

Issuing Date: 5-23-2023

Approved By:

Cal. Technician: DC

Calibrated at: ✓ Lab
___ On-Site (Customer's)

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

0723.01
Calibration

PO: 1033
Order Date: 03/08/2021
Authorized By: N/A

Property #: 097
User: N/A
Department: N/A
Make: Unknown
Model: 10 Lbs.
Serial #: 097
Description: Mass
Procedure: DCN 500901
Accuracy: Raw Data

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

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

Measurement Data

Parameter / Measurement Description	Range	Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After								Accredited = ü
Mass								
Raw Data		g	4535.92370000	0.0000000	0.0000000	0.1785299	4536.1022299 g	3.5E-01 ü

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/NCSL 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

Maggie Moore
Inspector

Certificate of Calibration

Certificate Number: 743894

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

Property #: 139
User: N/A
Department: N/A
Make: Unknown
Model: 5 Lbs. (Class F)
Serial #: 139
Description: Mass
Procedure: DCN 500901
Accuracy: Class F (±227mg)

Calibrated on: 03/24/2021
*Recommended Due: 03/24/2026
Environment: 19 °C 39 % RH
* As Received: Other - See Remarks
* As Returned: Other - See Remarks
Action Taken: Calibrated
Technician: 156

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.

Raw data has been provided for your determination of acceptability.

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
550A	And (A&D) Co.	HP-30K	Balance 30 Kg	12/31/2021	739307
503A	Rice Lake	1mg-200g (Class 0)	Mass Set,	09/11/2021	729241

Measurement Data

Parameter / Measurement Description	Range	Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After								Accredited = ü
Mass								
5 Lbs.		g	2267.961850	0.00000	0.00000	0.08860	2268.05045 g	3.5E-01 ü

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/NCSL 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. A test uncertainty ratio (TUR) of 4:1, if achievable, is maintained. Where uncertainties are reported, see uncertainties to calculate TUR to determine your possible Risk. The results reported herein apply only to the calibration of the item described above. JJ Calibrations does not alter or update software of the UUT, version stays the same unless otherwise noted. This report may not be reproduced, except in full, without written approval of JJ Calibrations

Reviewer

3 Issued 03/30/2021 Rev # 15

Inspector

Report and Certificate of Calibration

CAL-CERT CALIBRATION IDENTIFICATION

www.Cal-Cert.com

Toll Free: [illegible]
Address: [illegible] SE International Way
Milwaukie, OR 97222
Local: [illegible]

ACCREDITED
CERT #4986.01

Report #:	31538-218157-14	**Customer PO#:**	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212, Suite 305	Clackamas, OR 97015	

Calibration Standards

10-00209 | Weight | Rice Lake | SN: 43334 | Cal: 02/02/2022 | Due: 02/28/2024 | Vendor: Oregon Dept of Ag | Report #: 20220092
19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 08/14/2023 | Due: 08/31/2024 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 30530-30694-3646

Instrument Data

Calibration Date:	October 12, 2023	**Reference:**	ASTM E898-20, D4753-15
Calibration Due Date:	April 12, 2024	**Cal-Cert Procedure:**	CP-002
Calibration Frequency:	6 Months	**Indicating System:**	Digital
Manufacturer:	Sartorius	**Temperature:**	73 °F
Model Number:	ENTRIS224	**Humidity:**	52% RH
Type:	Digital Balance	**Asset #:**	107
Serial #:	34307497	**Service Location:**	Service Address
Scale Capacity:	200 grams	**As Found:**	PASS
		As Left:	PASS

Scale Linear Test

Instrument Range: 200.0000 grams **Resolution:** 0.0001 grams

Calibration Standard grams	As Found UUT grams	As Found Error grams	As Left UUT grams	As Left Error grams	As Left % of Error	Tolerance (As Left) Allowable Error		
						Error	Condition	Expanded Unc. (grams)
0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0000	PASS	0.00000
20.0000	19.9998	-0.0002	19.9998	-0.0002	0.00	0.0200	PASS	0.00463
40.0000	39.9997	-0.0003	40.0000	0.0000	0.00	0.0400	PASS	0.00924
60.0000	59.9996	-0.0004	60.0001	0.0001	0.00	0.0600	PASS	0.01386
80.0000	79.9995	-0.0005	80.0001	0.0001	0.00	0.0800	PASS	0.01848
100.0000	99.9994	-0.0006	99.9999	-0.0001	0.00	0.1000	PASS	0.02310
120.0000	119.9993	-0.0007	119.9999	-0.0001	0.00	0.1200	PASS	0.02771
140.0000	139.9991	-0.0009	140.0000	0.0000	0.00	0.1400	PASS	0.03233
160.0000	159.9990	-0.0010	160.0001	0.0001	0.00	0.1600	PASS	0.03695
180.0000	179.9990	-0.0010	180.0000	0.0000	0.00	0.1800	PASS	0.03926
200.0000	199.9989	-0.0011	200.0000	0.0000	0.00	0.2000	PASS	0.04619
100.0000	99.9994	-0.0006	99.9999	-0.0001	0.00	0.1000	PASS	0.02310
0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0000	PASS	0.00000

