hearthstone

TEST REPORT

SCOPE: EMISSIONS, EFFICIENCY AND OUTPUT

FUEL: CORDWOOD

TEST STANDARD: EPA (ASTM WK47329)

MODEL: WFP100 WOOD FIREPLACE

Notice to reader: Our WFP100 wood fireplace was tested as part of the HE350 Series firebox. Therefore, the HE350 Series is referenced throughout the attached test report.

000- 102163747MTL-001 Test Report

TEST REPORT

REPORT NUMBER: 102163747MTL-001
REPORT DATE: July 8th, 2016

EVALUATION CENTER
Intertek Testing Services NA Ltd.
1829, 32nd Avenue
Lachine, Qc.

RENDERED TO

Stove Builder International Inc.
250, Copenhague
St-Augustin-de-Desmaures, G3A 2H3
Canada

PRODUCT EVALUATED:

Model HE350 Series Solid Fuel Factory-Built Fireplaces

Report of Testing of HE350 Series Solid Fuel Factory-Built Fireplaces for compliance with the applicable requirements of the following criteria: ASTM WK 47329 Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test fuel in conjunction with ASTM E2515.

000- 102163747MTL-001 Test Report (page 2 of 15)

TABLE OF CONTENTS

I. INTRODUCTION 3
A. GENERAL 3
B. TEST UNIT DESCRIPTION 3

II. SUMMARY OF TEST RESULTS 4
A. PRETEST INFORMATION 4
1. TEST STANDARD 4
2. DEVIATION FROM STANDARD METHOD 4

III. SUMMARY OF TEST RESULTS 5

IV. PROCESS DESCRIPTION 8
A. AIR SUPPLY SYSTEM 8
B. TEST FUEL PROPERTIES 8

V. SAMPLING SYSTEMS 9
A. SAMPLING LOCATIONS 9
B. DILUTION TUNNEL 10
C. STACK GAS SAMPLE TRAIN 11
D. DILUTION TUNNEL SAMPLE SYSTEMS 12

VI. SAMPLING METHODS 13
A. PARTICULATE SAMPLING 13

VII. QUALITY ASSURANCE 13
A. INSTRUMENT CALIBRATION 13
B. TEST METHOD PROCEDURES 14

VIII. RESULTS AND OBSERVATIONS 15

APPENDICES

Laboratory Operating Procedure ..... A
Data and Calculation Forms ..... B
Calibration Documents C
Unit Drawings and Installation Manual ..... D
Dry Gas Meter Calibration Data ..... E
Unit Pre-burn Documentation ..... F
Stack Loss Efficiency data/Results ..... G
Tunnel Cleaning and Test Load Photographs ..... H
EPA Correspondence I

000- 102163747MTL-001 Test Report (page 3 of 15)

I. INTRODUCTION

Intertek Testing Services NA (Intertek) has conducted testing for Stove Builder International (SBI), on the HE350 Series Solid-Fuel Factory-Built Fireplaces[1] to evaluate compliance to the amended Standards of Performance for New Residential Wood Heaters (40 CFR Part 60, subpart AAA).

A. GENERAL

Tests were conducted by Claude Pelland, the undersigned. Tests were conducted at the client facility in St-Augustin-de-Desmaures, Quebec located at 250 de Copenhague, St-Augustin-de-Desmaures, Quebec, G3A 2H3. The laboratory elevation is 213 feet above sea level.

Per Section §60.534 (a) (ii) of 40 CFR Part 60 Subpart AAA, a request was made and authorized by EPA to use ASTM work Item WK47329, titled “Standard Method for Determining Particulate Matter Emissions for Wood Heaters using Cordwood Test Fuel.” with some caveat. (See approval letter found in Appendix I) CAN/CSA B415.1-2010 “Performance Testing of Solid-Fuel-Burning Heating Appliances” was used for determination of heat output, efficiency and CO emissions and ASTM E2515-11 “Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel” to measure particulate matter emissions. This evaluation was conducted from June 8th to June 10th, 2016.

Test program consisted in three (3) runs all of which started by a high burn rate test.

B. TEST UNIT DESCRIPTION

The HE350 Series is a factory-built fireplace manually fed constructed of carbon steel with a fire chamber lined with refractory stones. The outer dimensions are 45.125-inches wide, 40.875-inches high and 28.875-inches deep. It has a firebox volume of 4.28 ft³. The unit has two front doors with viewing glass and a blower located under the firebox. (See product drawings and component description in Appendix D)

The HE350 Series is comprised of four models which are the FP-15 – Waterloo (Valcourt brand), the Horizon (Osburn brand), the HE350 (Ventis brand) and the Monaco XL (Flame brand). They all share the same critical characteristics like firebox dimensions, air inlets and outlets, flue gas dimension and location, refractory dimensions and locations, etc. (See product drawings and component description in Appendix D)

They differ only by their faceplates and doors’ designs.

Tests were conducted using the FP-15 unit as a reference representative of

1 Considered a *built-in wood heater* per Section 60.531 of 40 CFR Part 60, Subpart AAA

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000- 102163747MTL-001 Test Report (page 4 of 15)

this model line.

II. SUMMARY OF TEST RESULTS

A. PRETEST INFORMATION

A sample was submitted to Intertek directly from the client. The sample was not independently selected for testing. The test unit was handed to the Intertek representative at client's facility in St-Augustin-de-Desmaures, Quebec. The unit was inspected upon receipt and found to be in good condition. The unit was set up following manufacturer's instructions without difficulty. Following assembly, the unit was placed on the test stand and instrumented with thermocouples in the specified locations.

Prior to beginning the emissions tests, the unit was operated for a minimum of 50 hours at medium burn rates to break in the heater in accordance with Appendix A-8 to Part 60 Test Methods 26 through 30B. (See data found in Appendix F). The unit was found to be operating satisfactory during this break-in.

Following the pre-burn break-in process the unit was allowed to cool. The unit's chimney system and laboratory dilution tunnels were cleaned using standard wire brush chimney equipment. On June 7th, 2016 the unit was ready for testing.

1. TEST STANDARD

From June 8th to June 10th, 2016, the HE350 Series factory-built fireplace particulate emission rate, burn-rate, heat output, efficiency and CO emission were evaluated using all applicable sections of ASTM WK47329, CSA B415.1-10 and ASTM E2515-11 standards.

2. DEVIATION FROM STANDARD METHOD

Deviations from ASTM WK 47329 and ASTM E2515-11 were performed but were in accordance with the requests made by EPA in the letter dated January 21st, 2016 in Appendix I.

A deviation was performed for the measurement of first hour of particulate matter emissions. A third independent and complete sampling train was installed. During the development of ASTM WK47329, some labs observed that doing a filter switch on one of the sampling train ended most of the time in a deviation between the two filter trains. That is the rationale for using a third independent sampling train.

No other deviations from the standard were performed, however, only applicable sections of standards were used during all testing.

000- 102163747MTL-001 Test Report (page 5 of 15)

III. SUMMARY OF TEST RESULTS

RUN #1 (June 8th, 2016). Primary air control was set to fully open. Kindling, start-up fuel and fuel were loaded per manufacturer's instructions. (See owner's Manual Appendix D) Convection blower was on max speed for the full duration of the test. The total fuel load including kindling and start-up fuel weighed 62.88 lb. The main fuel load was loaded with a coal bed of 4.4 lb. Burn time was 320 minutes. The burn rate was 4.08 kg/hr. The particulate emissions were 2.89 g/h.

RUN #2 (June 9th, 2016). Primary air control was set to fully open for the first 7 minutes and completely closed for the remainder of the test. Fuel was loaded by 100 seconds. Convection blower was on max speed for the full duration of the test. The test load weighed 51.83 lb and was loaded with a coal bed of 6.56 lb. Burn time was 770 minutes. The burn rate was 1.49 kg/hr. The particulate emissions were 1.49 g/h. The control so set yielded a low burn-rate as defined by Clause 9.7.1 of WK47329 using the burn time criteria. The procedure described under Run #2 was conducted after a high burn rate like the one described under Run #1

RUN #3 (June 10th, 2016). Primary air control was set to fully open for the first 7 minutes. Following this period, the primary air control was completely closed and the auxiliary air control fully opened (See product drawings). Fuel was loaded by 60 seconds. Convection blower was on max speed for the full duration of the test. The test load weighed 51.38 lb and was loaded with a coal bed of 8.10 lb. Burn time was 680 minutes. The burn rate was 1.67 kg/hr. The particulate emissions were 1.08 g/h. The control so set yielded a medium burn-rate (below mid-point between low and maximum burn-rate). The procedure described under Run #3 was conducted after a high burn rate like the one described under Run #1

000- 102163747MTL-001 Test Report (page 6 of 15)

SECTION 2 – Test Conditions Summary

Model Name(s)/Number(s)	HE350 Series (FP-15)			
Usable Firebox Volume - ft^3	4.276			
Convection Air Fan (No, Standard, Optional)	Standard			
Test Run #	2	3	1	
Date Tested	2016-06-09	2016-06-10	2016-06-08	
Test Run Category (L, M, H)	L	M	H	
Average Barometric Pressure - in Hg	29.70	29.85	29.40	
Max. Observed Ambient Temp - °F	83	80	87	
Min. Observed Ambient Temp - °F	65	70	77	
Max. Observed Filter Temp - °F	87	90	89	
Test Run Air Settings				
Primary (measured up from minimum)	Minimum	Minimum Auxiliary Max	Maximum	
Secondary (measured up from minimum)	Minimum	Minimum	Maximum	
Convection Air Fan Setting	Maximum	Maximum	Maximum	
Test Fuel Load				
Cordwood Fuel Species	Beech	Beech	Beech	
Specific Gravity (from Table 1)	0.67	0.67	0.67	
Higher Heating Value - Btu/lb (from Annex A1)	8088	8088	8088	
Nom. Test Fuel Load Piece Length - in.	16	16	16	
Number of Test Fuel Pieces	7	7	6	
Test Fuel Weight				
Kindling - As Fired lb	na	na	7.56	
Kindling Wt. - As % of Test Fuel Load	na	na	17.5%	
Kindling Moisture - % DB	na	na	10%	
Kindling - kg DB	na	na	3.12	
SU Fuel - As Fired lb	na	na	12.10	
SU Fuel Wt. - As % of Test Fuel Load	na	na	28.0%	
SU Fuel Moisture - % DB	na	na	20.9%	
SU Fuel - kg DB	na	na	4.54	
Test Fuel Load - As Fired lb	51.83	51.38	43.22	
Ave. Test Fuel Load MC % DB	23.1	23.4	21.78	
Test Fuel Load - kg DB	19.09	18.88	16.10	
Test Fuel Loading Density - lb/ft^3	12.12	12.02	10.11	

Intertek

000- 102163747MTL-001 Test Report (page 7 of 15)

SECTION 3 – Test Run Results Summary

Model Name(s)/Number(s)	HE350 Series (FP-15)			
Usable Firebox Volume - ft^3	4.276			
Convection Air Fan (No, Standard, Optional)	Standard			
Test Run #	2	3	1	
Date Tested	6-9-16	6-10-16	6-8-16	
Test Run Category	L	M	H	
Burn Rate - kg/h DB	1.49	1.67	4.08	
Burn Rate - As % of Low to High Midpoint	na	60%	na	
Test Run Duration - h	12.83	11.33	5.33	
Heat Output - Btu/h	16600	19100	43000	
Train 1 - g	19.37	11.96	18.28	
Train 2 - g	18.92	12.57	12.55	
Average	19.145	12.265	15.415	
PM Emission Train Precision - %	1.2%	-2.5%	18.6%	
PM Emission Train Precision - g/kg	0.02	-0.03	0.26	
PM Emission Rate - g/h	1.49	1.08	2.89	
First Hour Emissions - g	11.440	14.400	3.430	
First Hour Emissions - % of Total	60%	117%	22%	
Total CO Emissions - g	2125	1343	911	
CO Emissions Rate - g/h	166	119	219	
Overall Efficiency - CSA B415.1-10				
% HHV Basis	63.5	65.1	62.4	
% LHV Basis	68	69.7	66.8	

SECTION 4 - Weighted Average Summary

Model Name(s)/Number(s)	HE350 Series (FP-15)		
Usable Firebox Volume - ft_3	4.276		
Convection Air Fan (No, Standard, Optional)	Standard		
Average for Each Test Run Category	L	M	H
Burn Rate - kg/h DB	1.49	1.67	4.08
PM Emission Rate - g/h	1.49	1.08	2.89
CO Emissions Rate - g/h	165.6	118.5	218.7
Overall Efficiency - CSA B415.1-10			
% HHV Basis	63.5	65.1	62.4
% LHV Basis	68.0	69.7	66.8
Heat Output - Btu/h	16600	19100	43000
Category Weighting	40%	40%	20%

000- 102163747MTL-001 Test Report (page 8 of 15)

ASTM WK47329 Weighted Averages			
PM Emission Rate - g/h	1.6		
CO Emissions Rate - g/h	157		
Overall Efficiency - CSA B415.1-10			
% HHV Basis	64		
% LHV Basis	68		
Heat Output Range - Btu/h	16600	to	43000

IV. PROCESS DESCRIPTION

A. AIR SUPPLY SYSTEM

Primary and secondary combustion air enters on the bottom right side of the outer jacket. This air is then split and fed to two separate 3” diameter flexible pipes. One for primary air and one for secondary air. The primary air is routed to the top of the glass door and pushed down to the ember bed. The secondary air is routed behind the fire chamber and fed the secondary air tube located at the top of the firebox.

These two combustion air are linked together and controlled by one handle located at the bottom right of the faceplate. When not operating at maximum air setting, the system is also controlled by an internal thermostat (snap-disc) that close an electric circuit that is controlling a motor. Therefore, when the control handle is partially or completely closed and when the fireplace is warm enough, the thermostat closes a circuit that affect the position of the primary air control. Until it gets warm, even though the control handle is partially or completely closed, the primary air inlet will remain partially opened for a period of time.

This mechanism prevents the fire from polluting and choking after a reload with high humidity logs or low temperature coal.

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B. TEST FUEL PROPERTIES

The species of fuel used was mainly beech. The fuel was split cordwood of nominal length of 16 inches. The fuel was dried in air to average moisture content between 18% and 28% on a dry basis. Cordwood fuel was loaded from front to back into the firebox per manufacturer’s instructions.

Intertek

000- 102163747MTL-001 Test Report (page 9 of 15)

V. SAMPLING SYSTEMS

The sampling procedure used was as specified in ASTM WK47329 & ASTM E2515-11.

A. SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 20 feet from the tunnel entrance. The tunnel has two elbows ahead of the sampling section. (See Figure 1) The sampling section is a continuous 15-foot section of 8-inches diameter pipe straight over its entire length. Tunnel velocity pressure is determined by a Type “S” Pitot tube located 100 inches from the beginning of the sampling section. The dry bulb thermocouple is located six inches downstream from the Pitot tube. Tunnel samplers are located 48 inches downstream of the Pitot tube and 32 inches upstream from the end of this section. (See Figure 1.)

Stack gas samples are collected from the insulated steel chimney section 8 feet ± 6 inches above the scale platform. (See Figure 2.)

000- 102163747MTL-001 Test Report (page 10 of 15)

B. DILUTION TUNNEL

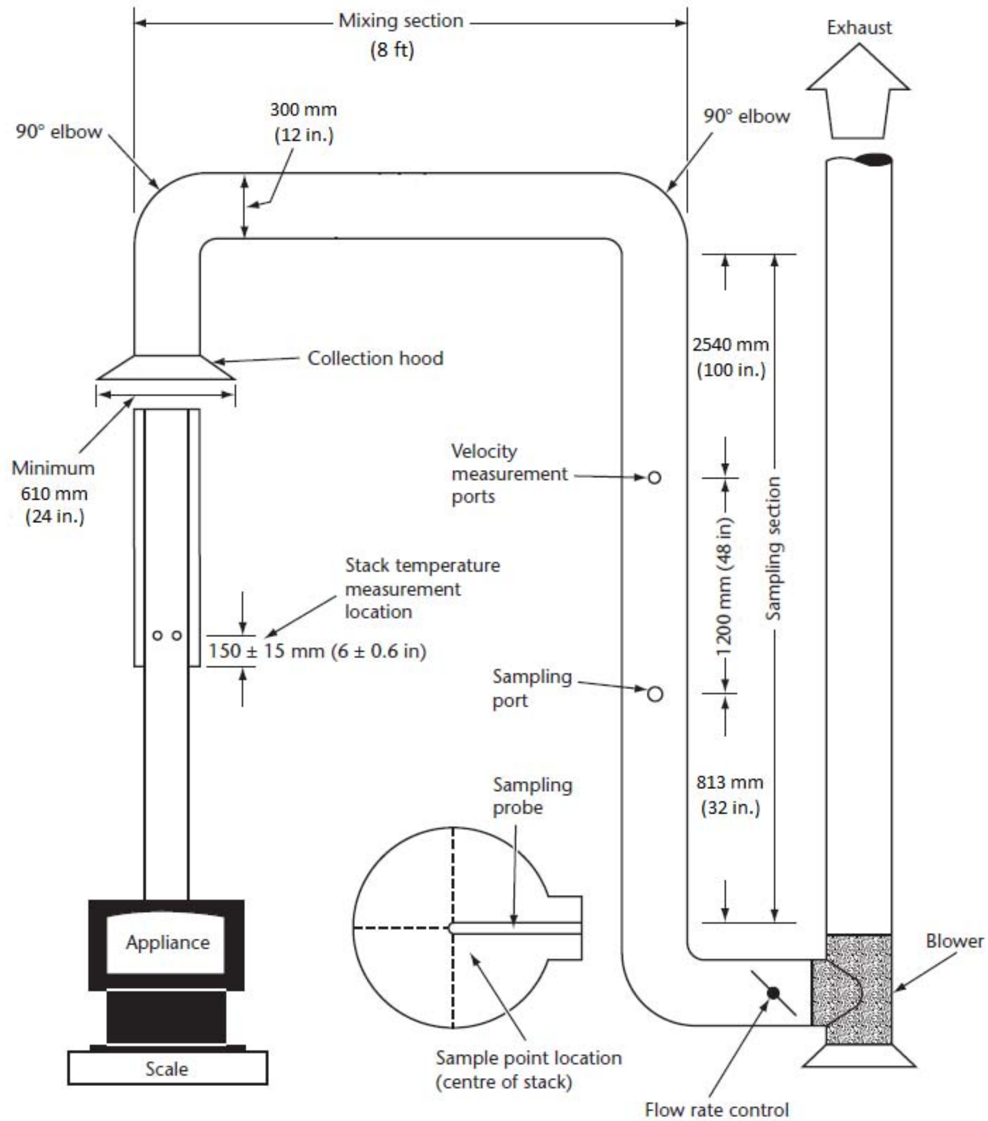
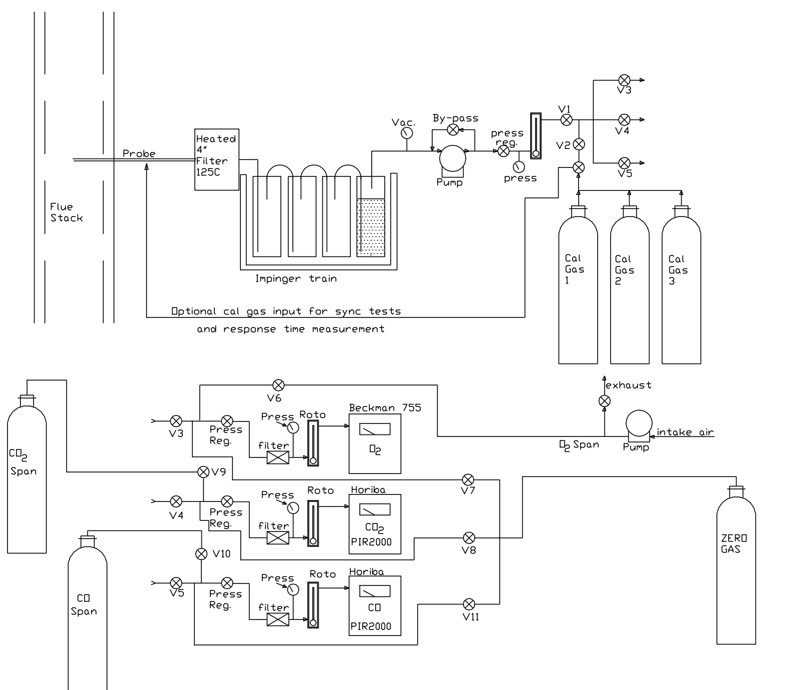


Figure 1- Dilution tunnel

000- 102163747MTL-001 Test Report (page 11 of 15)

C. STACK GAS SAMPLE TRAIN



ITS FLUE GAS SAMPLE TRAIN

FIGURE 2

000- 102163747MTL-001 Test Report (page 12 of 15)

D. DILUTION TUNNEL SAMPLE SYSTEMS

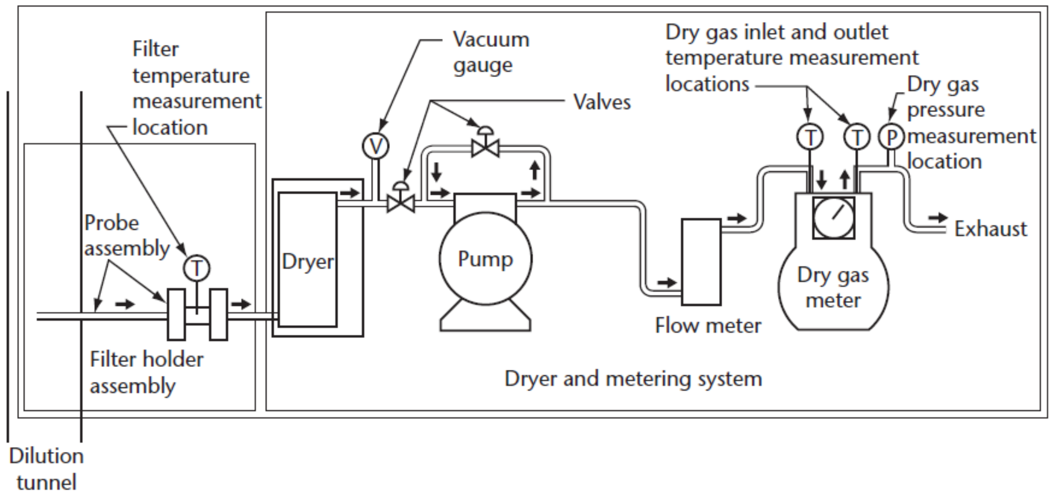


Figure 2 - Sampling trains

000- 102163747MTL-001 Test Report (page 13 of 15)

VI. SAMPLING METHODS

A. PARTICULATE SAMPLING

Particulates were sampled in strict accordance with ASTM E2515-11. Sample filters used were Pall TX-40 as requested. The dryers used in the sample systems are filled with “Drierite” before each test run.

VII. QUALITY ASSURANCE

A. INSTRUMENT CALIBRATION

1. DRY GAS METERS

At the conclusion of each test program the dry gas meters are checked against a standard dry gas meter. Three runs are made on each dry gas meter used during the test program. The average calibration factors obtained are then compared with the six-month calibration factor and, if within 5%, the six-month factor is used to calculate standard volumes. Results of this calibration are contained in Appendix E.

An integral part of the post test calibration procedure is a leak check of the pressure side by plugging the system exhaust and pressurizing the system to 10” W.C. The system is judged to be leak free if it retains the pressure for at least 10 minutes.

The standard dry gas meter is calibrated every 12 months using a Spirometer designed by the EPA Emissions Measurement Branch. The process involves sampling the train operation for 1 cubic foot of volume. With readings made to .001 ft^3, the resolution is 0.1%, giving an accuracy higher than the ±2% required by the standard.

2. STACK SAMPLE ROTOMETER

The stack sample rotameter is checked by running three tests at each flow rate used during the test program. The flow rate is checked by running the rotometer in series with one of the dry gas meters for 10 minutes with the rotometer at a constant setting. The dry gas meter volume measured is then corrected to standard temperature and pressure conditions. The flow rate determined is then used to calculate actual sampled volumes.

000- 102163747MTL-001 Test Report (page 14 of 15)

3. GAS ANALYZERS

The continuous analyzers are zeroed and spanned before each test with appropriate gases. A mid-scale multi-component calibration gas is then analyzed. At the conclusion of a test, the instruments are checked again with zero, span and calibration gases. The drift in each meter is then calculated and must not exceed 5% of the scale used for the test.

At the conclusion of each unit test program, a five-point calibration check is made. This calibration check must meet accuracy requirements of the applicable standards. Consistent deviations between analyzer readings and calibration gas concentrations are used to correct data before computer processing. Data is also corrected for interferences as prescribed by the instrument manufacturer's instructions.

B. TEST METHOD PROCEDURES

1. LEAK CHECK PROCEDURES

Before and after each test, each sample train is tested for leaks. Leakage rates are measured and must not exceed 0.02 CFM or 4% of the sampling rate. Leak checks are performed checking the entire sampling train, not just the dry gas meters. Pre-test and post-test leak checks are conducted with a vacuum of 5 inches of mercury. Vacuum is monitored during each test and the highest vacuum reached is then used for the post test vacuum value. If leakage limits are not met, the test run is rejected. During these tests no vacuum were observed. Thus, leakage rates reported are expected to be much higher than actual leakage during the tests.

2. TUNNEL VELOCITY/FLOW MEASUREMENT

The tunnel velocity is calculated from a center point Pitot tube signal multiplied by an adjustment factor. This factor is determined by a traverse of the tunnel as prescribed in EPA Method 1. Final tunnel velocities and flow rates are calculated from EPA Method 2, Equation 6.9 and 6.10. (Tunnel cross sectional area is the average from both lines of traverse.)

Pitot tubes are cleaned before each test and leak checks are conducted after each test.

3. PM SAMPLING PROPORTIONALITY (ASTM E2515-11)

Proportionality was calculated in accordance with ASTM E2515-11. The data and results are included in Appendix B.

000- 102163747MTL-001 Test Report (page 15 of 15)

VIII. RESULTS AND OBSERVATIONS

Stove Builder International Inc. model HE350 series Factory-built fireplace has been found to be in compliance with the applicable performance requirements of the following criteria:

Standards of Performance for New Residential Wood Heaters (40 CFR Part 60, subpart AAA)

This standard requires that the weighted average particulate emission rate for an appliance not equipped with a catalytic combustor not exceed 4.5 g/h. The unit as tested produced a weighted average emission rate of 1.61 g/h and therefore met this limit.

INTERTEK TESTING SERVICES NA

Reported by: ______________
Claude Pelland, Eng.
Test Engineer

Reviewed by: ______________
Rick Curkeet P.E.
Chief Engineer- Hearth Products

200- App-A Laboratory Operating Procedure

APPENDIX A
Laboratory Operating Procedure

200- App-A Laboratory Operating Procedure (page 2 of 7)

Report Number: G102038216 Issued date: April 29, 2015
Client: Stove Builder International inc.

A. GAS ANALYSIS

1. Instruments should be turned on and allowed to warm up for one (1) hour minimum.

2. Calibrate analyzers as follows:

NOTE : Prior to proceeding with calibration, make sure to use NIST tracable calibration gas bottles. Adjust flow meter if necessary at each instrument to required flow value.

a) Using span gas, adjust span control to values specified on calibration gas label.
b) Using nitrogene, adjust zero controls to provide a 0.00 analyzer readout.

c) Repeat a) and b) until no further adjustment is required.
d) Check readout vs. calibration gases (2) labels.

The CO_2 and CO analyzers are "ZEROED" on nitrogen. The O_2 analyzer is spanned on air and set for 20.9%. It is zeroed on nitrogen as well.

3. Check for response time synchronization.

a) With no fire in unit, allow reading to stabilize (O_2 should be 20.93, CO and CO_2 should equal O).
b) Flow the calibration gas in the unit and start stop watch. Note the time required for each unit to reach .90 of the calibration gas bottle value. If all three analyzers reach this value within 15 seconds of each other, synchronization is adequate. If not, contact the laboratory manager. Synchronization is adjusted by internal instrument setting.

4. Set-up sample clean-up and water collection train as follows.

a) Load impingers as follows:
Impinger #1: 100 ml distilled water and 5 ml H_2SO_4
Impinger #2: 100 ml distilled water and 5 ml H_2SO_4
Impinger #3: Empty
Impinger #4: 200 – 300 grams silica gel (dry)

200- App-A Laboratory Operating Procedure (page 3 of 7)

Report Number: G102038216 Issued date: April 29, 2015
Client: Stove Builder International inc.

b) Place impingers in container and connect with "U TUBES". Grease carefully on bottom half of ball joint so that grease will not get into tubes.

c) Connect filter to first impinger and sample line to last impinger.

e. Leak check system as follows.

1) Plug probe.
2) Turn on sample system.
3) Observe sample flow rotometer and vacuum gauge. If necessary, use vacuum; adjust valve to set vacuum to the maximum inches Hg.
4) If the float in rotometer does not stabilize below 10 on scale, system must be resealed.
5) Repeat leak check procedure until satisfactory results are obtained.

f) Just prior to starting test, fill impinger container with water and ice and record ambiant conditions on data form no. 192-t-9904.

B. Dilution tunnel sample train set-up

1. Filters and holders.

a) Clean probes and filter holder front housings carefully and desiccate for at least 24 hours prior to use.

b) Filters should be numbered and filter and probe combinations labeled prior to use.

c) Weigh desiccated filters and probe-filter units on analytical balance. Record weights data form no. 192-p-9904. Note that probe and front half of front filter are to be weighed as a unit.

d) Carefully assemble filter holder units and connect to sampling systems. Check "DRIERITE" columns for adequate dry absorbent (blue).

2. Leak checking.

a) Each sample system is to be checked for leakage prior to inserting probes in tunnel.

200- App-A Laboratory Operating Procedure (page 4 of 7)

Intertek

Report Number: G102038216 Issued date: April 29, 2015
Client: Stove Builder International inc.

b) Plug probes and start samplers, adjust pump bypass valve to produce a vacuum reading of 5 inches Hg. (NOTE: During test, vacuum must not exceed 5 inches unless posttest leak check shows acceptable results.)

c) Allow vacuum indication to stabilize for two (2) minutes, then record time and dry gas (DGM_1) and (DGM_2) meter readings. Wait ten (10) minutes and record dry gas meter readings again (DGM_3, DGM_4). NOTE: If mark, system is leaking too much and all seals should be checked.

d) Calculate leakage rate as follows.

1) System 1: $\frac{(DGM_3 - DGM_1)}{10} = CFM_1$

2) System 2: $\frac{(DGM_4 - DGM_2)}{10} = CFM_2$

If CFM_1 or CFM_2 is greater than .02 CFM, leakage is unacceptable and system must be resealed.

If CFM_1 or CFM_2 is greater than 0.04 X sample rate, leakage is unacceptable. For most tests, the sample rate will be about 0.15 CFM, thus leakage rates in excess of 0.04 X 0.15 = 0.006 CFM are not acceptable.

e) Once leakage check is satisfactory, unplug probe and set flow to appropriate rate for test. This should be done in the minimum amount of time necessary and with the probes in ambient air. Do not insert probes in tunnel until the start of the test run. When flow is established, replug probes to prevent contamination.

200- App-A Laboratory Operating Procedure (page 5 of 7)

Report Number: G102038216 Issued date: April 29, 2015
Client: Stove Builder International inc.

TEST CONDUCT

A. FUEL LOAD

1. Determine optimum load weight by multiplying firebox volume in cubic feet by 7. This is the load weight on an as-fired basis.
2. Determine piece size to obtain the requested load configuration and meet the test load weight criteria. The load should consist of the following: **TO BE DETERMINED**
3. Weigh out test load and adjust weight by shortening all pieces equally if necessary.
4. Measure and record moisture content of each fuel piece using Delmhorst moisture meter. Determine if fuel load moisture content is in required range. If not, construct new load using wood with required moisture content. All wood in the humidity chamber should be within range. Contact project manager if you cannot find suitable pieces.

B. Unit start-up

1. Before lighting a fire, turn on dilution tunnel and set flow rate to 140 SCFM if burn rate is to be less than 3 kg/hr or to an appropriate rate from table provided in laboratory for higher burn rates. Record readings on data form no. 192-r-9904.
2. Check draft imposed on cold stove with all inlets closed and a draft gauge in the chimney. If draft is greater than 0.005 inches water column, adjust tunnel to stack gap until draft is less than 0.005.
3. Check for ambient airflow around unit with hot wire anomometer. Must be less than 50 ft/min.
4. Check all equipment for proper operation. Analyzers should be on and in sample mode. Computer should be loaded with test program and awaiting test start command.
5. Zero scale and start fire with uncolored newspaper and kindling representing 10 % of test load with the same type of fuel.
6. Once kindling is burning well after 5 minutes, add splitted pieces having a bottom surface around 4 sq. inches and representing 25% of test load weight. Operate at high fire for 15 minutes. Then adjust settings to intended test run levels as per the manufacturer's.
7. Following addition of pretest fuel load (splitted pieces), start computer for data logging.

200- App-A Laboratory Operating Procedure (page 6 of 7)

Report Number: G102038216 Issued date: April 29, 2015
Client: Stove Builder International inc.

C. Test run

1. When the 15 minutes high fire pre-burn period is completed, the test is to be started as follows:

a) Insert the sample probes into the tunnel being careful not to hit sides of tunnel with probe tip.
b) Check tunnel pitot tube for proper position. (Pitot should be carefully cleaned prior to each test.)
c) Turn on probe sample systems and stack sampler.
d) Open stove door, rake coals and load stove as follows: **TO BE DETERMINED**
e) Close door or follow manufacturer's start-up procedures. (Five (5) minutes maximum time before all doors and controls must be set to final positions for duration of test.)
f) An alarm will sound an audible signal at the (10) minutes intervals. This signal a reading interval. You must record at each interval the following readings on data form no. 192-v-9904:

1) Rotometer readings.
2) Tunnel pitot tube reading.
(Zero regularly between readings)
3) Dry gas meter readings.
4) Temperature readings.
5) Draft reading
6) Test laod weight
7) CO, CO_2 and O_2 readings
8) Observations of any unusual or non-routine events.

g) During the test, any condition approaching unacceptable limits will be noted. The filter probes and housings are installed in small holders just outside the tunnel. If the filter temperature gets too high, you will have to increase the water flow through the cooling unit until acceptable temperatures are obtained. In between readings, check on other equipment. Be sure dryers and filters are working and monitor impinger train for proper water and ice levels etc.

200- App-A Laboratory Operating Procedure (page 7 of 7)

h) When the fuel charge is consumed, it will signal end of test and shut down the sampling systems. When this occurs, remove filter holder and probes from tunnel and impingers from sample line.

III. POST TEST PROCEDURES

SAMPLE RECOVERY – FILTER TRAINS

1. Carefully clean outside of probes and filter housings with alcohol.
2. Disassemble filter holder and transfer filters to clean petri dish. Scrape gasket with scalpel and collect any loose material on filters.
3. Place probe and front half of first filter holders (still assembled) and filters in desiccator. Allow 24-hour desiccation before weighing.
4. Weigh probe filter holder units and filters at two (2) hour intervals until weight change between weighings is less than 0.5 mg. Record all weights taken on data form no. 192-p-9904.

Calculation of results

The computer program carries out all final calculations. When run, it will ask for data from forms used during the test. Enter data as called for.

Other tests

Fuel samples for each run should be tested for heating value and moisture content by ASTM D3286 and D4442 methods respectively.

GENERAL

This guide cannot cover every possible contingency, which may develop during a particular test program. Many questions, which may arise, can be answered by a complete understanding of the test standards and their intent. When in doubt on any detail, check with the laboratory manager and be sure you understand the procedures involved.

It is critical that all spaces on the data forms be properly filled in. Each test must be represented by a complete record of what was done and when.