Manufacturer: Sartorius **Type:** Digital Balance **Serial #:** 34307497

FUNCTIONAL CHECKS					
ECCENTRIC LOAD TEST:		**HYSTERESIS: Load Increments**		**REPEATABILITY:**	
Loading position	100.0000	Test Weight Applied. % of load	Readings	Test Weight Applied	100.0000
Right	99.9999	0%	0.0000	1st	99.9999
Left	99.9998	(R1) 50%	99.9999	2nd	100.0000
Front	99.9998	100%	200.0000	3rd	99.9999
Back	99.9999	(R2)50%	99.9999	4th	100.0000
Center	99.9999	0%	0.0000	5th	100.0000
As Left	PASS	As Left	PASS	As Left	PASS
Tolerance: The maximum error of the eccentric loading must be less than .1% of center load value.		Tolerance: The Difference of R1 and R2 must be within 0.1%		Tolerance: Deviation of lowest and highest reading within 0.1%	

Remarks:

The scale was adjusted prior to taking the As Left readings.

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.

Service Engineer: Jon Rau **Date:** October 12, 2023

Technical Manager: Marshall Doyle **Signature:** 

REPORT#: 31538-218157-14

Established 1974

QUALITY CONTROL SERVICES

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

ACCREDITED
CERTIFICATE #1550.01

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

Material	Assumed Density	Range	Tolerance Class
Stainless Steel	7.95 g/cm^3	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" **(Previoosly known as "Apparent Mass vs. 8.0 g/cm^3).**

Uncertainty Statement: The uncertainty conforms to the ISO Guide to the Expressions of Uncertainty in Measurement. Uncertainty as reported is based on a coverage factor k=2 for an approximate 95 percent level of uncertainty. Uncertainty components include the standard deviation of the process, the uncertainty of the standard used, an uncertainty component associated with the potential drift of the standard used, and the estimated uncertainty related to measuring and determining the air buoyancy effect.

Conventional Mass Values are listed on page 2 of this report.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 05/09/22

Signature David S. Thompson

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
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Report of Calibration

Firm: PFS-TECO
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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.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 05/09/22

Signature David S. Thompson

Model 1430 Microtector® Portable Electronic Point Gage

Accurate To ±.00025"w.c., Battery Operated, Self-Contained

Fast, accurate pressure measurements at moderate cost. Combines modern, solid state integrated circuit electronics with the timeproven point gage manometer. Delivers repeatable accuracy in measuring positive, negative or differential pressures to ±.00025" water column over a 0 to 2" w.c. range. Metric model M-1430 reads from 0-50 mm w.c.

Calibrates other instruments. Provides high precision for test laboratories of manufacturers of fans, air conditioning and heating equipment, pneumatic or fluidic controls, etc. Used in college, university and consultant laboratories — wherever precision measurements are required. Used with pitot tube (at extra cost) for precision measurement of low air velocities.

Measures positive, negative or differential pressures to 2.0" w.c.

Easy to maintain and clean. Battery replacement and instrument cleaning are quick and simple-use mild soap and water. Indicating fluid consists of distilled water and a small amount of Dwyer A-126 Fluorescein green color concentrate. Max. press. 100 psig (6.89 bar).

*Patent No 3,726,142

Microtector® gage kit includes everything needed:

Microtector® Gage* – A Durablock® solid, precision machined acrylic plastic body, mounted on heavy, 1/2" thick steel base. 3-point base mounting has two leveling screws and level vial for quick setup.

Gage Meter – Sensitive 0-50 microamp D.C. meter acts as detector. Powered by 1-1/2 volt penlight cell (included). No external power needed. Meter also indicates battery and hook probe condition.

Electronic Circuitry – Solid state integrated circuit electronic components are mounted on glass epoxy board enclosed in a molded styrene acrylonitrile compartment for protection. A.C. Detector current eliminates hook plating.

Micrometer – Adjusts point with precision. Complies with Federal Specification GGG-C-105C and is traceable to a master at the NIST.

Dwyer® Gage Fluid – 3/4˝ oz non-toxic concentrate of fluorescein green color, wetting agent and distilled water. Use with distilled water.

Accessories – Two 3-foot lengths of tygon tubing, two 1/8" pipe thread adapters, micrometer wrench and crocus cloth for cleaning point.

Carrying Case-Cover – Rugged sheet steel, gray finish. Carrying handle and latches. Complete instructions included.

MODELS

Model Number	Range
1430	0-2 in. w.c.
M1430	0-50 mm w.c.

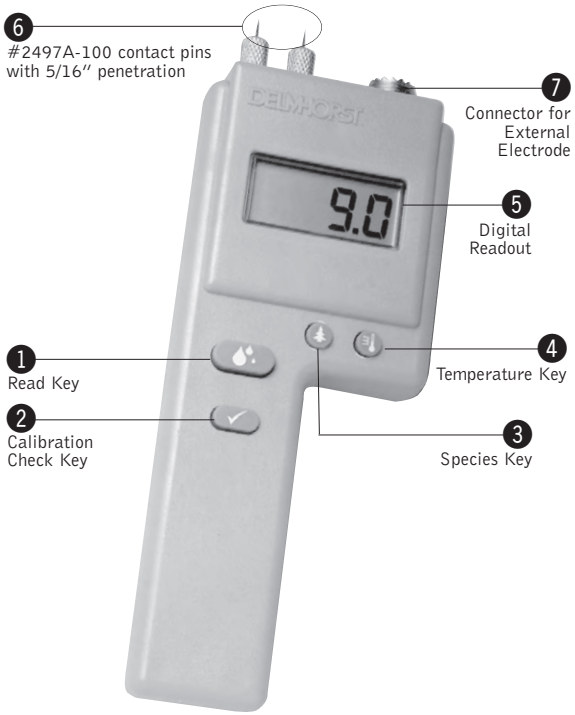
J-2000

owner's manual

DELMHORST®
INSTRUMENT CO.

WHEN ACCURACY IS THE POINT.™

TABLE OF CONTENTS



J-2000 FEATURES

- ▶ Resistance technology recognized worldwide as the most accurate method for measuring wood MC
- ▶ 6% to 40% MC wood (Douglas Fir ref)
- ▶ 6% to 60% MC wood (J-2000/X)
- ▶ Averages up to 100 accumulated readings
- ▶ User-selectable corrections for 48 species
- ▶ Built-in temperature compensation (F/C)
- ▶ Proven microcontroller circuit
- ▶ Easy one-hand operation
- ▶ Includes (1) 9-Volt Battery
- ▶ Includes sturdy carrying case
- ▶ One-year warranty

BEFORE YOU BEGIN

Key Functions

1. READ KEY - Press to read the %MC.

2. CALIBRATION CHECK KEY - This key, (when pressed with the read key) checks the meter calibration. It also displays the number of readings in memory (up to 100), the average, and the highest stored reading. It also clears the memory.

3. SPECIES KEY - Press to select the species code for the wood you are testing. Species are numbered from 1 to 48 and are listed on the Species Code Chart on page 5. To scroll forward through the species codes keep the species key pressed. To scroll backward press the species key, release it and immediately press the temperature key.

4. TEMPERATURE KEY - Press to set the wood temperature. Press and immediately press the Calibration Check the temperature key 2 to toggle between (F and C). To increase the temperature setting keep the temperature key pressed. To decrease the temperature, press the temperature key, release it and immediately press the species key.

CHECK CALIBRATION ✓

Press the calibration check key 2 and read key 1 simultaneously. Meter is in calibration if it displays 12% (+ or - 0.2).

If you check the calibration and the meter does not display 12% it is likely an indication of a low battery. If this occurs, replace the battery immediately with a new EverReady or Duracell brand 9V. Continued use with a low battery may cause the meter to go out of calibration. If you have a fresh battery and the instrument still does not indicate a proper calibration, return it to DELMHORST for service. See **Service for your Meter** section.

When the battery is removed and then reconnected, the meter displays its software version for one second and then turns itself off. After replacing the battery, you must reset the meter as described in **Resetting the Meter** section.

A hard Reset is required if, after changing the battery, the display is frozen. This is sometimes caused by the interruption of contact between the battery and battery lead wire. Resolve this as follows: Disconnect the battery. Press and hold the Read key for 15 seconds. Release the Read key. Press and hold the Check key for 15 seconds. Release the Check key. Connect a fresh battery to the lead wire in a single action, making sure to align the poles properly and without interrupting contact. If the display remains frozen, repeat the procedure. If this procedure does not solve the problem, refer to the Service for Your Meter section.

Meter Default Settings

Species - Douglas Fir
Temperature - 70°F
Pin/Electrode - 4-pin (non-insulated)
Each of these parameters is programmed into the meter and is user-selectable. Proper setting of each will insure the most accurate readings.

SET SPECIES 

The J-2000 defaults to Species Code #1 - Douglas Fir - the USDA standard and basis for all Delmhorst calibrations. Because the electrical characteristics of different species vary, all species read differently at the same moisture content. For this reason you need to adjust for species. If you are working with a species other than Douglas Fir, set the species code using the species key 3, and the meter will make the necessary corrections.

- **To change species** press the species key 3. The meter will display the current species code for one second. Refer to the Species Code Chart on page 5. Call our customer service team at 877-DELMHORST (335-6467) or e-mail info@delmhorst.com for assistance with any species or wood-based material that is not included in the chart. It is always helpful if you have the scientific name as well as any common names for the species.

- **To scroll forward** through the species list hold the species key ❸ while the current species code is displayed and scroll to the species number desired.
- **To scroll backward** through the species list, press and release the species key ❸. Within one second, press and hold the temperature key ❹. Continue to hold the temperature button ❹ and the species number will decrease.
- **When scrolling in either direction**, release the key to stop at your desired species.