300- App-B Data and Calculation Forms

Appendix B

Data and calculation Forms

300- App-B Data and Calculation Forms (page 2 of 92)

Manufacturer:	SBI	**Eng:**	Claude Pelland
Model:	HE350 Series (FP-15)		
Date:	2016-06-08		
Run:	1		
Control #:	QC20160608		
Rated Capacity	-	BTU/HR	
Test Duration:	**60**		
)utput Category:	4	Start	End
	Barometer (in.Hg):	29.4	29.4
	Dry Bulb (F):	62	65
	Humidity (%):	71	64
Average Stove Temperature:		0.00	
Moisture content of wood (wet basis):		17.84	

	Average	0.00	0.00	0.00	442.12	79.44	118.72	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		86.41	86.70	83.62					0.1417	0.05
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*					*	*
Elapsed	Weight				Flue	Room	Tunnel	Outlet	door	ash door	left side	back	right side	front	DGM 3	DGM 3	DGM 3	Filter 3					Tunnel	
Time	Remaining	CO	CO_2	O_2	Gas	Temp	Dry Bulb	air							Reading	Inlet T	Outlet T	Temp					Velocity	Draft
0.00	4.39	0.00	0.00	0.00	77.66	77.39	77.86		0.00	0.00	0.00	0.00	0.00	0.00	540.123	81.23	81.03	85.87					0.138	0.000
10.00	6.83	0.00	0.00	0.00	231.10	78.05	103.66		0.00	0.00	0.00	0.00	0.00	0.00	541.660	88.52	83.84	83.67					0.132	0.034
20.00	5.20	0.00	0.00	0.00	452.73	78.49	111.76		0.00	0.00	0.00	0.00	0.00	0.00	543.175	87.60	86.21	82.43					0.133	0.062
30.00	3.34	0.00	0.00	0.00	515.08	79.26	120.81		0.00	0.00	0.00	0.00	0.00	0.00	544.630	87.19	87.89	84.26					0.148	0.068
40.00	12.88	0.00	0.00	0.00	525.27	79.93	128.79		0.00	0.00	0.00	0.00	0.00	0.00	546.160	87.03	88.80	83.75					0.145	0.069
50.00	9.39	0.00	0.00	0.00	663.09	80.73	148.22		0.00	0.00	0.00	0.00	0.00	0.00	547.490	86.77	89.30	83.34					0.142	0.077
60.00	6.45	0.00	0.00	0.00	629.94	82.24	139.98		0.00	0.00	0.00	0.00	0.00	0.00	548.904	86.56	89.82	81.99					0.154	0.074

300- App-B Data and Calculation Forms (page 3 of 92)

(ASTM E2515 Formula)

Manufacturer:	SBI		
Model:	HE350 Series (FP-15)	Stack area (ft2):	0.349066
Date:	6-8-16	Wood moisture (% wet):	17.84
Run:	1	Load Weight (lbs wet):	62.88
Project #:	QC20160608	Burn Rate (Dry kg/hr):	23.434
	-		
Test Duration:	60		
Total Gas Volume (DGM 1):	8.211	Final Temperature (DGM #3) Degrees Rankin:	546.556
Total Gas Volume (DGM 2):	0.000		
Average Barometric Pressure:	29.4	Final Tunnel Temperature Degrees Rankin:	578.724
Molecular Weight:	28.78	Final Tunnel Velocity (feet per second):	21.292
Pitot Correction:	0.952529	Standardized Tunnel Flow (dscfm):	391.637197
Calibration Factor (DGM #3):	0.9870		
(3) VS:	0.268863		

Manufacturer:	SBI
Model:	HE350 Series (FP-15)
Date:	6-8-16
Run:	1

Elapsed Time	DGM 3 Reading	DGM 3 Inlet T	DGM 3 Outlet T	Tunnel Dry Bulb	Filter Face Velocity DGM 3	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 3 Deg. R	Average **100.1** **Proportional Rates** **PR3**	#3 dDGM Vol.Std. (ft3)	Time	Average **0.38** SQRT Delta-P
0.00	540.12	81.23	81.03	77.857		0.138	20.231	541.1			0	0.370874
10.00	541.66	88.52	83.84	103.66	7.70	0.132	20.284	546.2	107.48	1.440	10	0.363223
20.00	543.18	87.60	86.21	111.76	7.58	0.133	20.509	546.9	106.00	1.418	20	0.364644
30.00	544.63	87.19	87.89	120.81	7.27	0.148	21.823	547.5	96.96	1.360	30	0.384975
40.00	546.16	87.03	88.80	128.79	7.64	0.145	21.762	547.9	103.51	1.429	40	0.381289
50.00	547.49	86.77	89.30	148.22	6.64	0.142	21.824	548.0	92.64	1.242	50	0.376215
60.00	548.90	86.56	89.82	139.98	7.06	0.154	22.614	548.2	93.72	1.320	60	0.392495

300- App-B Data and Calculation Forms (page 4 of 92)

Intertek Testing Services

Manufacturer:	SBI	RESULTS	
Model:	HE350 Series (FP-15)		
Date:	6-8-16	Average emission rate:(gr/hr)	3.4
Run:	1		
Project #:	QC20160608	Burn Rate (Dry kg/hr):	N/A
Test Duration: (minutes)	60		

PRESSURE FACTOR	0.98262	BAROMETRIC PRESSURE	
		Average:	29.4
TEMPERATURE FACTORS		Start:	29.4
DGM #3:	0.96605	End:	29.4
		DRY GAS METER VALUES	
VOLUMES SAMPLED		DGM #3 Final:	548.904
DGM #3:	8.22709	Initial:	540.123
TOTAL TUNNEL VOLUME (scf):	23498		
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)	
Sample Train 3:	2856.201	DGM #3:	546.556
TOTAL EMISSIONS		CALIBRATION FACTORS	
Sample Train 3 (g):	**3.43**	DGM #3:	0.9870
EMISSION RATES		TUNNEL FLOW RATE:	391.637
Sample Train 3 (g/hr):	**3.43**		
		PARTICULATE CATCH (mg)	
		Total Sample Train 3:	1.2
		Filter and seal Sample Train 3:	1.2
MAX Allowed	N/A		
		Probe Sample Train 3:	0
DEVIATION:	N/A		

	Train 3	Room Particulate Correction		
Cs	0.00014586	Mr	0	Milligram Catch (mg)
Cr	0	Vmr	7.7544	Total Volume Sampled (dscf)
Et	3.43			Rotometer (glass) at 100 flow rate is 0.12924 cfm
Et	AVERAGE	Grams Emissions		

300- App-B Data and Calculation Forms (page 5 of 92)

Manufacturer: SBI **Eng:** Claude Pelland
Model: HE350 Series (FP-15)
Date: 2016-06-08
Run: 1
Control #: QC20160608
Rated Capacity - BTU/HR
Test Duration: 320
Output Category: 4

	Start	End
Barometer (in.Hg):	29.4	29.4
Dry Bulb (F):	62	65
Humidity (%):	71	64

Average Stove Temperature: 0.00
Moisture content of wood (wet basis): 17.88

Elapsed Time	Weight Remaining	CO	CO_2	O_2	Flue Gas	Room Temp	Tunnel Dry Bulb	Outlet air	door	ash door	left side	back	right side	front	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	Filter 1 Temp	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Filter 2 Temp	Tunnel Velocity	Draft
	Average	0.00	0.00	0.00	564.98	82.67	139.40	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		88.66	90.90	84.34		84.82	84.14	84.27	0.1414	0.07
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*	*	*	*	*	*	*
0	4.39	0.00	0.00	0.00	77.66	77.39	77.86		0.00	0.00	0.00	0.00	0.00	0.00	921.072	81.23	81.03	89.20	1083.788	79.87	81.15	84.15	0.138	0.000
10	6.83	0.00	0.00	0.00	231.10	78.05	103.66		0.00	0.00	0.00	0.00	0.00	0.00	921.952	88.52	83.84	81.70	1084.692	81.03	84.21	83.00	0.132	0.034
20	5.20	0.00	0.00	0.00	452.73	78.49	111.76		0.00	0.00	0.00	0.00	0.00	0.00	922.900	87.60	86.21	81.83	1085.651	81.81	84.13	81.48	0.133	0.062
30	3.34	0.00	0.00	0.00	515.08	79.26	120.81		0.00	0.00	0.00	0.00	0.00	0.00	923.860	87.19	87.89	83.12	1086.618	82.82	83.37	82.63	0.148	0.068
40	12.88	0.00	0.00	0.00	525.27	79.93	128.79		0.00	0.00	0.00	0.00	0.00	0.00	924.829	87.03	88.80	85.28	1087.573	83.50	83.20	84.66	0.145	0.069
50	9.39	0.00	0.00	0.00	663.09	80.73	148.22		0.00	0.00	0.00	0.00	0.00	0.00	925.803	86.77	89.30	82.74	1088.540	83.82	83.10	82.78	0.142	0.077
60	6.45	0.00	0.00	0.00	629.94	82.24	139.98		0.00	0.00	0.00	0.00	0.00	0.00	926.773	86.56	89.82	82.50	1089.516	83.88	82.94	82.54	0.154	0.074
70	58.48	0.00	0.00	0.00	600.26	82.43	200.89		0.00	0.00	0.00	0.00	0.00	0.00	927.738	86.67	90.44	82.54	1090.495	84.09	82.64	82.35	0.148	0.076
80	39.55	0.00	0.00	0.00	739.21	81.28	157.99		0.00	0.00	0.00	0.00	0.00	0.00	928.703	87.06	90.99	83.56	1091.475	84.77	82.86	83.28	0.152	0.082
90	33.85	0.00	0.00	0.00	847.53	82.83	179.49		0.00	0.00	0.00	0.00	0.00	0.00	929.677	87.38	91.26	84.88	1092.423	85.06	83.18	84.48	0.149	0.088
100	28.60	0.00	0.00	0.00	893.72	83.88	182.12		0.00	0.00	0.00	0.00	0.00	0.00	930.628	87.72	91.33	85.45	1093.361	85.09	83.31	85.87	0.149	0.090
110	24.13	0.00	0.00	0.00	888.48	84.14	182.41		0.00	0.00	0.00	0.00	0.00	0.00	931.558	88.40	91.36	85.78	1094.280	85.19	83.69	86.15	0.146	0.088
120	19.95	0.00	0.00	0.00	877.37	85.26	180.93		0.00	0.00	0.00	0.00	0.00	0.00	932.456	88.97	91.33	85.65	1095.164	85.39	84.20	86.12	0.150	0.088
130	16.34	0.00	0.00	0.00	838.66	85.63	174.71		0.00	0.00	0.00	0.00	0.00	0.00	933.366	89.66	91.82	85.62	1096.068	85.59	84.70	85.96	0.152	0.087
140	13.14	0.00	0.00	0.00	807.14	85.76	171.62		0.00	0.00	0.00	0.00	0.00	0.00	934.275	90.02	92.08	85.74	1096.975	85.81	84.87	85.71	0.141	0.085
150	10.64	0.00	0.00	0.00	763.36	85.87	165.04		0.00	0.00	0.00	0.00	0.00	0.00	935.194	90.06	92.34	85.40	1097.886	85.72	84.67	85.24	0.144	0.081
160	8.51	0.00	0.00	0.00	732.09	86.02	159.01		0.00	0.00	0.00	0.00	0.00	0.00	936.116	90.21	92.61	85.03	1098.796	85.89	84.78	84.87	0.147	0.081
170	6.91	0.00	0.00	0.00	685.64	86.58	154.97		0.00	0.00	0.00	0.00	0.00	0.00	937.039	90.25	92.71	84.72	1099.721	85.99	84.92	84.76	0.138	0.078
180	5.61	0.00	0.00	0.00	647.90	85.88	149.98		0.00	0.00	0.00	0.00	0.00	0.00	937.952	90.22	92.70	84.33	1100.631	86.11	85.04	84.45	0.138	0.075
190	4.57	0.00	0.00	0.00	615.59	85.00	144.61		0.00	0.00	0.00	0.00	0.00	0.00	938.885	90.25	92.77	84.34	1101.548	86.23	85.13	84.06	0.136	0.073
200	3.73	0.00	0.00	0.00	585.04	84.51	140.40		0.00	0.00	0.00	0.00	0.00	0.00	939.805	90.27	92.85	83.98	1102.469	86.26	85.35	83.84	0.136	0.070
210	3.12	0.00	0.00	0.00	544.56	83.76	135.00		0.00	0.00	0.00	0.00	0.00	0.00	940.725	90.30	92.86	83.61	1103.392	86.36	85.48	83.43	0.138	0.067
220	2.67	0.00	0.00	0.00	508.64	83.33	130.37		0.00	0.00	0.00	0.00	0.00	0.00	941.651	90.13	92.81	83.33	1104.312	86.28	85.46	83.16	0.140	0.065
230	2.29	0.00	0.00	0.00	484.31	82.82	127.26		0.00	0.00	0.00	0.00	0.00	0.00	942.573	90.04	92.86	83.22	1105.235	86.19	85.48	82.98	0.139	0.062
240	1.95	0.00	0.00	0.00	449.06	83.30	122.93		0.00	0.00	0.00	0.00	0.00	0.00	943.488	89.99	92.73	82.83	1106.162	86.15	85.21	82.64	0.142	0.061
250	1.63	0.00	0.00	0.00	429.07	82.53	120.05		0.00	0.00	0.00	0.00	0.00	0.00	944.412	89.83	92.62	82.45	1107.083	85.93	85.08	82.31	0.142	0.059
260	1.29	0.00	0.00	0.00	414.73	82.14	117.84		0.00	0.00	0.00	0.00	0.00	0.00	945.334	89.49	92.26	84.31	1108.008	85.80	84.93	83.84	0.142	0.057
270	1.02	0.00	0.00	0.00	396.08	81.59	115.62		0.00	0.00	0.00	0.00	0.00	0.00	946.240	89.22	92.00	84.89	1108.940	85.09	84.35	85.71	0.143	0.054
280	0.80	0.00	0.00	0.00	379.47	82.04	114.09		0.00	0.00	0.00	0.00	0.00	0.00	947.164	89.05	91.88	84.88	1109.860	85.17	84.36	85.71	0.130	0.054
290	0.55	0.00	0.00	0.00	368.11	81.57	112.65		0.00	0.00	0.00	0.00	0.00	0.00	948.081	88.99	91.79	85.10	1110.784	85.01	84.18	85.55	0.135	0.052
300	0.31	0.00	0.00	0.00	359.21	81.47	110.69		0.00	0.00	0.00	0.00	0.00	0.00	949.005	88.88	91.70	85.10	1111.720	84.62	83.95	85.68	0.133	0.051
310	0.05	0.00	0.00	0.00	352.12	81.42	109.76		0.00	0.00	0.00	0.00	0.00	0.00	949.924	88.86	91.32	85.04	1112.639	84.36	83.54	85.72	0.133	0.050
320	-0.16	0.00	0.00	0.00	342.21	80.96	108.57		0.00	0.00	0.00	0.00	0.00	0.00	950.848	89.07	91.26	85.05	1113.538	84.14	83.26	85.80	0.134	0.051

300- App-B Data and Calculation Forms (page 6 of 92)

Manufacturer:	SBI	Stack area (ft2):	0.3490659
Model:	HE350 Series (FP-15)	Wood moisture (% wet):	17.88
Date:	6-8-16	Load Weight (lbs wet):	58.49
Run:	1	Burn Rate (Dry kg/hr):	4.085
Project #:	QC20160608		
	-		
Test Duration:	320		
Total Gas Volume (DGM 1):	28.244	Final Temperature (DGM #1) Degrees Rankin:	549.779
Total Gas Volume (DGM 2):	28.416	Final Temperature (DGM #2) Degrees Rankin:	544.481
Average Barometric Pressure:	29.4	Final Tunnel Temperature Degrees Rankin:	599.396
Molecular Weight:	28.78	Final Tunnel Velocity (feet per second):	21.654
Pitot Correction:	0.9525288	Standardized Tunnel Flow (dscfm):	384.5533289
Calibration Factor (DGM #1):	1.0060		
Calibration Factor (DGM #2):	1.0030		
(1) VS:	0.0767454		
(2) VS:	0.0762803		

(ASTM E2515 Formula)

Manufacturer:	SBI
Model:	HE350 Series (FP-15)
Date:	6-8-16
Run:	1

Elapsed Time	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Tunnel Dry Bulb	Filter Face Velocity DGM 1	Filter Face Velocity DGM 2	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 1 Deg. R	Average Inlet + Outlet Temp. Meter 2 Deg. R	Average **100.0** Proportional Rates **PR1**	Average **100.0** **PR2**	#1 dDGM Vol.Std. (ft3)	#2 dDGM Vol.Std. (ft3)	Time	Average **0.38** SQRT Delta-P
0.00	921.07	81.23	81.03	1083.79	79.87	81.15	77.8575			0.138	20.231	541.1	540.5					0	0.370874
10.00	921.95	88.52	83.84	1084.69	81.03	84.21	103.662	4.50	4.63	0.132	20.284	546.2	542.6	96.16	98.25	0.841	0.867	10	0.363223
20.00	922.90	87.60	86.21	1085.65	81.81	84.13	111.755	4.84	4.91	0.133	20.509	546.9	543.0	103.65	104.43	0.904	0.919	20	0.364644
30.00	923.86	87.19	87.89	1086.62	82.82	83.37	120.805	4.89	4.95	0.148	21.823	547.5	543.1	99.97	100.48	0.915	0.926	30	0.384975
40.00	924.83	87.03	88.80	1087.57	83.50	83.20	128.791	4.93	4.89	0.145	21.762	547.9	543.3	102.44	100.78	0.923	0.914	40	0.381289
50.00	925.80	86.77	89.30	1088.54	83.82	83.10	148.216	4.96	4.95	0.142	21.824	548.0	543.5	106.02	105.08	0.927	0.926	50	0.376215
60.00	926.77	86.56	89.82	1089.52	83.88	82.94	139.98	4.94	5.00	0.154	22.614	548.2	543.4	100.46	100.98	0.923	0.934	60	0.392495
70.00	927.74	86.67	90.44	1090.50	84.09	82.64	200.886	4.91	5.01	0.148	23.293	548.6	543.4	106.73	108.34	0.918	0.937	70	0.385213
80.00	928.70	87.06	90.99	1091.48	84.77	82.86	157.99	4.90	5.01	0.152	22.788	549.0	543.8	101.84	103.49	0.917	0.937	80	0.389713
90.00	929.68	87.38	91.26	1092.42	85.06	83.18	179.485	4.95	4.85	0.149	22.931	549.3	544.1	105.59	102.83	0.925	0.906	90	0.385508
100.00	930.63	87.72	91.33	1093.36	85.09	83.31	182.121	4.83	4.79	0.149	23.006	549.5	544.2	103.11	101.80	0.903	0.897	100	0.385989
110.00	931.56	88.40	91.36	1094.28	85.19	83.69	182.408	4.72	4.70	0.146	22.765	549.9	544.4	101.81	100.75	0.882	0.878	110	0.381851
120.00	932.46	88.97	91.33	1095.16	85.39	84.20	180.926	4.55	4.51	0.150	23.069	550.2	544.8	96.70	95.29	0.852	0.844	120	0.387392
130.00	933.37	89.66	91.82	1096.07	85.59	84.70	174.708	4.61	4.61	0.152	23.096	550.7	545.1	96.72	96.26	0.862	0.863	130	0.389746
140.00	934.28	90.02	92.08	1096.98	85.81	84.87	171.624	4.60	4.63	0.141	22.220	551.0	545.3	99.82	99.83	0.861	0.865	140	0.375871
150.00	935.19	90.06	92.34	1097.89	85.72	84.67	165.044	4.65	4.65	0.144	22.310	551.2	545.2	99.41	98.88	0.870	0.869	150	0.379387
160.00	936.12	90.21	92.61	1098.80	85.89	84.78	159.01	4.67	4.64	0.147	22.456	551.4	545.3	98.05	97.13	0.872	0.868	160	0.383728
170.00	937.04	90.25	92.71	1099.72	85.99	84.92	154.967	4.67	4.72	0.138	21.644	551.5	545.5	101.15	101.72	0.873	0.882	170	0.371058
180.00	937.95	90.22	92.70	1100.63	86.11	85.04	149.982	4.62	4.64	0.138	21.564	551.5	545.6	99.62	99.59	0.864	0.868	180	0.371189
190.00	938.89	90.25	92.77	1101.55	86.23	85.13	144.61	4.72	4.67	0.136	21.364	551.5	545.7	101.83	100.36	0.883	0.874	190	0.36939
200.00	939.81	90.27	92.85	1102.47	86.26	85.35	140.402	4.65	4.69	0.136	21.245	551.6	545.8	100.25	100.61	0.870	0.878	200	0.368605
210.00	940.73	90.30	92.86	1103.39	86.36	85.48	135.003	4.65	4.70	0.138	21.281	551.6	545.9	99.18	99.71	0.870	0.879	210	0.370906
220.00	941.65	90.13	92.81	1104.31	86.28	85.46	130.373	4.68	4.69	0.140	21.420	551.5	545.9	98.44	97.99	0.876	0.877	220	0.374798
230.00	942.57	90.04	92.86	1105.24	86.19	85.48	127.261	4.66	4.70	0.139	21.262	551.5	545.8	98.23	98.53	0.872	0.880	230	0.373011
240.00	943.49	89.99	92.73	1106.16	86.15	85.21	122.927	4.63	4.73	0.142	21.411	551.4	545.7	96.12	97.60	0.866	0.884	240	0.377025
250.00	944.41	89.83	92.62	1107.08	85.93	85.08	120.046	4.68	4.70	0.142	21.335	551.2	545.5	96.98	96.90	0.875	0.878	250	0.37662
260.00	945.33	89.49	92.26	1108.01	85.80	84.93	117.839	4.67	4.72	0.142	21.279	550.9	545.4	96.78	97.25	0.873	0.882	260	0.376346
270.00	946.24	89.22	92.00	1108.94	85.09	84.35	115.619	4.59	4.76	0.143	21.317	550.6	544.7	94.66	97.67	0.858	0.890	270	0.377739
280.00	947.16	89.05	91.88	1109.86	85.17	84.36	114.094	4.68	4.70	0.130	20.351	550.5	544.8	100.91	100.71	0.876	0.878	280	0.361092
290.00	948.08	88.99	91.79	1110.78	85.01	84.18	112.65	4.65	4.72	0.135	20.646	550.4	544.6	98.49	99.51	0.869	0.883	290	0.366787
300.00	949.01	88.88	91.70	1111.72	84.62	83.95	110.688	4.68	4.78	0.133	20.493	550.3	544.3	99.68	101.32	0.876	0.895	300	0.364695
310.00	949.92	88.86	91.32	1112.64	84.36	83.54	109.756	4.66	4.70	0.133	20.450	550.1	544.0	99.26	99.65	0.872	0.879	310	0.364229
320.00	950.85	89.07	91.26	1113.54	84.14	83.26	108.572	4.69	4.60	0.134	20.542	550.2	543.7	99.11	96.93	0.876	0.860	320	0.366258

300- App-B Data and Calculation Forms (page 7 of 92)

Intertek Testing Services

Manufacturer:	**SBI**	RESULTS	
Model:	**HE350 Series (FP-15)**		
Date:	**6-8-16**	**Average emission rate:(gr/hr)**	**2.9**
Run:	**1**		
Project #:	**QC20160608**	Burn Rate (Dry kg/hr):	4.085
Test Duration: (minutes)	**320**		

PRESSURE FACTOR	0.98262	BAROMETRIC PRESSURE		
			Average:	29.4
TEMPERATURE FACTORS			Start:	29.4
DGM #1:	0.96039		End:	29.4
DGM #2:	0.96973			
		DRY GAS METER VALUES		
VOLUMES SAMPLED		DGM #1	Final:	950.848
DGM #1:	28.26803		Initial:	921.072
DGM #2:	28.43313			
		DGM #2	Final:	1113.538
TOTAL TUNNEL VOLUME (scf):	123057		Initial:	1083.788
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)		
Sample Train 1:	4353.224		DGM #1:	549.779
Sample Train 2:	4327.946		DGM #2:	544.481
TOTAL EMISSIONS		CALIBRATION FACTORS		
Sample Train 1 (g):	**18.28**		DGM #1:	1.0060
Sample Train 2 (g):	**12.55**		DGM #2:	1.0030
EMISSION RATES		TUNNEL FLOW RATE:		384.553
Sample Train 1 (g/hr):	**3.43**			
Sample Train 2 (g/hr):	**2.35**	PARTICULATE CATCH (mg)		
			Total Sample Train 1:	4.2
			Total Sample Train 2:	2.9
			Filter and seal Sample Train 1:	3
MAX Allowed	7.50%		Filter and seal Sample Train 2:	2.9
			Probe Sample Train 1:	1.2
DEVIATION:	37.18%		Probe Sample Train 2:	0

	Train 1	Train 2			
Cs	0.00014858	0.00010199	Room Particulate Correction		
			Mr	0	Milligram Catch (mg)
Cr	0	0	Vmr	41.3568	Total Volume Sampled (dscf)
Et	18.28	12.55			Rotometer (glass) at 100 flow rate is 0.12924 cfm
Et	AVERAGE	15.42	Grams Emissions		

300- App-B Data and Calculation Forms (page 8 of 92)

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only						
Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	4.28	ft^3				
Total Nom. Load Wt. Target	42.76	lb				
Total Load Wt. Allowable Range	40.60	to	44.90	lb		
Core Target Wt. Allowable Range	19.20	to	27.80	lb		
Remainder Load Wt. Allowable Range	15.00	to	23.50	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	6.40	to	10.70	lb		8.55
Remainder Load Pc. Wt. Allowable Range	4.30	to	23.50	lb		13.90
	Pc. #					
Core Load Piece Wt. Actual	1	7.36	lb	In Range		
	2	8.60	lb	In Range		
	3	8.63	lb	In Range		
Core Load Total. Wt. Actual		24.59	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	7.77	lb	In Range		
(1 to 3 Pcs.)	2	6.06	lb	In Range		
	3	4.80	lb	In Range		
Remainder Load Piece Weight Ratio - Small/Large		62%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		18.63	lb	In Range		
Total Load Wt. Actual		43.22	lb	In Range		
Core % of Total Wt.		57%		In Range		45-65%
Remainder % of Total Wt.		43%		In Range		35-55%
Actual Load % of Nominal Target		101%		In Range		95-105%
Actual Fuel Load Density		10.1	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		8.64	lb			
Actual Kindling Wt.		7.56	lb	In Range		17.5%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		12.97	lb			
Actual Start-up Fuel Wt.		12.10	lb	In Range		28.0%
Allowable Residual Start-up Fuel Wt. Range	4.3	to	8.6	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		4.40	lb	In Range		6.5
Total Wt. All Fuel Added (wet basis)		62.87	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	3.9	to	4.8	lb		4.3
Actual Fuel Load Ending Wt.		0.0	lb	Out of Range		

300- App-B Data and Calculation Forms (page 9 of 92)

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
21.5	25.4	13.9	20.3	In Range	6.12	lb	2.78	kg
22.7	21.7	22	22.1	In Range	7.04	lb	3.19	kg
24	17.1	17.1	19.4	In Range	7.23	lb	3.28	kg
23.2	24.2	21.9	23.1	In Range	6.31	lb	2.86	kg
23	24.3	23.5	23.6	In Range	4.90	lb	2.22	kg
32.3	18.6	19.7	23.5	In Range	3.88	lb	1.76	kg
Total Load Ave. MC (%-dry basis)			21.8	In Range				
Total Load Ave. MC % (wet basis)			17.9					
Total Test Load Weight (dry basis) →					35.49	lb	16.09	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	6.87	lb	3.12	kg
Start-up Fuel Moisture Readings (%-dry basis)								
21.2	20.6666667		20.9	In Range	10.01	lb	4.54	kg
Total Wt. All Fuel Added (dry basis) →					52.36	lb	23.75	kg
Total Wt. All Fuel Burned (dry basis) →					48.0	lb	21.7	kg

300- App-B Data and Calculation Forms (page 10 of 92)

Intertek

TEST FUEL DATA
EPA METHOD 5G-3

Project Number:	G102163747
Manufacturer:	SBI
Model:	HE350 Series
Sample ID Number:	QC20160608
Test Date:	8-Jun-16
Test Run Number:	1

Calibration Reference ID	SBI-153	
Set meter to Species 1		
Set Temperature to 70F	12%	12%
Set pin setting to 444	22%	22%

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time: 9:35	Temp.,°F: 78.9		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
Pre Burn ~~Kindling~~ ~~1~~ 2		12.1	23.7	19.1	20.8
~~2~~ 3			20.2	19.1	22.7
3					
4					
5					
6					
7					
8					
9					
Kindling 10		7.557	—	10%	—
11					
12					
Total Weight		0.0	Average, %db		#DIV/0!

Allowable Fuel Load Range:			27	to	32.9

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:	SBI-229	Time: 9:55		Temp.,°F:	78.9
Piece No.	Length, In.	Weight, Lb.		Moisture, %, Dry Basis	
		2x4	4x4		
1	16	8.627		24.0	17.1	17.1
2	16 1/2	7.772		23.2	28.2	21.9
3	17	8.602		22.7	21.7	22.0
4	16 1/2	7.363		21.5	25.4	13.0
5	16	6.057		23.0	24.3	23.5
6	17	4.796		32.3	18.6	19.7
7						
8						
Totals		0.0	0.0			
% of Weight		#DIV/0!	#DIV/0!			
Total weight, wet, lb.		0.00		Average Moisture, dry		#DIV/0!
Total weight, dry, kg		#DIV/0!		Average Moisture, wet		#DIV/0!

Test Engineer: [illegible]

Date: 8-Jun-2016

300- App-B Data and Calculation Forms (page 11 of 92)

Intertek

Dillution Tunnel Velocity Traverse
EPA Method 5G-3

Project Number: G102163747
Manufacturer: SBI
Model: HE 350 Series
Sample ID Number: QC20160608
Test Date: 8-Jun-16
Test Run Number: 1

	Dilution Tunnel Delta P In. H2O	Dilution Tunnel Temp,°F	Square Root
A1	0.115	76.9	0.0000
A2	0.141	76.8	0.0000
A3	0.138	76.8	0.0000
A4	0.085	77.5	0.0000
A Center	0.136	77.3	0.0000
B1	0.120	76.9	0.0000
B2	0.136	76.9	0.0000
B3	0.130	76.8	0.0000
B4	0.117	77.0	0.0000
B Center	0.140	78.8	0.0000
Averages	#DIV/0!	#DIV/0!	0.0000

Tunnel Diameter	**8.000**	inches
Tunnel Static	0.209	in. H2O
Tunnel Area	0.34907	Ft2
Pitot Correction	#DIV/0!	factor
Baro. Pressure	29.40	
Pitot Factor	**0.84**	(0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity	#DIV/0!	Ft/ Sec
Initial Flow	**#DIV/0!**	Ft3/min

Test Engineer: C. Pellerd

Date: 8-June-2016

300- App-B Data and Calculation Forms (page 12 of 92)

Date/heure	Time	O_2	CO	CO_2IR	CO	
YYYY-MM-DD HH:MM:SS	min	%	ppm	%	%	
2016-06-08 10:03:00	0	20.79	*25*	1.20	0.00	
2016-06-08 10:13:00	10	16.14	*604*	2.66	0.06	
2016-06-08 10:23:00	20	15.51	*1409*	4.85	0.14	
2016-06-08 10:33:00	30	12.20	*669*	7.29	0.07	
2016-06-08 10:43:00	40	11.82	*893*	8.59	0.09	
2016-06-08 10:53:00	50	10.55	*180*	10.94	0.02	
2016-06-08 11:03:00	60	12.61	*215*	8.66	0.02	
2016-06-08 11:13:00	70	12.44	*2081*	6.42	0.21	<--Main fuel load added.
2016-06-08 11:23:00	80	5.96	*22355*	12.61	2.24	
2016-06-08 11:33:00	90	5.31	*14906*	15.54	1.49	
2016-06-08 11:43:00	100	6.39	*7470*	15.16	0.75	
2016-06-08 11:53:00	110	6.44	*5870*	14.94	0.59	
2016-06-08 12:03:00	120	7.42	*2093*	14.33	0.21	
2016-06-08 12:13:00	130	7.57	*1592*	13.84	0.16	
2016-06-08 12:23:00	140	9.22	*218*	12.27	0.02	
2016-06-08 12:33:00	150	9.73	*175*	11.48	0.02	
2016-06-08 12:43:00	160	11.10	*119*	10.04	0.01	
2016-06-08 12:53:00	170	12.08	*78*	9.06	0.01	
2016-06-08 13:03:00	180	13.03	*184*	8.16	0.02	
2016-06-08 13:13:00	190	13.62	*343*	7.56	0.03	
2016-06-08 13:23:00	200	14.60	*483*	6.54	0.05	
2016-06-08 13:33:00	210	15.40	*1397*	5.55	0.14	
2016-06-08 13:43:00	220	15.47	*2686*	5.38	0.27	
2016-06-08 13:53:00	230	16.39	*3287*	4.63	0.33	
2016-06-08 14:03:00	240	16.63	*3382*	4.22	0.34	
2016-06-08 14:13:00	250	16.69	*3476*	4.10	0.35	
2016-06-08 14:23:00	260	17.27	*2546*	3.69	0.25	
2016-06-08 14:33:00	270	17.62	*2173*	3.34	0.22	
2016-06-08 14:43:00	280	17.64	*2059*	3.18	0.21	
2016-06-08 14:53:00	290	17.68	*1963*	3.22	0.20	
2016-06-08 15:03:00	300	17.80	*2012*	3.08	0.20	
2016-06-08 15:13:00	310	17.95	*1989*	2.95	0.20	
2016-06-08 15:23:00	320	18.22	*1678*	2.71	0.17	

300- App-B Data and Calculation Forms (page 13 of 92)

Time	Ambient	Flue	Dilution Tunnel	Firebox Top	Firebox Right	Firebox Back	Firebox Bottom	Firebox Left
min	°F	°F	°F	°F	°F	°F	°F	°F
0	77.39	77.66	77.86	77.86	76.68	77.09	77.07	76.16
10	78.05	231.10	103.66	180.76	85.25	80.83	80.74	77.83
20	78.49	452.73	111.76	396.39	109.26	99.95	100.42	99.02
30	79.26	515.08	120.81	463.39	147.67	135.37	139.86	172.31
40	79.93	525.27	128.79	462.75	213.43	179.18	191.82	251.63
50	80.73	663.09	148.22	654.12	285.23	234.14	255.06	314.01
60	82.24	629.94	139.98	621.43	358.46	294.72	329.13	369.53
70	82.43	600.26	200.89	583.62	415.69	338.28	378.05	416.80
80	81.28	739.21	157.99	733.93	458.49	363.16	410.57	445.05
90	82.83	847.53	179.49	854.39	480.45	394.03	457.13	432.42
100	83.88	893.72	182.12	905.46	499.73	450.39	511.89	413.87
110	84.14	888.48	182.41	895.80	517.41	492.84	546.19	405.32
120	85.26	877.37	180.93	929.37	534.09	516.06	570.66	418.00
130	85.63	838.66	174.71	937.68	547.51	530.91	578.63	438.97
140	85.76	807.14	171.62	910.06	560.68	541.91	580.64	459.99
150	85.87	763.36	165.04	843.36	573.23	543.01	580.19	485.37
160	86.02	732.09	159.01	816.03	584.51	538.87	579.20	495.07
170	86.58	685.64	154.97	741.18	595.20	532.52	573.97	502.35
180	85.88	647.90	149.98	678.04	601.35	524.52	565.42	513.92
190	85.00	615.59	144.61	627.82	604.12	514.04	552.93	518.65
200	84.51	585.04	140.40	588.69	603.34	502.58	540.70	523.45
210	83.76	544.56	135.00	540.92	596.99	489.03	524.66	531.74
220	83.33	508.64	130.37	489.74	584.83	472.31	503.00	534.27
230	82.82	484.31	127.26	462.45	568.16	454.18	482.78	534.17
240	83.30	449.06	122.93	423.05	551.49	436.74	463.67	533.94
250	82.53	429.07	120.05	397.14	534.58	421.40	446.51	527.82
260	82.14	414.73	117.84	379.57	518.03	406.67	430.11	523.78
270	81.59	396.08	115.62	358.39	503.67	392.74	415.75	523.06
280	82.04	379.47	114.09	339.33	489.99	378.63	400.20	520.56
290	81.57	368.11	112.65	325.81	477.86	364.97	384.88	520.75
300	81.47	359.21	110.69	314.70	467.44	353.22	371.48	520.84
310	81.42	352.12	109.76	305.38	457.12	342.45	359.38	521.02

300- App-B Data and Calculation Forms (page 14 of 92)

320	80.96	342.21	108.57	294.62	447.07	333.41	349.52	517.26

300- App-B Data and Calculation Forms (page 15 of 92)

DGM Outlet 1	DGM Inlet 1	Probe 1	DGM Outlet 2	DGM Inlet 2	Probe 2	Probe 3	Draft	Dilution Tunnel
°F	°F	°F	°F	°F	°F	°F	"H_2O	"H_2O
81.03	81.23	89.20	81.15	79.87	84.15	85.87	0.007	0.138
83.84	84.52	81.70	84.21	81.03	83.00	83.67	0.034	0.132
84.21	83.60	81.83	84.13	81.81	81.48	82.43	0.062	0.133
85.89	83.19	83.12	83.37	82.82	82.63	84.26	0.068	0.148
85.80	83.03	85.28	83.20	83.50	84.66	83.75	0.069	0.145
85.30	82.77	82.74	83.10	83.82	82.78	83.34	0.077	0.142
85.82	82.56	82.50	82.94	83.88	82.54	81.99	0.074	0.154
86.44	82.67	82.54	82.64	84.09	82.35	N/A	0.076	0.148
86.99	83.06	83.56	82.86	84.77	83.28	N/A	0.082	0.152
87.26	83.38	84.88	83.18	85.06	84.48	N/A	0.088	0.149
87.33	83.72	85.45	83.31	85.09	85.87	N/A	0.090	0.149
87.36	84.40	85.78	83.69	85.19	86.15	N/A	0.088	0.146
87.33	84.97	85.65	84.20	85.39	86.12	N/A	0.088	0.150
87.82	85.66	85.62	84.70	85.59	85.96	N/A	0.087	0.152
88.08	86.02	85.74	84.87	85.81	85.71	N/A	0.085	0.141
88.34	86.06	85.40	84.67	85.72	85.24	N/A	0.081	0.144
88.61	86.21	85.03	84.78	85.89	84.87	N/A	0.081	0.147
88.71	86.25	84.72	84.92	85.99	84.76	N/A	0.078	0.138
88.70	86.22	84.33	85.04	86.11	84.45	N/A	0.075	0.138
88.77	86.25	84.34	85.13	86.23	84.06	N/A	0.073	0.136
88.85	86.27	83.98	85.35	86.26	83.84	N/A	0.070	0.136
88.86	86.30	83.61	85.48	86.36	83.43	N/A	0.067	0.138
88.81	86.13	83.33	85.46	86.28	83.16	N/A	0.065	0.140
88.86	86.04	83.22	85.48	86.19	82.98	N/A	0.062	0.139
88.73	85.99	82.83	85.21	86.15	82.64	N/A	0.061	0.142
88.62	85.83	82.45	85.08	85.93	82.31	N/A	0.059	0.142
88.26	85.49	84.31	84.93	85.80	83.84	N/A	0.057	0.142
88.00	85.22	85.09	84.89	85.71	84.35	N/A	0.054	0.143
87.88	85.05	85.17	84.88	85.71	84.36	N/A	0.054	0.130
87.79	84.99	85.01	85.10	85.55	84.18	N/A	0.052	0.135
87.70	84.88	84.62	85.10	85.68	83.95	N/A	0.051	0.133
87.32	84.86	84.36	85.04	85.72	83.54	N/A	0.050	0.133

300- App-B Data and Calculation Forms (page 16 of 92)

87.26	85.07	84.14	85.05	85.80	83.26	N/A	0.051	0.134

300- App-B Data and Calculation Forms (page 17 of 92)

Scale	DGM 1 mean	DGM 2 mean	Scale zeroed
lb	°F	°F	lb
4.39	81.13	86.68	0.00
11.22	84.18	82.35	6.83
9.59	83.91	81.65	5.20
7.73	84.54	82.87	3.34
17.27	84.41	84.97	12.88
13.78	84.03	82.76	9.39
10.83	84.19	82.52	6.45
62.86	84.55	82.45	58.48
43.94	85.02	83.42	39.55
38.24	85.32	84.68	33.85
32.99	85.52	85.66	28.60
28.51	85.88	85.97	24.13
24.34	86.15	85.89	19.95
20.73	86.74	85.79	16.34
17.53	87.05	85.72	13.14
15.03	87.20	85.32	10.64
12.90	87.41	84.95	8.51
11.30	87.48	84.74	6.91
10.00	87.46	84.39	5.61
8.96	87.51	84.20	4.57
8.12	87.56	83.91	3.73
7.51	87.58	83.52	3.12
7.06	87.47	83.25	2.67
6.68	87.45	83.10	2.29
6.34	87.36	82.73	1.95
6.02	87.22	82.38	1.63
5.68	86.88	84.07	1.29
5.41	86.61	84.72	1.02
5.18	86.47	84.77	0.80
4.94	86.39	84.59	0.55
4.70	86.29	84.29	0.31
4.44	86.09	83.95	0.05

300- App-B Data and Calculation Forms (page 18 of 92)

4.23	86.17	83.70	-0.16

300- App-B Data and Calculation Forms (page 19 of 92)

Manufacturer:	SBI	Eng:	Claude Pelland
Model:	HE350 Series (FP-15)		
Date:	2016-06-09		
Run:	2		
Control #:	QC20160208		
Rated Capacity	-	BTU/HR	
Test Duration:	60		
Output Category:	1	Start	End
Barometer (in.Hg):		29.6	29.8
Dry Bulb (F):			
Humidity (%):		74	91
Average Stove Temperature:		0.00	
Moisture content of wood (wet basis):		19.92	

Elapsed Time	Weight Remaining	CO	CO_2	O_2	Flue Gas	Room Temp	Tunnel Dry Bulb	Outlet air	door	ash door	left side	back	right side	front	DGM 3 Reading	DGM 3 Inlet T	DGM 3 Outlet T	Filter 3 Temp				Tunnel Velocity	Draft
	Average	0.00	0.00	0.00	681.59	79.96	150.92	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		83.16	83.67	83.74				0.1386	0.08
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*				*	*
0.00	51.8	0.00	0.00	0.00	233.27	76.85	90.85		0.00	0.00	0.00	0.00	0.00	0.00	548.905	78.07	77.87	84.61				0.137	0.035
10.00	47.9	0.00	0.00	0.00	704.64	77.22	159.95		0.00	0.00	0.00	0.00	0.00	0.00	550.300	81.20	80.98	84.05				0.138	0.080
20.00	42.4	0.00	0.00	0.00	780.60	79.00	161.95		0.00	0.00	0.00	0.00	0.00	0.00	551.745	82.24	82.77	82.15				0.143	0.085
30.00	37.5	0.00	0.00	0.00	764.48	80.45	160.90		0.00	0.00	0.00	0.00	0.00	0.00	553.143	83.83	84.73	82.80				0.136	0.084
40.00	32.5	0.00	0.00	0.00	761.97	81.25	160.88		0.00	0.00	0.00	0.00	0.00	0.00	554.555	85.06	85.94	86.59				0.140	0.084
50.00	27.9	0.00	0.00	0.00	761.76	82.21	161.66		0.00	0.00	0.00	0.00	0.00	0.00	555.963	85.57	86.51	82.30				0.139	0.084
60.00	23.7	0.00	0.00	0.00	764.42	82.76	160.24		0.00	0.00	0.00	0.00	0.00	0.00	557.308	86.14	86.87	83.69				0.137	0.084