Species Code Chart

CODE	SPECIES	CODE	SPECIES
1	Fir, Douglas	25	Magnolia
2	Pine, Southern	26	Mahogany, African (also Khaya)
3	SPF	27	Mahogany, Honduras
4	Alder	28	Mahogany, Philippine
5	Apitong	29	Maple, Hard/Soft
6	Aspen	30	Meranti, Dark Red
7	Ash, White	31	Oak, Red
8	Basswood	32	Oak, White
9	Birch	33	Pecan
10	Cedar, Eastern Red	34	Pine, Longleaf
11	Cedar, Incense	35	Pine, Ponderosa
12	Cherry	36	Pine, Shortleaf
13	Cottonwood	37	Pine, Sugar
14	Cypress	38	Pine, White
15	Elm, American	39	Poplar, Yellow
16	Fir, Red	40	Ramin
17	Fir, White	41	Radiata Pine
18	Gum, Black	42	Redwood
19	Gum, Red	43	Spruce, Sitka
20	Hemlock, Western	44	SPF, COFI*
21	Hackberry	45	Teak
22	Hickory	46	Virola
23	Keruing	47	Walnut, Black
24	Larch	48	Western Hemlock - COFI*

*Species and temperature correction data for both Western Hemlock-COFI (code #48) and SPF-COFI (code #44) were developed by COFI.

When comparing readings between the model RDM-2/COFI or the RDM-2S/COFI, used with type 26-E electrode with insulated pins, and the J-2000, be sure both meters are set to 2-pin electrode (insulated pins).

SET TEMPERATURE 

The J-2000 defaults to a temperature of 70°F. As wood temperature increases, its electrical resistance decreases and indicated moisture content rises. Lower wood temperatures result in lower indicated moisture content. A correction is necessary if the wood temperature is outside the range of 50°F (10°C) to 90°F (32°C). Set the temperature accordingly and the meter will make the correction.

- **To change temperature** press and release the temperature key 4. The meter will display the current temperature for one second.
- **To scroll forward** through the temperature settings, press and hold the temperature key 4 while the current temperature is displayed.
- **To scroll backward** press and release the temperature key 4. Within one second, press and hold the species key 3. Continue to hold the species key 3 and the temperature will decrease.
- **When scrolling in either direction**, release the button to stop at the desired temperature.

Set Temperature Mode

- **To change between Fahrenheit and Celsius modes** press the temperature key 4.
- **Press the calibration check key** 2 within one second and release when you are in the desired mode.
- **The meter will display the current temperature setting** in the new mode and will wait one more second until shutting off so that you may change the temperature value as described above.

If the meter is in Fahrenheit mode, the letter "F" will display in the left-hand corner. If it is in Celsius mode, no letter will appear in the display.

In the Fahrenheit mode, the temperature will change in increments of 5°F. In Celsius, the temperature will change in increments of either 2°C or 3°C depending on its conversion from Fahrenheit.

In the Fahrenheit mode, the temperature value will display in whole numbers. In the Celsius mode, positive values will display in whole numbers; negative values will display with a decimal point and a "minus" sign in the left-hand corner. (i.e.: -17.0)

SET PIN CALIBRATION

The basic factory calibration of the J-2000 is for use with non-insulated pins. Insulated pins read lower than non-insulated ones. The difference is small below 10% MC but increases as the moisture content increases above 10%. When using an electrode with insulated pins, such as the 26-ES hammer electrode, you can change the calibration to compensate for this difference.

- **To change the pin setting**, press and release the species key 3, then press the calibration check key 2 within one second.
- **The meter will display** the current pin calibration as either 222 for insulated or 444 for non-insulated pins.
- **If you continue to hold the calibration check key 2**, the meter will toggle between 222 and 444.

TAKING A READING

- **Remove the protective cover** to expose the pins. Check that the contact pins 6 are firmly hand tightened.
- **To take a reading**, align the contact pins 6 parallel to the grain and push them to their full penetration into the wood, if possible. Insulated pins read only at the tip and can be driven to the desired depth.
- **Press the read key 1** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.
- **To add a reading** to the sum of all the previously stored readings, release the read key 1 within 2 seconds.

The non-insulated contact pins on the top of the meter penetrate max 5/16in. and may be used on wood up to 1-1/2 to 2in. thick. Push the pins into the wood to their full penetration for best accuracy. For thicker wood and hardwoods over 4/4, use the 26-ES hammer electrode with insulated pins. These pins (no. 496), may be used on wood up to 5-6in. thick. Connect the electrode to the input connector on the top of the meter 7. Contact our customer service team for more information on other available pins for your application.
Insulated pins offer the advantage of taking measurements at various depths since the reading is made at the point in the wood where only the non-insulated tips of the pins make contact. This is especially useful when drying lumber since reliable shell and core readings are essential to producing high quality lumber.

See the FAQ section of our website for helpful application info. www.delmhorst.com

INFORMATION ABOUT YOUR READINGS

Readings below 6% will be displayed as a numeric value, (-##.#), but will not be added to the accumulated readings in memory. Readings below 6% due to temperature and species adjustments will be shown as a numeric value with no minus sign. These readings will be added to the accumulated total in memory and included in the statistical calculations.

Readings above 40% are always displayed as 999 and are not added to the memory.

The meter will accumulate up to 100 readings. After all 100 readings are stored it will not add new readings until the memory has been cleared. It will also continue to display the average of all 100 readings as a reminder that the memory is full.

When taking and storing readings for a specific wood species, be sure to clear the meter's memory before moving on to the next species if you do not want to group all of the readings together.

TO CHECK ACCUMULATED READINGS

This feature allows you to view the total number of all accumulated readings, the average of those readings, and the highest stored reading.

- **To view the readings** press and release the calibration check key (2). The meter displays the number of accumulated readings for one second, then the average of those readings for two seconds. Then it displays the highest stored reading for two seconds. The total cycle time is five seconds.
- **To clear the memory** press and hold the calibration check key (2) down for 5 seconds. All accumulated readings will be erased and the meter will display "0".

TO RESET METER

- **Press and release** the calibration check key (2).
- **Within one second** press the species key (3).
- **The meter will reset itself** and display "170" to indicate the meter is reset to default: Species #1 (Douglas Fir) at 70°F, followed by 444 (pin setting). All of the readings in memory will be cleared.

CARE OF YOUR METER

To keep your meter in good working order:

- Store your meter in a clean, dry place. The protective carrying case provided is an ideal storage place when the meter is not in use.
- Change the 9-Volt battery as needed. Use only EverReady or Duracell brand batteries. Continued use with a low battery may cause the meter to go out of calibration.
- Change contact pins as needed. Keep contact pins hand tightened.
- Clean the meter and contact pins with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. Keep cleaner out of the external connector (7).
- Remove the battery if the meter will not be used for one month or longer.

SERVICE FOR YOUR METER

If your meter is not working properly, replace the battery with a new one and check the calibration. If this does not resolve the problem please send your meter back to Delmhorst for repair.
Go to HYPERLINK "http://www.delmhorst.com" www.delmhorst.com and click on Support and then download the Return Form.
If you require further assistance please call 877-DELMHORST (335-6467) or 973-334-2557.
E-mail HYPERLINK "mailto:info@delmhorst.com" info@delmhorst.com

WARRANTY

Delmhorst Instrument Co., referred to hereafter as Delmhorst, guarantees its J-2000 meter for one year from date of purchase and any optional electrodes against defects in material or workmanship for 90 days. If, within the warranty period, you find any defect in material or workmanship return the meter following the instructions in the **Service for Your Meter** section. This limited warranty does not cover abuse, alteration, misuse, damage during shipment, improper service, unauthorized or unreasonable use of the meter or electrodes. This warranty does not cover batteries or contact pins. If the meter or any optional electrodes have been tampered with, the warranty shall be void. At our option we may replace or repair the meter.

Delmhorst shall not be liable for incidental or consequential damages for the breach of any express or implied warranty with respect to this product or its calibration. With proper care and maintenance the meter should stay in calibration; follow the instructions in the **Care of Your Meter** section.

UNDER NO CIRCUMSTANCES SHALL DELMHORST BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES OF ANY TYPE WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR DOWNTIME ARISING OUT OF OR RELATED IN ANY RESPECT TO ITS METERS OR ELECTRODES AND NO OTHER WARRANTY, WRITTEN, ORAL OR IMPLIED APPLIES. DELMHORST SHALL IN NO EVENT BE LIABLE FOR ANY BREACH OF WARRANTY OR DEFECT IN THIS PRODUCT THAT EXCEEDS THE AMOUNT OF PURCHASE OF THIS PRODUCT.

The express warranty set forth above constitutes the entire warranty with respect to Delmhorst meters and electrodes and no other warranty, written, oral, or implied applies. This warranty is personal to the customer purchasing the product and is not transferable.

NOTES

For more than 65 years Delmhorst Instrument has been the leading manufacturer of high quality, US-made moisture meters and thermo-hygrometers. Today we offer a wide range of meters for applications including water damage restoration, construction, flooring, lumber/woodworking, paper, and agriculture.

DELMHORST®
INSTRUMENT CO.
WHEN ACCURACY IS THE POINT.™

51 Indian Lane East
Towaco, NJ 07082

(877)-DELMHORST
www.delmhorst.com
info@delmhorst.com

510INS-0003 REV. 01/15

Established 1974

QUALITY CONTROL SERVICES

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIR101C101887027231228

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Mettler	IND570 - 1000lbx0	C101887027	#189	Lab

Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
lbs	0.02	QC033	12/28/23	12/14/22	12/2024

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 400 Tol: 0.10	Test Wt: HB44 Tol: HB44	Test Wt: 200 Tol: 0.04	☐ Good ☑ Fair ☐ Poor
As-Fonnd: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 18.2°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	999.98	999.98	0.012
600	599.98	599.98	0.011
400	399.96	399.96	0.011
200	200.00	200.00	0.011
100	100.00	100.00	0.011
50	50.00	50.00	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	7/18/22	7/2024	20221688

Permanent Information Concerning tbis Equipment:

Comments/Information Concerning this Calibration

12/23 RH = 40.5%

Report prepared/revicwed by: R.B. **Date:** 12-28-23 **Technician:** R. Butcher
Signature: R. B Butcher