300- App-B Data and Calculation Forms (page 20 of 92)

(ASTM E2515 Formula)

Manufacturer:	SBI			Manufacturer:	SBI
Model:	HE350 Series (FP-15)	Stack area (ft2):	0.349066	Model:	HE350 Series (FP-15)
Date:	6-9-16	Wood moisture (% wet):	19.92	Date:	6-9-16
Run:	2	Load Weight (lbs wet):	51.83	Run:	2
Project #:	QC20160208	Burn Rate (Dry kg/hr):	18.827		
	-				
Test Duration:	60				
Total Gas Volume (DGM 3):	7.983	Final Temperature (DGM #3) Degrees Rankin:	543.411		
Average Barometric Pressure:	29.7	Final Tunnel Temperature Degrees Rankin:	610.918		
Molecular Weight:	28.78	Final Tunnel Velocity (feet per second):	21.672		
Pitot Correction:	0.958677	Standardized Tunnel Flow (dscfm):	381.460801		
Calibration Factor (DGM #3):	0.9870				
(3) VS:	0.266617				

Elapsed Time	DGM 3 Reading	DGM 3 Inlet T	DGM 3 Outlet T	Tunnel Dry Bulb	Filter Face Velocity DGM 3	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 3 Deg. R	Average **100.4** **Proportional Rates** **PR1**	#3 dDGM Vol.Std. (ft3)	Time	Average **0.37** SQRT Delta-P
0.00	548.91	78.07	77.87	90.848		0.137	20.497	538.0			0	0.370788
10.00	550.30	81.20	80.98	159.95	7.13	0.138	21.768	541.1	101.46	1.333	10	0.371191
20.00	551.75	82.24	82.77	161.95	7.37	0.143	22.199	542.5	102.85	1.377	20	0.377927
30.00	553.14	83.83	84.73	160.9	7.10	0.136	21.639	544.3	101.24	1.328	30	0.368701
40.00	554.56	85.06	85.94	160.88	7.16	0.140	21.998	545.5	100.13	1.338	40	0.374833
50.00	555.96	85.57	86.51	161.66	7.13	0.139	21.860	546.0	100.41	1.333	50	0.372243
60.00	557.31	86.14	86.87	160.24	6.81	0.137	21.740	546.5	96.06	1.273	60	0.370622

300- App-B Data and Calculation Forms (page 21 of 92)

Intertek Testing Services

Manufacturer:	**SBI**	RESULTS	
Model:	**HE350 Series (FP-15)**		
Date:	**6-9-16**	**Average emission rate:(gr/hr)**	**11.4**
Run:	**2**		
Project #:	**QC20160208**	Burn Rate (Dry kg/hr):	N/A
Test Duration: (minutes)	**60**		
PRESSURE FACTOR	0.99265	BAROMETRIC PRESSURE	
		Average:	29.7
TEMPERATURE FACTORS		Start:	29.6
DGM #3:	0.97164	End:	29.8
		DRY GAS METER VALUES	
VOLUMES SAMPLED		DGM #3 Final:	557.308
DGM #3:	7.99929	Initial:	548.905
TOTAL TUNNEL VOLUME (scf):	22888		
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)	
Sample Train 3:	2861.209	DGM #3:	543.411
TOTAL EMISSIONS		CALIBRATION FACTORS	
Sample Train 3 (g):	**11.44**	DGM #3:	0.9870
EMISSION RATES		TUNNEL FLOW RATE:	381.461
Sample Train 3 (g/hr):	**11.44**		
		PARTICULATE CATCH (mg)	
		Total Sample Train 3:	4
		Filter and seal Sample Train 3:	3.8
		Probe Sample Train 3:	0.2

	Train 3			
		Room Particulate Correction		
Cs	0.00050004	Mr	0	Milligram Catch (mg)
Cr	0	Vmr	7.7544	Total Volume Sampled (dscf)
Et	11.44			Rotometer (glass) at 100 flow rate is 0.12924 cfm
Et	AVERAGE	Grams Emissions		

300- App-B Data and Calculation Forms (page 22 of 92)

Manufacturer:	SBI	Eng:	Claude Pelland
Model:	HE350 Series (FP-15)		
Date:	2016-06-09		
Run:	2		
Control #:	QC20160208		
Rated Capacity	-	BTU/HR	
Test Duration:	770		
Output Category:	1	Start	End
	Barometer (in.Hg):	29.6	29.8
	Dry Bulb (F):		
	Humidity (%):	74	91
Average Stove Temperature:		0.00	
Moisture content of wood (wet basis):		19.92	

Elapsed Time	Weight Remaining	CO	CO_2	O_2	Flue Gas	Room Temp	Tunnel Dry Bulb	Outlet air	door	ash door	left side	back	right side	front	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	Filter 1 Temp	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Filter 2 Temp	Tunnel Velocity	Draft
	Average	0.00	0.00	0.00	308.78	77.67	98.04	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		85.25	88.55	82.85		82.96	83.25	82.42	0.1355	0.04
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*	*	*	*	*	*	*
0	51.8	0.00	0.00	0.00	233.27	76.85	90.85		0.00	0.00	0.00	0.00	0.00	0.00	950.851	78.07	77.87	86.88	1113.539	76.55	77.16	82.42	0.137	0.035
10	47.9	0.00	0.00	0.00	704.64	77.22	159.95		0.00	0.00	0.00	0.00	0.00	0.00	951.756	81.20	80.98	81.77	1114.484	77.84	78.64	82.12	0.138	0.080
20	42.4	0.00	0.00	0.00	780.60	79.00	161.95		0.00	0.00	0.00	0.00	0.00	0.00	952.662	82.24	82.77	81.17	1115.362	78.92	79.09	82.96	0.143	0.085
30	37.5	0.00	0.00	0.00	764.48	80.45	160.90		0.00	0.00	0.00	0.00	0.00	0.00	953.538	83.83	84.73	80.51	1116.236	79.88	79.59	83.76	0.136	0.084
40	32.5	0.00	0.00	0.00	761.97	81.25	160.88		0.00	0.00	0.00	0.00	0.00	0.00	954.436	85.06	85.94	83.63	1117.124	80.62	80.09	84.32	0.140	0.084
50	27.9	0.00	0.00	0.00	761.76	82.21	161.66		0.00	0.00	0.00	0.00	0.00	0.00	955.331	85.57	86.51	82.22	1118.005	81.12	80.41	84.58	0.139	0.084
60	23.7	0.00	0.00	0.00	764.42	82.76	160.24		0.00	0.00	0.00	0.00	0.00	0.00	956.226	86.14	86.87	82.18	1118.873	81.37	80.57	84.44	0.137	0.084
70	20.2	0.00	0.00	0.00	637.09	82.62	133.19		0.00	0.00	0.00	0.00	0.00	0.00	957.125	87.12	87.15	83.10	1119.712	81.70	80.81	83.20	0.141	0.076
80	18.3	0.00	0.00	0.00	541.02	82.15	124.53		0.00	0.00	0.00	0.00	0.00	0.00	958.013	88.09	87.55	82.45	1120.577	82.02	81.28	81.95	0.130	0.070
90	16.6	0.00	0.00	0.00	507.94	81.53	120.23		0.00	0.00	0.00	0.00	0.00	0.00	958.912	88.80	87.66	81.61	1121.459	82.33	81.51	81.05	0.133	0.067
100	14.9	0.00	0.00	0.00	509.34	80.61	118.27		0.00	0.00	0.00	0.00	0.00	0.00	959.809	88.45	87.95	81.14	1122.345	82.45	81.60	81.99	0.135	0.068
110	13.4	0.00	0.00	0.00	502.33	80.40	116.40		0.00	0.00	0.00	0.00	0.00	0.00	960.703	88.17	87.97	83.18	1123.224	82.61	81.78	82.64	0.133	0.067
120	12.1	0.00	0.00	0.00	495.53	80.30	115.27		0.00	0.00	0.00	0.00	0.00	0.00	961.600	87.61	88.15	81.69	1124.118	82.65	81.81	82.96	0.139	0.066
130	11.0	0.00	0.00	0.00	477.74	81.06	112.83		0.00	0.00	0.00	0.00	0.00	0.00	962.499	87.03	88.39	80.82	1125.029	82.55	81.67	82.83	0.135	0.065
140	10.2	0.00	0.00	0.00	437.54	80.32	109.81		0.00	0.00	0.00	0.00	0.00	0.00	963.396	86.85	88.71	83.68	1125.936	82.53	81.65	82.34	0.135	0.062
150	9.6	0.00	0.00	0.00	405.26	80.25	106.41		0.00	0.00	0.00	0.00	0.00	0.00	964.293	86.44	89.28	84.80	1126.858	82.64	81.77	82.20	0.136	0.058
160	9.3	0.00	0.00	0.00	353.46	79.82	103.30		0.00	0.00	0.00	0.00	0.00	0.00	965.191	86.37	89.18	86.65	1127.785	82.75	81.83	82.12	0.131	0.051
170	9.1	0.00	0.00	0.00	324.54	79.45	100.42		0.00	0.00	0.00	0.00	0.00	0.00	966.089	86.27	89.19	84.54	1128.729	82.80	81.95	81.86	0.134	0.049
180	8.8	0.00	0.00	0.00	306.63	79.67	98.40		0.00	0.00	0.00	0.00	0.00	0.00	966.990	86.00	88.93	81.62	1129.665	82.76	82.00	81.51	0.135	0.046
190	8.6	0.00	0.00	0.00	295.34	79.28	97.17		0.00	0.00	0.00	0.00	0.00	0.00	967.889	85.96	89.27	81.97	1130.627	82.75	81.91	82.19	0.135	0.044
200	8.4	0.00	0.00	0.00	288.68	79.25	96.17		0.00	0.00	0.00	0.00	0.00	0.00	968.787	85.75	89.08	84.69	1131.570	82.76	81.78	84.90	0.132	0.044
210	8.1	0.00	0.00	0.00	283.60	78.96	95.35		0.00	0.00	0.00	0.00	0.00	0.00	969.682	85.84	89.16	84.41	1132.518	82.83	81.96	83.69	0.127	0.042
220	7.9	0.00	0.00	0.00	281.19	78.85	94.95		0.00	0.00	0.00	0.00	0.00	0.00	970.579	85.68	88.64	81.52	1133.453	82.77	82.21	80.14	0.139	0.044
230	7.6	0.00	0.00	0.00	279.75	78.43	94.78		0.00	0.00	0.00	0.00	0.00	0.00	971.474	85.61	88.83	81.82	1134.402	82.72	82.09	80.74	0.135	0.044
240	7.4	0.00	0.00	0.00	277.98	78.60	94.27		0.00	0.00	0.00	0.00	0.00	0.00	972.368	85.52	88.64	81.00	1135.342	82.72	82.25	80.26	0.137	0.042
250	7.2	0.00	0.00	0.00	278.24	78.62	94.14		0.00	0.00	0.00	0.00	0.00	0.00	973.259	85.52	89.19	82.41	1136.300	82.69	82.37	82.78	0.136	0.043
260	6.9	0.00	0.00	0.00	280.09	78.69	94.12		0.00	0.00	0.00	0.00	0.00	0.00	974.148	85.52	89.54	85.09	1137.263	82.69	82.36	85.03	0.138	0.044
270	6.7	0.00	0.00	0.00	279.27	78.87	93.92		0.00	0.00	0.00	0.00	0.00	0.00	975.035	85.47	89.56	82.83	1138.218	86.43	85.76	82.79	0.131	0.044
280	6.5	0.00	0.00	0.00	276.26	78.94	93.57		0.00	0.00	0.00	0.00	0.00	0.00	975.929	85.65	89.44	83.16	1139.173	86.83	85.80	82.90	0.135	0.042
290	6.2	0.00	0.00	0.00	273.50	78.83	93.31		0.00	0.00	0.00	0.00	0.00	0.00	976.826	85.71	89.31	82.93	1140.126	86.93	85.96	82.98	0.135	0.043
300	6.0	0.00	0.00	0.00	271.72	78.63	93.16		0.00	0.00	0.00	0.00	0.00	0.00	977.726	85.83	89.16	82.75	1141.079	86.96	85.93	83.04	0.136	0.042

300- App-B Data and Calculation Forms (page 23 of 92)

310	5.8	0.00	0.00	0.00	271.29	78.66	93.07		0.00	0.00	0.00	0.00	0.00	0.00	978.622	85.82	89.04	82.67	1142.023	87.04	85.88	83.04	0.139	0.041
320	5.6	0.00	0.00	0.00	270.81	78.42	92.83		0.00	0.00	0.00	0.00	0.00	0.00	979.522	85.75	89.09	82.38	1142.971	87.15	85.81	83.02	0.133	0.042
330	5.4	0.00	0.00	0.00	269.84	78.53	92.80		0.00	0.00	0.00	0.00	0.00	0.00	980.421	85.91	89.29	82.11	1143.918	83.92	85.90	82.94	0.138	0.041
340	5.2	0.00	0.00	0.00	266.53	78.63	92.49		0.00	0.00	0.00	0.00	0.00	0.00	981.316	85.88	89.28	82.22	1144.863	83.04	85.63	83.00	0.136	0.040
350	5.0	0.00	0.00	0.00	263.56	78.69	92.28		0.00	0.00	0.00	0.00	0.00	0.00	982.209	85.90	89.28	82.39	1145.815	83.59	85.32	82.91	0.137	0.041
360	4.8	0.00	0.00	0.00	260.34	78.46	91.97		0.00	0.00	0.00	0.00	0.00	0.00	983.097	85.95	89.29	82.61	1146.759	83.46	85.29	82.96	0.137	0.040
370	4.6	0.00	0.00	0.00	257.47	78.25	91.83		0.00	0.00	0.00	0.00	0.00	0.00	983.989	85.88	89.42	82.70	1147.725	83.57	85.38	82.89	0.134	0.040
380	4.5	0.00	0.00	0.00	254.38	78.19	91.38		0.00	0.00	0.00	0.00	0.00	0.00	984.878	85.88	89.57	82.96	1148.692	83.79	85.48	82.81	0.135	0.039
390	4.3	0.00	0.00	0.00	251.81	78.48	91.39		0.00	0.00	0.00	0.00	0.00	0.00	985.759	85.77	89.66	83.15	1149.655	83.73	85.38	82.83	0.137	0.038
400	4.1	0.00	0.00	0.00	249.51	78.47	91.15		0.00	0.00	0.00	0.00	0.00	0.00	986.645	85.77	89.77	83.26	1150.635	83.85	85.27	82.92	0.135	0.038
410	4.0	0.00	0.00	0.00	247.54	78.15	90.74		0.00	0.00	0.00	0.00	0.00	0.00	987.529	85.70	89.80	83.38	1151.615	83.67	85.17	82.89	0.140	0.039
420	3.8	0.00	0.00	0.00	245.57	78.29	90.60		0.00	0.00	0.00	0.00	0.00	0.00	988.414	85.63	89.68	83.51	1152.585	83.55	85.08	82.86	0.137	0.038
430	3.6	0.00	0.00	0.00	244.42	78.04	90.35		0.00	0.00	0.00	0.00	0.00	0.00	989.299	85.56	89.75	83.49	1153.559	83.83	84.98	82.90	0.137	0.039
440	3.5	0.00	0.00	0.00	243.56	78.03	90.24		0.00	0.00	0.00	0.00	0.00	0.00	990.182	85.56	89.74	83.49	1154.535	83.72	84.97	82.85	0.133	0.038
450	3.3	0.00	0.00	0.00	242.25	77.93	89.93		0.00	0.00	0.00	0.00	0.00	0.00	991.067	85.47	89.88	83.51	1155.514	83.48	84.81	82.80	0.135	0.039
460	3.2	0.00	0.00	0.00	240.69	77.99	89.90		0.00	0.00	0.00	0.00	0.00	0.00	991.949	85.43	89.72	83.56	1156.488	83.58	84.81	82.79	0.138	0.038
470	3.0	0.00	0.00	0.00	239.29	77.89	89.65		0.00	0.00	0.00	0.00	0.00	0.00	992.834	85.29	89.74	83.37	1157.458	83.38	84.65	82.65	0.136	0.036
480	2.9	0.00	0.00	0.00	240.10	77.94	89.62		0.00	0.00	0.00	0.00	0.00	0.00	993.719	85.21	89.74	83.11	1158.431	83.31	84.55	82.55	0.133	0.037
490	2.7	0.00	0.00	0.00	238.59	77.73	89.41		0.00	0.00	0.00	0.00	0.00	0.00	994.603	85.13	89.72	82.90	1159.411	83.42	84.59	82.48	0.136	0.038
500	2.6	0.00	0.00	0.00	235.76	77.77	89.18		0.00	0.00	0.00	0.00	0.00	0.00	995.485	85.05	89.64	82.85	1160.384	83.21	84.43	82.39	0.131	0.038
510	2.4	0.00	0.00	0.00	233.31	77.77	88.98		0.00	0.00	0.00	0.00	0.00	0.00	996.370	85.03	89.61	82.94	1161.356	83.34	84.50	82.41	0.130	0.037
520	2.3	0.00	0.00	0.00	230.27	77.23	88.95		0.00	0.00	0.00	0.00	0.00	0.00	997.253	85.03	89.54	83.02	1162.330	83.18	84.48	82.50	0.135	0.037
530	2.2	0.00	0.00	0.00	228.40	77.21	88.55		0.00	0.00	0.00	0.00	0.00	0.00	998.138	85.00	89.52	83.17	1163.303	83.27	84.25	82.35	0.133	0.035
540	2.0	0.00	0.00	0.00	227.45	77.18	88.30		0.00	0.00	0.00	0.00	0.00	0.00	999.028	85.01	89.43	82.98	1164.279	83.12	84.28	82.33	0.134	0.035
550	1.9	0.00	0.00	0.00	226.65	76.87	88.16		0.00	0.00	0.00	0.00	0.00	0.00	999.911	84.87	89.35	82.65	1165.250	83.00	84.14	82.18	0.135	0.036
560	1.8	0.00	0.00	0.00	225.42	76.76	88.08		0.00	0.00	0.00	0.00	0.00	0.00	1000.798	84.85	89.33	82.55	1166.225	82.98	84.01	82.10	0.133	0.036
570	1.6	0.00	0.00	0.00	224.52	76.53	87.87		0.00	0.00	0.00	0.00	0.00	0.00	1001.682	84.74	89.28	82.21	1167.195	82.84	84.02	81.99	0.130	0.035
580	1.5	0.00	0.00	0.00	222.71	76.55	87.62		0.00	0.00	0.00	0.00	0.00	0.00	1002.562	84.72	89.20	82.12	1168.167	88.43	84.21	81.85	0.141	0.036
590	1.4	0.00	0.00	0.00	220.95	76.71	87.46		0.00	0.00	0.00	0.00	0.00	0.00	1003.435	84.78	89.19	82.65	1169.137	80.79	84.12	81.93	0.136	0.037
600	1.3	0.00	0.00	0.00	219.03	76.60	87.26		0.00	0.00	0.00	0.00	0.00	0.00	1004.320	84.65	89.21	83.07	1170.106	82.94	83.81	81.93	0.134	0.035
610	1.2	0.00	0.00	0.00	216.72	76.35	87.06		0.00	0.00	0.00	0.00	0.00	0.00	1005.191	84.51	89.13	82.82	1171.079	83.00	83.63	81.87	0.131	0.032
620	1.1	0.00	0.00	0.00	214.21	76.10	86.32		0.00	0.00	0.00	0.00	0.00	0.00	1006.073	84.44	88.99	82.97	1172.049	83.04	83.60	81.93	0.132	0.034
630	1.0	0.00	0.00	0.00	209.46	73.77	83.89		0.00	0.00	0.00	0.00	0.00	0.00	1006.957	84.34	88.82	82.87	1173.015	82.95	83.43	81.98	0.131	0.033
640	0.8	0.00	0.00	0.00	204.90	73.30	82.78		0.00	0.00	0.00	0.00	0.00	0.00	1007.839	84.27	88.77	82.43	1173.978	82.75	83.20	81.87	0.141	0.033
650	0.7	0.00	0.00	0.00	199.69	70.72	80.81		0.00	0.00	0.00	0.00	0.00	0.00	1008.720	84.24	88.66	82.48	1174.947	82.75	83.09	81.83	0.134	0.033
660	0.7	0.00	0.00	0.00	194.59	72.30	80.89		0.00	0.00	0.00	0.00	0.00	0.00	1009.595	84.28	88.57	82.67	1175.914	82.68	83.18	81.88	0.137	0.032
670	0.5	0.00	0.00	0.00	190.67	66.87	79.39		0.00	0.00	0.00	0.00	0.00	0.00	1010.478	84.20	88.47	82.81	1176.874	82.60	82.91	81.85	0.138	0.032
680	0.4	0.00	0.00	0.00	185.37	65.24	78.50		0.00	0.00	0.00	0.00	0.00	0.00	1011.356	84.17	88.43	82.84	1177.844	82.43	82.60	81.88	0.137	0.028
690	0.3	0.00	0.00	0.00	181.11	73.41	81.39		0.00	0.00	0.00	0.00	0.00	0.00	1012.231	84.12	88.43	83.00	1178.806	82.56	83.05	81.77	0.136	0.028
700	0.3	0.00	0.00	0.00	178.49	74.86	81.74		0.00	0.00	0.00	0.00	0.00	0.00	1013.105	84.13	88.53	82.89	1179.769	82.51	83.09	81.62	0.139	0.030
710	0.3	0.00	0.00	0.00	175.79	75.34	81.85		0.00	0.00	0.00	0.00	0.00	0.00	1013.982	84.09	88.55	82.69	1180.736	82.36	82.97	81.55	0.133	0.028
720	0.2	0.00	0.00	0.00	173.02	75.50	81.86		0.00	0.00	0.00	0.00	0.00	0.00	1014.863	84.08	88.49	82.46	1181.712	82.33	83.00	81.45	0.136	0.027
730	0.2	0.00	0.00	0.00	170.55	75.52	81.82		0.00	0.00	0.00	0.00	0.00	0.00	1015.724	84.10	88.50	82.33	1182.661	82.34	83.23	81.40	0.137	0.027
740	0.2	0.00	0.00	0.00	167.44	75.51	81.69		0.00	0.00	0.00	0.00	0.00	0.00	1016.587	84.06	88.50	82.58	1183.629	82.32	83.00	81.37	0.137	0.026
750	0.1	0.00	0.00	0.00	164.37	75.42	81.64		0.00	0.00	0.00	0.00	0.00	0.00	1017.454	84.03	88.47	82.87	1184.590	82.22	82.89	81.31	0.140	0.026
760	0.1	0.00	0.00	0.00	161.92	75.27	81.39		0.00	0.00	0.00	0.00	0.00	0.00	1018.320	83.94	88.44	83.07	1185.552	82.21	82.82	81.28	0.139	0.025
770	0.0	0.00	0.00	0.00	169.37	75.10	81.46		0.00	0.00	0.00	0.00	0.00	0.00	1019.206	83.92	88.38	83.21	1186.537	82.17	82.73	81.33	0.133	0.026

300- App-B Data and Calculation Forms (page 24 of 92)

(ASTM E2515 Formula)

- Manufacturer: SBI
- Model: HE350 Series (FP-15)
- Date: 6-9-16
- Run: 2
- Project #: QC20160208
- -
- Test Duration: 770
- Total Gas Volume (DGM 1): 65.861
- Total Gas Volume (DGM 2): 70.616
- Average Barometric Pressure: 29.7
- Molecular Weight: 28.78
- Pitot Correction: 0.9586767
- Calibration Factor (DGM #1): 1.0060
- Calibration Factor (DGM #2): 1.0030
- (1) VS: 0.033433
- (2) VS: 0.0311818

- Stack area (ft2): 0.3490659
- Wood moisture (% wet): 19.92
- Load Weight (lbs wet): 51.83
- Burn Rate (Dry kg/hr): 1.467
- Final Temperature (DGM #1) Degrees Rankin: 546.898
- Final Temperature (DGM #2) Degrees Rankin: 543.101
- Final Tunnel Temperature Degrees Rankin: 558.037
- Final Tunnel Velocity (feet per second): 20.479
- Standardized Tunnel Flow (dscfm): 394.6293093

- Manufacturer: SBI
- Model: HE350 Series (FP-15)
- Date: 6-9-16
- Run: 2

Elapsed Time	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Tunnel Dry Bulb	Filter Face Velocity DGM 1	Filter Face Velocity DGM 2	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 1 Deg. R	Average Inlet + Outlet Temp. Meter 2 Deg. R	Proportional Rates PR1 (Average **99.9**)	Proportional Rates PR2 (Average **99.9**)	#1 dDGM Vol.Std. (ft3)	#2 dDGM Vol.Std. (ft3)	Time	SQRT Delta-P (Average **0.37**)
0.00	950.85	78.07	77.87	1113.54	76.55	77.16	90.8482			0.137	20.497	538.0	536.9					0	0.370788
10.00	951.76	81.20	80.98	1114.48	77.84	78.64	159.946	4.71	4.93	0.138	21.768	541.1	538.2	108.81	106.03	0.882	0.923	10	0.371191
20.00	952.66	82.24	82.77	1115.36	78.92	79.09	161.955	4.71	4.58	0.143	22.199	542.5	539.0	106.60	96.64	0.880	0.856	20	0.377927
30.00	953.54	83.83	84.73	1116.24	79.88	79.59	160.901	4.54	4.55	0.136	21.639	544.3	539.7	104.87	98.25	0.848	0.851	30	0.368701
40.00	954.44	85.06	85.94	1117.12	80.62	80.09	160.881	4.64	4.62	0.140	21.998	545.5	540.4	105.27	97.97	0.868	0.864	40	0.374833
50.00	955.33	85.57	86.51	1118.01	81.12	80.41	161.656	4.62	4.58	0.139	21.860	546.0	540.8	105.51	97.79	0.864	0.856	50	0.372243
60.00	956.23	86.14	86.87	1118.87	81.37	80.57	160.236	4.62	4.51	0.137	21.740	546.5	541.0	105.67	96.58	0.863	0.843	60	0.370622
70.00	957.13	87.12	87.15	1119.71	81.70	80.81	133.185	4.63	4.36	0.141	21.552	547.1	541.3	102.16	89.97	0.866	0.815	70	0.375697
80.00	958.01	88.09	87.55	1120.58	82.02	81.28	124.534	4.57	4.49	0.130	20.517	547.8	541.7	104.19	95.87	0.854	0.839	80	0.360302
90.00	958.91	88.80	87.66	1121.46	82.33	81.51	120.226	4.62	4.57	0.133	20.671	548.2	541.9	103.77	96.22	0.864	0.855	90	0.36434
100.00	959.81	88.45	87.95	1122.35	82.45	81.60	118.27	4.61	4.59	0.135	20.792	548.2	542.0	102.60	95.73	0.862	0.859	100	0.367099
110.00	960.70	88.17	87.97	1123.22	82.61	81.78	116.401	4.60	4.56	0.133	20.593	548.1	542.2	102.96	95.52	0.860	0.852	110	0.364173
120.00	961.60	87.61	88.15	1124.12	82.65	81.81	115.27	4.61	4.63	0.139	21.024	547.9	542.2	101.06	94.96	0.863	0.866	120	0.372158
130.00	962.50	87.03	88.39	1125.03	82.55	81.67	112.831	4.63	4.72	0.135	20.691	547.7	542.1	102.54	97.95	0.865	0.883	130	0.367046
140.00	963.40	86.85	88.71	1125.94	82.53	81.65	109.812	4.62	4.70	0.135	20.674	547.8	542.1	101.83	97.09	0.863	0.879	140	0.367712
150.00	964.29	86.44	89.28	1126.86	82.64	81.77	106.407	4.61	4.78	0.136	20.655	547.9	542.2	101.29	98.16	0.863	0.894	150	0.368476
160.00	965.19	86.37	89.18	1127.79	82.75	81.83	103.298	4.62	4.80	0.131	20.196	547.8	542.3	103.17	100.35	0.864	0.898	160	0.361289
170.00	966.09	86.27	89.19	1128.73	82.80	81.95	100.415	4.62	4.89	0.134	20.374	547.7	542.4	101.76	100.74	0.864	0.915	170	0.365403
180.00	966.99	86.00	88.93	1129.67	82.76	82.00	98.3955	4.64	4.85	0.135	20.478	547.5	542.4	101.32	99.03	0.867	0.907	180	0.367923
190.00	967.89	85.96	89.27	1130.63	82.75	81.91	97.1716	4.63	4.98	0.135	20.435	547.6	542.3	101.02	101.78	0.865	0.932	190	0.367567
200.00	968.79	85.75	89.08	1131.57	82.76	81.78	96.1682	4.62	4.89	0.132	20.181	547.4	542.3	102.07	100.87	0.865	0.914	200	0.363327
210.00	969.68	85.84	89.16	1132.52	82.83	81.96	95.3505	4.61	4.91	0.127	19.776	547.5	542.4	103.63	103.29	0.862	0.918	210	0.356283
220.00	970.58	85.68	88.64	1133.45	82.77	82.21	94.9534	4.62	4.84	0.139	20.722	547.2	542.5	99.17	97.11	0.864	0.906	220	0.373469
230.00	971.47	85.61	88.83	1134.40	82.72	82.09	94.7814	4.61	4.92	0.135	20.372	547.2	542.4	100.60	100.26	0.862	0.919	230	0.367223
240.00	972.37	85.52	88.64	1135.34	82.72	82.25	94.2729	4.61	4.87	0.137	20.557	547.1	542.5	99.54	98.30	0.861	0.911	240	0.370719
250.00	973.26	85.52	89.19	1136.30	82.69	82.37	94.1439	4.59	4.96	0.136	20.422	547.4	542.5	99.74	100.80	0.858	0.928	250	0.368338
260.00	974.15	85.52	89.54	1137.26	82.69	82.36	94.1242	4.58	4.99	0.138	20.585	547.5	542.5	98.66	100.52	0.856	0.933	260	0.371277
270.00	975.04	85.47	89.56	1138.22	86.43	85.76	93.9218	4.57	4.91	0.131	20.060	547.5	546.1	100.98	100.92	0.854	0.919	270	0.361878
280.00	975.93	85.65	89.44	1139.17	86.83	85.80	93.5682	4.60	4.91	0.135	20.328	547.5	546.3	100.36	99.45	0.861	0.919	280	0.366828
290.00	976.83	85.71	89.31	1140.13	86.93	85.96	93.3084	4.62	4.90	0.135	20.343	547.5	546.4	100.59	99.07	0.863	0.916	290	0.367191
300.00	977.73	85.83	89.16	1141.08	86.96	85.93	93.156	4.63	4.90	0.136	20.459	547.5	546.4	100.34	98.49	0.866	0.916	300	0.369329

300- App-B Data and Calculation Forms (page 25 of 92)

310.00	978.62	85.82	89.04	1142.02	87.04	85.88	93.0686	4.61	4.85	0.139	20.638	547.4	546.5	99.03	96.69	0.863	0.908	310	0.372583
320.00	979.52	85.75	89.09	1142.97	87.15	85.81	92.8314	4.63	4.87	0.133	20.221	547.4	546.5	101.48	99.05	0.867	0.912	320	0.365141
330.00	980.42	85.91	89.29	1143.92	83.92	85.90	92.7957	4.63	4.88	0.138	20.563	547.6	544.9	99.61	97.86	0.865	0.913	330	0.371333
340.00	981.32	85.88	89.28	1144.86	83.04	85.63	92.4906	4.61	4.88	0.136	20.453	547.6	544.3	99.65	98.33	0.861	0.912	340	0.369445
350.00	982.21	85.90	89.28	1145.82	83.59	85.32	92.2845	4.60	4.91	0.137	20.524	547.6	544.5	99.05	98.64	0.860	0.919	350	0.37079
360.00	983.10	85.95	89.29	1146.76	83.46	85.29	91.9705	4.57	4.87	0.137	20.471	547.6	544.4	98.68	98.03	0.855	0.911	360	0.369937
370.00	983.99	85.88	89.42	1147.73	83.57	85.38	91.8333	4.59	4.99	0.134	20.257	547.6	544.5	100.14	101.31	0.858	0.932	370	0.366125
380.00	984.88	85.88	89.57	1148.69	83.79	85.48	91.3813	4.57	4.99	0.135	20.299	547.7	544.6	99.49	101.07	0.855	0.933	380	0.367024
390.00	985.76	85.77	89.66	1149.66	83.73	85.38	91.3889	4.53	4.97	0.137	20.473	547.7	544.6	97.76	99.83	0.848	0.929	390	0.370168
400.00	986.65	85.77	89.77	1150.64	83.85	85.27	91.149	4.56	5.06	0.135	20.281	547.8	544.6	99.18	102.50	0.852	0.946	400	0.366772
410.00	987.53	85.70	89.80	1151.62	83.67	85.17	90.7405	4.55	5.06	0.140	20.652	547.7	544.4	97.11	100.64	0.851	0.946	410	0.373635
420.00	988.41	85.63	89.68	1152.59	83.55	85.08	90.6006	4.55	5.01	0.137	20.439	547.7	544.3	98.25	100.66	0.852	0.936	420	0.369818
430.00	989.30	85.56	89.75	1153.56	83.83	84.98	90.3498	4.55	5.03	0.137	20.458	547.7	544.4	98.11	100.90	0.852	0.940	430	0.370251
440.00	990.18	85.56	89.74	1154.54	83.72	84.97	90.2367	4.54	5.04	0.133	20.182	547.7	544.3	99.21	102.49	0.850	0.942	440	0.365296
450.00	991.07	85.47	89.88	1155.51	83.48	84.81	89.9336	4.55	5.06	0.135	20.330	547.7	544.1	98.65	102.08	0.852	0.945	450	0.368064
460.00	991.95	85.43	89.72	1156.49	83.58	84.81	89.8957	4.54	5.03	0.138	20.533	547.6	544.2	97.37	100.53	0.849	0.941	460	0.371756
470.00	992.83	85.29	89.74	1157.46	83.38	84.65	89.6521	4.56	5.01	0.136	20.361	547.5	544.0	98.50	100.98	0.852	0.937	470	0.368736
480.00	993.72	85.21	89.74	1158.43	83.31	84.55	89.6243	4.56	5.03	0.133	20.163	547.5	543.9	99.48	102.32	0.852	0.940	480	0.365159
490.00	994.60	85.13	89.72	1159.41	83.42	84.59	89.408	4.55	5.06	0.136	20.389	547.4	544.0	98.25	101.85	0.851	0.947	490	0.36931
500.00	995.49	85.05	89.64	1160.38	83.21	84.43	89.1834	4.54	5.03	0.131	20.014	547.3	543.8	99.85	103.04	0.849	0.940	500	0.36259
510.00	996.37	85.03	89.61	1161.36	83.34	84.50	88.9788	4.56	5.02	0.130	19.870	547.3	543.9	100.89	103.60	0.852	0.939	510	0.36005
520.00	997.25	85.03	89.54	1162.33	83.18	84.48	88.9513	4.55	5.03	0.135	20.251	547.3	543.8	98.77	101.89	0.850	0.941	520	0.366964
530.00	998.14	85.00	89.52	1163.30	83.27	84.25	88.5452	4.56	5.03	0.133	20.122	547.3	543.8	99.56	102.39	0.852	0.940	530	0.364774
540.00	999.03	85.01	89.43	1164.28	83.12	84.28	88.2979	4.58	5.04	0.134	20.163	547.2	543.7	99.89	102.47	0.857	0.943	540	0.365599
550.00	999.91	84.87	89.35	1165.25	83.00	84.14	88.1626	4.55	5.02	0.135	20.280	547.1	543.6	98.55	101.38	0.851	0.939	550	0.367766
560.00	1000.80	84.85	89.33	1166.23	82.98	84.01	88.082	4.57	5.04	0.133	20.088	547.1	543.5	99.94	102.79	0.855	0.943	560	0.364298
570.00	1001.68	84.74	89.28	1167.20	82.84	84.02	87.8748	4.55	5.02	0.130	19.893	547.0	543.4	100.57	103.25	0.852	0.938	570	0.360836
580.00	1002.56	84.72	89.20	1168.17	88.43	84.21	87.6159	4.53	5.00	0.141	20.664	547.0	546.3	96.35	98.50	0.848	0.935	580	0.374915
590.00	1003.44	84.78	89.19	1169.14	80.79	84.12	87.4584	4.50	5.02	0.136	20.333	547.0	542.5	97.10	101.30	0.841	0.940	590	0.368959
600.00	1004.32	84.65	89.21	1170.11	82.94	83.81	87.2633	4.56	5.01	0.134	20.188	546.9	543.4	99.13	101.54	0.853	0.937	600	0.366398
610.00	1005.19	84.51	89.13	1171.08	83.00	83.63	87.0572	4.49	5.03	0.131	19.949	546.8	543.3	98.73	103.17	0.840	0.941	610	0.362122
620.00	1006.07	84.44	88.99	1172.05	83.04	83.60	86.3248	4.55	5.02	0.132	19.986	546.7	543.3	99.69	102.52	0.850	0.938	620	0.363038
630.00	1006.96	84.34	88.82	1173.02	82.95	83.43	83.8912	4.56	5.00	0.131	19.862	546.6	543.2	100.15	102.33	0.852	0.935	630	0.361584
640.00	1007.84	84.27	88.77	1173.98	82.75	83.20	82.7847	4.55	4.98	0.141	20.585	546.5	543.0	96.24	98.30	0.851	0.932	640	0.375126
650.00	1008.72	84.24	88.66	1174.95	82.75	83.09	80.8105	4.54	5.02	0.134	20.050	546.5	542.9	98.36	101.20	0.850	0.938	650	0.366051
660.00	1009.60	84.28	88.57	1175.91	82.68	83.18	80.8872	4.51	5.00	0.137	20.284	546.4	542.9	96.58	99.84	0.844	0.936	660	0.370306
670.00	1010.48	84.20	88.47	1176.87	82.60	82.91	79.3863	4.56	4.97	0.138	20.314	546.3	542.8	97.09	98.76	0.852	0.929	670	0.371357
680.00	1011.36	84.17	88.43	1177.84	82.43	82.60	78.5047	4.53	5.02	0.137	20.250	546.3	542.5	96.69	100.03	0.847	0.940	680	0.370501
690.00	1012.23	84.12	88.43	1178.81	82.56	83.05	81.3861	4.51	4.98	0.136	20.207	546.3	542.8	97.09	99.84	0.844	0.931	690	0.36873
700.00	1013.11	84.13	88.53	1179.77	82.51	83.09	81.7388	4.51	4.99	0.139	20.417	546.3	542.8	96.03	98.98	0.843	0.932	700	0.372441
710.00	1013.98	84.09	88.55	1180.74	82.36	82.97	81.8518	4.52	5.01	0.133	20.030	546.3	542.7	98.24	101.39	0.846	0.936	710	0.36534
720.00	1014.86	84.08	88.49	1181.71	82.33	83.00	81.8622	4.55	5.05	0.136	20.215	546.3	542.7	97.80	101.39	0.850	0.945	720	0.368704
730.00	1015.72	84.10	88.50	1182.66	82.34	83.23	81.818	4.44	4.91	0.137	20.260	546.3	542.8	95.36	98.32	0.831	0.919	730	0.369539
740.00	1016.59	84.06	88.50	1183.63	82.32	83.00	81.6888	4.45	5.01	0.137	20.302	546.3	542.7	95.37	100.10	0.833	0.937	740	0.370348
750.00	1017.45	84.03	88.47	1184.59	82.22	82.89	81.6418	4.47	4.98	0.140	20.531	546.2	542.6	94.74	98.30	0.837	0.931	750	0.374544
760.00	1018.32	83.94	88.44	1185.55	82.21	82.82	81.389	4.47	4.98	0.139	20.402	546.2	542.5	95.21	98.99	0.836	0.932	760	0.372285
770.00	1019.21	83.92	88.38	1186.54	82.17	82.73	81.4603	4.57	5.10	0.133	20.019	546.1	542.4	99.30	103.34	0.855	0.954	770	0.365261

300- App-B Data and Calculation Forms (page 26 of 92)

Intertek Testing Services

Manufacturer:	**SBI**	RESULTS	
Model:	**HE350 Series (FP-15)**		
Date:	**6-9-16**	**Average emission rate:(gr/hr)**	**1.5**
Run:	**2**		
Project #:	**QC20160208**	Burn Rate (Dry kg/hr):	1.467
Test Duration: (minutes)	**770**		
PRESSURE FACTOR	0.99265	BAROMETRIC PRESSURE	
		Average:	29.7
TEMPERATURE FACTORS		Start:	29.6
DGM #1:	0.96545	End:	29.8
DGM #2:	0.97220		
		DRY GAS METER VALUES	
VOLUMES SAMPLED		DGM #1 Final:	1019.206
DGM #1:	65.90085	Initial:	950.851
DGM #2:	70.65781		
		DGM #2 Final:	1186.537
TOTAL TUNNEL VOLUME (scf):	303865	Initial:	1113.539
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)	
Sample Train 1:	4610.936	DGM #1:	546.898
Sample Train 2:	4300.510	DGM #2:	543.101
TOTAL EMISSIONS		CALIBRATION FACTORS	
Sample Train 1 (g):	**19.37**	DGM #1:	1.0060
Sample Train 2 (g):	**18.92**	DGM #2:	1.0030
EMISSION RATES		TUNNEL FLOW RATE:	394.629
Sample Train 1 (g/hr):	**1.51**		
Sample Train 2 (g/hr):	**1.47**	PARTICULATE CATCH (mg)	
		Total Sample Train 1:	4.2
		Total Sample Train 2:	4.4
		Filter and seal Sample Train 1:	3.7
MAX Allowed	7.50%	Filter and seal Sample Train 2:	3.2
		Probe Sample Train 1:	0.5
DEVIATION:	2.32%	Probe Sample Train 2:	1.2

	Train 1	Train 2	
Cs	6.3732E-05	6.2272E-05	
Cr	0	0	
Et	19.37	18.92	
Et AVERAGE		19.14	Grams Emissions

Room Particulate Correction

Mr	0	Milligram Catch (mg)
Vmr	99.5148	Total Volume Sampled (dscf)

Rotometer (glass) at 100 flow rate is 0.12924 cfm

300- App-B Data and Calculation Forms (page 27 of 92)

Intertek

TEST FUEL DATA
EPA METHOD 5G-3

Project Number:	G102163747
Manufacturer:	SBI
Model:	HE350 Series
Sample ID Number:	QC20160608
Test Date:	9 ~~10~~-Jun-16
Test Run Number:	3

Calibration Reference ID	SBI-153	
Set meter to Species 1		
Set Temperature to 70F	12%	12
Set pin setting to 444	22%	22

PRE-BURN FUEL PROPERTIES

Eq. ID No.:		Time: 07:55	Temp.,°F: 76.7		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight		0.0	Average, %db		#DIV/0!