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). Calibratinn tlata 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: DIR101

Report and Certificate of Calibration

CAL-CERT
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Toll Free
Address
5777 SE International Way
Milwaukie, OR 97222
Local
ACCREDITED
CERT #4986.01

Report #:	32102-201251-4686		**Customer PO#:**	1102	
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

10-00954 | Gage Block Set | Shars | SN: 120018 | Cal: 05/26/2023 | Due: 05/26/2025 | Vendor: American Gage | Report #: 109141
LP-00397 | Gage Block Set | Mitutoyo | SN: 509020 | Cal: 12/28/2022 | Due: 12/28/2024 | Vendor: BHD Test and Measurement | Report #: 99826
LP-01757 | Thermo-Hygrometer | Comark | SN: 06257740560 | Cal: 04/28/2023 | Due: 04/28/2024 | Report #: 29096-209333-4201

Instrument Data

Calibration Date:	December 6, 2023	**Reference:**	Manufacturer's Spec
Calibration Due Date:	December 6, 2024	**Cal-Cert Procedure:**	CP-115
Calibration Frequency:	12 Months	**Indicating System:**	Stamped
Manufacturer:	Starrett	**Temperature:**	69 °F
Type:	Tape Measure	**Humidity:**	51% RH
Model Number:	Exact	**Asset #:**	207
Serial #:	138054-2203-00002249	**Service Location:**	Cal-Cert Lab
Capacity:	192.00 Inches	**As Found:**	Pass
		As Left:	Pass

Instrument Range: 192.000 Inches **Range Resolution:** 0.06250 Inches

Calibration Standard	As Found Reading	Verification Reading #1	Verification Reading #2
0.2500	0.2500	0.2500	0.2500
1.0000	1.0000	1.0000	1.0000
6.0000	6.0000	6.0000	6.0000
12.0000	12.0000	12.0000	12.0000
64.0000	64.0000	64.0000	64.0000
128.0000	128.0000	128.0000	128.0000
192.0000	192.0000	192.0000	192.0000

Expanded Uncertainty ± 0.07217 Inches

Remarks:

Metric scale not calibrated.

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.

Service Engineer: Scott McGuire **Date:** December 6, 2023

Technical Manager: Marshall Doyle **Signature:**

Report and Certificate of Calibration

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Report #:	31621-201253-5	**Customer PO#:** 1102	
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

LP-00397 | Gage Block Set | Mitutoyo | SN: 509020 | Cal: 12/28/2022 | Due: 12/28/2024 | Vendor: BHD Test and Measurement | Report #: 99826
LP-01782 | Thermo-Hygrometer | Comark | SN: 06247790052 | Cal: 01/30/2023 | Due: 01/31/2024 | Range: 122 °F 95 %RH | Report #: 27747-205513-4239

Instrument Data

Calibration Date:	October 23, 2023	**Reference:**	ASME B89.1.14 2018
Calibration Due Date:	October 23, 2024	**Cal-Cert Procedure:**	CP-008
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Mitutoyo	**Temperature:**	66 °F
Type:	Digital Caliper	**Humidity:**	51% RH
Model Number:	CD-P6"S	**Asset #:**	208
Serial #:	B22159310	**Service Location:**	Cal-Cert Lab
Capacity:	6 Inches	**As Found:**	PASS
Resolution:	0.0005 Inches	**As Left:**	PASS

Instrument Range: 6.0000 Inches **Range Resolution:** 0.0005 Inches

Outside Jaws / Linearity

Calibration Standard Inches	As Found Inches	As Left Reading 1 Inches	As Left Reading 2 Inches	Tolerance ± Inches
0.0000	0.0000	0.0000	0.0000	0.0000
0.0500	0.0495	0.0495	0.0495	0.0010
0.3000	0.3000	0.3000	0.3000	0.0010
0.6000	0.6000	0.6000	0.6000	0.0010
1.2000	1.1995	1.1995	1.1995	0.0010
2.4000	2.4000	2.4000	2.4000	0.0010
3.5000	3.5000	3.5000	3.5000	0.0010
5.0000	5.0000	5.0000	5.0000	0.0010
6.0000	5.9995	5.9995	5.9995	0.0010

Expanded Uncertainty ± 0.00036 Inches

Scale Shift Verification

	Target	Measured	Tolerance ±
Resolution Check	0.1005	0.10050	N/A
Depth	1.000	1.00000	0.001
Step	1.000	1.00000	0.001
Inside Jaws	1.000	0.99950	0.001

Inspections

Jaws Parallel	Acceptable

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).

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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.