Allowable Fuel Load Range: 27 to 32.9

TEST FUEL LOAD PROPERTIES

Eq. ID No.:	SBI-229		Time: 07:55	Temp.,°F: 76.7	
Piece No.	Length, In.	Weight, Lb.		Moisture, %, Dry Basis	
		2x4	4x4		
1	16.5	7.110	-	24.6	24.6	21.9
2	16 3/4	8.551	-	22.3	33.5	26.3
3	16 1/2	8.233	-	22.1	26.4	23.8
4	15 1/2	8.858	-	24.5	20.7	24.3
5	17	7.821	-	21.3	16.0	19.1
6	16 1/4	5.554	-	22.8	18.4	24.2
7	16 1/4	5.707	-	21.5	21.4	24.2
8	-	-	-	-	-	-
Totals		0.0	0.0			
% of Weight		#DIV/0!	#DIV/0!			
Total weight, wet, lb.		0.00		Average Moisture, dry		#DIV/0!
Total weight, dry, kg		#DIV/0!		Average Moisture, wet		#DIV/0!

Test Engineer: [illegible]

Date: 9-June 2016

300- App-B Data and Calculation Forms (page 28 of 92)

Intertek

TEST FUEL DATA
EPA METHOD 5G-3

Project Number:	G102163747
Manufacturer:	SBI
Model:	HE350 Series
Sample ID Number:	QC20160608
Test Date:	9-Jun-16
Test Run Number:	2

Calibration Reference ID	SBI-153	
Set meter to Species 1 Set Temperature to 70F Set pin setting to 444	12%	12.0
	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time: 5:15	Temp.,°F: 76.6		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
kidling: – 1		7.717			
start-up 2		12.077	24.3	22.3	20.4
" 3		12.077	24.3	19.6	18.9
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight		0.0	Average, %db		#DIV/0!

} 12.077 (4 pieces)

Allowable Fuel Load Range:	27	to	32.9

TEST FUEL LOAD PROPERTIES					
Eq. ID No.: SBI-229		Time:		Temp.,°F:	76.6
Piece No.	Length, In.	Weight, Lb. 2x4	Weight, Lb. 4x4	Moisture, %, Dry Basis		
1	17	8.615	–	23.5	17.6	28.6
2	17	8.827	–	24.0	25.8	24.5
3	16 1/2	7.189	–	26.8	19.2	25.1
4	16 3/4	6.539	–	26.0	21.4	19.0
5	16 3/4	6.359	–	24.9	33.7	16.4
6	17	4.782	–	20.5	18.4	17.8
7						
8						
Totals		0.0	0.0			
% of Weight		#DIV/0!	#DIV/0!			
Total weight, wet, lb.		0.00		Average Moisture, dry		#DIV/0!
Total weight, dry, kg		#DIV/0!		Average Moisture, wet		#DIV/0!

Test Engineer: [signature]

Date: 9-Jun-2016

300- App-B Data and Calculation Forms (page 29 of 92)

Intertek

Dillution Tunnel Velocity Traverse
EPA Method 5G-3

Project Number: G102163747
Manufacturer: SBI
Model: HE350 Series
Sample ID Number: QC20160608
Test Date: 9-Jun-16
Test Run Number: 2

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp,°F	
A1	0.110	100.4	0.0000
A2	0.127	100.7	0.0000
A3	0.125	100.8	0.0000
A4	0.122	96.6	0.0000
A Center	0.131	101.2	0.0000
B1	0.117	99.7	0.0000
B2	0.132	100.0	0.0000
B3	0.125	99.9	0.0000
B4	0.094	98.3	0.0000
B Center	0.133	99.6	0.0000
Averages	#DIV/0!	#DIV/0!	0.0000

Tunnel Diameter	8.000	inches
Tunnel Static	0.198	in. H2O
Tunnel Area	0.34907	Ft2
Pitot Correction	#DIV/0!	factor
Baro. Pressure	29.40	
Pitot Factor	0.84	(0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity	#DIV/0!	Ft/ Sec
Initial Flow	**#DIV/0!**	Ft3/min

Test Engineer: [illegible]

Date: 9-Jun-2016

300- App-B Data and Calculation Forms (page 30 of 92)

Time	Ambiant	Flue	Firebox Top	Dilution Tunnel	Firebox Right	Firebox Back	Firebox Bottom	Firebox Left	DGM Outlet 1
min	°F	°F	°F	°F	°F	°F	°F	°F	°F
0	79.15	501.95	131.31	540.89	607.44	511.72	549.36	527.91	N/A
1	79.35	492.56	123.16	535.24	606.25	509.03	546.31	525.52	N/A
2	78.96	483.76	119.99	531.69	604.76	505.90	543.20	523.49	N/A
3	79.41	474.80	118.12	528.63	603.10	503.23	539.51	521.76	N/A
4	78.92	465.95	116.83	524.80	601.04	500.44	535.57	519.82	N/A
5	78.67	457.76	115.93	520.16	598.94	497.23	531.53	518.05	N/A
6	79.15	450.21	114.81	515.12	596.67	494.02	527.55	516.33	N/A
7	78.59	443.20	114.30	510.20	594.21	491.41	523.47	514.76	N/A
8	78.60	436.20	113.55	504.74	591.60	488.23	519.74	512.15	N/A
9	79.23	428.61	112.64	498.54	588.85	484.64	515.76	510.68	N/A
10	79.16	421.37	112.15	491.59	585.99	481.89	511.87	508.47	N/A
11	79.43	414.70	111.36	484.52	582.99	479.04	508.06	506.85	N/A
12	79.30	408.14	110.99	477.01	579.61	475.47	503.52	504.92	N/A
13	78.06	402.38	110.42	470.85	576.40	472.51	499.71	502.08	N/A
14	78.01	397.26	109.86	464.99	573.15	469.26	495.65	499.65	N/A
15	78.29	392.22	109.12	459.30	569.83	465.80	491.88	497.84	N/A
16	78.37	387.40	108.70	453.57	566.49	462.71	487.94	495.63	N/A
17	78.07	382.56	108.16	448.44	563.13	460.21	484.46	493.57	N/A
18	77.85	378.17	107.69	443.58	559.75	456.93	480.73	490.81	N/A
19	77.88	373.82	107.35	438.84	556.35	453.54	477.22	488.29	N/A
20	77.61	369.84	106.88	434.32	552.94	450.58	473.67	486.66	N/A
21	77.61	365.59	106.38	429.68	549.27	447.13	469.82	484.08	N/A
22	77.33	361.74	105.85	425.51	545.89	444.07	466.34	480.72	N/A
23	77.49	358.71	105.61	421.27	542.51	440.86	463.30	479.28	N/A
24	77.46	355.46	105.15	417.40	539.16	437.95	459.99	477.03	N/A
25	77.25	352.47	104.86	413.66	535.84	434.97	456.86	474.39	N/A
26	77.37	349.44	104.34	410.22	532.56	432.03	454.01	472.53	N/A
27	77.11	346.54	104.12	406.87	529.28	428.90	450.89	469.95	N/A
28	77.35	343.64	103.63	403.48	526.04	426.28	448.09	468.35	N/A
29	77.23	340.76	103.45	400.41	522.87	424.02	445.24	466.19	N/A
30	77.47	337.76	103.12	396.87	519.46	420.95	441.80	463.96	N/A
31	77.00	335.32	102.75	393.71	516.38	418.52	438.94	461.55	N/A

32	77.11	332.71	102.44	390.83	513.35	416.23	435.98	459.40	N/A
33	77.28	330.52	102.31	388.05	510.35	413.71	433.13	457.41	N/A
34	77.09	328.17	101.93	385.25	507.35	411.02	430.45	455.44	N/A
35	77.11	325.76	101.66	382.51	504.47	408.63	428.16	453.46	N/A
36	77.15	323.63	101.54	380.01	501.64	406.01	425.82	451.63	N/A
37	77.19	321.51	100.57	377.44	498.85	403.98	423.46	449.53	N/A
38	77.34	319.76	100.63	375.16	496.11	401.72	420.56	446.94	N/A
39	77.06	317.83	82.84	372.69	493.21	399.40	417.78	444.67	N/A
40	77.06	315.63	99.64	370.46	490.56	397.17	415.81	442.16	N/A
41	77.33	314.02	100.10	368.43	487.94	395.10	413.51	440.40	N/A
42	76.75	312.25	90.36	366.38	485.38	392.41	411.34	438.01	N/A
43	76.97	310.23	88.44	364.45	482.86	390.59	408.97	436.29	N/A
44	77.28	308.84	98.40	362.67	480.38	388.55	406.77	434.93	N/A
45	77.11	303.98	105.22	354.34	478.77	386.42	404.46	433.47	N/A
46	77.52	302.61	101.35	352.92	476.19	384.76	402.61	432.50	N/A
47	77.48	300.71	100.02	351.42	473.65	382.46	400.27	431.25	N/A
48	77.40	298.86	99.28	349.66	470.99	380.49	397.90	429.92	N/A
49	76.94	297.01	98.89	347.87	468.59	378.15	396.09	428.52	N/A
50	76.72	295.30	98.41	346.10	466.19	376.47	394.08	426.60	N/A
51	76.62	293.71	98.20	344.22	463.82	374.29	391.96	425.11	N/A
52	76.85	292.01	97.93	342.30	461.46	372.64	389.87	422.99	N/A
53	76.68	290.35	97.71	340.20	459.13	370.72	387.99	421.35	N/A
54	76.66	288.65	97.49	338.19	456.79	368.62	385.88	419.27	N/A
55	76.48	287.31	97.35	336.38	454.48	366.88	383.91	417.13	N/A
56	76.66	285.96	97.13	334.39	452.17	365.34	381.86	415.08	N/A
57	76.39	283.87	96.93	332.39	449.71	363.26	379.83	412.93	N/A
58	76.44	282.58	96.71	330.51	447.47	361.67	377.65	410.93	N/A
59	76.41	280.92	96.44	328.73	445.22	359.73	375.73	409.13	N/A
60	76.26	279.58	96.32	326.88	443.00	357.54	374.37	407.42	N/A
61	76.52	278.18	96.06	325.18	440.81	355.95	372.69	405.35	N/A
62	76.39	277.09	95.97	323.48	438.65	354.51	371.10	403.62	N/A
63	76.61	275.74	95.75	321.90	436.52	352.72	369.24	401.33	N/A
64	76.58	274.25	95.64	320.13	434.40	350.82	367.49	399.78	N/A
65	76.36	273.36	95.44	318.47	432.33	349.32	365.44	397.88	N/A

300- App-B Data and Calculation Forms (page 32 of 92)

66	76.38	271.99	95.36	316.83	430.27	347.90	363.67	396.11	N/A
67	76.41	270.70	95.16	315.07	428.05	346.41	362.17	393.90	N/A
68	76.37	269.62	95.12	313.54	426.03	344.52	360.74	392.24	N/A
69	76.44	268.43	95.01	312.18	424.04	342.61	358.78	390.51	N/A
70	76.24	267.11	94.83	310.72	422.09	341.22	357.07	388.94	N/A
71	76.27	266.22	94.80	309.32	420.16	339.28	355.61	387.10	N/A
72	76.31	265.33	94.60	307.93	418.26	337.58	353.91	385.44	N/A
73	76.33	264.01	94.35	306.66	416.36	336.17	352.30	383.92	N/A
74	76.48	263.16	94.29	305.33	414.50	334.79	350.85	382.56	N/A
75	76.41	262.05	94.15	304.01	412.69	333.29	349.35	380.79	N/A
76	76.63	260.95	94.09	302.62	410.72	331.74	347.89	379.27	N/A
77	76.85	260.03	93.99	301.53	408.95	329.86	346.60	378.20	N/A
78	76.96	259.30	93.88	300.57	407.20	328.68	345.08	376.88	N/A
79	76.88	258.69	93.66	299.38	405.50	327.17	343.38	375.55	N/A
80	77.24	257.65	93.57	298.21	403.81	325.54	341.93	374.34	N/A
81	76.80	257.01	93.59	297.15	402.15	324.66	340.47	372.73	N/A
82	76.80	255.99	93.34	296.08	400.51	323.59	338.88	371.45	N/A
83	76.55	255.01	93.29	295.01	398.91	321.96	337.80	370.22	N/A
84	76.88	254.03	93.09	293.87	397.31	320.61	336.50	369.15	N/A
85	77.03	253.18	93.01	292.72	395.64	319.43	334.99	367.85	N/A
86	77.20	252.40	92.88	291.62	394.09	318.16	333.63	366.55	N/A
87	76.95	251.17	92.83	290.49	392.60	317.02	332.57	365.47	N/A
88	76.53	250.53	92.69	289.31	391.10	315.88	331.45	364.16	N/A
89	76.51	249.80	92.64	288.27	389.63	314.54	330.27	362.30	N/A
90	76.66	248.80	92.54	287.25	388.19	313.36	328.98	361.19	N/A
91	76.50	248.90	92.98	286.26	386.76	312.32	327.63	360.19	N/A
92	76.46	248.15	99.91	279.03	386.20	311.34	326.32	359.37	N/A
93	76.40	247.66	94.94	279.61	384.61	310.47	325.39	359.28	N/A
94	76.37	247.25	93.54	279.96	382.99	308.77	323.98	359.32	N/A
95	76.41	246.41	93.01	280.06	381.61	307.55	323.04	359.14	N/A
96	76.38	246.16	92.67	279.82	380.34	306.51	322.19	358.79	N/A
97	76.49	245.37	92.44	279.41	379.08	305.56	321.03	358.87	N/A
98	76.38	244.94	92.30	278.86	377.88	304.53	319.94	358.08	N/A
99	76.47	244.46	92.11	278.12	376.69	303.42	318.80	357.75	N/A

300- App-B Data and Calculation Forms (page 33 of 92)

100	76.49	243.43	91.91	277.27	375.54	302.45	317.87	357.38	N/A
101	76.65	242.59	91.83	276.29	374.40	301.59	316.90	356.88	N/A
102	76.40	241.58	91.76	275.27	373.15	300.67	315.81	356.41	N/A
103	76.60	240.69	91.57	274.08	372.02	299.85	314.73	355.89	N/A
104	76.81	240.22	91.50	272.94	370.95	299.09	313.55	355.12	N/A
105	76.72	239.25	91.45	271.70	369.87	298.10	312.43	354.41	N/A
106	76.79	238.55	91.21	270.54	368.81	297.60	311.68	353.39	N/A
107	76.80	237.60	91.10	269.41	367.75	296.94	310.76	352.53	N/A
108	76.94	236.76	91.11	268.21	366.68	295.79	310.07	351.64	N/A
109	77.01	236.10	91.08	266.98	365.64	294.88	309.07	350.83	N/A
110	76.99	235.17	90.90	265.85	364.60	293.86	307.95	349.63	N/A
111	76.81	234.24	90.82	264.54	363.48	292.88	306.76	348.66	N/A
112	76.80	233.60	90.87	263.33	362.43	292.18	305.68	347.62	N/A

300- App-B Data and Calculation Forms (page 34 of 92)

DGM Inlet 1	Probe 1	DGM Outlet 2	DGM Inlet 2	Probe 2	Probe 3	Draft	Dilution Tunnel	Scale
°F	°F	°F	°F	°F	°F	"H2O	"H2O	lb
N/A	N/A	N/A	N/A	N/A	N/A	0.062	0.127	7.98
N/A	N/A	N/A	N/A	N/A	N/A	0.062	0.125	7.97
N/A	N/A	N/A	N/A	N/A	N/A	0.061	0.129	7.93
N/A	N/A	N/A	N/A	N/A	N/A	0.060	0.125	7.93
N/A	N/A	N/A	N/A	N/A	N/A	0.059	0.128	7.90
N/A	N/A	N/A	N/A	N/A	N/A	0.059	0.129	7.88
N/A	N/A	N/A	N/A	N/A	N/A	0.058	0.129	7.85
N/A	N/A	N/A	N/A	N/A	N/A	0.058	0.129	7.83
N/A	N/A	N/A	N/A	N/A	N/A	0.057	0.130	7.82
N/A	N/A	N/A	N/A	N/A	N/A	0.056	0.128	7.81
N/A	N/A	N/A	N/A	N/A	N/A	0.056	0.129	7.78
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.130	7.76
N/A	N/A	N/A	N/A	N/A	N/A	0.054	0.131	7.75
N/A	N/A	N/A	N/A	N/A	N/A	0.054	0.129	7.73
N/A	N/A	N/A	N/A	N/A	N/A	0.053	0.131	7.74
N/A	N/A	N/A	N/A	N/A	N/A	0.053	0.129	7.72
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.128	7.72
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.132	7.71
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.129	7.70
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.128	7.69
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.130	7.67
N/A	N/A	N/A	N/A	N/A	N/A	0.050	0.129	7.67
N/A	N/A	N/A	N/A	N/A	N/A	0.050	0.132	7.65
N/A	N/A	N/A	N/A	N/A	N/A	0.050	0.130	7.64
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.131	7.62
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.131	7.60
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.129	7.59
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.130	7.58
N/A	N/A	N/A	N/A	N/A	N/A	0.048	0.131	7.56
N/A	N/A	N/A	N/A	N/A	N/A	0.048	0.131	7.54
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.132	7.53
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.132	7.51

300- App-B Data and Calculation Forms (page 35 of 92)

N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.131	7.50
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.133	7.49
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.131	7.47
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.130	7.47
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.131	7.44
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.108	7.43
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.123	7.42
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.031	7.40
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.133	7.39
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.133	7.37
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.091	7.36
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.092	7.35
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.132	7.34
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.134	7.30
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.133	7.30
N/A	N/A	N/A	N/A	N/A	N/A	0.043	0.134	7.29
N/A	N/A	N/A	N/A	N/A	N/A	0.043	0.134	7.28
N/A	N/A	N/A	N/A	N/A	N/A	0.043	0.132	7.28
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.133	7.29
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.133	7.29
N/A	N/A	N/A	N/A	N/A	N/A	0.043	0.135	7.29
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.135	7.28
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.132	7.27
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.133	7.26
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.134	7.26
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.135	7.25
N/A	N/A	N/A	N/A	N/A	N/A	0.042	0.135	7.24
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.135	7.23
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.135	7.21
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.137	7.21
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.137	7.19
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.138	7.17
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.134	7.15
N/A	N/A	N/A	N/A	N/A	N/A	0.041	0.136	7.15

300- App-B Data and Calculation Forms (page 36 of 92)

N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.138	7.15
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.138	7.12
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.137	7.11
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.134	7.10
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.134	7.10
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.136	7.08
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.137	7.07
N/A	N/A	N/A	N/A	N/A	N/A	0.040	0.137	7.05
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.135	7.04
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.136	7.02
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.137	7.01
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.135	7.02
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.138	6.98
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.135	6.98
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.137	6.95
N/A	N/A	N/A	N/A	N/A	N/A	0.039	0.135	6.94
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.136	6.92
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.135	6.92
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.137	6.90
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.135	6.88
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.136	6.88
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.137	6.85
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.138	6.84
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.136	6.84
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.136	6.83
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.137	6.85
N/A	N/A	N/A	N/A	N/A	N/A	0.038	0.137	6.81
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.137	6.79
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.137	6.77
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.137	6.75
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.135	6.75
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.137	6.73
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.136	6.71
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.135	6.71

300- App-B Data and Calculation Forms (page 37 of 92)

N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.136	6.70
N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.135	6.70
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.138	6.68
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.137	6.67
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.136	6.67
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.134	6.65
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.137	6.64
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.135	6.63
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.135	6.62
N/A	N/A	N/A	N/A	N/A	N/A	0.036	0.137	6.60
N/A	N/A	N/A	N/A	N/A	N/A	0.035	0.137	6.59
N/A	N/A	N/A	N/A	N/A	N/A	0.035	0.137	6.57
N/A	N/A	N/A	N/A	N/A	N/A	0.035	0.137	6.57

300- App-B Data and Calculation Forms (page 38 of 92)

Date/heure	Time	O_2	CO	CO_2IR	CO
YYYY-MM-DD HH:MM:SS	min	%	ppm	%	%
2016-06-09 09:27:29	0	17.10	2932	2.33	0.29
2016-06-09 09:37:29	10	7.45	9329	13.45	0.93
2016-06-09 09:47:29	20	7.37	14602	13.82	1.46
2016-06-09 09:57:29	30	6.89	21485	14.06	2.15
2016-06-09 10:07:29	40	6.86	19751	13.95	1.98
2016-06-09 10:17:29	50	6.77	18775	13.94	1.88
2016-06-09 10:27:29	60	6.53	12707	14.43	1.27
2016-06-09 10:37:29	70	11.02	17280	10.04	1.73
2016-06-09 10:47:29	80	11.74	13291	8.98	1.33
2016-06-09 10:57:29	90	11.00	9429	9.96	0.94
2016-06-09 11:07:29	100	10.22	18166	10.34	1.82
2016-06-09 11:17:29	110	11.31	5766	9.39	0.58
2016-06-09 11:27:29	120	11.06	6265	9.47	0.63
2016-06-09 11:37:29	130	12.43	5726	8.05	0.57
2016-06-09 11:47:29	140	12.88	4987	7.41	0.50
2016-06-09 11:57:29	150	14.89	5835	5.81	0.58
2016-06-09 12:07:29	160	15.25	6043	4.99	0.60
2016-06-09 12:17:29	170	15.29	5457	5.02	0.55
2016-06-09 12:27:29	180	15.23	5311	5.05	0.53
2016-06-09 12:37:29	190	15.13	5020	5.10	0.50
2016-06-09 12:47:29	200	15.15	5135	5.17	0.51
2016-06-09 12:57:29	210	15.11	4902	5.17	0.49
2016-06-09 13:07:29	220	15.12	4736	5.18	0.47
2016-06-09 13:17:29	230	15.16	4617	5.16	0.46
2016-06-09 13:27:29	240	15.16	4483	5.20	0.45
2016-06-09 13:37:29	250	15.09	4500	5.27	0.45
2016-06-09 13:47:29	260	15.17	4256	5.23	0.43
2016-06-09 13:57:29	270	15.39	4207	5.08	0.42
2016-06-09 14:07:29	280	15.51	4358	4.96	0.44
2016-06-09 14:17:29	290	15.54	4272	4.82	0.43
2016-06-09 14:27:29	300	15.50	4091	4.82	0.41
2016-06-09 14:37:29	310	15.65	4349	4.74	0.43
2016-06-09 14:47:29	320	15.71	4130	4.70	0.41
2016-06-09 14:57:29	330	15.85	4043	4.58	0.40
2016-06-09 15:07:29	340	16.07	3879	4.37	0.39
2016-06-09 15:17:29	350	16.20	3728	4.30	0.37
2016-06-09 15:27:29	360	16.29	3611	4.16	0.36
2016-06-09 15:37:29	370	16.47	3716	4.02	0.37
2016-06-09 15:47:29	380	16.51	3781	3.94	0.38
2016-06-09 15:57:29	390	16.66	3939	3.78	0.39
2016-06-09 16:07:29	400	16.70	3648	3.73	0.36
2016-06-09 16:17:29	410	16.77	3524	3.70	0.35
2016-06-09 16:27:29	420	16.81	3510	3.65	0.35
2016-06-09 16:37:29	430	16.81	3419	3.67	0.34
2016-06-09 16:47:29	440	16.92	3287	3.56	0.33
2016-06-09 16:57:29	450	17.01	3284	3.48	0.33
2016-06-09 17:07:29	460	17.09	3147	3.43	0.31
2016-06-09 17:17:29	470	17.08	3236	3.42	0.32
2016-06-09 17:27:29	480	17.26	3078	3.34	0.31
2016-06-09 17:37:29	490	17.37	3029	3.22	0.30
2016-06-09 17:47:29	500	17.48	2989	3.10	0.30
2016-06-09 17:57:29	510	17.65	2985	2.91	0.30
2016-06-09 18:07:29	520	17.65	2989	2.89	0.30

300- App-B Data and Calculation Forms (page 39 of 92)

2016-06-09 18:17:29	530	17.70	*2884*	2.88	0.29
2016-06-09 18:27:29	540	17.70	*2816*	2.85	0.28
2016-06-09 18:37:29	550	17.67	*2818*	2.88	0.28
2016-06-09 18:47:29	560	17.77	*2614*	2.82	0.26
2016-06-09 18:57:29	570	17.86	*2549*	2.75	0.42
2016-06-09 19:07:29	580	17.92	*2489*	2.68	0.25
2016-06-09 19:17:29	290	18.07	*2467*	2.58	0.25
2016-06-09 19:27:29	600	18.12	*2368*	2.50	0.24
2016-06-09 19:37:29	610	18.18	*2327*	2.44	0.23
2016-06-09 19:47:29	620	18.46	*2155*	2.22	0.22
2016-06-09 19:57:29	630	18.51	*2095*	2.15	0.21
2016-06-09 20:07:29	640	18.69	*1989*	2.02	0.20
2016-06-09 20:17:29	650	18.74	*1987*	1.95	0.20
2016-06-09 20:27:29	660	18.83	*1966*	1.86	0.20
2016-06-09 20:37:29	670	18.94	*3862*	1.75	0.39
2016-06-09 20:47:29	680	18.97	*1889*	1.73	0.19
2016-06-09 20:57:29	690	19.04	*1841*	1.65	0.18
2016-06-09 21:07:29	700	19.09	*1802*	1.29	0.18
2016-06-09 21:17:29	710	19.10	*1769*	1.29	0.18
2016-06-09 21:27:29	720	19.15	*1741*	1.55	0.17
2016-06-09 21:37:29	730	19.23	*1660*	1.48	0.17
2016-06-09 21:47:29	740	19.32	*1620*	1.43	0.16
2016-06-09 21:57:29	750	19.31	*1654*	1.42	0.17
2016-06-09 22:07:29	760	17.60	*4232*	1.75	0.42
2016-06-09 22:17:29	770	17.76	*3606*	2.66	0.36

300- App-B Data and Calculation Forms (page 40 of 92)

Time	Ambient	Flue	Dilution Tunnel	Firebox Top	Firebox Right	Firebox Back	Firebox Bottom	Firebox Left
min	°F	°F	°F	°F	°F	°F	°F	°F
0	76.85	233.27	90.85	262.96	362.09	291.86	305.22	347.15
10	77.22	704.64	159.95	628.90	360.70	289.04	296.20	337.32
20	79.00	780.60	161.95	856.99	369.84	337.08	346.16	328.47
30	80.45	764.48	160.90	817.11	386.42	382.68	389.52	323.71
40	81.25	761.97	160.88	816.70	401.27	419.42	417.90	324.16
50	82.21	761.76	161.66	823.10	416.30	457.42	446.43	327.54
60	82.76	764.42	160.24	854.05	433.36	489.65	469.02	335.58
70	82.62	637.09	133.19	784.72	450.87	512.69	487.11	346.39
80	82.15	541.02	124.53	693.86	452.92	498.41	470.91	363.80
90	81.53	507.94	120.23	680.23	449.32	471.06	444.88	374.59
100	80.61	509.34	118.27	728.38	445.86	451.57	428.86	374.30
110	80.40	502.33	116.40	713.73	445.94	443.03	417.69	370.39
120	80.30	495.53	115.27	669.15	446.84	429.77	412.43	363.89
130	81.06	477.74	112.83	627.38	449.52	421.49	409.90	359.69
140	80.32	437.54	109.81	539.40	452.17	411.78	403.42	358.48
150	80.25	405.26	106.41	482.97	454.09	403.18	396.54	358.36
160	79.82	353.46	103.30	427.51	451.06	393.73	386.27	359.47
170	79.45	324.54	100.42	387.12	440.71	384.47	375.86	358.53
180	79.67	306.63	98.40	363.80	430.42	376.06	368.75	355.55
190	79.28	295.34	97.17	349.95	421.41	364.32	364.84	352.64
200	79.25	288.68	96.17	341.09	414.12	353.39	363.50	350.73
210	78.96	283.60	95.35	334.67	408.37	342.13	362.45	349.31
220	78.85	281.19	94.95	331.40	403.62	333.11	361.31	349.96
230	78.43	279.75	94.78	329.07	399.74	325.82	360.42	349.75
240	78.60	277.98	94.27	326.83	396.69	319.76	359.22	351.17
250	78.62	278.24	94.14	325.66	394.01	314.89	357.17	354.29
260	78.69	280.09	94.12	328.59	391.32	312.03	356.43	355.81
270	78.87	279.27	93.92	327.06	388.73	309.84	355.48	356.28
280	78.94	276.26	93.57	323.19	386.72	307.30	354.19	354.99
290	78.83	273.50	93.31	319.88	385.08	304.61	349.66	353.67
300	78.63	271.72	93.16	316.57	383.95	302.20	345.02	351.96
310	78.66	271.29	93.07	315.43	383.45	299.70	340.76	350.93

320	78.42	270.81	92.83	313.95	382.32	298.00	338.03	349.49
330	78.53	269.84	92.80	310.88	380.92	296.11	335.03	347.86
340	78.63	266.53	92.49	306.85	379.80	294.42	331.55	346.22
350	78.69	263.56	92.28	301.49	378.27	293.32	328.80	342.96
360	78.46	260.34	91.97	296.63	375.88	292.48	324.90	338.60
370	78.25	257.47	91.83	291.77	373.25	290.94	321.28	333.39
380	78.19	254.38	91.38	286.20	370.77	289.00	317.31	329.30
390	78.48	251.81	91.39	282.63	368.23	287.14	313.87	324.57
400	78.47	249.51	91.15	279.81	365.47	286.19	310.55	319.47
410	78.15	247.54	90.74	276.49	362.44	285.11	306.23	313.41
420	78.29	245.57	90.60	273.30	359.46	284.77	300.56	308.39
430	78.04	244.42	90.35	271.82	357.11	283.36	296.40	304.18
440	78.03	243.56	90.24	269.87	355.12	280.04	292.06	300.69
450	77.93	242.25	89.93	267.59	353.35	277.79	288.89	298.24
460	77.99	240.69	89.90	265.67	351.87	275.37	285.54	296.51
470	77.89	239.29	89.65	263.44	350.10	273.57	282.67	294.89
480	77.94	240.10	89.62	262.65	348.33	271.90	279.74	292.81
490	77.73	238.59	89.41	260.27	346.69	270.05	276.83	290.18
500	77.77	235.76	89.18	255.85	344.86	267.85	273.92	287.79
510	77.77	233.31	88.98	251.66	342.81	265.54	270.94	285.30
520	77.23	230.27	88.95	246.65	341.08	262.85	267.48	281.04
530	77.21	228.40	88.55	243.38	339.49	260.45	263.53	277.91
540	77.18	227.45	88.30	240.97	337.95	258.15	259.74	274.13
550	76.87	226.65	88.16	239.49	336.55	256.44	256.24	270.18
560	76.76	225.42	88.08	237.97	335.60	255.07	252.83	267.13
570	76.53	224.52	87.87	235.96	334.82	253.79	249.86	264.69
580	76.55	222.71	87.62	233.97	334.03	252.33	247.18	262.85
590	76.71	220.95	87.46	231.83	332.52	250.36	243.67	260.94
600	76.60	219.03	87.26	229.02	330.04	248.22	240.73	259.41
610	76.35	216.72	87.06	225.90	326.52	245.84	237.27	258.08
620	76.10	214.21	86.32	223.19	323.07	243.54	234.04	256.90
630	73.77	209.46	83.89	217.87	318.43	239.49	230.15	255.87
640	73.30	204.90	82.78	213.20	312.81	235.56	225.61	253.81
650	70.72	199.69	80.81	207.23	306.72	231.16	221.41	251.47

300- App-B Data and Calculation Forms (page 42 of 92)

660	72.30	194.59	80.89	201.74	300.02	227.06	216.86	249.68
670	66.87	190.67	79.39	196.39	293.27	222.96	212.15	248.01
680	65.24	185.37	78.50	189.62	285.93	217.37	205.93	244.86
690	73.41	181.11	81.39	185.98	279.66	214.82	202.86	241.47
700	74.86	178.49	81.74	183.06	274.34	212.07	200.13	239.06
710	75.34	175.79	81.85	179.94	268.86	208.81	197.15	236.56
720	75.50	173.02	81.86	176.93	263.39	205.34	193.61	234.46
730	75.52	170.55	81.82	173.82	258.20	202.18	189.72	232.42
740	75.51	167.44	81.69	170.33	253.15	198.52	186.16	230.64
750	75.42	164.37	81.64	166.81	248.14	194.70	182.40	228.91
760	75.27	161.92	81.39	163.93	243.34	191.17	179.22	227.31
770	75.10	169.37	81.46	176.09	240.10	188.43	176.20	230.43

DGM Outlet 1	DGM Inlet 1	Probe 1	DGM Outlet 2	DGM Inlet 2	Probe 2	Probe 3	Draft	Dilution Tunnel
°F	°F	°F	°F	°F	°F	°F	"H_2O	"H_2O
77.87	78.07	86.88	77.16	76.55	82.42	84.61	0.035	0.137
80.98	81.20	81.77	78.64	77.84	82.12	84.05	0.080	0.138
82.77	82.24	81.17	79.09	78.92	82.96	82.15	0.085	0.143
84.73	83.83	80.51	79.59	79.88	83.76	82.80	0.084	0.136
85.94	85.06	83.63	80.09	80.62	84.32	86.59	0.084	0.140
86.51	85.57	82.22	80.41	81.12	84.58	82.30	0.084	0.139
86.87	86.14	82.18	80.57	81.37	84.44	83.69	0.084	0.137
87.15	87.12	83.10	80.81	81.70	83.20	N/A	0.076	0.141
87.55	88.09	82.45	81.28	82.02	81.95	N/A	0.070	0.130
87.66	88.80	81.61	81.51	82.33	81.05	N/A	0.067	0.133
87.95	88.45	81.14	81.60	82.45	81.99	N/A	0.068	0.135
87.97	88.17	83.18	81.78	82.61	82.64	N/A	0.067	0.133
88.15	87.61	81.69	81.81	82.65	82.96	N/A	0.066	0.139
88.39	87.03	80.82	81.67	82.55	82.83	N/A	0.065	0.135
88.71	86.85	83.68	81.65	82.53	82.34	N/A	0.062	0.135
89.28	86.44	84.80	81.77	82.64	82.20	N/A	0.058	0.136
89.18	86.37	86.65	81.83	82.75	82.12	N/A	0.051	0.131
89.19	86.27	84.54	81.95	82.80	81.86	N/A	0.049	0.134
88.93	86.00	81.62	82.00	82.76	81.51	N/A	0.046	0.135
89.27	85.96	81.97	81.91	82.75	82.19	N/A	0.044	0.135
89.08	85.75	84.69	81.78	82.76	84.90	N/A	0.044	0.132
89.16	85.84	84.41	81.96	82.83	83.69	N/A	0.042	0.127
88.64	85.68	81.52	82.21	82.77	80.14	N/A	0.044	0.139
88.83	85.61	81.82	82.09	82.72	80.74	N/A	0.044	0.135
88.64	85.52	81.00	82.25	82.72	80.26	N/A	0.042	0.137
89.19	85.52	82.41	82.37	82.69	82.78	N/A	0.043	0.136
89.54	85.52	85.09	82.36	82.69	85.03	N/A	0.044	0.138
89.56	85.47	86.43	82.83	82.79	85.76	N/A	0.044	0.131
89.44	85.65	86.83	83.16	82.90	85.80	N/A	0.042	0.135
89.31	85.71	86.93	82.93	82.98	85.96	N/A	0.043	0.135
89.16	85.83	86.96	82.75	83.04	85.93	N/A	0.042	0.136
89.04	85.82	87.04	82.67	83.04	85.88	N/A	0.041	0.139