Service Engineer: Cameron Walling **Date:** October 23, 2023

Technical Manager: Marshall Doyle **Signature:**

Report and Certificate of Calibration

CAL-CERT
www.Cal-Cert.com
Toll Free
Address
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CERT #4986.01

Report #:	33086-206391-4525	**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 | Tegam | 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

Calibration Date:	February 26, 2024	**Reference:**	Navair 17-20ST-95
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-013
Calibration Frequency:	12 Months	**Indicating System:**	Computer
Manufacturer:	National Instruments	**Temperature:**	64 °F
Type:	Data Logger	**Humidity:**	39% RH
Model Number:	NI 9213	**Asset #:**	215 Booth 1
Serial #:	1B182FB	**Service Location:**	Service Address
Resolution:	0.1 °F	**As Found:**	Pass
Capacity:	2,500 °F	**As Left:**	Pass
Tolerance:	± 3.0 °F		
Thermocouple Type:	K		

Thermocouple METER 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	1.10	1.10	1.10	1.10	
	500.00	501.10	501.10	501.10	1.10	
	1000.00	1001.10	1001.10	1001.10	1.10	
	1500.00	1501.20	1501.20	1501.20	1.20	0.346
	2000.00	2001.30	2001.30	2001.30	1.30	
	2400.00	2401.40	2401.40	2401.40	1.40	
	0.00	1.20	1.20	1.20	1.20	

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	0.80	0.80	0.80	0.80	
	500.00	500.80	500.80	500.80	0.80	
	1000.00	1000.80	1000.80	1000.80	0.80	
	1500.00	1500.90	1500.90	1500.90	0.90	0.346
	2000.00	2001.00	2001.00	2001.00	1.00	
	2400.00	2401.10	2401.10	2401.10	1.10	
	0.00	0.80	0.80	0.80	0.80	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter A	0.00	0.60	0.60	0.60	0.60	0.346
	500.00	500.60	500.60	500.60	0.60	
	1000.00	1000.70	1000.70	1000.70	0.70	
	1500.00	1500.70	1500.70	1500.70	0.70	
	2000.00	2000.80	2000.80	2000.80	0.80	
	2400.00	2400.00	2400.00	2400.00	0.00	
	0.00	0.60	0.60	0.60	0.60	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Back	0.00	0.40	0.40	0.40	0.40	0.346
	500.00	500.40	500.40	500.40	0.40	
	1000.00	1000.50	1000.50	1000.50	0.50	
	1500.00	1500.50	1500.50	1500.50	0.50	
	2000.00	2000.60	2000.60	2000.60	0.60	
	2400.00	2400.70	2400.70	2400.70	0.70	
	0.00	0.50	0.50	0.50	0.50	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Catalyst	0.00	0.30	0.30	0.30	0.30	0.346
	500.00	500.20	500.20	500.20	0.20	
	1000.00	1000.30	1000.30	1000.30	0.30	
	1500.00	1500.40	1500.40	1500.40	0.40	
	2000.00	2000.40	2000.40	2000.40	0.40	
	2400.00	2400.40	2400.40	2400.40	0.40	
	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±**
Meter A	0.00	0.10	0.10	0.10	0.10	0.346
	500.00	500.10	500.10	500.10	0.10	
	1000.00	1000.20	1000.20	1000.20	0.20	
	1500.00	1500.20	1500.20	1500.20	0.20	
	2000.00	2000.30	2000.30	2000.30	0.30	
	2400.00	2400.30	2400.30	2400.30	0.30	
	0.00	0.10	0.10	0.10	0.10	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Left	0.00	0.10	0.10	0.10	0.10	0.346
	500.00	500.10	500.10	500.10	0.10	
	1000.00	1000.20	1000.20	1000.20	0.20	
	1500.00	1500.20	1500.20	1500.20	0.20	
	2000.00	2000.20	2000.20	2000.20	0.20	
	2400.00	2400.20	2400.20	2400.20	0.20	
	0.00	0.10	0.10	0.10	0.10	

Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Right	0.00	0.00	0.00	0.00	0.00	
	500.00	500.00	500.00	500.00	0.00	
	1000.00	1000.10	1000.10	1000.10	0.10	
	1500.00	1500.10	1500.10	1500.10	0.10	0.346
	2000.00	2000.20	2000.20	2000.20	0.20	
	2400.00	2400.20	2400.20	2400.20	0.20	
	0.00	0.00	0.00	0.00	0.00	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter B	0.00	0.00	0.00	0.00	0.00	
	500.00	501.30	501.30	501.30	1.30	
	1000.00	1001.00	1001.00	1001.00	1.00	
	1500.00	1500.70	1500.70	1500.70	0.70	0.346
	2000.00	2000.40	2000.40	2000.40	0.40	
	2400.00	2400.00	2400.00	2400.00	0.00	
	0.00	0.00	0.00	0.00	0.00	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Top	0.00	-0.10	-0.10	-0.10	0.10	
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.10	1000.10	1000.10	0.10	
	1500.00	1500.10	1500.10	1500.10	0.10	0.346
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.10	2400.10	2400.10	0.10	
	0.00	-0.10	-0.10	-0.10	0.10	

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.