300- App-B Data and Calculation Forms (page 44 of 92)

89.09	85.75	87.15	82.38	83.02	85.81	N/A	0.042	0.133
89.29	85.91	83.92	82.11	82.94	85.90	N/A	0.041	0.138
89.28	85.88	83.04	82.22	83.00	85.63	N/A	0.040	0.136
89.28	85.90	83.59	82.39	82.91	85.32	N/A	0.041	0.137
89.29	85.95	83.46	82.61	82.96	85.29	N/A	0.040	0.137
89.42	85.88	83.57	82.70	82.89	85.38	N/A	0.040	0.134
89.57	85.88	83.79	82.96	82.81	85.48	N/A	0.039	0.135
89.66	85.77	83.73	83.15	82.83	85.38	N/A	0.038	0.137
89.77	85.77	83.85	83.26	82.92	85.27	N/A	0.038	0.135
89.80	85.70	83.67	83.38	82.89	85.17	N/A	0.039	0.140
89.68	85.63	83.55	83.51	82.86	85.08	N/A	0.038	0.137
89.75	85.56	83.83	83.49	82.90	84.98	N/A	0.039	0.137
89.74	85.56	83.72	83.49	82.85	84.97	N/A	0.038	0.133
89.88	85.47	83.48	83.51	82.80	84.81	N/A	0.039	0.135
89.72	85.43	83.58	83.56	82.79	84.81	N/A	0.038	0.138
89.74	85.29	83.38	83.37	82.65	84.65	N/A	0.036	0.136
89.74	85.21	83.31	83.11	82.55	84.55	N/A	0.037	0.133
89.72	85.13	83.42	82.90	82.48	84.59	N/A	0.038	0.136
89.64	85.05	83.21	82.85	82.39	84.43	N/A	0.038	0.131
89.61	85.03	83.34	82.94	82.41	84.50	N/A	0.037	0.130
89.54	85.03	83.18	83.02	82.50	84.48	N/A	0.037	0.135
89.52	85.00	83.27	83.17	82.35	84.25	N/A	0.035	0.133
89.43	85.01	83.12	82.98	82.33	84.28	N/A	0.035	0.134
89.35	84.87	83.00	82.65	82.18	84.14	N/A	0.036	0.135
89.33	84.85	82.98	82.55	82.10	84.01	N/A	0.036	0.133
89.28	84.74	82.84	82.21	81.99	84.02	N/A	0.035	0.130
89.20	84.72	88.43	82.12	81.85	84.21	N/A	0.036	0.141
89.19	84.78	80.79	82.65	81.93	84.12	N/A	0.037	0.136
89.21	84.65	82.94	83.07	81.93	83.81	N/A	0.035	0.134
89.13	84.51	83.00	82.82	81.87	83.63	N/A	0.032	0.131
88.99	84.44	83.04	82.97	81.93	83.60	N/A	0.034	0.132
88.82	84.34	82.95	82.87	81.98	83.43	N/A	0.033	0.131
88.77	84.27	82.75	82.43	81.87	83.20	N/A	0.033	0.141
88.66	84.24	82.75	82.48	81.83	83.09	N/A	0.033	0.134

88.57	84.28	82.68	82.67	81.88	83.18	N/A	0.032	0.137
88.47	84.20	82.60	82.81	81.85	82.91	N/A	0.032	0.138
88.43	84.17	82.43	82.84	81.88	82.60	N/A	0.028	0.137
88.43	84.12	82.56	83.00	81.77	83.05	N/A	0.028	0.136
88.53	84.13	82.51	82.89	81.62	83.09	N/A	0.030	0.139
88.55	84.09	82.36	82.69	81.55	82.97	N/A	0.028	0.133
88.49	84.08	82.33	82.46	81.45	83.00	N/A	0.027	0.136
88.50	84.10	82.34	82.33	81.40	83.23	N/A	0.027	0.137
88.50	84.06	82.32	82.58	81.37	83.00	N/A	0.026	0.137
88.47	84.03	82.22	82.87	81.31	82.89	N/A	0.026	0.140
88.44	83.94	82.21	83.07	81.28	82.82	N/A	0.025	0.139
88.38	83.92	82.17	83.21	81.33	82.73	N/A	0.026	0.133

300- App-B Data and Calculation Forms (page 46 of 92)

Scale	DGM 1 mean	DGM 2 mean	Scale zeroed
lb	°F	°F	lb
6.56	77.97	76.86	-
54.42	81.09	78.24	47.95
48.87	82.50	79.00	42.39
43.94	84.28	79.74	37.47
39.02	85.50	80.35	32.54
34.42	86.04	80.76	27.94
30.13	86.51	80.97	23.66
26.70	87.13	81.26	20.23
24.77	87.82	81.65	18.30
23.07	88.23	81.92	16.60
21.40	88.20	82.02	14.93
19.85	88.07	82.19	13.37
18.59	87.88	82.23	12.12
17.45	87.71	82.11	10.98
16.67	87.78	82.09	10.20
16.10	87.86	82.20	9.63
15.80	87.78	82.29	9.32
15.55	87.73	82.37	9.07
15.32	87.46	82.38	8.85
15.09	87.62	82.33	8.61
14.85	87.42	82.27	8.38
14.62	87.50	82.39	8.14
14.36	87.16	82.49	7.89
14.12	87.22	82.41	7.64
13.88	87.08	82.49	7.40
13.63	87.36	82.53	7.16
13.39	87.53	82.53	6.92
13.15	87.52	82.81	6.68
12.93	87.55	83.03	6.46
12.70	87.51	82.96	6.23
12.49	87.49	82.90	6.02
12.28	87.43	82.85	5.80

12.06	87.42	82.70	5.59
11.85	87.60	82.52	5.38
11.64	87.58	82.61	5.16
11.46	87.59	82.65	4.98
11.29	87.62	82.78	4.81
11.11	87.65	82.80	4.63
10.94	87.72	82.88	4.46
10.77	87.71	82.99	4.30
10.60	87.77	83.09	4.12
10.44	87.75	83.14	3.97
10.27	87.65	83.18	3.79
10.11	87.66	83.19	3.63
9.95	87.65	83.17	3.48
9.80	87.67	83.16	3.32
9.64	87.58	83.18	3.17
9.47	87.51	83.01	3.00
9.33	87.48	82.83	2.85
9.17	87.43	82.69	2.70
9.04	87.35	82.62	2.57
8.91	87.32	82.68	2.43
8.78	87.28	82.76	2.30
8.65	87.26	82.76	2.18
8.52	87.22	82.66	2.04
8.38	87.11	82.42	1.91
8.25	87.09	82.33	1.78
8.12	87.01	82.10	1.65
8.00	86.96	81.99	1.52
7.89	86.99	82.29	1.41
7.77	86.93	82.50	1.30
7.66	86.82	82.34	1.19
7.56	86.72	82.45	1.08
7.43	86.58	82.42	0.95
7.31	86.52	82.15	0.83
7.22	86.45	82.16	0.74

300- App-B Data and Calculation Forms (page 48 of 92)

7.13	86.43	82.27	0.66
7.00	86.33	82.33	0.53
6.86	86.30	82.36	0.39
6.81	86.28	82.38	0.34
6.78	86.33	82.26	0.31
6.75	86.32	82.12	0.28
6.71	86.29	81.95	0.23
6.68	86.30	81.86	0.20
6.64	86.28	81.97	0.17
6.60	86.25	82.09	0.13
6.57	86.19	82.17	0.09
6.48	86.15	82.27	0.00

300- App-B Data and Calculation Forms (page 49 of 92)

Manufacturer:	SBI	Eng:	Claude Pelland
Model:	HE350 Series (FP-15)		
Date:	2016-06-10		
Run:	3		
Control #:	QC20160208		
Rated Capacity	-	BTU/HR	
Test Duration:	60		
Output Category:	2	Start	End
Barometer (in.Hg):		29.8	29.9
Dry Bulb (F):			
Humidity (%):		89	50
Average Stove Temperature:		0.00	
Moisture content of wood (wet basis):		20.13	

	Average	0.00	0.00	0.00	669.18	77.50	142.11	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		80.78	83.32	85.34					0.1481	0.08
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*					*	*
Elapsed	Weight				Flue	Room	Tunnel	Outlet	door	ash door	left side	back	right side	front	DGM 3	DGM 3	DGM 3	Filter 3					Tunnel	
Time	Remaining	CO	CO_2	O_2	Gas	Temp	Dry Bulb	air							Reading	Inlet T	Outlet T	Temp					Velocity	Draft
0.00	51.4	0.00	0.00	0.00	293.57	75.55	96.88		0.00	0.00	0.00	0.00	0.00	0.00	557.315	76.61	76.46	89.93					0.130	0.044
10.00	46.6	0.00	0.00	0.00	695.19	75.85	159.75		0.00	0.00	0.00	0.00	0.00	0.00	558.521	79.87	79.78	81.56					0.108	0.081
20.00	41.4	0.00	0.00	0.00	760.15	76.73	151.68		0.00	0.00	0.00	0.00	0.00	0.00	560.030	80.45	82.64	81.68					0.168	0.084
30.00	36.8	0.00	0.00	0.00	802.03	77.54	159.35		0.00	0.00	0.00	0.00	0.00	0.00	561.400	81.19	84.63	83.02					0.156	0.087
40.00	32.1	0.00	0.00	0.00	820.43	78.43	161.86		0.00	0.00	0.00	0.00	0.00	0.00	562.710	81.89	85.85	86.59					0.155	0.088
50.00	28.4	0.00	0.00	0.00	697.72	79.31	136.37		0.00	0.00	0.00	0.00	0.00	0.00	564.010	82.45	86.71	88.27					0.157	0.081
60.00	26.1	0.00	0.00	0.00	615.18	79.07	128.88		0.00	0.00	0.00	0.00	0.00	0.00	565.410	83.00	87.17	86.36					0.164	0.077

300- App-B Data and Calculation Forms (page 50 of 92)

(ASTM E2515 Formula)

Manufacturer:	SBI		
Model:	HE350 Series (FP-15)	Stack area (ft2):	0.349066
Date:	6-10-16	Wood moisture (% wet):	20.13
Run:	3	Load Weight (lbs wet):	51.38
Project #:	QC20160208	Burn Rate (Dry kg/hr):	18.615
	-		
Test Duration:	60		
Total Gas Volume (DGM 3):	7.748	Final Temperature (DGM #3) Degrees Rankin:	542.051
Average Barometric Pressure:	29.85	Final Tunnel Temperature Degrees Rankin:	460.000
Molecular Weight:	28.78	Final Tunnel Velocity (feet per second):	19.342
Pitot Correction:	0.958498	Standardized Tunnel Flow (dscfm):	454.441041
Calibration Factor (DGM #3):	0.9870		
(1) VS:	0.325624		
(2) VS:	#DIV/0!		

Manufacturer:	SBI
Model:	HE350 Series (FP-15)
Date:	6-10-16
Run:	3

Elapsed Time	DGM 3 Reading	DGM 3 Inlet T	DGM 3 Outlet T	Filter Face Velocity DGM 3	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 3 Deg. R	Average **98.7** **Proportional Rates** **PR1**	#3 dDGM Vol.Std. (ft3)	Time	Average **0.38** SQRT Delta-P
0.00	557.32	76.61	76.46		0.130	18.134	536.5			0	0.359953
10.00	558.52	79.87	79.78	6.21	0.108	16.553	539.8	105.27	1.161	10	0.328578
20.00	560.03	80.45	82.64	7.74	0.168	20.623	541.5	105.06	1.448	20	0.409352
30.00	561.40	81.19	84.63	7.01	0.156	19.924	542.9	98.23	1.311	30	0.395488
40.00	562.71	81.89	85.85	6.69	0.155	19.807	543.9	94.15	1.252	40	0.393151
50.00	564.01	82.45	86.71	6.63	0.157	19.944	544.6	92.54	1.241	50	0.395885
60.00	565.41	83.00	87.17	7.14	0.164	20.410	545.1	97.21	1.335	60	0.405135

300- App-B Data and Calculation Forms (page 51 of 92)

Intertek Testing Services

Manufacturer:	**SBI**	RESULTS	
Model:	**HE350 Series (FP-15)**		
Date:	**6-10-16**	**Average emission rate:(gr/hr)**	**14.4**
Run:	**3**		
Project #:	**QC20160208**	Burn Rate (Dry kg/hr):	N/A
Test Duration: (minutes)	**60**		
PRESSURE FACTOR	0.99766	BAROMETRIC PRESSURE	
		Average:	29.85
TEMPERATURE FACTORS		Start:	29.8
DGM #3:	0.97408	End:	29.9
		DRY GAS METER VALUES	
VOLUMES SAMPLED		DGM #3 Final:	565.410
DGM #3:	7.76444	Initial:	557.315
TOTAL TUNNEL VOLUME (scf):	27266		
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)	
Sample Train 3:	3511.708	DGM #3:	542.051
TOTAL EMISSIONS		CALIBRATION FACTORS	
Sample Train 3 (g):	**14.40**	DGM #3:	0.9870
EMISSION RATES		TUNNEL FLOW RATE:	454.441
Sample Train 3 (g/hr):	**14.40**		
		PARTICULATE CATCH (mg)	
		Total Sample Train 3:	4.1
		Filter and seal Sample Train 3:	3.2
MAX Allowed	N/A		
		Probe Sample Train 3:	0.9
DEVIATION:	N/A		

	Train 3	Room Particulate Correction		
Cs	0.00052805	Mr	0	Milligram Catch (mg)
Cr	0	Vmr	7.7544	Total Volume Sampled (dscf)
Et	14.40			Rotometer (glass) at 100 flow rate is 0.12924 cfm
Et	AVERAGE	Grams Emissions		

300- App-B Data and Calculation Forms (page 52 of 92)

Manufacturer:	SBI	Eng:	Claude Pelland	
Model:	HE350 Series (FP-15)			
Date:	2016-06-10			
Run:	3			
Control #:	QC20160208			
Rated Capacity	-	BTU/HR		
Test Duration: 680				
Output Category:	2	Start	End	
	Barometer (in.Hg):	29.8	29.9	
	Dry Bulb (F):			
	Humidity (%):	89	50	
Average Stove Temperature:		0.00		
Moisture content of wood (wet basis):		20.13		

Elapsed Time	Weight Remaining	CO	CO_2	O_2	Flue Gas	Room Temp	Tunnel Dry Bulb	Outlet air	door	ash door	left side	back	right side	front	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	Filter 1 Temp	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Filter 2 Temp	Tunnel Velocity	Draft
	Average	0.00	0.00	0.00	347.26	75.42	98.68	#DIV/0!	0.00	0.00	0.00	0.00	0.00	0.00		85.51	88.21	81.67		82.38	82.54	83.80	0.1397	0.05
*	*	*	*	*	*1	*2	*3	*4							*	*	*	*	*	*	*	*	*	*
0	51.4	0.00	0.00	0.00	293.57	75.55	96.88		0.00	0.00	0.00	0.00	0.00	0.00	1019.165	76.61	76.46	86.01	1186.692	74.97	75.44	83.31	0.130	0.044
10	46.6	0.00	0.00	0.00	695.19	75.85	159.75		0.00	0.00	0.00	0.00	0.00	0.00	1019.954	79.87	79.78	81.24	1187.498	76.51	76.28	83.27	0.108	0.081
20	41.4	0.00	0.00	0.00	760.15	76.73	151.68		0.00	0.00	0.00	0.00	0.00	0.00	1020.895	80.45	82.64	81.57	1188.445	77.85	76.75	81.25	0.168	0.084
30	36.8	0.00	0.00	0.00	802.03	77.54	159.35		0.00	0.00	0.00	0.00	0.00	0.00	1021.829	81.19	84.63	81.81	1189.395	78.89	77.10	85.05	0.156	0.087
40	32.1	0.00	0.00	0.00	820.43	78.43	161.86		0.00	0.00	0.00	0.00	0.00	0.00	1022.774	81.89	85.85	82.32	1190.342	79.65	77.33	87.15	0.155	0.088
50	28.4	0.00	0.00	0.00	697.72	79.31	136.37		0.00	0.00	0.00	0.00	0.00	0.00	1023.709	82.45	86.71	82.08	1191.291	80.20	77.68	87.20	0.157	0.081
60	26.1	0.00	0.00	0.00	615.18	79.07	128.88		0.00	0.00	0.00	0.00	0.00	0.00	1024.659	83.00	87.17	81.50	1192.220	80.79	78.15	85.25	0.164	0.077
70	23.8	0.00	0.00	0.00	597.92	78.19	126.74		0.00	0.00	0.00	0.00	0.00	0.00	1025.592	83.46	87.54	81.00	1193.152	81.04	78.57	84.27	0.153	0.076
80	21.5	0.00	0.00	0.00	599.25	78.11	125.72		0.00	0.00	0.00	0.00	0.00	0.00	1026.537	83.84	87.63	80.90	1194.082	81.23	78.66	83.85	0.155	0.075
90	19.3	0.00	0.00	0.00	595.20	79.37	125.76		0.00	0.00	0.00	0.00	0.00	0.00	1027.476	84.07	87.36	80.75	1194.998	81.33	78.76	83.49	0.150	0.074
100	17.2	0.00	0.00	0.00	590.86	78.40	124.83		0.00	0.00	0.00	0.00	0.00	0.00	1028.411	84.28	87.40	80.80	1195.915	81.27	78.83	83.40	0.151	0.075
110	15.2	0.00	0.00	0.00	574.90	79.55	121.41		0.00	0.00	0.00	0.00	0.00	0.00	1029.349	84.47	87.47	83.21	1196.831	81.40	79.00	83.23	0.155	0.073
120	13.5	0.00	0.00	0.00	564.82	80.02	121.02		0.00	0.00	0.00	0.00	0.00	0.00	1030.277	84.57	87.54	83.21	1197.743	81.45	78.98	83.16	0.152	0.072
130	12.0	0.00	0.00	0.00	540.72	79.31	117.37		0.00	0.00	0.00	0.00	0.00	0.00	1031.220	84.55	87.50	82.91	1198.660	81.24	78.57	83.02	0.149	0.071
140	10.8	0.00	0.00	0.00	521.23	76.83	113.94		0.00	0.00	0.00	0.00	0.00	0.00	1032.144	84.81	87.86	83.05	1199.570	81.41	78.72	82.73	0.150	0.070
150	9.8	0.00	0.00	0.00	497.34	79.76	113.99		0.00	0.00	0.00	0.00	0.00	0.00	1033.075	85.04	87.90	83.15	1200.492	81.49	79.11	82.78	0.144	0.066
160	9.2	0.00	0.00	0.00	457.95	79.08	110.53		0.00	0.00	0.00	0.00	0.00	0.00	1034.011	85.09	87.90	83.09	1201.407	81.60	79.39	82.67	0.145	0.063
170	8.7	0.00	0.00	0.00	423.21	77.63	106.18		0.00	0.00	0.00	0.00	0.00	0.00	1034.939	85.07	88.01	82.94	1202.318	81.72	79.64	82.40	0.147	0.060
180	8.3	0.00	0.00	0.00	401.32	73.92	102.07		0.00	0.00	0.00	0.00	0.00	0.00	1035.874	85.30	88.06	82.80	1203.234	81.85	79.77	82.11	0.148	0.058
190	7.9	0.00	0.00	0.00	369.47	73.11	98.64		0.00	0.00	0.00	0.00	0.00	0.00	1036.809	85.39	88.15	82.53	1204.151	82.06	80.16	81.81	0.145	0.054
200	7.6	0.00	0.00	0.00	348.62	71.91	96.13		0.00	0.00	0.00	0.00	0.00	0.00	1037.737	85.60	88.21	82.53	1205.063	82.18	80.37	81.57	0.146	0.052
210	7.3	0.00	0.00	0.00	335.14	72.35	94.34		0.00	0.00	0.00	0.00	0.00	0.00	1038.673	85.64	88.24	82.42	1205.989	82.26	80.42	89.77	0.144	0.051
220	7.0	0.00	0.00	0.00	325.26	72.09	92.77		0.00	0.00	0.00	0.00	0.00	0.00	1039.600	85.77	88.34	82.42	1206.898	82.40	80.48	88.40	0.141	0.050
230	6.8	0.00	0.00	0.00	317.96	71.76	91.42		0.00	0.00	0.00	0.00	0.00	0.00	1040.540	85.93	88.78	82.44	1207.833	82.49	80.61	89.96	0.141	0.049
240	6.5	0.00	0.00	0.00	310.47	72.07	90.70		0.00	0.00	0.00	0.00	0.00	0.00	1041.470	85.77	89.06	82.47	1208.769	82.54	80.57	83.87	0.144	0.047
250	6.2	0.00	0.00	0.00	301.04	71.66	90.08		0.00	0.00	0.00	0.00	0.00	0.00	1042.400	85.68	88.95	82.52	1209.708	82.56	80.64	82.27	0.131	0.048
260	6.0	0.00	0.00	0.00	296.36	71.58	89.21		0.00	0.00	0.00	0.00	0.00	0.00	1043.337	85.52	88.95	82.48	1210.635	82.62	80.73	82.00	0.133	0.046
270	5.7	0.00	0.00	0.00	289.58	70.78	88.30		0.00	0.00	0.00	0.00	0.00	0.00	1044.262	85.75	89.10	80.55	1211.560	82.35	81.87	82.66	0.134	0.046
280	5.5	0.00	0.00	0.00	287.27	71.34	87.84		0.00	0.00	0.00	0.00	0.00	0.00	1045.199	85.68	88.92	80.54	1212.493	82.50	81.85	82.67	0.134	0.044
290	5.3	0.00	0.00	0.00	284.35	71.18	87.36		0.00	0.00	0.00	0.00	0.00	0.00	1046.135	85.82	89.06	80.68	1213.425	82.61	84.28	82.80	0.135	0.044
300	5.1	0.00	0.00	0.00	279.91	71.43	87.16		0.00	0.00	0.00	0.00	0.00	0.00	1047.059	85.82	89.21	80.89	1214.355	82.68	85.52	82.89	0.135	0.045

300- App-B Data and Calculation Forms (page 53 of 92)

310	4.9	0.00	0.00	0.00	276.93	71.59	86.71		0.00	0.00	0.00	0.00	0.00	0.00	1048.000	85.92	89.15	81.01	1215.290	82.75	85.79	83.10	0.133	0.045
320	4.7	0.00	0.00	0.00	275.24	71.76	86.29		0.00	0.00	0.00	0.00	0.00	0.00	1048.927	86.04	89.27	81.10	1216.219	82.82	85.78	83.22	0.136	0.042
330	4.5	0.00	0.00	0.00	272.44	71.17	86.11		0.00	0.00	0.00	0.00	0.00	0.00	1049.860	86.04	89.26	80.94	1217.155	82.72	85.85	83.19	0.134	0.044
340	4.3	0.00	0.00	0.00	269.82	70.43	85.82		0.00	0.00	0.00	0.00	0.00	0.00	1050.800	85.98	89.14	81.00	1218.083	82.71	85.70	83.34	0.134	0.044
350	4.1	0.00	0.00	0.00	268.09	71.20	85.48		0.00	0.00	0.00	0.00	0.00	0.00	1051.730	86.08	88.98	81.01	1219.005	82.75	85.69	83.40	0.138	0.043
360	3.9	0.00	0.00	0.00	264.95	71.13	85.19		0.00	0.00	0.00	0.00	0.00	0.00	1052.672	86.02	89.05	80.84	1219.937	82.72	85.79	83.38	0.137	0.043
370	3.8	0.00	0.00	0.00	262.63	71.18	85.01		0.00	0.00	0.00	0.00	0.00	0.00	1053.610	86.02	89.19	80.88	1220.860	82.74	85.80	83.47	0.135	0.043
380	3.6	0.00	0.00	0.00	261.25	71.70	84.90		0.00	0.00	0.00	0.00	0.00	0.00	1054.558	86.06	88.98	81.11	1221.785	82.92	85.89	83.52	0.135	0.042
390	3.4	0.00	0.00	0.00	259.03	71.90	84.74		0.00	0.00	0.00	0.00	0.00	0.00	1055.488	86.21	88.80	81.23	1222.700	82.76	85.70	83.51	0.138	0.042
400	3.2	0.00	0.00	0.00	257.29	71.84	84.55		0.00	0.00	0.00	0.00	0.00	0.00	1056.437	86.37	88.63	81.11	1223.610	82.72	85.99	83.40	0.138	0.042
410	3.1	0.00	0.00	0.00	254.99	70.81	84.44		0.00	0.00	0.00	0.00	0.00	0.00	1057.361	86.46	88.74	81.15	1224.517	82.78	84.83	83.42	0.135	0.040
420	2.9	0.00	0.00	0.00	252.95	72.26	84.18		0.00	0.00	0.00	0.00	0.00	0.00	1058.299	86.50	88.81	81.12	1225.419	82.92	80.38	83.44	0.133	0.041
430	2.7	0.00	0.00	0.00	250.87	72.11	83.98		0.00	0.00	0.00	0.00	0.00	0.00	1059.231	86.49	88.84	81.22	1226.326	82.94	80.13	83.57	0.135	0.040
440	2.6	0.00	0.00	0.00	248.86	71.08	83.71		0.00	0.00	0.00	0.00	0.00	0.00	1060.163	86.60	88.97	81.14	1227.234	83.05	80.26	83.62	0.135	0.040
450	2.4	0.00	0.00	0.00	246.60	71.37	83.71		0.00	0.00	0.00	0.00	0.00	0.00	1061.113	86.57	88.95	81.01	1228.148	82.91	80.14	83.68	0.136	0.040
460	2.3	0.00	0.00	0.00	244.52	71.01	83.51		0.00	0.00	0.00	0.00	0.00	0.00	1062.040	86.51	88.88	81.01	1229.049	83.03	83.47	83.67	0.135	0.040
470	2.2	0.00	0.00	0.00	242.18	73.09	83.95		0.00	0.00	0.00	0.00	0.00	0.00	1062.983	86.50	88.85	80.92	1229.953	83.05	85.35	83.69	0.137	0.039
480	2.0	0.00	0.00	0.00	241.82	76.54	87.59		0.00	0.00	0.00	0.00	0.00	0.00	1063.920	86.53	88.91	80.99	1230.856	83.14	86.18	83.61	0.134	0.039
490	1.9	0.00	0.00	0.00	240.88	77.94	88.43		0.00	0.00	0.00	0.00	0.00	0.00	1064.857	86.51	88.94	80.83	1231.757	83.37	86.58	83.60	0.135	0.038
500	1.8	0.00	0.00	0.00	240.22	78.39	89.07		0.00	0.00	0.00	0.00	0.00	0.00	1065.799	86.62	89.02	80.89	1232.660	83.45	86.72	83.68	0.136	0.038
510	1.7	0.00	0.00	0.00	238.89	78.68	89.41		0.00	0.00	0.00	0.00	0.00	0.00	1066.731	86.45	88.99	80.85	1233.567	83.53	86.91	83.58	0.133	0.038
520	1.6	0.00	0.00	0.00	238.61	78.73	89.59		0.00	0.00	0.00	0.00	0.00	0.00	1067.675	86.60	89.10	80.81	1234.471	83.54	86.88	83.69	0.131	0.040
530	1.5	0.00	0.00	0.00	236.63	78.70	89.56		0.00	0.00	0.00	0.00	0.00	0.00	1068.609	86.64	89.13	80.92	1235.378	83.67	86.96	83.70	0.136	0.039
540	1.4	0.00	0.00	0.00	234.64	78.82	89.74		0.00	0.00	0.00	0.00	0.00	0.00	1069.553	86.72	89.15	80.80	1236.280	83.65	87.09	83.68	0.138	0.038
550	1.3	0.00	0.00	0.00	232.65	78.82	89.73		0.00	0.00	0.00	0.00	0.00	0.00	1070.485	86.81	89.26	80.87	1237.180	83.64	82.48	83.68	0.137	0.037
560	1.2	0.00	0.00	0.00	230.37	78.83	89.67		0.00	0.00	0.00	0.00	0.00	0.00	1071.430	86.83	89.31	80.81	1238.082	83.67	85.50	83.67	0.133	0.037
570	1.1	0.00	0.00	0.00	227.78	78.49	89.54		0.00	0.00	0.00	0.00	0.00	0.00	1072.369	86.87	89.28	80.87	1238.982	83.75	86.85	83.84	0.136	0.038
580	1.0	0.00	0.00	0.00	226.07	78.87	89.61		0.00	0.00	0.00	0.00	0.00	0.00	1073.295	86.89	89.32	81.01	1239.875	83.84	87.14	83.92	0.136	0.036
590	0.9	0.00	0.00	0.00	225.57	78.89	89.56		0.00	0.00	0.00	0.00	0.00	0.00	1074.252	86.85	89.41	81.11	1240.791	83.99	87.31	84.03	0.135	0.037
600	0.8	0.00	0.00	0.00	223.60	78.57	89.47		0.00	0.00	0.00	0.00	0.00	0.00	1075.192	86.87	89.49	81.36	1241.696	84.32	87.26	84.18	0.133	0.037
610	0.7	0.00	0.00	0.00	221.65	78.05	89.10		0.00	0.00	0.00	0.00	0.00	0.00	1076.137	87.23	89.12	81.79	1242.611	84.25	87.49	84.35	0.136	0.037
620	0.6	0.00	0.00	0.00	219.60	78.15	88.97		0.00	0.00	0.00	0.00	0.00	0.00	1077.074	86.97	89.26	81.78	1243.540	84.06	87.71	84.38	0.135	0.036
630	0.5	0.00	0.00	0.00	216.38	78.17	88.65		0.00	0.00	0.00	0.00	0.00	0.00	1078.019	87.04	89.10	81.98	1244.458	84.09	87.60	84.30	0.134	0.036
640	0.4	0.00	0.00	0.00	211.94	77.95	88.39		0.00	0.00	0.00	0.00	0.00	0.00	1078.956	87.17	89.08	82.19	1245.376	83.94	82.56	84.25	0.136	0.035
650	0.3	0.00	0.00	0.00	207.63	77.91	88.08		0.00	0.00	0.00	0.00	0.00	0.00	1079.902	87.35	89.17	82.49	1246.282	84.20	82.21	84.34	0.138	0.034
660	0.3	0.00	0.00	0.00	203.73	78.05	87.83		0.00	0.00	0.00	0.00	0.00	0.00	1080.836	87.49	89.13	82.72	1247.196	84.22	82.47	84.35	0.134	0.033
670	0.1	0.00	0.00	0.00	217.58	78.04	88.19		0.00	0.00	0.00	0.00	0.00	0.00	1081.782	87.52	89.71	82.71	1248.131	84.24	82.46	84.39	0.136	0.036
680	-0.1	0.00	0.00	0.00	221.35	78.04	88.54		0.00	0.00	0.00	0.00	0.00	0.00	1082.718	87.43	89.78	82.78	1249.071	84.29	82.47	84.45	0.133	0.036

300- App-B Data and Calculation Forms (page 54 of 92)

Manufacturer:	SBI		
Model:	HE350 Series (FP-15)	Stack area (ft2):	0.3490659
Date:	6-10-16	Wood moisture (% wet):	20.13
Run:	3	Load Weight (lbs wet):	51.38
Project #:	QC20160208	Burn Rate (Dry kg/hr):	1.643
	-		
Test Duration:	680		
Total Gas Volume (DGM 1):	61.542	Final Temperature (DGM #1) Degrees Rankin:	546.860
Total Gas Volume (DGM 2):	60.721	Final Temperature (DGM #2) Degrees Rankin:	542.463
Average Barometric Pressure:	29.85	Final Tunnel Temperature Degrees Rankin:	558.685
Molecular Weight:	28.78	Final Tunnel Velocity (feet per second):	20.741
Pitot Correction:	0.9584979	Standardized Tunnel Flow (dscfm):	401.2197732
Calibration Factor (DGM #1):	1.0060		
Calibration Factor (DGM #2):	1.0030		
(1) VS:	0.0361939		
(2) VS:	0.0366833		

(ASTM E2515 Formula)

Manufacturer:	SBI
Model:	HE350 Series (FP-15)
Date:	6-10-16
Run:	3

Elapsed Time	DGM 1 Reading	DGM 1 Inlet T	DGM 1 Outlet T	DGM 2 Reading	DGM 2 Inlet T	DGM 2 Outlet T	Tunnel Dry Bulb	Filter Face Velocity DGM 1	Filter Face Velocity DGM 2	Delta-P (in. H2O) Tunnel	Tunnel Velocity Ft/Sec	Average Inlet + Outlet Temp. Meter 1 Deg. R	Average Inlet + Outlet Temp. Meter 2 Deg. R	Average 99.9 Proportional Rates PR1	Average 99.9 Proportional Rates PR2	#1 dDGM Vol.Std. (ft3)	#2 dDGM Vol.Std. (ft3)	Time	Average 0.37 SQRT Delta-P
0.00	1019.17	76.61	76.46	1186.69	74.97	75.44	96.8812			0.130	19.953	536.5	535.2					0	0.359953
10.00	1019.95	79.87	79.78	1187.50	76.51	76.28	159.749	4.14	4.24	0.108	19.214	539.8	536.4	103.70	107.56	0.774	0.794	10	0.328578
20.00	1020.90	80.45	82.64	1188.45	77.85	76.75	151.684	4.92	4.98	0.168	23.781	541.5	537.3	98.00	100.44	0.920	0.931	20	0.409352
30.00	1021.83	81.19	84.63	1189.40	78.89	77.10	159.348	4.87	4.99	0.156	23.119	542.9	538.0	100.80	104.67	0.911	0.933	30	0.395488
40.00	1022.77	81.89	85.85	1190.34	79.65	77.33	161.862	4.92	4.97	0.155	23.029	543.9	538.5	102.44	104.98	0.920	0.929	40	0.393151
50.00	1023.71	82.45	86.71	1191.29	80.20	77.68	136.373	4.86	4.97	0.157	22.709	544.6	538.9	98.31	102.14	0.909	0.930	50	0.395885
60.00	1024.66	83.00	87.17	1192.22	80.79	78.15	128.884	4.94	4.86	0.164	23.093	545.1	539.5	96.82	96.90	0.923	0.909	60	0.405135
70.00	1025.59	83.46	87.54	1193.15	81.04	78.57	126.739	4.84	4.88	0.153	22.231	545.5	539.8	98.26	100.49	0.906	0.912	70	0.390711
80.00	1026.54	83.84	87.63	1194.08	81.23	78.66	125.723	4.91	4.86	0.155	22.396	545.7	539.9	98.54	99.31	0.917	0.910	80	0.393962
90.00	1027.48	84.07	87.36	1195.00	81.33	78.76	125.763	4.87	4.79	0.150	21.984	545.7	540.0	99.76	99.62	0.911	0.896	90	0.386696
100.00	1028.41	84.28	87.40	1195.92	81.27	78.83	124.832	4.85	4.80	0.151	22.095	545.8	540.0	98.63	99.07	0.907	0.897	100	0.388958
110.00	1029.35	84.47	87.47	1196.83	81.40	79.00	121.406	4.87	4.79	0.155	22.297	546.0	540.2	97.43	97.43	0.910	0.896	110	0.393672
120.00	1030.28	84.57	87.54	1197.74	81.45	78.98	121.018	4.81	4.77	0.152	22.087	546.1	540.2	97.22	97.86	0.900	0.892	120	0.390092
130.00	1031.22	84.55	87.50	1198.66	81.24	78.57	117.371	4.89	4.80	0.149	21.815	546.0	539.9	99.40	99.11	0.915	0.897	130	0.386507
140.00	1032.14	84.81	87.86	1199.57	81.41	78.72	113.94	4.79	4.76	0.150	21.759	546.3	540.1	96.96	97.96	0.896	0.890	140	0.386673
150.00	1033.08	85.04	87.90	1200.49	81.49	79.11	113.992	4.83	4.82	0.144	21.352	546.5	540.3	99.52	101.07	0.902	0.901	150	0.37941
160.00	1034.01	85.09	87.90	1201.41	81.60	79.39	110.527	4.85	4.78	0.145	21.330	546.5	540.5	99.54	99.73	0.907	0.894	160	0.38018
170.00	1034.94	85.07	88.01	1202.32	81.72	79.64	106.184	4.81	4.76	0.147	21.413	546.5	540.7	97.54	98.09	0.899	0.890	170	0.383118
180.00	1035.87	85.30	88.06	1203.23	81.85	79.77	102.069	4.84	4.78	0.148	21.389	546.7	540.8	97.62	97.97	0.906	0.895	180	0.384087
190.00	1036.81	85.39	88.15	1204.15	82.06	80.16	98.6369	4.84	4.79	0.145	21.145	546.8	541.1	98.11	98.49	0.906	0.895	190	0.380869
200.00	1037.74	85.60	88.21	1205.06	82.18	80.37	96.1305	4.81	4.76	0.146	21.183	546.9	541.3	96.72	97.28	0.899	0.890	200	0.382406
210.00	1038.67	85.64	88.24	1205.99	82.26	80.42	94.3438	4.85	4.83	0.144	20.981	546.9	541.3	98.17	99.39	0.907	0.903	210	0.379364
220.00	1039.60	85.77	88.34	1206.90	82.40	80.48	92.7734	4.80	4.74	0.141	20.732	547.1	541.4	98.07	98.42	0.898	0.887	220	0.375396
230.00	1040.54	85.93	88.78	1207.83	82.49	80.61	91.4159	4.86	4.88	0.141	20.716	547.4	541.6	99.17	101.02	0.910	0.912	230	0.375581
240.00	1041.47	85.77	89.06	1208.77	82.54	80.57	90.6952	4.81	4.88	0.144	20.930	547.4	541.6	96.96	99.96	0.900	0.913	240	0.379695
250.00	1042.40	85.68	88.95	1209.71	82.56	80.64	90.0791	4.81	4.90	0.131	19.924	547.3	541.6	101.78	105.21	0.900	0.916	250	0.361653
260.00	1043.34	85.52	88.95	1210.64	82.62	80.73	89.2051	4.85	4.83	0.133	20.094	547.2	541.7	101.55	102.79	0.907	0.904	260	0.36503
270.00	1044.26	85.75	89.10	1211.56	82.35	81.87	88.2995	4.79	4.82	0.134	20.160	547.4	542.1	99.68	101.90	0.895	0.901	270	0.366538
280.00	1045.20	85.68	88.92	1212.49	82.50	81.85	87.8379	4.85	4.86	0.134	20.153	547.3	542.2	100.97	102.71	0.907	0.909	280	0.366564
290.00	1046.14	85.82	89.06	1213.43	82.61	84.28	87.3562	4.84	4.84	0.135	20.198	547.4	543.4	100.50	101.80	0.906	0.906	290	0.367544
300.00	1047.06	85.82	89.21	1214.36	82.68	85.52	87.1603	4.78	4.83	0.135	20.200	547.5	544.1	99.14	101.29	0.894	0.903	300	0.367648

300- App-B Data and Calculation Forms (page 55 of 92)

310.00	1048.00	85.92	89.15	1215.29	82.75	85.79	86.713	4.87	4.85	0.133	20.053	547.5	544.3	101.61	102.44	0.910	0.907	310	0.365118
320.00	1048.93	86.04	89.27	1216.22	82.82	85.78	86.295	4.79	4.82	0.136	20.234	547.7	544.3	99.09	100.78	0.897	0.901	320	0.368549
330.00	1049.86	86.04	89.26	1217.16	82.72	85.85	86.114	4.83	4.86	0.134	20.123	547.6	544.3	100.25	102.07	0.902	0.908	330	0.366589
340.00	1050.80	85.98	89.14	1218.08	82.71	85.70	85.823	4.86	4.82	0.134	20.108	547.6	544.2	101.06	101.25	0.909	0.901	340	0.366405
350.00	1051.73	86.08	88.98	1219.01	82.75	85.69	85.478	4.81	4.78	0.138	20.375	547.5	544.2	98.62	99.21	0.900	0.895	350	0.371401
360.00	1052.67	86.02	89.05	1219.94	82.72	85.79	85.193	4.87	4.84	0.137	20.284	547.5	544.3	100.28	100.67	0.911	0.904	360	0.36984
370.00	1053.61	86.02	89.19	1220.86	82.74	85.80	85.01	4.85	4.79	0.135	20.177	547.6	544.3	100.33	100.19	0.907	0.896	370	0.367936
380.00	1054.56	86.06	88.98	1221.79	82.92	85.89	84.902	4.90	4.80	0.135	20.154	547.5	544.4	101.53	100.45	0.917	0.897	380	0.367553
390.00	1055.49	86.21	88.80	1222.70	82.76	85.70	84.736	4.81	4.75	0.138	20.354	547.5	544.2	98.59	98.42	0.900	0.888	390	0.371274
400.00	1056.44	86.37	88.63	1223.61	82.72	85.99	84.55	4.91	4.72	0.138	20.365	547.5	544.4	100.52	97.75	0.918	0.883	400	0.371523
410.00	1057.36	86.46	88.74	1224.52	82.78	84.83	84.444	4.78	4.71	0.135	20.169	547.6	543.8	98.77	98.56	0.894	0.881	410	0.367992
420.00	1058.30	86.50	88.81	1225.42	82.92	80.38	84.179	4.85	4.70	0.133	19.956	547.7	541.6	101.26	99.80	0.907	0.879	420	0.364201
430.00	1059.23	86.49	88.84	1226.33	82.94	80.13	83.975	4.82	4.73	0.135	20.128	547.7	541.5	99.72	99.50	0.901	0.885	430	0.367392
440.00	1060.16	86.60	88.97	1227.23	83.05	80.26	83.712	4.82	4.73	0.135	20.098	547.8	541.7	99.77	99.66	0.901	0.885	440	0.36695
450.00	1061.11	86.57	88.95	1228.15	82.91	80.14	83.706	4.91	4.77	0.136	20.190	547.8	541.5	101.25	99.92	0.919	0.891	450	0.36862
460.00	1062.04	86.51	88.88	1229.05	83.03	83.47	83.509	4.79	4.68	0.135	20.130	547.7	543.2	99.08	98.12	0.897	0.876	460	0.367599
470.00	1062.98	86.50	88.85	1229.95	83.05	85.35	83.947	4.88	4.69	0.137	20.261	547.7	544.2	100.22	97.55	0.912	0.877	470	0.369838
480.00	1063.92	86.53	88.91	1230.86	83.14	86.18	87.59	4.85	4.68	0.134	20.130	547.7	544.7	100.89	98.57	0.906	0.876	480	0.366221
490.00	1064.86	86.51	88.94	1231.76	83.37	86.58	88.431	4.85	4.67	0.135	20.182	547.7	545.0	100.78	98.14	0.906	0.873	490	0.366879
500.00	1065.80	86.62	89.02	1232.66	83.45	86.72	89.071	4.87	4.68	0.136	20.261	547.8	545.1	101.01	98.04	0.911	0.875	500	0.368109
510.00	1066.73	86.45	88.99	1233.57	83.53	86.91	89.406	4.82	4.70	0.133	20.057	547.7	545.2	101.05	99.49	0.901	0.879	510	0.364285
520.00	1067.68	86.60	89.10	1234.47	83.54	86.88	89.592	4.88	4.68	0.131	19.953	547.9	545.2	102.87	99.72	0.913	0.876	520	0.362339
530.00	1068.61	86.64	89.13	1235.38	83.67	86.96	89.561	4.83	4.70	0.136	20.278	547.9	545.3	100.13	98.40	0.903	0.878	530	0.368255
540.00	1069.55	86.72	89.15	1236.28	83.65	87.09	89.737	4.88	4.67	0.138	20.468	547.9	545.4	100.27	96.96	0.913	0.873	540	0.371651
550.00	1070.49	86.81	89.26	1237.18	83.64	82.48	89.731	4.82	4.68	0.137	20.348	548.0	543.1	99.55	98.14	0.901	0.875	550	0.369472
560.00	1071.43	86.83	89.31	1238.08	83.67	85.50	89.667	4.88	4.68	0.133	20.100	548.1	544.6	102.16	99.01	0.913	0.875	560	0.364976
570.00	1072.37	86.87	89.28	1238.98	83.75	86.85	89.536	4.85	4.66	0.136	20.297	548.1	545.3	100.50	97.55	0.908	0.872	570	0.368615
580.00	1073.30	86.89	89.32	1239.88	83.84	87.14	89.606	4.79	4.62	0.136	20.335	548.1	545.5	98.93	96.56	0.895	0.865	580	0.369266
590.00	1074.25	86.85	89.41	1240.79	83.99	87.31	89.559	4.95	4.74	0.135	20.222	548.1	545.7	102.79	99.53	0.925	0.887	590	0.367243
600.00	1075.19	86.87	89.49	1241.70	84.32	87.26	89.467	4.86	4.68	0.133	20.059	548.2	545.8	101.75	99.06	0.908	0.876	600	0.364311
610.00	1076.14	87.23	89.12	1242.61	84.25	87.49	89.098	4.88	4.73	0.136	20.276	548.2	545.9	101.13	98.99	0.913	0.885	610	0.368369
620.00	1077.07	86.97	89.26	1243.54	84.06	87.71	88.967	4.84	4.81	0.135	20.204	548.1	545.9	100.63	100.84	0.906	0.899	620	0.367099
630.00	1078.02	87.04	89.10	1244.46	84.09	87.60	88.654	4.88	4.75	0.134	20.177	548.1	545.8	101.58	99.73	0.913	0.888	630	0.366722
640.00	1078.96	87.17	89.08	1245.38	83.94	82.56	88.385	4.84	4.77	0.136	20.288	548.1	543.3	100.10	100.09	0.906	0.892	640	0.368834
650.00	1079.90	87.35	89.17	1246.28	84.20	82.21	88.078	4.89	4.71	0.138	20.405	548.3	543.2	100.37	98.17	0.914	0.881	650	0.371062
660.00	1080.84	87.49	89.13	1247.20	84.22	82.47	87.831	4.83	4.75	0.134	20.106	548.3	543.3	100.51	100.41	0.902	0.888	660	0.365713
670.00	1081.78	87.52	89.71	1248.13	84.24	82.46	88.191	4.88	4.86	0.136	20.303	548.6	543.3	100.77	101.79	0.913	0.909	670	0.36916
680.00	1082.72	87.43	89.78	1249.07	84.29	82.47	88.54	4.83	4.89	0.133	20.031	548.6	543.4	101.13	103.78	0.904	0.914	680	0.3641

300- App-B Data and Calculation Forms (page 56 of 92)

Intertek Testing Services

Manufacturer:	**SBI**	RESULTS	
Model:	**HE350 Series (FP-15)**		
Date:	**6-10-16**	**Average emission rate:(gr/hr)**	**1.1**
Run:	**3**		
Project #:	**QC20160208**	Burn Rate (Dry kg/hr):	1.643
Test Duration: (minutes)	**680**		

PRESSURE FACTOR	0.99766	BAROMETRIC PRESSURE			
				Average:	29.85
TEMPERATURE FACTORS				Start:	29.8
DGM #1:	0.96551			End:	29.9
DGM #2:	0.97334				
		DRY GAS METER VALUES			
VOLUMES SAMPLED			DGM #1	Final:	1082.718
DGM #1:	61.58495			Initial:	1019.165
DGM #2:	60.75557				
			DGM #2	Final:	1249.071
TOTAL TUNNEL VOLUME (scf):	272829			Initial:	1186.692
SAMPLE RATIOS		TEMPERATURES (DEG. RANKIN)			
Sample Train 1:	4430.132			DGM #1:	546.860
Sample Train 2:	4490.608			DGM #2:	542.463
TOTAL EMISSIONS		CALIBRATION FACTORS			
Sample Train 1 (g):	**11.96**			DGM #1:	1.0060
Sample Train 2 (g):	**12.57**			DGM #2:	1.0030
EMISSION RATES		TUNNEL FLOW RATE:			401.220
Sample Train 1 (g/hr):	**1.06**				
Sample Train 2 (g/hr):	**1.11**	PARTICULATE CATCH (mg)			
				Total Sample Train 1:	2.7
				Total Sample Train 2:	2.8
				Filter and seal Sample Train 1:	2.5
MAX Allowed	7.50%			Filter and seal Sample Train 2:	2.7
				Probe Sample Train 1:	0.2
DEVIATION:	4.99%			Probe Sample Train 2:	0.1

	Train 1	Train 2			
Cs	4.3842E-05	4.6086E-05	Room Particulate Correction		
			Mr	0	Milligram Catch (mg)
Cr	0	0	Vmr	87.8832	Total Volume Sampled (dscf)
Et	11.96	12.57			Rotometer (glass) at 100 flow rate is 0.12924 cfm
Et	AVERAGE	12.27	Grams Emissions		

300- App-B Data and Calculation Forms (page 57 of 92)

Intertek

TEST FUEL DATA
EPA METHOD 5G-3

Project Number:	G102163747
Manufacturer:	SBI
Model:	HE350 Series
Sample ID Number:	QC20160608
Test Date:	10-Jun-16
Test Run Number:	3

Calibration Reference ID	SBI-153	
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:		Temp.,°F:	
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight		0.0	Average, %db		#DIV/0!

Allowable Fuel Load Range:	27	to	32.9

TEST FUEL LOAD PROPERTIES						
Eq. ID No.:	SBI-229		Time:	05:26	Temp.,°F:	75.5
Piece No.	Length, In.	Weight, Lb.		Moisture, %, Dry Basis		
		2x4	4x4			
1	16 1/2	8.780	-	21.6	21.7	20.0
2	16 3/4	~~16 1/2~~ 8.021	-	23.5	26.0	22.8
3	16 3/4	8.546	-	24.0	23.5	25.3
4	17	8.406	-	26.8	18.2	22.3
5	16 1/4	6.695	-	28.4	24.2	23.5
6	16 1/2	5.134	-	24.7	21.4	21.8
7	16 1/4	5.801	-	24.3	21.0	27.6
8				-	-	-
Totals		0.0	0.0			
% of Weight		#DIV/0!	#DIV/0!			
Total weight, wet, lb.		0.00		Average Moisture, dry		#DIV/0!
Total weight, dry, kg		#DIV/0!		Average Moisture, wet		#DIV/0!

Test Engineer: [illegible]

Date: 10-JUN-2016

300- App-B Data and Calculation Forms (page 58 of 92)

Intertek

TEST FUEL DATA
EPA METHOD 5G-3

Project Number:	G102163747
Manufacturer:	SBI
Model:	HE350 Series
Sample ID Number:	QC20160608
Test Date:	10-Jun-16
Test Run Number:	3

Calibration Reference ID	SBI-153	
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES

Eq. ID No.: SBI-214		Time: 2:10	Temp.,°F: 75		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	16	8.275	10		
2					
3					
4					
5					
6	16 ½	12.187	21.2	18.1	18.3
7	16 ½		26.7	28.0	21.8
8					
9					
10					
11					
12					
Total Weight		0.0	Average, %db		#DIV/0!

Kindling

Start-up fuel

Allowable Fuel Load Range: 27 to 32.9

TEST FUEL LOAD PROPERTIES

Eq. ID No.: SBI-229			Time:		Temp.,°F:	
Piece No.	Length, In.	Weight, Lb. 2x4	Weight, Lb. 4x4	Moisture, %, Dry Basis		
1	17		6.401	26.1	26.4	22.3
2	16½		4.817	18.6	19.2	25.7
3	17½		8.683	21.9	22.7	24.5
4	16½		6.031	18.5	21.8	24.2
5	17¾		6.980	21.3	24.8	23.9
6	17¼		8.796	20.4	22.4	26.5
7						
8						
Totals		0.0	0.0			
% of Weight		#DIV/0!	#DIV/0!			
Total weight, wet, lb.		0.00		Average Moisture, dry		#DIV/0!
Total weight, dry, kg		#DIV/0!		Average Moisture, wet		#DIV/0!

Test Engineer: [illegible]

Date: 10-Jun-2016

300- App-B Data and Calculation Forms (page 59 of 92)

Intertek

Dillution Tunnel Velocity Traverse
EPA Method 5G-3

Project Number: G102163747
Manufacturer: SBI
Model: HE350 Series
Sample ID Number: QC20160608
Test Date: 10-Jun-16
Test Run Number: 3

	Dilution Tunnel		
	Delta P In. H2O	Temp,°F	Square Root
A1	0.116	97.3	0.0000
A2	0.126	97.7	0.0000
A3	0.118	97.6	0.0000
A4	0.120	99.2	0.0000
A Center	0.128	97.4	0.0000
B1	0.100	98.3	0.0000
B2	0.131	98.5	0.0000
B3	0.125	98.4	0.0000
B4	0.110	96.4	0.0000
B Center	0.133	99.3	0.0000
Averages	#DIV/0!	#DIV/0!	0.0000

Tunnel Diameter	8.000	inches
Tunnel Static	0.193	in. H2O
Tunnel Area	0.34907	Ft2
Pitot Correction	#DIV/0!	factor
Baro. Pressure	29.50	
Pitot Factor	0.84	(0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity	#DIV/0!	Ft/ Sec
Initial Flow	**#DIV/0!**	Ft3/min

Test Engineer: [illegible]

Date: 10-Jun 2016

300- App-B Data and Calculation Forms (page 60 of 92)

Time	Ambiant	Flue	Firebox Top	Dilution Tunnel	Firebox Right	Firebox Back	Firebox Bottom	Firebox Left	DGM Outlet 1
min	°F	°F	°F	°F	°F	°F	°F	°F	°F
0	79.08	703.75	145.52	820.39	587.93	546.24	588.21	475.21	N/A
1	79.38	679.13	141.06	814.23	589.59	545.63	588.52	477.14	N/A
2	79.40	662.32	138.50	806.53	591.18	544.82	589.14	478.53	N/A
3	79.88	646.86	136.12	795.55	592.63	543.86	588.75	479.85	N/A
4	80.04	631.58	134.39	781.41	594.05	542.45	587.88	481.02	N/A
5	79.41	618.24	132.99	767.16	595.17	541.38	587.44	482.32	N/A
6	79.16	606.93	131.74	752.25	596.14	539.83	586.20	483.29	N/A
7	79.44	598.06	130.99	740.94	596.93	538.45	584.70	485.54	N/A
8	79.00	588.98	129.98	730.37	597.50	537.15	582.99	487.52	N/A
9	78.92	579.79	128.73	719.34	597.87	535.37	580.84	489.28	N/A
10	78.70	571.05	128.07	708.42	598.06	533.89	578.74	491.28	N/A
11	78.40	561.69	127.24	697.65	598.10	531.82	576.43	493.04	N/A
12	77.96	552.50	126.46	684.10	597.96	529.43	573.82	495.83	N/A
13	78.00	545.17	125.60	671.07	597.73	527.58	571.35	498.53	N/A
14	78.15	538.61	124.88	659.39	597.40	525.07	569.09	500.12	N/A
15	78.09	531.81	123.97	649.32	597.02	522.42	566.94	501.23	N/A
16	77.95	526.25	123.59	639.86	596.58	519.62	564.50	502.72	N/A
17	78.00	519.78	122.36	630.08	596.11	516.72	562.12	502.66	N/A
18	77.96	512.82	121.58	618.96	595.58	513.50	559.46	503.18	N/A
19	77.87	506.56	121.04	609.25	595.00	510.36	557.31	502.55	N/A
20	78.12	500.26	120.28	599.35	594.28	506.95	554.62	502.14	N/A
21	77.83	495.05	119.67	591.36	593.48	503.90	552.00	501.84	N/A
22	77.42	489.73	119.07	585.20	592.58	501.30	549.96	501.06	N/A
23	77.86	485.04	118.52	580.15	591.58	498.03	547.60	500.65	N/A
24	77.61	481.10	118.09	575.05	590.48	495.47	545.16	500.13	N/A
25	77.52	476.71	117.36	568.57	589.29	492.41	542.62	499.24	N/A
26	77.45	470.26	116.68	560.08	588.02	489.25	540.35	498.69	N/A
27	78.08	463.69	115.96	551.30	586.73	486.51	537.64	497.58	N/A
28	78.36	457.27	115.35	543.12	585.37	483.76	535.08	496.99	N/A
29	78.39	451.45	114.69	535.20	583.81	480.84	532.43	496.13	N/A
30	78.23	446.07	113.95	528.27	582.25	478.48	529.76	495.59	N/A
31	78.00	441.84	113.41	522.18	580.59	475.37	526.80	494.90	N/A

300- App-B Data and Calculation Forms (page 61 of 92)

32	77.85	437.56	112.88	516.63	578.84	473.22	524.23	494.06	N/A
33	77.33	433.18	112.58	511.23	577.00	470.13	521.33	493.01	N/A
34	77.03	429.04	112.09	505.65	575.10	467.41	518.23	491.96	N/A
35	77.16	424.99	111.62	500.22	573.11	465.01	515.94	491.08	N/A
36	77.14	420.66	111.16	495.00	571.07	462.56	513.31	490.37	N/A
37	77.08	417.11	110.71	489.75	568.86	459.45	510.45	489.41	N/A
38	76.99	413.76	110.26	485.14	566.74	456.96	507.82	488.88	N/A
39	77.39	402.09	125.71	471.97	565.99	454.91	505.05	489.24	N/A
40	77.72	404.30	113.48	471.58	563.86	452.74	502.78	490.64	N/A
41	77.45	402.51	111.09	470.67	561.62	450.75	500.60	491.40	N/A
42	76.84	400.98	110.16	470.18	559.39	448.76	498.04	491.92	N/A
43	76.69	398.68	109.41	468.82	557.13	446.32	495.53	492.02	N/A
44	76.36	395.49	108.66	465.44	554.90	444.48	492.78	491.33	N/A
45	77.40	389.73	108.28	459.04	552.62	442.54	489.90	490.46	N/A
46	77.15	385.53	107.56	452.45	550.11	440.09	486.69	489.03	N/A
47	77.10	381.34	106.84	446.71	547.72	438.36	484.26	487.60	N/A
48	77.03	377.74	106.47	441.37	545.25	435.72	481.34	485.72	N/A
49	76.70	374.31	106.05	436.44	542.73	434.15	478.14	483.52	N/A
50	76.59	371.00	105.76	431.55	540.16	432.11	475.50	481.83	N/A
51	76.71	367.48	105.29	427.06	537.55	430.01	472.62	481.11	N/A
52	76.63	364.89	104.87	422.82	534.93	427.69	469.49	479.83	N/A
53	76.53	362.05	104.65	418.56	532.32	425.32	466.64	478.36	N/A
54	76.64	358.77	104.21	414.28	529.45	422.95	463.34	475.61	N/A
55	76.51	356.26	104.02	410.56	526.80	420.91	460.24	474.37	N/A
56	76.37	353.78	103.73	406.85	524.16	418.95	456.75	473.08	N/A
57	76.47	351.15	103.33	403.34	521.51	416.73	454.12	471.66	N/A
58	76.18	348.82	103.12	400.06	518.85	414.82	451.15	469.87	N/A
59	76.26	346.93	102.87	396.84	516.20	412.60	448.31	468.07	N/A
60	76.24	344.13	102.48	393.51	513.54	410.94	445.43	466.14	N/A
61	76.75	337.98	111.91	385.03	511.73	408.40	442.09	465.07	N/A
62	77.11	338.55	104.49	382.78	509.12	406.08	439.53	463.93	N/A
63	76.28	336.91	102.91	380.40	506.28	403.59	436.65	461.23	N/A
64	76.30	335.04	102.08	378.15	503.72	401.65	434.07	459.23	N/A
65	76.13	333.22	101.59	375.65	501.21	399.51	431.30	456.60	N/A

66	75.87	331.31	101.16	372.92	498.73	397.52	428.40	454.86	N/A
67	75.98	329.11	100.98	370.22	496.31	395.76	425.86	453.26	N/A
68	76.00	326.99	100.71	367.59	493.90	393.78	423.05	452.03	N/A
69	76.12	325.07	100.39	364.95	491.53	392.22	421.02	450.41	N/A
70	76.17	323.31	100.27	362.16	489.19	390.56	418.72	448.68	N/A
71	76.03	321.69	100.03	359.27	486.70	388.34	416.17	447.05	N/A
72	75.79	319.62	99.93	356.83	484.39	386.78	413.99	444.74	N/A
73	75.66	317.79	99.82	354.16	482.15	384.55	411.71	443.66	N/A
74	75.83	315.94	99.40	351.93	479.95	382.51	409.41	441.52	N/A
75	75.72	314.03	99.32	349.47	477.75	380.85	407.17	440.01	N/A
76	76.08	312.24	98.50	347.04	475.60	379.08	405.41	438.63	N/A
77	76.37	310.64	96.23	344.78	473.47	377.33	403.46	437.36	N/A
78	75.99	308.68	98.40	342.58	471.34	375.70	401.40	434.75	N/A
79	75.92	306.69	98.47	340.26	469.07	374.20	399.19	432.89	N/A
80	75.90	305.34	98.30	337.97	467.01	372.67	396.90	430.66	N/A
81	76.10	303.56	98.19	335.77	464.96	370.99	394.75	428.75	N/A
82	75.71	302.23	97.61	333.58	462.92	369.28	392.69	427.26	N/A
83	75.76	300.76	97.65	331.45	460.87	367.55	390.77	425.52	N/A
84	75.89	299.15	96.56	329.36	458.85	366.16	388.76	424.14	N/A
85	75.87	297.22	97.19	327.59	456.83	364.19	386.69	422.45	N/A
86	75.77	295.66	97.10	325.60	454.86	362.53	384.58	420.31	N/A
87	75.77	294.27	97.00	323.59	452.90	360.49	382.37	417.99	N/A

300- App-B Data and Calculation Forms (page 63 of 92)

DGM Inlet 1	Probe 1	DGM Outlet 2	DGM Inlet 2	Probe 2	Probe 3	Draft	Dilution Tunnel	Scale
°F	°F	°F	°F	°F	°F	"H_2O	"H_2O	lb
N/A	N/A	N/A	N/A	N/A	N/A	0.077	0.125	11.75
N/A	N/A	N/A	N/A	N/A	N/A	0.076	0.127	11.58
N/A	N/A	N/A	N/A	N/A	N/A	0.075	0.128	11.41
N/A	N/A	N/A	N/A	N/A	N/A	0.074	0.126	11.27
N/A	N/A	N/A	N/A	N/A	N/A	0.073	0.128	11.13
N/A	N/A	N/A	N/A	N/A	N/A	0.073	0.128	11.01
N/A	N/A	N/A	N/A	N/A	N/A	0.072	0.127	10.88
N/A	N/A	N/A	N/A	N/A	N/A	0.071	0.126	10.76
N/A	N/A	N/A	N/A	N/A	N/A	0.070	0.126	10.63
N/A	N/A	N/A	N/A	N/A	N/A	0.070	0.125	10.52
N/A	N/A	N/A	N/A	N/A	N/A	0.069	0.129	10.41
N/A	N/A	N/A	N/A	N/A	N/A	0.069	0.129	10.30
N/A	N/A	N/A	N/A	N/A	N/A	0.068	0.126	10.19
N/A	N/A	N/A	N/A	N/A	N/A	0.067	0.127	10.09
N/A	N/A	N/A	N/A	N/A	N/A	0.067	0.127	10.00
N/A	N/A	N/A	N/A	N/A	N/A	0.066	0.129	9.92
N/A	N/A	N/A	N/A	N/A	N/A	0.066	0.127	9.82
N/A	N/A	N/A	N/A	N/A	N/A	0.065	0.130	9.74
N/A	N/A	N/A	N/A	N/A	N/A	0.065	0.127	9.68
N/A	N/A	N/A	N/A	N/A	N/A	0.064	0.130	9.59
N/A	N/A	N/A	N/A	N/A	N/A	0.064	0.129	9.53
N/A	N/A	N/A	N/A	N/A	N/A	0.063	0.128	9.48
N/A	N/A	N/A	N/A	N/A	N/A	0.063	0.129	9.39
N/A	N/A	N/A	N/A	N/A	N/A	0.062	0.129	9.34
N/A	N/A	N/A	N/A	N/A	N/A	0.062	0.128	9.28
N/A	N/A	N/A	N/A	N/A	N/A	0.061	0.129	9.23
N/A	N/A	N/A	N/A	N/A	N/A	0.061	0.129	9.18
N/A	N/A	N/A	N/A	N/A	N/A	0.060	0.128	9.15
N/A	N/A	N/A	N/A	N/A	N/A	0.060	0.129	9.13
N/A	N/A	N/A	N/A	N/A	N/A	0.059	0.131	9.09
N/A	N/A	N/A	N/A	N/A	N/A	0.059	0.132	9.05
N/A	N/A	N/A	N/A	N/A	N/A	0.059	0.129	9.02

300- App-B Data and Calculation Forms (page 64 of 92)

N/A	N/A	N/A	N/A	N/A	N/A	0.058	0.130	8.99
N/A	N/A	N/A	N/A	N/A	N/A	0.058	0.130	8.94
N/A	N/A	N/A	N/A	N/A	N/A	0.057	0.131	8.91
N/A	N/A	N/A	N/A	N/A	N/A	0.057	0.131	8.88
N/A	N/A	N/A	N/A	N/A	N/A	0.056	0.132	8.84
N/A	N/A	N/A	N/A	N/A	N/A	0.056	0.131	8.80
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.130	8.78
N/A	N/A	N/A	N/A	N/A	N/A	0.056	0.132	8.73
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.129	8.69
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.132	8.66
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.132	8.64
N/A	N/A	N/A	N/A	N/A	N/A	0.055	0.129	8.61
N/A	N/A	N/A	N/A	N/A	N/A	0.054	0.131	8.60
N/A	N/A	N/A	N/A	N/A	N/A	0.054	0.131	8.58
N/A	N/A	N/A	N/A	N/A	N/A	0.053	0.130	8.56
N/A	N/A	N/A	N/A	N/A	N/A	0.053	0.131	8.55
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.129	8.55
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.131	8.54
N/A	N/A	N/A	N/A	N/A	N/A	0.052	0.132	8.53
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.130	8.52
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.131	8.51
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.131	8.49
N/A	N/A	N/A	N/A	N/A	N/A	0.051	0.129	8.48
N/A	N/A	N/A	N/A	N/A	N/A	0.050	0.130	8.47
N/A	N/A	N/A	N/A	N/A	N/A	0.050	0.131	8.45
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.131	8.45
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.132	8.43
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.130	8.40
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.130	8.39
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.129	8.37
N/A	N/A	N/A	N/A	N/A	N/A	0.049	0.131	8.33
N/A	N/A	N/A	N/A	N/A	N/A	0.048	0.132	8.31
N/A	N/A	N/A	N/A	N/A	N/A	0.048	0.133	8.30
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.132	8.29

N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.132	8.28
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.132	8.27
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.131	8.25
N/A	N/A	N/A	N/A	N/A	N/A	0.047	0.131	8.23
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.130	8.22
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.133	8.22
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.134	8.20
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.134	8.19
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.135	8.18
N/A	N/A	N/A	N/A	N/A	N/A	0.046	0.134	8.17
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.129	8.17
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.104	8.16
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.132	8.14
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.130	8.13
N/A	N/A	N/A	N/A	N/A	N/A	0.045	0.131	8.13
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.135	8.11
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.128	8.10
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.117	8.11
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.130	8.11
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.132	8.10
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.131	8.10
N/A	N/A	N/A	N/A	N/A	N/A	0.044	0.130	8.10

300- App-B Data and Calculation Forms (page 66 of 92)

Date/heure	Time	O_2	CO	CO_2IR	CO
YYYY-MM-DD HH:MM:SS	min	%	ppm CO	%	%
2016-06-10 05:51:49	0	15.53	3534	3.75	0.35
2016-06-10 06:01:49	10	6.89	12742	13.67	1.27
2016-06-10 06:11:49	20	6.98	9090	13.76	0.91
2016-06-10 06:21:49	30	6.12	16598	14.61	1.66
2016-06-10 06:31:49	40	6.24	10126	14.74	1.01
2016-06-10 06:41:49	50	10.15	6293	11.15	0.63
2016-06-10 06:51:49	60	10.08	4962	11.05	0.50
2016-06-10 07:01:49	70	9.70	5157	11.38	0.52
2016-06-10 07:11:49	80	9.73	4254	11.42	0.43
2016-06-10 07:21:49	90	9.46	4373	11.59	0.44
2016-06-10 07:31:49	100	9.46	4637	11.48	0.46
2016-06-10 07:41:49	110	9.52	3641	11.11	0.36
2016-06-10 07:51:49	120	10.66	2324	10.16	0.23
2016-06-10 08:01:49	130	11.24	2154	9.35	0.22
2016-06-10 08:11:49	140	11.41	3037	8.94	0.30
2016-06-10 08:21:49	150	12.86	1470	7.36	0.15
2016-06-10 08:31:49	160	13.70	2865	6.46	0.29
2016-06-10 08:41:49	170	14.58	3484	5.84	0.27
2016-06-10 08:51:49	180	14.88	4045	5.38	0.40
2016-06-10 09:01:49	490	15.33	4398	4.91	0.44
2016-06-10 09:11:49	200	15.47	4587	4.81	0.46
2016-06-10 09:21:49	210	15.53	4186	4.72	0.42
2016-06-10 09:31:49	220	15.59	4281	4.70	0.43
2016-06-10 09:41:49	230	15.61	4304	4.65	0.43
2016-06-10 09:51:49	240	15.98	4571	4.36	0.46
2016-06-10 10:01:49	250	16.10	4146	4.22	0.41
2016-06-10 10:11:49	260	16.20	3977	4.13	0.40
2016-06-10 10:21:49	270	16.15	4136	4.09	0.41
2016-06-10 10:31:49	280	16.23	4067	4.03	0.41
2016-06-10 10:41:49	290	16.33	3717	3.97	0.37
2016-06-10 10:51:49	300	16.48	3572	3.82	0.36
2016-06-10 11:01:49	310	16.53	3485	3.81	0.35
2016-06-10 11:11:49	320	16.71	3777	3.60	0.38
2016-06-10 11:21:49	330	16.77	3596	3.57	0.36
2016-06-10 11:31:49	340	16.81	3661	3.52	0.37
2016-06-10 11:41:49	350	16.89	3576	3.50	0.36
2016-06-10 11:51:49	360	16.98	3340	3.39	0.33
2016-06-10 12:01:49	370	17.01	3414	3.37	0.34
2016-06-10 12:11:49	380	17.07	3291	3.30	0.33
2016-06-10 12:21:49	390	17.18	3120	3.20	0.31
2016-06-10 12:31:49	400	17.27	3095	3.15	0.31
2016-06-10 12:41:49	410	17.40	2960	3.00	0.30
2016-06-10 12:51:49	420	17.51	2945	2.91	0.29
2016-06-10 13:01:49	430	17.58	2855	2.85	0.29
2016-06-10 13:11:49	440	17.66	2773	2.77	0.28
2016-06-10 13:21:49	450	17.69	2759	2.74	0.28
2016-06-10 13:31:49	460	17.78	2736	2.68	0.27
2016-06-10 13:41:49	470	17.80	2703	2.63	0.27
2016-06-10 13:51:49	480	17.83	2604	2.62	0.26
2016-06-10 14:01:49	490	17.83	2606	2.61	0.26
2016-06-10 14:11:49	500	17.91	2651	2.62	0.27
2016-06-10 14:21:49	510	18.07	2526	2.49	0.25
2016-06-10 14:31:49	520	18.09	2516	2.47	0.25

300- App-B Data and Calculation Forms (page 67 of 92)

2016-06-10 14:41:49	530	18.17	*2388*	2.40	0.24
2016-06-10 14:51:49	540	18.22	*2326*	2.37	0.23
2016-06-10 15:01:49	550	18.25	*2269*	2.34	0.23
2016-06-10 15:11:49	560	18.33	*2179*	2.26	0.22
2016-06-10 15:21:49	570	18.33	*2134*	2.28	0.21
2016-06-10 15:31:49	580	18.29	*2146*	2.29	0.21
2016-06-10 15:41:49	590	18.36	*2050*	2.26	0.21
2016-06-10 15:51:49	600	18.49	*4977*	2.15	0.50
2016-06-10 16:01:49	610	18.51	*2100*	2.08	0.21
2016-06-10 16:11:49	620	18.65	*4967*	1.99	0.50
2016-06-10 16:21:49	630	18.79	*1850*	1.88	0.19
2016-06-10 16:31:49	640	18.93	*1720*	1.76	0.17
2016-06-10 16:41:49	650	49.00	*1652*	1.69	0.17
2016-06-10 16:51:49	660	17.49	*3363*	1.70	0.34
2016-06-10 17:01:49	670	17.00	*3788*	3.28	0.38
2016-06-10 17:11:49	680	17.28	*3486*	3.06	0.35

300- App-B Data and Calculation Forms (page 68 of 92)

Time	Ambiant	Flue	Dilution Tunnel	Firebox Top	Firebox Right	Firebox Back	Firebox Bottom	Firebox Left
min	°F	°F	°F	°F	°F	°F	°F	°F
0	75.55	293.57	96.88	322.47	451.76	359.63	381.26	417.24
10	75.85	695.19	159.75	702.34	440.74	360.52	368.61	401.41
20	76.73	760.15	151.68	858.52	431.54	408.33	406.23	381.98
30	77.54	802.03	159.35	859.81	436.24	448.28	440.20	363.71
40	78.43	820.43	161.86	849.71	442.85	477.37	465.40	353.40
50	79.31	697.72	136.37	832.61	449.44	497.70	484.59	348.82
60	79.07	615.18	128.88	763.96	444.99	486.77	468.79	354.34
70	78.19	597.92	126.74	776.37	438.11	474.50	449.32	359.41
80	78.11	599.25	125.72	810.26	437.00	468.57	438.27	361.77
90	79.37	595.20	125.76	805.36	440.09	463.54	432.84	359.60
100	78.40	590.86	124.83	804.09	445.61	460.61	430.42	352.33
110	79.55	574.90	121.41	787.59	453.31	459.87	429.15	347.13
120	80.02	564.82	121.02	763.36	461.18	459.27	427.94	341.59
130	79.31	540.72	117.37	714.29	468.48	451.02	427.76	338.40
140	76.83	521.23	113.94	654.00	474.56	439.77	429.24	335.27
150	79.76	497.34	113.99	615.78	480.09	430.96	430.32	333.56
160	79.08	457.95	110.53	558.97	479.44	422.36	426.17	334.42
170	77.63	423.21	106.18	506.20	472.78	413.12	420.80	334.52
180	73.92	401.32	102.07	460.22	463.78	405.26	413.96	335.24
190	73.11	369.47	98.64	421.54	452.30	396.24	405.32	334.80
200	71.91	348.62	96.13	396.79	441.70	385.30	395.94	333.69
210	72.35	335.14	94.34	379.41	432.10	376.18	387.37	332.24
220	72.09	325.26	92.77	367.04	423.95	366.40	381.02	330.33
230	71.76	317.96	91.42	357.24	416.97	357.34	375.49	329.51
240	72.07	310.47	90.70	349.05	411.06	348.72	370.28	328.53
250	71.66	301.04	90.08	337.46	406.61	341.08	364.23	328.55
260	71.58	296.36	89.21	331.87	402.19	335.00	356.21	328.11
270	70.78	289.58	88.30	321.68	398.33	328.68	348.48	327.47
280	71.34	287.27	87.84	318.37	395.18	322.90	341.50	327.08
290	71.18	284.35	87.36	313.58	391.60	317.20	335.30	326.37
300	71.43	279.91	87.16	306.49	387.97	312.07	331.14	325.79
310	71.59	276.93	86.71	301.90	385.06	308.13	325.72	323.69

300- App-B Data and Calculation Forms (page 69 of 92)

320	71.76	275.24	86.29	298.19	382.19	303.95	320.12	321.42
330	71.17	272.44	86.11	295.62	379.14	300.75	315.62	319.54
340	70.43	269.82	85.82	290.30	375.90	297.25	311.19	316.56
350	71.20	268.09	85.48	286.37	372.67	294.11	306.88	313.67
360	71.13	264.95	85.19	283.57	369.72	290.80	303.08	310.15
370	71.18	262.63	85.01	278.95	366.72	287.96	299.33	307.14
380	71.70	261.25	84.90	275.53	364.32	284.09	295.56	304.26
390	71.90	259.03	84.74	272.86	362.15	281.22	292.23	302.92
400	71.84	257.29	84.55	269.42	359.50	278.21	289.11	301.61
410	70.81	254.99	84.44	266.62	356.32	275.78	285.99	299.56
420	72.26	252.95	84.18	263.24	352.86	273.34	283.73	296.07
430	72.11	250.87	83.98	259.83	349.65	270.89	280.84	290.40
440	71.08	248.86	83.71	255.94	346.51	267.86	278.02	284.78
450	71.37	246.60	83.71	252.46	343.53	265.36	274.88	279.42
460	71.01	244.52	83.51	249.40	340.64	263.13	271.88	275.11
470	73.09	242.18	83.95	245.99	337.76	260.24	269.32	270.72
480	76.54	241.82	87.59	244.05	335.67	259.70	267.69	266.73
490	77.94	240.88	88.43	242.07	333.91	258.52	265.63	263.49
500	78.39	240.22	89.07	241.67	332.04	256.86	264.21	260.72
510	78.68	238.89	89.41	240.50	330.35	255.83	262.31	258.58
520	78.73	238.61	89.59	237.78	328.49	253.91	259.88	256.42
530	78.70	236.63	89.56	235.70	326.48	251.93	257.45	254.28
540	78.82	234.64	89.74	232.76	324.15	249.78	254.97	252.53
550	78.82	232.65	89.73	230.98	321.62	247.62	252.18	251.35
560	78.83	230.37	89.67	228.35	319.05	245.68	249.59	249.84
570	78.49	227.78	89.54	225.38	316.33	243.29	247.10	248.62
580	78.87	226.07	89.61	223.46	313.60	241.32	244.87	247.70
590	78.89	225.57	89.56	221.92	311.26	238.85	243.18	247.02
600	78.57	223.60	89.47	220.25	308.97	236.49	242.18	246.67
610	78.05	221.65	89.10	217.87	306.31	234.38	240.33	246.79
620	78.15	219.60	88.97	215.33	303.36	232.26	238.56	246.83
630	78.17	216.38	88.65	211.78	300.03	230.47	236.04	246.60
640	77.95	211.94	88.39	207.06	296.14	227.78	233.26	246.30
650	77.91	207.63	88.08	202.32	291.82	224.33	230.20	245.05

300- App-B Data and Calculation Forms (page 70 of 92)