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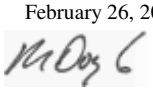
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-206391-4525

Report and Certificate of Calibration

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CERT #4986.01

Report #:	33086-206391-4525-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 | Tegam | 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

Calibration Date:	February 26, 2024	**Reference:**	Navair 17-20ST-95
Recommended Due Date:	February 26, 2025	**Cal-Cert Procedure:**	CP-013
Calibration Frequency:	12 Months	**Indicating System:**	Computer
Manufacturer:	National Instruments	**Temperature:**	66 °F
Type:	Data Logger	**Humidity:**	34% RH
Model Number:	NI 9213	**Asset #:**	215 Booth 1
Serial #:	1B182FB	**Service Location:**	Service Address
Resolution:	0.1 °F	**As Found:**	Pass
Capacity:	2,500 °F	**As Left:**	Pass
Tolerance:	± 3.0 °F		
Thermocouple Type:	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	-0.10	-0.10	-0.10	0.10	
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.00	1000.00	1000.00	0.00	
	1500.00	1500.10	1500.10	1500.10	0.10	0.346
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.00	2400.00	2400.00	0.00	
	0.00	-0.10	-0.10	-0.10	0.10	

	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	-0.10	-0.10	-0.10	0.10	
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.10	1000.10	1000.10	0.10	
	1500.00	1500.10	1500.10	1500.10	0.10	0.346
	2000.00	2000.20	2000.20	2000.20	0.20	
	2400.00	2400.20	2400.20	2400.20	0.20	
	0.00	0.00	0.00	0.00	0.00	

Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	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 C	0.00	-0.20	-0.20	-0.20	0.20	0.346
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.00	1000.00	1000.00	0.00	
	1500.00	1500.00	1500.00	1500.00	0.00	
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.10	2400.10	2400.10	0.10	
	0.00	-0.10	-0.10	-0.10	0.10	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter C	0.00	-0.20	-0.20	-0.20	0.20	0.346
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.00	1000.00	1000.00	0.00	
	1500.00	1500.10	1500.10	1500.10	0.10	
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.10	2400.10	2400.10	0.10	
	0.00	-0.10	-0.10	-0.10	0.10	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Ambient	0.00	0.00	0.00	0.00	0.00	0.346
	20.00	18.70	18.70	18.70	-1.30	
	40.00	38.70	38.70	38.70	-1.30	
	60.00	58.90	58.90	58.90	-1.10	
	80.00	78.80	78.80	78.80	-1.20	
	100.00	98.80	98.80	98.80	-1.20	
	0.00	0.00	0.00	0.00	0.00	

Remarks:

15 Channels Tested, Ambient is Type T tested from 0-100°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.
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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.

Service Engineer: Steven White **Date:** February 26, 2024

Technical Manager: Marshall Doyle **Signature:** 

Report #: 33086-206391-4525-B

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: 1200 psig 99 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date: 05/08/2031		NIST Traceable Expanded Uncertainty
Cylinder Number: CC505834		
16.98 %	Carbon dioxide	± 0.13 %
4.30 %	Carbon monoxide	± 0.03 %
17.16 %	Oxygen	± 0.05 %
Balance	Nitrogen	

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 28C194WK
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	Conc:	16.97
R:	19.36	Z:	0	C:	10.99	Conc:	18.96
Z:	0	C:	17	R:	19.35	Conc:	15.99
UOM:	%						

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

2. Component:

PRAXAIR
Making our planet more productive

DocNumber: 271687

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22019

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: 7008928102
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	10/16/2019
Z:	0	R:	14	C:	10.09	Conc:	10.09
R:	14	Z:	0	C:	10.1	Conc:	10.1
Z:	0	C:	10.1	R:	14.01	Conc:	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: 13.983% / ±0.034%
SRM Expiration Date: 05/16/2022

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

2. **Component:** Carbon monoxide

Requested Concentration: 2.5 %
Certified Concentration: 2.53 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 09/19/2019

First Analysis Data:						Date	10/16/2019
Z:	0	R:	5	C:	2.53	Conc:	2.53
R:	5	Z:	0	C:	2.53	Conc:	2.53
Z:	0	C:	2.54	R:	5.01	Conc:	2.54
UOM:	%			Mean Test Assay:			2.53 %

Reference Standard: Type / Cylinder #: GMIS / CC242633
Concentration / Uncertainty: 5.00 % ±0.643%
Expiration Date: 04/09/2020
Traceable to: SRM # / Sample # / Cylinder #: SRM 2642a / 51-D-23 / FF23106
SRM Concentration / Uncertainty: 7.859% / ±0.039%
SRM Expiration Date: 07/15/2019

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

3. **Component:** Oxygen

Requested Concentration: 10.6 %
Certified Concentration: 10.48 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/16/2019

First Analysis Data:						Date	10/16/2019
Z:	0	R:	9.88	C:	10.49	Conc:	10.48
R:	9.88	Z:	0	C:	10.49	Conc:	10.48
Z:	0	C:	10.5	R:	9.89	Conc:	10.49
UOM:	%			Mean Test Assay:			10.48 %

Reference Standard: Type / Cylinder #: NTRM / DT0010384
Concentration / Uncertainty: 9.875 % ±0.4%
Expiration Date: 11/16/2022
Traceable to: SRM # / Sample # / Cylinder #: NTRM / 170701 / NTRM DT0010384
SRM Concentration / Uncertainty: 9.875% / ±0.040%
SRM Expiration Date: 11/16/2022

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

Analyzed By: Jose Vasquez

Certified By: Jenna Lockman