660	78.05	203.73	87.83	197.93	287.22	220.41	226.58	243.27
670	78.04	217.58	88.19	211.90	284.24	216.73	224.19	241.52
680	78.04	221.35	88.54	227.76	283.44	218.44	227.36	238.94

DGM Outlet 1	DGM Inlet 1	Probe 1	DGM Outlet 2	DGM Inlet 2	Probe 2	Probe 3	Draft	Dilution tunnel
°F	°F	°F	°F	°F	°F	°F	"H_2O	"H_2O
76.46	76.61	86.01	75.44	74.97	83.31	89.93	0.044	0.130
79.78	79.87	81.24	76.28	76.51	83.27	81.56	0.081	0.108
82.64	80.45	81.57	76.75	77.85	81.25	81.68	0.084	0.168
84.63	81.19	81.81	77.10	78.89	85.05	83.02	0.087	0.156
85.85	81.89	82.32	77.33	79.65	87.15	86.59	0.088	0.155
86.71	82.45	82.08	77.68	80.20	87.20	88.27	0.081	0.157
87.17	83.00	81.50	78.15	80.79	85.25	86.36	0.077	0.164
87.54	83.46	81.00	78.57	81.04	84.27	N/A	0.076	0.153
87.63	83.84	80.90	78.66	81.23	83.85	N/A	0.075	0.155
87.36	84.07	80.75	78.76	81.33	83.49	N/A	0.074	0.150
87.40	84.28	80.80	78.83	81.27	83.40	N/A	0.075	0.151
87.47	84.47	83.21	79.00	81.40	83.23	N/A	0.073	0.155
87.54	84.57	83.21	78.98	81.45	83.16	N/A	0.072	0.152
87.50	84.55	82.91	78.57	81.24	83.02	N/A	0.071	0.149
87.86	84.81	83.05	78.72	81.41	82.73	N/A	0.070	0.150
87.90	85.04	83.15	79.11	81.49	82.78	N/A	0.066	0.144
87.90	85.09	83.09	79.39	81.60	82.67	N/A	0.063	0.145
88.01	85.07	82.94	79.64	81.72	82.40	N/A	0.060	0.147
88.06	85.30	82.80	79.77	81.85	82.11	N/A	0.058	0.148
88.15	85.39	82.53	80.16	82.06	81.81	N/A	0.054	0.145
88.21	85.60	82.53	80.37	82.18	81.57	N/A	0.052	0.146
88.24	85.64	82.42	80.42	82.26	89.77	N/A	0.051	0.144
88.34	85.77	82.42	80.48	82.40	88.40	N/A	0.050	0.141
88.78	85.93	82.44	80.61	82.49	89.96	N/A	0.049	0.141
89.06	85.77	82.47	80.57	82.54	83.87	N/A	0.047	0.144
88.95	85.68	82.52	80.64	82.56	82.27	N/A	0.048	0.131
88.95	85.52	82.48	80.73	82.62	82.00	N/A	0.046	0.133
89.10	85.75	82.35	80.55	82.66	81.87	N/A	0.046	0.134
88.92	85.68	82.50	80.54	82.67	81.85	N/A	0.044	0.134
89.06	85.82	82.61	80.68	82.80	84.28	N/A	0.044	0.135
89.21	85.82	82.68	80.89	82.89	85.52	N/A	0.045	0.135
89.15	85.92	82.75	81.01	83.10	85.79	N/A	0.045	0.133

300- App-B Data and Calculation Forms (page 72 of 92)

89.27	86.04	82.82	81.10	83.22	85.78	N/A	0.042	0.136
89.26	86.04	82.72	80.94	83.19	85.85	N/A	0.044	0.134
89.14	85.98	82.71	81.00	83.34	85.70	N/A	0.044	0.134
88.98	86.08	82.75	81.01	83.40	85.69	N/A	0.043	0.138
89.05	86.02	82.72	80.84	83.38	85.79	N/A	0.043	0.137
89.19	86.02	82.74	80.88	83.47	85.80	N/A	0.043	0.135
88.98	86.06	82.92	81.11	83.52	85.89	N/A	0.042	0.135
88.80	86.21	82.76	81.23	83.51	85.70	N/A	0.042	0.138
88.63	86.37	82.72	81.11	83.40	85.99	N/A	0.042	0.138
88.74	86.46	82.78	81.15	83.42	84.83	N/A	0.040	0.135
88.81	86.50	82.92	81.12	83.44	80.38	N/A	0.041	0.133
88.84	86.49	82.94	81.22	83.57	80.13	N/A	0.040	0.135
88.97	86.60	83.05	81.14	83.62	80.26	N/A	0.040	0.135
88.95	86.57	82.91	81.01	83.68	80.14	N/A	0.040	0.136
88.88	86.51	83.03	81.01	83.67	83.47	N/A	0.040	0.135
88.85	86.50	83.05	80.92	83.69	85.35	N/A	0.039	0.137
88.91	86.53	83.14	80.99	83.61	86.18	N/A	0.039	0.134
88.94	86.51	83.37	80.83	83.60	86.58	N/A	0.038	0.135
89.02	86.62	83.45	80.89	83.68	86.72	N/A	0.038	0.136
88.99	86.45	83.53	80.85	83.58	86.91	N/A	0.038	0.133
89.10	86.60	83.54	80.81	83.69	86.88	N/A	0.040	0.131
89.13	86.64	83.67	80.92	83.70	86.96	N/A	0.039	0.136
89.15	86.72	83.65	80.80	83.68	87.09	N/A	0.038	0.138
89.26	86.81	83.64	80.87	83.68	82.48	N/A	0.037	0.137
89.31	86.83	83.67	80.81	83.67	85.50	N/A	0.037	0.133
89.28	86.87	83.75	80.87	83.84	86.85	N/A	0.038	0.136
89.32	86.89	83.84	81.01	83.92	87.14	N/A	0.036	0.136
89.41	86.85	83.99	81.11	84.03	87.31	N/A	0.037	0.135
89.49	86.87	84.32	81.36	84.18	87.26	N/A	0.037	0.133
89.12	87.23	84.25	81.79	84.35	87.49	N/A	0.037	0.136
89.26	86.97	84.06	81.78	84.38	87.71	N/A	0.036	0.135
89.10	87.04	84.09	81.98	84.30	87.60	N/A	0.036	0.134
89.08	87.17	83.94	82.19	84.25	82.56	N/A	0.035	0.136
89.17	87.35	84.20	82.49	84.34	82.21	N/A	0.034	0.138

300- App-B Data and Calculation Forms (page 73 of 92)

89.13	87.49	84.22	82.72	84.35	82.47	N/A	0.033	0.134
89.71	87.52	84.24	82.71	84.39	82.46	N/A	0.036	0.136
89.78	87.43	84.29	82.78	84.45	82.47	N/A	0.036	0.133

300- App-B Data and Calculation Forms (page 74 of 92)

Scale	DGM 1 mean	DGM 2 mean	Scale zeroed
lb	°F	°F	lb
8.10	76.53	75.21	-
54.69	79.83	76.40	46.59
49.55	81.55	77.30	41.44
44.91	82.91	77.99	36.80
40.24	83.87	78.49	32.13
36.48	84.58	78.94	28.38
34.18	85.08	79.47	26.08
31.86	85.50	79.81	23.76
29.59	85.74	79.94	21.49
27.42	85.71	80.04	19.31
25.30	85.84	80.05	17.20
23.32	85.97	80.20	15.22
21.61	86.05	80.22	13.50
20.15	86.02	79.91	12.05
18.92	86.33	80.06	10.82
17.95	86.47	80.30	9.84
17.35	86.50	80.49	9.25
16.81	86.54	80.68	8.70
16.36	86.68	80.81	8.25
16.02	86.77	81.11	7.91
15.70	86.90	81.28	7.60
15.43	86.94	81.34	7.32
15.12	87.05	81.44	7.02
14.86	87.35	81.55	6.75
14.58	87.41	81.56	6.48
14.35	87.32	81.60	6.24
14.10	87.24	81.67	5.99
13.85	87.43	81.60	5.75
13.65	87.30	81.61	5.55
13.44	87.44	81.74	5.34
13.21	87.52	81.89	5.11
13.01	87.54	82.06	4.90

300- App-B Data and Calculation Forms (page 75 of 92)

12.79	87.66	82.16	4.69
12.62	87.65	82.06	4.52
12.40	87.56	82.17	4.30
12.24	87.53	82.21	4.14
12.05	87.54	82.11	3.94
11.87	87.61	82.18	3.76
11.69	87.52	82.31	3.59
11.52	87.51	82.37	3.41
11.34	87.50	82.25	3.24
11.18	87.60	82.28	3.08
11.01	87.65	82.28	2.91
10.85	87.67	82.40	2.74
10.70	87.78	82.38	2.59
10.55	87.76	82.35	2.44
10.41	87.70	82.34	2.30
10.28	87.67	82.30	2.17
10.15	87.72	82.30	2.05
10.04	87.73	82.22	1.93
9.93	87.82	82.28	1.82
9.82	87.72	82.21	1.72
9.71	87.85	82.25	1.61
9.62	87.88	82.31	1.51
9.51	87.93	82.24	1.41
9.41	88.03	82.27	1.30
9.31	88.07	82.24	1.21
9.21	88.07	82.36	1.10
9.11	88.10	82.46	1.00
8.99	88.13	82.57	0.89
8.89	88.18	82.77	0.78
8.81	88.17	83.07	0.70
8.70	88.12	83.08	0.60
8.61	88.07	83.14	0.51
8.53	88.12	83.22	0.42
8.44	88.26	83.42	0.34

300- App-B Data and Calculation Forms (page 76 of 92)

8.36	88.31	83.54	0.25
8.16	88.61	83.55	0.06
8.00	88.61	83.61	-0.11

300- App-B Data and Calculation Forms (page 77 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)

Project #: G102163747 **Sample ID #:** QC20160608

Date: 2016-06-08 **Engineer:** Claude Pelland **Run #:** 1 **Sample Train #:** 1A

Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	25	**Tare:**	0.0842	**Preliminary Wt :**	0.1715	
Rear Filter #	26	**Tare:**	0.0842			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:15	12.9	72.8	0.1714	100mg= 0.0999 10g= 10.0001	
2016-06-10	9:24	1.0	71.7	0.1714	100mg= 0.1000 10g= 10.0001	
Probe #:	32	**Tare:**	135.9696	**Preliminary Wt :**	135.9716	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:12	12.9	72.8	135.9707	200 g = 200.0003	
2016-06-10	9:18	1.0	71.7	135.9704	200 g = 200.0001	
2016-06-13	8:48	0.2	71.6	135.9707	200 g = 199.9998	
2016-06-14	8:47	0.9	72.3	135.9708	200 g = 199.9998	

Date: ____________

Engineer Signature: ____________________

300- App-B Data and Calculation Forms (page 78 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-08 **Engineer:** Claude Pelland **Run #:** 1 **Sample Train #:** 1B
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	27	**Tare:**	0.0834	**Preliminary Wt :**	0.1703	
Rear Filter #	28	**Tare:**	0.0838			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:17	12.9	72.8	0.1702	100mg= 0.0999 10g= 10.0001	
2016-06-10	9:25	1.0	71.7	0.1701	100mg= 0.1000 10g= 10.0001	
Probe #:	-	**Tare:**	136.6443	**Preliminary Wt :**	136.6455	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:13	12.9	72.8	136.6450	200 g = 200.0003	
2016-06-10	9:19	1.0	71.7	136.6445	200 g = 200.0001	
2016-06-13	8:49	0.2	71.6	136.6442	200 g = 199.9998	
2016-06-14	8:48	0.9	72.3	136.6443	200 g = 199.9998	

Date: ____________

Engineer Signature: ____________________

300- App-B Data and Calculation Forms (page 79 of 92)

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-08 **Engineer:** Claude Pelland **Run #:** 1 **Sample Train #:** 1C
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	29	**Tare:**	0.0840	**Preliminary Wt :**	0.1689	
Rear Filter #	30	**Tare:**	0.0837			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:18	12.9	72.8	0.1689	100mg= 0.0999 10g= 10.0001	
2016-06-10	9:26	1.0	71.7	0.1689	100mg= 0.1000 10g= 10.0001	

Probe #:	28	**Tare:**	136.1845	**Preliminary Wt :**	136.1844	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-09	18:14	12.9	72.8	136.1844	200 g = 200.0003	
2016-06-10	9:20	1.0	71.7	136.1845	200 g = 200.0001	

Date: ____________

Engineer Signature: ____________________________

300- App-B Data and Calculation Forms (page 80 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-09 **Engineer:** Claude Pelland **Run #:** 2 **Sample Train #:** 2A
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	31	**Tare:**	0.0839	**Preliminary Wt :**	0.1716	
Rear Filter #	32	**Tare:**	0.0839			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:00	0.2	71.6	0.1715	100mg= 0.1000 10g= 10.0000	
2016-06-14	8:59	0.9	72.3	0.1715	100mg= 0.1000 10g= 10.0001	
Probe #:	34	**Tare:**	108.4461	**Preliminary Wt :**	108.4476	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-10	9:21	1.0	71.7	108.4465	200 g = 200.0001	
2016-06-13	8:51	0.2	71.6	108.4466	200 g = 199.9998	

Date: ____________

Engineer Signature: ____________

300- App-B Data and Calculation Forms (page 81 of 92)

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-09 **Engineer:** Claude Pelland **Run #:** 2 **Sample Train #:** 2B
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	33	**Tare:**	0.0842	**Preliminary Wt :**	0.1719	
Rear Filter #	34	**Tare:**	0.0843			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:02	0.2	71.6	0.1718	100mg= 0.1000 10g= 10.0000	
2016-06-14	9:01	0.9	72.3	0.1717	100mg= 0.1000 10g= 10.0001	
Probe #:	35	**Tare:**	107.8569	**Preliminary Wt :**	107.8588	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-10	9:22	1.0	71.7	107.8581	200 g = 200.0001	
2016-06-13	8:52	0.2	71.6	107.8581	200 g = 199.9998	

Date: ______________

Engineer Signature: ______________________________

300- App-B Data and Calculation Forms (page 82 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)

Project #: G102163747 **Sample ID #:** QC20160608

Date: 2016-06-09 **Engineer:** Claude Pelland **Run #:** 2 **Sample Train #:** 2C

Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	35	**Tare:**	0.0848	**Preliminary Wt :**	0.1725	
Rear Filter #	36	**Tare:**	0.0838			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:04	0.2	71.6	0.1723	100mg= 0.1000 10g= 10.0000	
2016-06-14	9:02	0.9	72.3	0.1724	100mg= 0.1000 10g= 10.0001	
Probe #:	37	**Tare:**	108.3883	**Preliminary Wt :**	108.3893	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-10	9:23	1.0	71.7	108.3884	200 g = 200.0001	
2016-06-13	8:53	0.2	71.6	108.3885	200 g = 199.9998	

Date: ____________

Engineer Signature: ____________

300- App-B Data and Calculation Forms (page 83 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-10 **Engineer:** Claude Pelland **Run #:** 3 **Sample Train #:** 3A
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	17	**Tare:**	0.0862	**Preliminary Wt :**	0.1751	
Rear Filter #	18	**Tare:**	0.0863			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:06	0.2	71.6	0.1749	100mg= 0.1000 10g= 10.0000	
2016-06-14	9:04	0.9	72.3	0.1750	100mg= 0.1000 10g= 10.0001	
Probe #:	17	**Tare:**	139.7131	**Preliminary Wt :**	139.7131	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	8:31	0.2	71.6	139.7134	200 g = 199.9998	
2016-06-14	8:28	0.9	72.3	139.7133	200 g = 199.9998	

Date: ____________

Engineer Signature: ________________________

300- App-B Data and Calculation Forms (page 84 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-10 **Engineer:** Claude Pelland **Run #:** 3 **Sample Train #:** 3B
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	19	**Tare:**	0.0856	**Preliminary Wt :**	0.1739	
Rear Filter #	20	**Tare:**	0.0858			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:08	0.2	71.6	0.1740	100mg= 0.1000 10g= 10.0000	
2016-06-14	9:06	0.9	72.3	0.1741	100mg= 0.1000 10g= 10.0001	
Probe #:	18	**Tare:**	147.7227	**Preliminary Wt :**	147.7230	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	8:32	0.2	71.6	147.7229	200 g = 199.9998	
2016-06-14	8:29	0.9	72.3	147.7228	200 g = 199.9998	

Date: ____________

Engineer Signature: ______________________

300- App-B Data and Calculation Forms (page 85 of 92)

Intertek

SAMPLE WEIGHT DETERMINATION

Client: SBI **Model:** HE350 Series (FP-15)
Project #: G102163747 **Sample ID #:** QC20160608
Date: 2016-06-10 **Engineer:** Claude Pelland **Run #:** 3 **Sample Train #:** 3C
Balance Equipment #: SBI-206 **Thermo/Hygrometer Equipment #:** SBI-213

Front Filter #	21	**Tare:**	0.0857	**Preliminary Wt :**	0.1748	
Rear Filter #	22	**Tare:**	0.0857			
Seal Set #	N/A	**Tare:**	N/A	**Preliminary Wt :**	N/A	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	9:10	0.2	71.6	0.1747	100mg= 0.1000 10g= 10.0001	
2016-06-14	9:08	0.9	72.3	0.1746	100mg= 0.1000 10g= 10.0001	
Probe #:	19	**Tare:**	140.1281	**Preliminary Wt :**	140.1290	
Date/Time in dessicator :		May 27th, 2016 / 8:00				
Date	**Time**	**R/H %**	**Temp. (F)**	**Weight (grams)**	**Audit**	**Initials**
2016-06-13	8:33	0.2	71.6	140.1290	200 g = 199.9998	
2016-06-14	8:30	0.9	72.3	140.1290	200 g = 199.9998	

Date: ____________

Engineer Signature: ____________________________

300- App-B Data and Calculation Forms (page 86 of 92)

Calibration records

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Calibration

Date (YYYY-MM-DD)	Time (HH:MM)	Calibration weight ID	Calibration weight true mass	Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)
2016-05-31	15:20	SBI-237	0.100003244	0.0999	6.4	72.1
2016-05-31	15:21	SBI-238	10.0000725	10.0000	6.4	72.1
2016-05-31	15:21	SBI-238	200.001163	199.9997	6.4	72.1
2016-06-01	14:54	SBI-237	0.100003244	0.1000	5.9	72.7
2016-06-01	14:55	SBI-238	10.0000725	10.0000	5.9	72.7
2016-06-01	14:56	SBI-238	200.001163	199.9993	5.9	72.7
2016-06-02	14:49	SBI-237	0.100003244	0.1000	6.8	72.4
2016-06-02	14:50	SBI-238	10.0000725	10.0001	6.8	72.4
2016-06-02	14:51	SBI-238	200.001163	199.9995	6.8	72.4
2016-06-03	9:32	SBI-237	0.100003244	0.1000	8.5	74.0
2016-06-03	9:33	SBI-238	10.0000725	10.0000	8.5	74.0
2016-06-03	9:34	SBI-238	200.001163	199.9996	8.5	74.0
2016-06-08	15:24	SBI-237	0.100003244	0.1000	6.4	72.3
2016-06-08	15:25	SBI-238	10.0000725	10.0000	6.4	72.3
2016-06-08	15:26	SBI-238	200.001163	200.0004	6.4	72.3
2016-06-09	08:22	SBI-237	0.100003244	0.0999	12.9	72.8
2016-06-09	08:23	SBI-238	10.0000725	10.0001	12.9	72.8
2016-06-09	08:24	SBI-238	200.001163	200.0003	12.9	72.8
2016-06-10	0:03	SBI-237	0.100003244	0.1000	1.0	71.7
2016-06-10	0:04	SBI-238	10.0000725	10.0001	1.0	71.7
2016-06-10	0:05	SBI-238	200.001163	200.0001	1.0	71.7

300- App-B Data and Calculation Forms (page 87 of 92)

Filters weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)	Filter ID	Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-06-02	15:06	25	0.0842	6.8	72.4	N/A
2016-06-02	15:08	26	0.0842	6.8	72.4	N/A
2016-06-02	15:09	27	0.0834	6.8	72.4	N/A
2016-06-02	15:10	28	0.0838	6.8	72.4	N/A
2016-06-02	15:10	29	0.0840	6.8	72.4	N/A
2016-06-02	15:11	30	0.0837	6.8	72.4	N/A
2016-06-02	15:12	31	0.0839	6.8	72.4	N/A
2016-06-02	15:12	32	0.0839	6.8	72.4	N/A
2016-06-02	15:13	33	0.0842	6.8	72.4	N/A
2016-06-02	15:13	34	0.0843	6.8	72.4	N/A
2016-06-02	15:14	35	0.0848	6.8	72.4	N/A
2016-06-02	15:15	36	0.0838	6.8	72.4	N/A
2016-06-02	15:16	37	0.0845	6.8	72.4	N/A
2016-06-02	15:16	38	0.0837	6.8	72.4	N/A
2016-06-02	15:17	39	0.0831	6.8	72.4	N/A
2016-06-02	15:17	40	0.0843	6.8	72.4	N/A
2016-06-02	15:18	41	0.0830	6.8	72.4	N/A
2016-06-02	15:19	42	0.0836	6.8	72.4	N/A
2016-06-02	15:19	43	0.0842	6.8	72.4	N/A
2016-06-02	15:20	44	0.0840	6.8	72.4	N/A
2016-06-02	15:21	45	0.0844	6.8	72.4	N/A
2016-06-02	15:21	46	0.0848	6.8	72.4	N/A
2016-06-02	15:22	47	0.0848	6.8	72.4	N/A
2016-06-02	15:22	48	0.0845	6.8	72.4	N/A

300- App-B Data and Calculation Forms (page 88 of 92)

Filters weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)	Filter ID	Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-06-02	**15:06**	25	0.0842	8.5	74.0	1A
2016-06-02	15:08	26	0.0842	8.5	74.0	1A
2016-06-02	15:09	27	0.0834	8.5	74.0	1B
2016-06-02	15:10	28	0.0838	8.5	74.0	1B
2016-06-02	15:10	29	0.0840	8.5	74.0	1C
2016-06-02	15:11	30	0.0837	8.5	74.0	1C
2016-06-02	15:12	31	0.0839	8.5	74.0	2A
2016-06-02	15:12	32	0.0839	8.5	74.0	2A
2016-06-02	15:13	33	0.0842	8.5	74.0	2B
2016-06-02	15:13	34	0.0843	8.5	74.0	2B
2016-06-02	15:14	35	0.0848	8.5	74.0	2C
2016-06-02	15:15	36	0.0838	8.5	74.0	2C
2016-06-02	15:16	37	0.0845	8.5	74.0	N/A
2016-06-02	15:16	38	0.0837	8.5	74.0	N/A
2016-06-02	15:17	39	0.0831	8.5	74.0	N/A
2016-06-02	15:17	40	0.0843	8.5	74.0	N/A
2016-06-02	15:18	41	0.0830	8.5	74.0	N/A
2016-06-02	15:19	42	0.0836	8.5	74.0	N/A
2016-06-02	15:19	43	0.0842	8.5	74.0	N/A
2016-06-02	15:20	44	0.0840	8.5	74.0	N/A
2016-06-02	15:21	45	0.0844	8.5	74.0	N/A
2016-06-02	15:21	46	0.0848	8.5	74.0	N/A
2016-06-02	15:22	47	0.0848	8.5	74.0	N/A
2016-06-02	15:22	48	0.0845	8.5	74.0	N/A

300- App-B Data and Calculation Forms (page 89 of 92)

Filters weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)		Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-05-31	15:42	1	0.0852	6.4	72.1	N/A
2016-05-31	15:43	2	0.0857	6.4	72.1	N/A
2016-05-31	15:44	3	0.0856	6.4	72.1	N/A
2016-05-31	15:44	4	0.0860	6.4	72.1	N/A
2016-05-31	15:45	5	0.0853	6.4	72.1	N/A
2016-05-31	15:46	6	0.0859	6.4	72.1	N/A
2016-05-31	15:46	7	0.0851	6.4	72.1	N/A
2016-05-31	15:47	8	0.0846	6.4	72.1	N/A
2016-05-31	15:48	9	0.0858	6.4	72.1	N/A
2016-05-31	15:49	10	0.0835	6.4	72.1	N/A
2016-05-31	15:49	11	0.0850	6.4	72.1	N/A
2016-05-31	15:50	12	0.0848	6.4	72.1	N/A
2016-05-31	15:50	13	0.0851	6.4	72.1	N/A
2016-05-31	15:51	14	0.0848	6.4	72.1	N/A
2016-05-31	15:52	15	0.0850	6.4	72.1	N/A
2016-05-31	15:52	16	0.0856	6.4	72.1	N/A
2016-05-31	15:53	17	0.0862	6.4	72.1	N/A
2016-05-31	15:53	18	0.0864	6.4	72.1	N/A
2016-05-31	15:54	19	0.0855	6.4	72.1	N/A
2016-05-31	15:54	20	0.0858	6.4	72.1	N/A
2016-05-31	15:55	21	0.0857	6.4	72.1	N/A
2016-05-31	15:56	22	0.0857	6.4	72.1	N/A
2016-05-31	15:56	23	0.0840	6.4	72.1	N/A
2016-05-31	15:57	24	0.0841	6.4	72.1	N/A

300- App-B Data and Calculation Forms (page 90 of 92)

Filters weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)		Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-06-01	15:23	1	0.0851	5.9	72.7	N/A
2016-06-01	15:24	2	0.0857	5.9	72.7	N/A
2016-06-01	15:25	3	0.0856	5.9	72.7	N/A
2016-06-01	15:26	4	0.0861	5.9	72.7	N/A
2016-06-01	15:26	5	0.0853	5.9	72.7	N/A
2016-06-01	15:27	6	0.0858	5.9	72.7	N/A
2016-06-01	15:28	7	0.0850	5.9	72.7	N/A
2016-06-01	15:28	8	0.0845	5.9	72.7	N/A
2016-06-01	15:29	9	0.0858	5.9	72.7	N/A
2016-06-01	15:29	10	0.0835	5.9	72.7	N/A
2016-06-01	15:30	11	0.0850	5.9	72.7	N/A
2016-06-01	15:31	12	0.0848	5.9	72.7	N/A
2016-06-01	15:31	13	0.0851	5.9	72.7	N/A
2016-06-01	15:32	14	0.0848	5.9	72.7	N/A
2016-06-01	15:32	15	0.0849	5.9	72.7	N/A
2016-06-01	15:33	16	0.0855	5.9	72.7	N/A
2016-06-01	15:33	17	0.0862	5.9	72.7	3A
2016-06-01	15:34	18	0.0863	5.9	72.7	3A
2016-06-01	15:34	19	0.0856	5.9	72.7	3B
2016-06-01	15:35	20	0.0858	5.9	72.7	3B
2016-06-01	15:36	21	0.0857	5.9	72.7	3C
2016-06-01	15:36	22	0.0857	5.9	72.7	3C
2016-06-01	01:37	23	0.0839	5.9	72.7	N/A
2016-06-01	15:38	24	0.0843	5.9	72.7	N/A

300- App-B Data and Calculation Forms (page 91 of 92)

Probe weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)		Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-05-31	15:26	17	139.7113	6.4	72.1	N/A
2016-05-31	15:29	18	147.1246	6.4	72.1	N/A
2016-05-31	15:30	19	140.1275	6.4	72.1	N/A
2016-05-31	15:31	20	139.1366	6.4	72.1	N/A
2016-05-31	15:32	31	137.0215	6.4	72.1	N/A
2016-05-31	15:33	21	139.5482	6.4	72.1	N/A
2016-05-31	15:34	27	136.8190	6.4	72.1	N/A
2016-05-31	15:35	38	136.2319	6.4	72.1	N/A
2016-05-31	15:36	32	135.9698	6.4	72.1	N/A
2016-05-31	15:37	-	136.6445	6.4	72.1	N/A
2016-05-31	15:38	28	136.1844	6.4	72.1	N/A
2016-05-31	15:39	34	108.4486	6.4	72.1	N/A
2016-05-31	15:39	35	107.8573	6.4	72.1	N/A
2016-05-31	15:40	37	108.3886	6.4	72.1	N/A
2016-05-31	15:41	36	108.5195	6.4	72.1	N/A
2016-06-02	14:52	17	139.7113	6.8	72.4	N/A
2016-06-02	14:53	18	147.7246	6.8	72.4	N/A
2016-06-02	14:54	19	147.1273	6.8	72.4	N/A
2016-06-02	14:55	20	139.1364	6.8	72.4	N/A
2016-06-02	14:56	31	137.0211	6.8	72.4	N/A
2016-06-02	14:57	21	139.5479	6.8	72.4	N/A
2016-06-02	14:58	27	136.8187	6.8	72.4	N/A
2016-06-02	14:59	38	136.2318	6.8	72.4	N/A
2016-06-02	15:00	32	135.9696	6.8	72.4	N/A

300- App-B Data and Calculation Forms (page 92 of 92)

Probe weights

General information

Project:	HE 350 Series (G102163747)
Project Engineer:	Claude Pelland
Project Engineer Signature:	
Scale ID:	SBI-206

Date (YYYY-MM-DD)	Time (HH:MM)	Probe ID	Reading (g)	Relative Humidity (%)	Ambiant temperature (°F)	Run number
2016-06-02	15:01	-	136.6436	6.8	72.4	N/A
2016-06-02	15:02	28	136.1845	6.8	72.4	N/A
2016-06-02	15:03	34	108.4461	6.8	72.4	N/A
2016-06-02	15:04	35	107.8569	6.8	72.4	N/A
2016-06-02	15:05	37	108.3883	6.8	72.4	N/A
2016-06-02	15:06	36	108.5182	6.8	72.4	N/A
2016-06-03	09:38	-	136.6443	8.5	74	N/A
2016-06-03	09:39	34	108.4466	8.5	74	N/A
2016-06-03	09:40	36	108.5186	8.5	74	N/A
2016-06-08	15:32	17	139.7133	6.4	72.3	N/A
2016-06-08	15:33	18	147.7229	6.4	72.3	N/A
2016-06-08	15:34	19	140.1283	6.4	72.3	N/A
2016-06-09	08:27	17	139.7131	12.9	72.8	3A
2016-06-09	08:28	18	147.7227	12.9	72.8	3B
2016-06-09	08:29	19	140.1281	12.9	72.8	3C

400- App-C Calibration Documents

Appendix C

Calibration documents

400- App-C Calibration Documents (page 2 of 64)

Rapport d'étalonnage No. CA0003-509-040116

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, Ohio 43240
1-800-METTLER

METTLER TOLEDO

ISO 9001 Registered

ANSI/NCSL Z540-1 Accrédité

Accrédité par l'American Association for Laboratory Accreditation (A2LA)
CERT.CALIBRATION #1902.02

Certificat d'étalonnage

Client

Société :	SBI Fabricant De Poeles		
Adresse :	250 Rue de Copenhague		
Ville :	Saint-Augustin-De-Desmaures	*État/Province :*	Quebec
Code postal :	G3A 2H3	Astea Customer ID:	300276257

Instrument

Constructeur :	SARTORIUS	*Modèle de terminal :*	N/A
Modèle :	TE214S	*# série du terminal:*	N/A
No de série :	25851066	*# série de l'imprimant*	N/A
Capacité :	210 g		N/A
Résolution :	0,0001 g	*Nbre de Divisions:*	2100000
Classe :	I	*Procédure utilisée :*	NIST Handbook 44
No./ID d'inventaire:	SBI-206		

Procédure: Le présent certificat est émis conformément aux conditions de certification accordées par l'A2LA, en vertu de la norme ISO/IEC 17025. A2LA a évalué la capacité de mesure du laboratoire et la traçabilité des normes nationales reconnues.

Date de calibrage :	1-avr-2016	*Date, prochaine Cal.*	31-mars-2017
Signataire autorisé (A2LA) :	Dany Careau	*Signature:*	ELECTRONIC SIGNATURE

Étalons de travail

Retracabilité: Les poids de test utilisés se réfèrent au National Institute of Standards and Technology.

Jeu de poids no :	*Traçabilité NIST No.:*	*Classe ASTM/OIML*	*Date d'étalonnage :*	*Date proch. étalonnage*
0718	M15-050	M1	22-avr-2015	22-avr-2016
142	MT00997	F1	7-mai-2014	30-avr-2016
Q1	1415126	M1	1-juin-2015	1-juin-2016

Version Logiciel : 4.6.2.10

Page 1 sur 3

400- App-C Calibration Documents (page 3 of 64)

Rapport d'étalonnage No. CA0003-509-040116

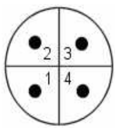
METTLER TOLEDO

Résultats de mesure

La température : 22 °C

Les conditions ambiantes ont été vérifiées afin d'assurer l'exactitude de l'étalonnage.

Test de variation



Poids Appliqués	Position	*Avant Réglage* Valeur lue
1: 50 g	*Position 1*	50,0001 g
2: 50 g	*Position 2*	50,0000 g
3: 50 g	*Position 3*	50,0001 g
4: 50 g	*Position 4*	50,0002 g
Erreur maximum :		0,0002 g
Max Erreur Admissible :		0,0003 g

Linéarité

	Avant réglage					
	Poids Appliqués	*Valeur lue*	*Erreur*		*Erreur admissible*	*Dans la Tolérance*
Zero 1,00	0,0000 g	0,0000 g	0,0000 g	0 d	1 d	OUI
2,00	0,1000 g	0,1000 g	0,0000 g	0 d	1 d	OUI
3,00	1,0000 g	0,9999 g	-0,0001 g	1 d	1 d	OUI
4,00	10,0000 g	9,9999 g	-0,0001 g	1 d	2 d	OUI
5,00	50,0000 g	50,0001 g	0,0001 g	1 d	3 d	OUI
6,00	100,0000 g	99,9999 g	-0,0001 g	1 d	3 d	OUI
7,00	150,0000 g	149,9998 g	-0,0002 g	2 d	3 d	OUI
Max 8,00	200,0000 g	200,0001 g	0,0001 g	1 d	3 d	OUI

☐ Méthode de substitution utilisée

Un réglage de la balance a été requis
Si non, les résultats "avant réglage" correspondent aux résultats tel que laissé.

☐ **OUI** ☑ **NON**

Version Logiciel : 4.6.2.10

Page 2 sur 3

400- App-C Calibration Documents (page 4 of 64)

Rapport d'étalonnage No. CA0003-509-040116

METTLER TOLEDO

Répétabilité

Poids appliqués : 10,0000 g

	Chargé	*Vide*	*Différence*
1	9,9999 g	0,0000 g	9,9999 g
2	10,0000 g	0,0000 g	10 g
3	9,9999 g	0,0000 g	9,9999 g
	Erreur maximale :	0,0001 g	1,0 d
	Tolérance :	0,0002 g	2 d

Incertitude

Mesure de l'incertitude = 0,00017 g

L'incertitude de mesure représente les incertitudes étendues selon un facteur de sécurité K=2 générant un niveau de confiance approximatif de 95 %. Des dispositions doivent être prises en matière d'environnement au lieu d'étalonnage, d'incertitude induite par l'article en étalonnage et d'effets indésirables causés par le transport du matériel d'étalonnage. Ces facteurs pourraient entraîner une incertitude plus grande que le CMC.

Remarques

Aucune.

Version Logiciel : 4.6.2.10

400- App-C Calibration Documents (page 5 of 64)

Ulrich Métrologie Inc.
Ulrich Metrology Inc.
9912, Côte-de-Liesse
Montréal (Québec) H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

ACCREDITATION ISO 17025

CALIBRATION CERTIFICATE

Certificate no.:	496310	**Calibration date:**	October 14, 2015
Identification:	SBI-213	**Certificate issued:**	October 14, 2015
Description:	THERMO-HYGROMETER, AMPROBE TH-3	**Interval:**	12 months
Manufacturer:	AMPROBE	**Due date:**	October 14, 2016
Model no.:	TH-3	**Procedure no.:**	MET/CAL
Serial no.:	101004044	**Environment:**	CLAS Type 2 Laboratory
		Temperature:	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	NFS

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens
David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

Notes:

EQUIPMENT RECEIVED OUT OF SPECIFICATIONS:

High humidity is out of tolerance @80% (reading of 75.1% instead of 77% minimum).
No adjustment. No support from manufacturer.

LIMITED CALIBRATION

226673 L

Page 1 of 1

400- App-C Calibration Documents (page 6 of 64)

Ulrich Métrologie inc.
Ulrich Metrology inc.
9912, Côte-de-Liesse
Motnréal (Québec) H8T 1A1

Tél. (514) 631-6663
Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

CALIBRATION DATA

Certificate no.: 496310
Identification: SBI-213
Description: THERMO-HYGROMETER
Serial no.: 101004044
Procedure: Amprobe TH-3: 2500ST-LT-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
1304953	HUMIDITY GENERATOR	THUNDER SCIENTIFIC	2500ST-LT	2015/06/19	2016/06/30

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	ACCEPTANCE LIMITS HIGH	PASS/ FAIL	TUR
TEMPERATURE CALIBRATION						
23°C						
23.01degC		23.30	22.21	23.81	PASS	
RELATIVE HUMIDITY CALIBRATION AT 23°C						
20% RH						
20.01%		19.00	17.01	23.01	PASS	
50% RH						
50.02%		48.40	47.02	53.02	PASS	
80% RH						
80.00%		75.10	77.00	83.00	FAIL	

End of Test Data

Calibration Data for Certificate No. 496310 Rtrslt01 Page 1 of 1

400- App-C Calibration Documents (page 7 of 64)

Rapport d'étalonnage No. CA0003-504-040116

METTLER TOLEDO

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, Ohio 43240
1-800-METTLER

ISO 9001 Registered

ANSI/NCSL Z540-1 Accrédité

Accrédité par l'American Association for Laboratory Accreditation (A2LA)
CERT.CALIBRATION #1902.02

Certificat d'étalonnage

Client

Société :	SBI Fabricant De Poeles		
Adresse :	250 Rue de Copenhague		
Ville :	Saint-Augustin-De-Desmaures	*État/Province :*	Quebec
Code postal :	G3A 2H3	Astea Customer ID:	300276257

Instrument

Constructeur :	Ohaus	*Modèle de terminal :*	N/A
Modèle :	FD15	*# série du terminal:*	N/A
No de série :	B144397174	*# série de l'imprimant*	N/A
Capacité :	15000 g		N/A
Résolution :	1 g	*Nbre de Divisions:*	15000
Classe :	III	*Procédure utilisée :*	NIST Handbook 44
No./ID d'inventaire:	SBI-222		

Procédure: Le présent certificat est émis conformément aux conditions de certification accordées par l'A2LA, en vertu de la norme ISO/IEC 17025. A2LA a évalué la capacité de mesure du laboratoire et la traçabilité des normes nationales reconnues.

Date de calibrage :	1-avr-2016	*Date, prochaine Cal.*	31-mars-2017
Signataire autorisé (A2LA) :	Dany Careau	*Signature:*	ELECTRONIC SIGNATURE

Étalons de travail

Retracabilité: Les poids de test utilisés se réfèrent au National Institute of Standards and Technology.

Jeu de poids no :	*Traçabilité NIST No.:*	*Classe ASTM/OIML*	*Date d'étalonnage :*	*Date proch. étalonnage*
0718	M15-050	M1	22-avr-2015	22-avr-2016
142	MT00997	F1	7-mai-2014	30-avr-2016
Q1	1415126	M1	1-juin-2015	1-juin-2016

Version Logiciel : 4.6.2.10

Page 1 sur 4

400- App-C Calibration Documents (page 8 of 64)

Rapport d'étalonnage No. CA0003-504-040116

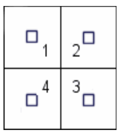
METTLER TOLEDO

Résultats de mesure

La température : 22 °C

Les conditions ambiantes ont été vérifiées afin d'assurer l'exactitude de l'étalonnage.

Test de variation



Poids Appliqués	Position	Avant Réglage Valeur lue
1: 5000 g	*Position 1*	5000 g
2: 5000 g	*Position 2*	5000 g
3: 5000 g	*Position 3*	5000 g
4: 5000 g	*Position 4*	5000 g
Erreur maximum :		0 g
Max Erreur Admissible :		5 g

Linéarité

	Avant réglage					
	Poids Appliqués	*Valeur lue*	*Erreur*		*Erreur admissible*	*Dans la Tolérance*
Zero 1,00	0 g	0 g	0 g	0 d	1 d	OUI
2,00	200 g	200 g	0 g	0 d	1 d	OUI
3,00	1000 g	1000 g	0 g	0 d	2 d	OUI
4,00	5000 g	5000 g	0 g	0 d	5 d	OUI
5,00	10000 g	10000 g	0 g	0 d	5 d	OUI
Max 6,00	15000 g	15000 g	0 g	0 d	5 d	OUI

☐ Méthode de substitution utilisée

Un réglage de la balance a été requis
Si non, les résultats "avant réglage" correspondent aux résultats tel que laissé.

☐ **OUI** ☑ **NON**

Version Logiciel : 4.6.2.10

Page 2 sur 4

400- App-C Calibration Documents (page 9 of 64)

Rapport d'étalonnage No. CA0003-504-040116

METTLER TOLEDO

Répétabilité

Poids appliqués : 5000 g

	Chargé	*Vide*	*Différence*
1	5000 g	0 g	5000 g
2	5000 g	0 g	5000 g
3	5000 g	0 g	5000 g
	Erreur maximale :	0 g	0,0 d
	Tolérance :	5 g	5 d

Incertitude

Mesure de l'incertitude = 0,60 g

L'incertitude de mesure représente les incertitudes étendues selon un facteur de sécurité K=2 générant un niveau de confiance approximatif de 95 %. Des dispositions doivent être prises en matière d'environnement au lieu d'étalonnage, d'incertitude induite par l'article en étalonnage et d'effets indésirables causés par le transport du matériel d'étalonnage. Ces facteurs pourraient entraîner une incertitude plus grande que le CMC.

Version Logiciel : 4.6.2.10

Page 3 sur 4

400- App-C Calibration Documents (page 10 of 64)

Rapport d'étalonnage No. CA0003-504-040116

METTLER TOLEDO

Certificat de Pesée Minimale

Incertitude de mesure élargie

U = Uo
Ur1 = 1 g

Exemple d'incertitudes élargies pour différentes valeurs de poids net :

Poids Net Affiché	*Incertitude de mesure élargie*	
15 g	1 g	4,00000 %
150 g	1 g	0,40000 %
1500 g	1 g	0,04000 %
7500 g	1 g	0,00800 %
15000 g	1 g	0,00400 %

Explication sur le tableau de pesée minimale

Les valeurs du poids net affiché indiquées dans le tableau suivant sont les valeurs des pesées minimales. Pour ces valeurs, l'incertitude élargie de mesure, multipliée par un Facteur de Sécurité (1, 2, 3 ou 5) est inférieure ou égale à l'Erreur Relative R

Tableau des Pesées Minimales pour différentes Erreurs Relatives et différents Facteurs de Sécurité

	Facteur de Sécurité FS			
Erreur Relative Requise	*1x FS = 1*	*2x FS = 2*	*3x FS = 3*	*5x FS = 5*
0.1 %	600 g	1200 g	1800 g	3000 g
0.2 %	300 g	600 g	900 g	1500 g
0.5 %	120 g	240 g	360 g	600 g
1 %	60 g	120 g	180 g	300 g
2 %	30 g	60 g	90 g	150 g
5 %	12 g	24 g	36 g	60 g

Remarques sur les valeurs de pesée minimale du tableau ci-dessus :

1. "N/A" est indiqué dans le tableau quand aucune valeur appropriée n'a pu être calculée.
2. Pour les instrument à étendues et échelons multiples, les valeurs indiquées dans le tableau ci-dessus s'appliquent à la plus petite étendue de mesure.
3. METTLER TOLEDO ne peut être tenu pour responsable du choix retenu concernant la sélection de l'Erreur Relative Requise ou du Facteur de Sécurité.
4. Le client veille à ce que les paramètres de réglage restent identiques à ceux utilisés pour l'établissement de ce Constat de Vérification Standard.
5. Le client veille à ce que l'environnement demeure identique aux conditions de travail retenues pour l'établissement de ce Constat de Vérification Standard.

Remarques

Aucune.

Version Logiciel : 4.6.2.10

Page 4 sur 4

400- App-C Calibration Documents (page 11 of 64)

MICRO PRECISION CALIBRATION INC.

MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

ilac-MRA A2LA ACCREDITED Calibration Laboratory CERT # 935.01

Certificate of Calibration

Date: Jun 10, 2015 **Cert No. 222008122545130**

Customer:
STOVE BUILDERS INTERNATIONAL INC.
PORTES 11-12
250 DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC G3A 2H3

		Work Order #:	SAC-70072244
		Purchase Order #:	44831
MPC Control #:	DA0649	Serial Number:	160S-24A20W
Asset ID:	SBI-239	Department:	N/A
Gage Type:	PITOT STATIC TUBE	Performed By:	BARRY MORRIS
Manufacturer:	DWYER INSTRUMENTS, INC.	Received Condition:	IN TOLERANCE
Model Number:	160S-24	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	June 09, 2015
Temp/RH:	69°F / 41 %	Cal. Interval:	12 MONTHS
		Cal. Due Date:	June 09, 2016

Calibration Notes:

Test Points

Seq.	Description	Standard	Tolerance -	Tolerance +	As Found	As Left	UOM	Result	Uncertainty
1	Tested At:	0.100	0.090	0.110	0.100	0.100	in/H20	Passed	0.003
2	Tested At:	0.200	0.190	0.210	0.200	0.200	in/H20	Passed	0.003
3	Tested At:	0.300	0.290	0.310	0.300	0.300	in/H20	Passed	0.003
4	Tested At:	0.400	0.390	0.410	0.400	0.400	in/H20	Passed	0.003

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
AW3587	TIMER	N/A	N/A	SPORTLINE	Jun 4, 2016	222008122539739
AW4419	MULTI-FUNCTION PRESSURE INDICATOR	DPI 145	14501283	DRUCK	Nov 19, 2015	2008120226860

Procedures Used in this Event

Procedure Name	Description
MPC-00062	Pressure and Vacuum

Calibrating Technician: Barry Morris — BARRY MORRIS

QC Approval: B Gold — Brian Gold

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO 17025:2005, ANSI/NCSL Z540-1, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.

Page 1 of 1 (CERT, Rev 3)

400- App-C Calibration Documents (page 12 of 64)

MICRO PRECISION CALIBRATION INC.

MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

ilac-MRA A2LA ACCREDITED Calibration Laboratory CERT # 935.01

Certificate of Calibration

Date: Jun 11, 2015 **Cert No. 222008122546708**

Customer:
STOVE BUILDERS INTERNATIONAL INC.
PORTES 11-12
250 DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC G3A 2H3

		Work Order #:	SAC-70072244
		Purchase Order #:	44831
MPC Control #:	DA0650	Serial Number:	16425450039
Asset ID:	SBI-241	Department:	N/A
Gage Type:	DIGITAL VANE/HOT-WIRE ANEMOMETER	Performed By:	BARRY MORRIS
Manufacturer:	TPI, INC.	Received Condition:	IN TOLERANCE
Model Number:	575	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	June 09, 2015
Temp/RH:	69°F / 41 %	Cal. Interval:	12 MONTHS
		Cal. Due Date:	June 09, 2016

Calibration Notes:

Test Points

Seq.	Description	Standard	Tolerance -	Tolerance +	As Found	As Left	UOM	Result	Uncertainty
1	Velocity (Vane)	200	193	207	199	199	ft/min	Passed	0.07
2	Vane:	400	389	411	402	402	ft/min	Passed	0.13
3	Vane:	600	585	615	604	604	ft/min	Passed	0.2
4	Vane	800	781	819	804	804	ft/min	Passed	0.26
5	Velocity (Hot Wire)	200	187	213	203	203	ft/min	Passed	0.07
6	Hot Wire:	400	377	423	405	405	ft/min	Passed	0.13
7	Hot Wire:	600	567	633	608	608	ft/min	Passed	0.2
8	Hot Wire:	800	757	843	807	807	ft/min	Passed	0.26
9	Temperature:	68.00	66.30	69.70	68.00	68.00	Deg F	Passed	0.01
10	Temperature:	100.00	98.00	102.00	100.20	100.20	Deg F	Passed	0.01

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CJ5100	WIND TUNNEL WITH CONTROLLER	JS-500	375/305	INTERACTIVE	Nov 21, 2015	222008122317577

Calibrating Technician: Barry Morris — BARRY MORRIS

QC Approval: B Gold — Brian Gold

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO 17025:2005, ANSI/NCSL Z540-1, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.

Page 1 of 2 (CERT, Rev 3)

400- App-C Calibration Documents (page 13 of 64)

MICRO PRECISION CALIBRATION INC.

MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

ilac-MRA | ACCREDITED
Calibration Laboratory
CERT # 935.01

Certificate of Calibration

Date: Jun 11, 2015 **Cert No. 222008122546708**

				INSTRUMENTS		
AE2821	ANEMOMETER	AM-4822	N272316	LANDTEK	Nov 12, 2015	220081202197887
AV5000	ENVIRONMENTAL CHAMBER	BTX-475	0612421	ESPEC	Dec 15, 2015	222008122342880
CL7456	STANDARD PLATINUM RESISTANCE THERMOMETER PROBE	5681	1595	FLUKE	Dec 4, 2015	A7B16006

Procedures Used in this Event

Procedure Name	Description
MPC-00132	Anemometers Calibration Procedure

Calibrating Technician: Barry Morris

BARRY MORRIS

QC Approval: B Gold

Brian Gold

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO 17025:2005, ANSI/NCSL Z540-1, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

400- App-C Calibration Documents (page 14 of 64)

Report of Calibration

As Found

ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A **Page 1 of 4**

UUT

Made by:	Dwyer
Model:	MS-121-LCD
Serial No.:	E52U0100523
ID No.:	SBI-250
Description:	Digital Pressure Gauge

Calibration

Report No.:	AC15081457-E52U0100523
Adjusted:	No
Condition:	Out of Tolerance
Calibration Date:	3-Sep-2015

Customer

STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

Environment

Temperature:	25.3°C
Humidity:	58%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

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STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Low Pressure Calibrator	Ruska 7250LP	PRE-CAL-06	1500171325/15000171326	1-Oct-2015
Multimeter	Fluke 8845A	ELC-MTR-04	AC14121527-9366020	16-Jan-2016

REMARKS:

Calibrated in vertical position.

Performed by: Ben Lemelin

Reviewed by: Anthony Morra

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

Alpha Controls & Instrumentation Inc., Suite 6, 361 Steelcase Road West, Markham, Ontario L3R 3V8 www.alphacontrols.com (800) 567-8686

Form: ROC101 Rev 8 *data: MMC*

400- App-C Calibration Documents (page 15 of 64)

Report of Calibration
As Found

ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A — **Page 2 of 4**

UUT		***Calibration***	
Made by:	Dwyer	Report No.:	AC15081457-E52U0100523
Model:	MS-121-LCD	Adjusted:	No
Serial No.:	E52U0100523	Condition:	Out of Tolerance
ID No.:	SBI-250	Calibration Date:	3-Sep-2015
Description:	Digital Pressure Gauge		

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Range: 0 to 0.1 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		-0.0076					
Output @ 0.0000 inH2O, mA		3.497					
0.000 inH2O	0.0000	-0.0031	-0.0031	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0176					
Output @ 0.025 inH2O, mA		6.831					
0.025 inH2O	0.0250	0.0183	-0.0067	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0430					
Output @ 0.050 inH2O, mA		10.934					
0.050 inH2O	0.0500	0.0433	-0.0067	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0684					
Output @ 0.075 inH2O, mA		14.954					
0.075 inH2O	0.0750	0.0685	-0.0065	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0938					
Output @ 0.100 inH2O, mA		19.018					
0.100 inH2O	0.1000	0.0939	-0.0061	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0688					
Output @ 0.075 inH2O, mA		15.027					
0.075 inH2O	0.0750	0.0689	-0.0061	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0439					
Output @ 0.050 inH2O, mA		11.003					
0.050 inH2O	0.0500	0.0438	-0.0062	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0186					
Output @ 0.025 inH2O, mA		6.986					
0.025 inH2O	0.0250	0.0187	-0.0063	±0.0020	inH2O	Fail	1.5e-04
Display Reading		0.0063					
Output @ 0.0000 inH2O, mA		3.497					
0.000 inH2O	0.0000	-0.0031	-0.0031	±0.0020	inH2O	Fail	1.5e-04
Range: 0 to 0.25 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		-0.0063					
Output @ 0.0000 inH2O, mA		3.582					
0.0000 inH2O	0.0000	-0.0000	0.0000	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0562					
Output @ 0.0625 inH2O, mA		7.613					
0.0625 inH2O	0.0625	0.0565	-0.0060	±0.0025	inH2O	Fail	1.5e-04
Display Reading		0.1182					
Output @ 0.1250 inH2O, mA		11.595					
0.1250 inH2O	0.1250	0.1187	-0.0063	±0.0025	inH2O	Fail	1.5e-04

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400- App-C Calibration Documents (page 16 of 64)

Report of Calibration
As Found

ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520Ip 8845A: Rev.1.0.A — **Page 3 of 4**

UUT		**Calibration**	
Made by:	Dwyer	Report No.:	AC15081457-E52U0100523
Model:	MS-121-LCD	Adjusted:	No
Serial No.:	E52U0100523	Condition:	Out of Tolerance
ID No.:	SBI-250	Calibration Date:	3-Sep-2015
Description:	Digital Pressure Gauge		

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.1824					
Output @ 0.1875 inH2O, mA		15.648					
0.1875 inH2O	0.1875	0.1820	-0.0055	±0.0025	inH2O	Fail	1.5e-04
Display Reading		0.2456					
Output @ 0.2500 inH2O, mA		19.714					
0.2500 inH2O	0.2500	0.2455	-0.0045	±0.0025	inH2O	Fail	1.5e-04
Display Reading		0.1829					
Output @ 0.1875 inH2O, mA		15.699					
0.1875 inH2O	0.1875	0.1828	-0.0047	±0.0025	inH2O	Fail	1.5e-04
Display Reading		0.1196					
Output @ 0.1250 inH2O, mA		11.681					
0.1250 inH2O	0.1250	0.1200	-0.0050	±0.0025	inH2O	Fail	1.5e-04
Display Reading		0.0566					
Output @ 0.0625 inH2O, mA		7.665					
0.0625 inH2O	0.0625	0.0573	-0.0052	±0.0025	inH2O	Fail	1.5e-04
Display Reading		-0.0056					
Output @ 0.0000 inH2O, mA		3.651					
0.0000 inH2O	0.0000	-0.0055	-0.0055	±0.0025	inH2O	Fail	1.5e-04

Range: 0 to 0.5 inH2O
Output signal: 4 to 20 mA
PRESSURE TEST

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		-0.0056					
Output @ 0.0000 inH2O, mA		3.822					
0.0000 inH2O	0.0000	-0.0056	-0.0056	±0.0050	inH2O	Fail	1.5e-04
Display Reading		0.1184					
Output @ 0.1250 inH2O, mA		7.822					
0.1250 inH2O	0.1250	0.1194	-0.0056	±0.0050	inH2O	Fail	1.5e-04
Display Reading		0.2446					
Output @ 0.2500 inH2O, mA		11.855					
0.2500 inH2O	0.2500	0.2455	-0.0045	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.3721					
Output @ 0.3750 inH2O, mA		15.942					
0.3750 inH2O	0.3750	0.3732	-0.0018	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.4995					
Output @ 0.5000 inH2O, mA		20.028					
0.5000 inH2O	0.5000	0.5009	0.0009	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.3752					
Output @ 0.3750 inH2O, mA		16.028					
0.3750 inH2O	0.3750	0.3759	0.0009	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.2485					
Output @ 0.2500 inH2O, mA		11.975					
0.2500 inH2O	0.2500	0.2492	-0.0008	±0.0050	inH2O	Pass	1.5e-04

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

Alpha Controls & Instrumentation Inc., Suite 6, 361 Steelcase Road West, Markham, Ontario L3R 3V8 www.alphacontrols.com (800) 567-8686

Form: ROC101 Rev 8 data: MMC

400- App-C Calibration Documents (page 17 of 64)

alpha CONTROLS & INSTRUMENTATION

Report of Calibration
As Found

ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A **Page 4 of 4**

UUT
Made by: Dwyer
Model: MS-121-LCD
Serial No.: E52U0100523
ID No.: SBI-250
Description: Digital Pressure Gauge

Calibration
Report No.: AC15081457-E52U0100523
Adjusted: No
Condition: Out of Tolerance
Calibration Date: 3-Sep-2015

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.1213					
Output @ 0.1250 inH2O, mA		7.908					
0.1250 inH2O	0.1250	0.1221	-0.0029	±0.0050	inH2O	Pass	1.5e-04
Display Reading		-0.0034					
Output @ 0.0000 inH2O, mA		3.891					
0.000 inH2O	0.0000	-0.0034	-0.0034	±0.0050	inH2O	Pass	1.5e-04

END OF REPORT

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

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Form: ROC101 Rev 8 *data: MMC*

400- App-C Calibration Documents (page 18 of 64)

alpha CONTROLS & INSTRUMENTATION

Report of Calibration

As Left

ilac-MRA ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A **Page 1 of 4**

UUT

Made by: Dwyer
Model: MS-121-LCD
Serial No.: E52U0100523
ID No.: SBI-250
Description: Digital Pressure Gauge

Calibration

Report No.: AC15081457-E52U0100523
Adjusted: Yes
Condition: In Tolerance
Calibration Date: 3-Sep-2015
Calibration Due: 3-Sep-2016

Customer

STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

Environment

Temperature: 25.9ºC
Humidity: 56%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

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Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This report shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Low Pressure Calibrator	Ruska 7250LP	PRE-CAL-06	1500171325/15000171326	1-Oct-2015
Multimeter	Fluke 8845A	ELC-MTR-04	AC14121527-9366020	16-Jan-2016

REMARKS:

Adjusted trim pots.

Calibrated in vertical position.

Performed by: Ben Lemelin

Reviewed by: Anthony Morra

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

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Form: ROC101 Rev 8 *data: MMC*

400- App-C Calibration Documents (page 19 of 64)

Report of Calibration
As Left

CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A

Page 2 of 4

UUT
Made by: Dwyer
Model: MS-121-LCD
Serial No.: E52U0100523
ID No.: SBI-250
Description: Digital Pressure Gauge

Calibration
Report No.: AC15081457-E52U0100523
Adjusted: Yes
Condition: In Tolerance
Calibration Date: 3-Sep-2015
Calibration Due: 3-Sep-2016

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Range: 0 to 0.1 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		0.0005					
Output @ 0.0000 inH2O, mA		4.08					
0.000 inH2O	0.0000	0.0005	0.0005	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0251					
Output @ 0.025 inH2O, mA		8.030					
0.025 inH2O	0.0250	0.0252	0.0002	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0503					
Output @ 0.050 inH2O, mA		12.099					
0.050 inH2O	0.0500	0.0506	0.0006	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0757					
Output @ 0.075 inH2O, mA		16.135					
0.075 inH2O	0.0750	0.0758	0.0008	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0994					
Output @ 0.100 inH2O, mA		20.048					
0.100 inH2O	0.1000	0.1003	0.0003	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0754					
Output @ 0.075 inH2O, mA		16.029					
0.075 inH2O	0.0750	0.0752	0.0002	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0503					
Output @ 0.050 inH2O, mA		12.063					
0.050 inH2O	0.0500	0.0504	0.0004	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0254					
Output @ 0.025 inH2O, mA		8.03					
0.025 inH2O	0.0250	0.0252	0.0002	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0005					
Output @ 0.0000 inH2O, mA		4.08					
0.000 inH2O	0.0000	0.0005	0.0005	±0.0020	inH2O	Pass	1.5e-04
Range: 0 to 0.25 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		0.0005					
Output @ 0.0000 inH2O, mA		4.028					
0.0000 inH2O	0.0000	0.0004	0.0004	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0623					
Output @ 0.0625 inH2O, mA		7.996					
0.0625 inH2O	0.0625	0.0624	-0.0001	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1233					
Output @ 0.1250 inH2O, mA		11.907					
0.1250 inH2O	0.1250	0.1235	-0.0015	±0.0025	inH2O	Pass	1.5e-04

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

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Form: ROC101 Rev 8 data: MMC

400- App-C Calibration Documents (page 20 of 64)

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Report of Calibration
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CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A **Page 3 of 4**

UUT		Calibration	
Made by:	Dwyer	Report No.:	AC15081457-E52U0100523
Model:	MS-121-LCD	Adjusted:	Yes
Serial No.:	E52U0100523	Condition:	In Tolerance
ID No.:	SBI-250	Calibration Date:	3-Sep-2015
Description:	Digital Pressure Gauge	Calibration Due:	3-Sep-2016

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.1853					
Output @ 0.1875 inH2O, mA		15.874					
0.1875 inH2O	0.1875	0.1855	-0.0020	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.2476					
Output @ 0.2500 inH2O, mA		19.873					
0.2500 inH2O	0.2500	0.2480	-0.0020	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1853					
Output @ 0.1875 inH2O, mA		15.892					
0.1875 inH2O	0.1875	0.1858	-0.0017	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1243					
Output @ 0.1250 inH2O, mA		11.958					
0.1250 inH2O	0.1250	0.1243	-0.0007	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0627					
Output @ 0.0625 inH2O, mA		8.065					
0.0625 inH2O	0.0625	0.0635	0.0010	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0007					
Output @ 0.0000 inH2O, mA		4.046					
0.0000 inH2O	0.0000	0.0007	0.0007	±0.0025	inH2O	Pass	1.5e-04

Range: 0 to 0.5 inH2O
Output signal: 4 to 20 mA
PRESSURE TEST

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.0005					
Output @ 0.0000 inH2O, mA		4.011					
0.0000 inH2O	0.0000	0.0003	0.0003	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.1233					
Output @ 0.1250 inH2O, mA		7.960					
0.1250 inH2O	0.1250	0.1238	-0.0012	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.2468					
Output @ 0.2500 inH2O, mA		11.924					
0.2500 inH2O	0.2500	0.2476	-0.0024	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.3735					
Output @ 0.3750 inH2O, mA		15.978					
0.3750 inH2O	0.3750	0.3743	-0.0007	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.4995					
Output @ 0.5000 inH2O, mA		20.031					
0.5000 inH2O	0.5000	0.5010	0.0010	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.3752					
Output @ 0.3750 inH2O, mA		16.029					
0.3750 inH2O	0.3750	0.3759	0.0009	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.2488					
Output @ 0.2500 inH2O, mA		11.958					
0.2500 inH2O	0.2500	0.2487	-0.0013	±0.0050	inH2O	Pass	1.5e-04

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400- App-C Calibration Documents (page 21 of 64)

Report of Calibration
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CALIBRATION
CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25;0.5 inH2O/7520lp 8845A: Rev.1.0.A **Page 4 of 4**

UUT		***Calibration***	
Made by:	Dwyer	Report No.:	AC15081457-E52U0100523
Model:	MS-121-LCD	Adjusted:	Yes
Serial No.:	E52U0100523	Condition:	In Tolerance
ID No.:	SBI-250	Calibration Date:	3-Sep-2015
Description:	Digital Pressure Gauge	Calibration Due:	3-Sep-2016

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.1252					
Output @ 0.1250 inH2O, mA		8.012					
0.1250 inH2O	0.1250	0.1254	0.0004	±0.0050	inH2O	Pass	1.5e-04
Display Reading		0.0010					
Output @ 0.0000 inH2O, mA		4.028					
0.000 inH2O	0.0000	0.0009	0.0009	±0.0050	inH2O	Pass	1.5e-04

END OF REPORT

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Report of Calibration

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ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25 inH2O/7520lp 8845A: Rev.1.0.A **Page 1 of 3**

UUT		**Calibration**	
Made by:	Dwyer	Report No.:	AC16031301-E51U01003612
Model:	MS-121-LCD	Adjusted:	No
Serial No.:	E51U01003612	Condition:	In Tolerance
ID No.:	SBI-253	Calibration Date:	18-Mar-2016
Description:	Digital Pressure Gauge	Calibration Due:	18-Mar-2017

Customer
STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

Environment
Temperature: 20.9°C
Humidity: 29%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

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STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Low Pressure Calibrator	Ruska 7250LP	PRE-CAL-06	1500188474/1500188475	29-Sep-2016
Multimeter	Fluke 8845A	ELC-MTR-04	AC15121397-9366020	13-Jan-2017

REMARKS:

Calibrated in vertical position.

Performed by: Tony Wheaton
Tony Wheaton

Reviewed by:
Slava Peciurov

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Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25 inH2O/7520lp 8845A: Rev.1.0.A **Page 2 of 3**

UUT		***Calibration***	
Made by:	Dwyer	Report No.:	AC16031301-E51U01003612
Model:	MS-121-LCD	Adjusted:	No
Serial No.:	E51U01003612	Condition:	In Tolerance
ID No.:	SBI-253	Calibration Date:	18-Mar-2016
Description:	Digital Pressure Gauge	Calibration Due:	18-Mar-2017

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Range: 0 to 0.1 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		0.0000					
Output @ 0.0000 inH2O, mA		3.998					
0.000 inH2O	0.0000	0.0000	0.0000	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0244					
Output @ 0.025 inH2O, mA		7.894					
0.025 inH2O	0.0250	0.0243	-0.0007	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0488					
Output @ 0.050 inH2O, mA		11.803					
0.050 inH2O	0.0500	0.0488	-0.0012	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0737					
Output @ 0.075 inH2O, mA		15.802					
0.075 inH2O	0.0750	0.0738	-0.0012	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0991					
Output @ 0.100 inH2O, mA		19.905					
0.100 inH2O	0.1000	0.0994	-0.0006	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0735					
Output @ 0.075 inH2O, mA		15.755					
0.075 inH2O	0.0750	0.0735	-0.0015	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0491					
Output @ 0.050 inH2O, mA		11.891					
0.050 inH2O	0.0500	0.0493	-0.0007	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0247					
Output @ 0.025 inH2O, mA		7.947					
0.025 inH2O	0.0250	0.0247	-0.0003	±0.0020	inH2O	Pass	1.5e-04
Display Reading		0.0000					
Output @ 0.0000 inH2O, mA		3.999					
0.000 inH2O	0.0000	0.0000	0.0000	±0.0020	inH2O	Pass	1.5e-04
Range: 0 to 0.25 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading		0.0002					
Output @ 0.0000 inH2O, mA		3.999					
0.0000 inH2O	0.0000	0.0000	0.0000	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0620					
Output @ 0.0625 inH2O, mA		7.964					
0.0625 inH2O	0.0625	0.0619	-0.0006	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1243					
Output @ 0.1250 inH2O, mA		11.942					
0.1250 inH2O	0.1250	0.1241	-0.0009	±0.0025	inH2O	Pass	1.5e-04

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400- App-C Calibration Documents (page 24 of 64)

Report of Calibration
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ACCREDITED CALIBRATION CERT #2260.01

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.25 inH2O/7520lp 8845A: Rev.1.0.A **Page 3 of 3**

UUT		***Calibration***	
Made by:	Dwyer	Report No.:	AC16031301-E51U01003612
Model:	MS-121-LCD	Adjusted:	No
Serial No.:	E51U01003612	Condition:	In Tolerance
ID No.:	SBI-253	Calibration Date:	18-Mar-2016
Description:	Digital Pressure Gauge	Calibration Due:	18-Mar-2017

Test Description	STD	UUT	Error	Tolerance	Units	P/F	Uncertainty
Display Reading		0.1860					
Output @ 0.1875 inH2O, mA		15.906					
0.1875 inH2O	0.1875	0.1860	-0.0015	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.2490					
Output @ 0.2500 inH2O, mA		19.940					
0.2500 inH2O	0.2500	0.2491	-0.0009	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1868					
Output @ 0.1875 inH2O, mA		15.959					
0.1875 inH2O	0.1875	0.1869	-0.0006	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.1245					
Output @ 0.1250 inH2O, mA		11.960					
0.1250 inH2O	0.1250	0.1244	-0.0006	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0618					
Output @ 0.0625 inH2O, mA		7.943					
0.0625 inH2O	0.0625	0.0616	-0.0009	±0.0025	inH2O	Pass	1.5e-04
Display Reading		0.0000					
Output @ 0.0000 inH2O, mA		3.998					
0.0000 inH2O	0.0000	0.0000	0.0000	±0.0025	inH2O	Pass	1.5e-04

END OF REPORT

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Form: ROC101 Rev 8 data: MMC

400- App-C Calibration Documents (page 25 of 64)

400- App-C Calibration Documents (page 26 of 64)

Report of Calibration
As Found

CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 1 of 2**

UUT

Made by:	Aalborg
Model:	GFC37
Serial No.:	251111-5
ID No.:	SBI-259
Description:	Mass Flow Controller

Calibration

Report No.:	AC15081457-251111-5
Adjusted:	No
Condition:	Out of Tolerance
Calibration Date:	3-Sep-2015

Customer

STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

Environment

Temperature:	25.7ºC
Humidity:	58%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

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STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Molbloc-L Laminar Element	Fluke 3E4	FLOW-3E4-01	1500183748	26-Jun-2016
Molbloc-L Laminar Element	Fluke 3E4	FLOW-3E4-02	1500183749	27-Jun-2016
Process Calibrator	Fluke 744	ELC-CAL-02	AC14101571-8223003	10-Nov-2015
Multimeter	Fluke 87 V	ELC-MTR-05	AC15031661-96010221	25-Mar-2016
Mass Flow Terminal	Fluke Molbox1+	FLOW-CAL-01	1500183843	30-Jun-2016

REMARKS:

LCD readings: 0.0, 5.1, 10.0, 15.1, 20.0

Cleaned filter.

Performed by: Slava Peciurov

Reviewed by: Anthony Morra

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data: C4P

Form: ROC101 Rev 8

400- App-C Calibration Documents (page 27 of 64)

Report of Calibration
As Found

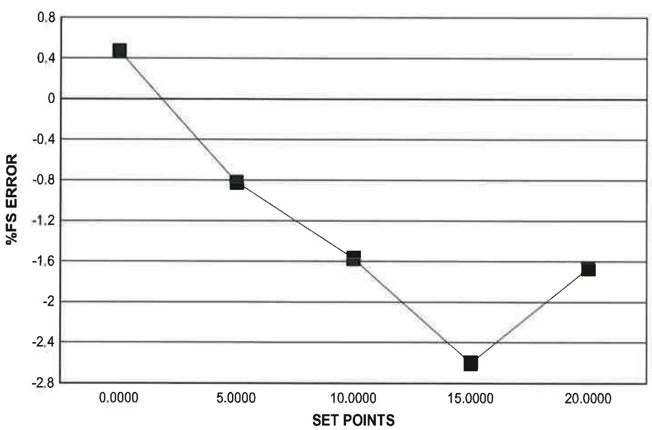
CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 2 of 2**

UUT
Made by: Aalborg
Model: GFC37
Serial No.: 251111-5
ID No.: SBI-259
Description: Mass Flow Controller

Calibration
Report No.: AC15081457-251111-5
Adjusted: No
Condition: Out of Tolerance
Calibration Date: 3-Sep-2015

Test Description	Output	STD	UUT	Error (%FS)	Tolerance (%FS)	Units	P/F
0.0000	0.024V	0.0023	0.10	0.47	±1.00	slm@70.0F	Pass
5.0000	1.269V	5.2406	5.08	-0.82	±1.00	slm@70.0F	Pass
10.0000	2.522V	10.4025	10.09	-1.57	±1.00	slm@70.0F	Fail
15.0000	3.775V	15.6205	15.10	-2.60	±1.00	slm@70.0F	Fail
20.0000	5.030V	20.4539	20.12	-1.67	±1.00	slm@70.0F	Fail



Calibration Gas: N2
Standard Pressure Conditions: 1 atm
Standard Temperature Conditions: see Units
Estimated Measurement Uncertainty: +/-0.3% rdg

END OF REPORT

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Form: ROC101 Rev 8 data: C4P

400- App-C Calibration Documents (page 28 of 64)

Report of Calibration

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ACCREDITED CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 1 of 2**

UUT		***Calibration***	
Made by:	Aalborg	Report No.:	AC15081457-251111-5
Model:	GFC37	Adjusted:	Yes
Serial No.:	251111-5	Condition:	In Tolerance
ID No.:	SBI-259	Calibration Date:	3-Sep-2015
Description:	Mass Flow Controller	Calibration Due:	3-Sep-2016
Customer	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUSTIN-DE-DESMAURES, QC G3A 2H3	***Environment*** Temperature: Humidity:	 26.1ºC 53%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

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STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Molbloc-L Laminar Element	Fluke 3E4	FLOW-3E4-01	1500183748	26-Jun-2016
Molbloc-L Laminar Element	Fluke 3E4	FLOW-3E4-02	1500183749	27-Jun-2016
Process Calibrator	Fluke 744	ELC-CAL-02	AC14101571-8223003	10-Nov-2015
Multimeter	Fluke 87 V	ELC-MTR-05	AC15031661-96010221	25-Mar-2016
Mass Flow Terminal	Fluke Molbox1+	FLOW-CAL-01	1500183843	30-Jun-2016

REMARKS:

LCD readings: 0.0, 5.1, 10.0, 15.1, 20.0

Adjusted trim pots.

Performed by: Slava Peciurov

Reviewed by: Anthony Morra

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400- App-C Calibration Documents (page 29 of 64)

Report of Calibration
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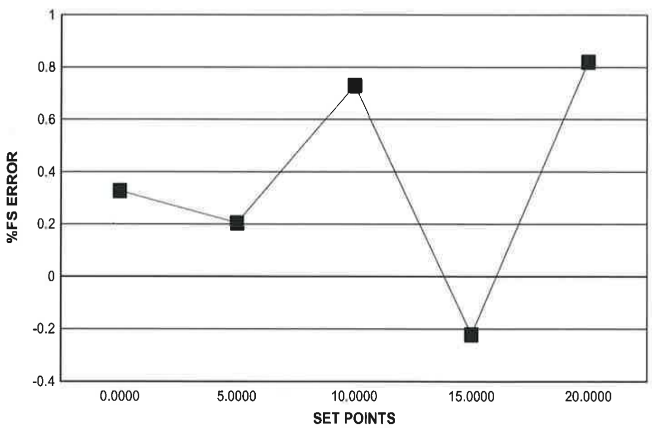
ACCREDITED CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 2 of 2**

UUT
Made by: Aalborg
Model: GFC37
Serial No.: 251111-5
ID No.: SBI-259
Description: Mass Flow Controller

Calibration
Report No.: AC15081457-251111-5
Adjusted: Yes
Condition: In Tolerance
Calibration Date: 3-Sep-2015
Calibration Due: 3-Sep-2016

Test Description	Output	STD	UUT	Error (%FS)	Tolerance (%FS)	Units	P/F
0.0000	0.017V	0.0025	0.07	0.33	±1.00	slm@70.0F	Pass
5.0000	1.271V	5.0431	5.08	0.20	±1.00	slm@70.0F	Pass
10.0000	2.524V	9.9500	10.10	0.73	±1.00	slm@70.0F	Pass
15.0000	3.775V	15.1443	15.10	-0.22	±1.00	slm@70.0F	Pass
20.0000	5.027V	19.9439	20.11	0.82	±1.00	slm@70.0F	Pass



Calibration Gas: N2
Standard Pressure Conditions: 1 atm
Standard Temperature Conditions: see Units
Estimated Measurement Uncertainty: +/-0.3% rdg

END OF REPORT

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Report of Calibration

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CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 1 of 2**

UUT		**Calibration**	
Made by:	Aalborg	Report No.:	AC15101171-251111-3
Model:	GFC37	Adjusted:	No
Serial No.:	251111-3	Condition:	In Tolerance
ID No.:	SBI-260	Calibration Date:	15-Oct-2015
Description:	Mass Flow Controller	Calibration Due:	15-Oct-2016

Customer		**Environment**	
	STOVE BUILDER INTERNATIONAL INC.	Temperature:	22.4ºC
	250 RUE DE COPENHAGUE	Humidity:	34%RH
	ST-AUSTIN-DE-DESMAURES, QC		
	G3A 2H3		

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

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STANDARDS

Instrument	Model	ID No./Serial No.	Traceability No.	Recall Date
Thermohygrometer Probe	Hart Scientific 2626-S	TRH-PRB-02	AC14121193-A71035	6-Jan-2016
Mass Flow Terminal	Fluke Molbox1+	FLOW-CAL-01	1500183843	30-Jun-2016

REMARKS:

None

Performed by: Slava Peciurov

Reviewed by: Anthony Morra

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

Alpha Controls & Instrumentation Inc., Suite 6, 361 Steelcase Road West, Markham, Ontario L3R 3V8 www.alphacontrols.com (800) 567-8686

Form: ROC101 Rev 8 data: C4P

400- App-C Calibration Documents (page 31 of 64)

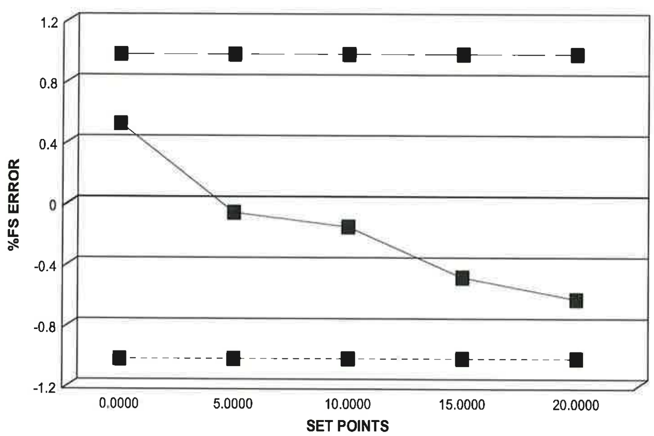
Report of Calibration
As Found / As Left

ACCREDITED CALIBRATION CERT #2260.01

Procedure: Mass Flow Meter/Controller: 5pts: Rev. 1.0.A **Page 2 of 2**

UUT		***Calibration***	
Made by:	Aalborg	Report No.:	AC15101171-251111-3
Model:	GFC37	Adjusted:	No
Serial No.:	251111-3	Condition:	In Tolerance
ID No.:	SBI-260	Calibration Date:	15-Oct-2015
Description:	Mass Flow Controller	Calibration Due:	15-Oct-2016

Test Description	Output	STD	UUT	Error (%FS)	Tolerance (%FS)	Units	P/F
0.0000	0.044V	0.0671	0.18	0.54	±1.00	slm@70.0F	Pass
5.0000	1.280V	5.1280	5.12	-0.04	±1.00	slm@70.0F	Pass
10.0000	2.534V	10.1627	10.14	-0.13	±1.00	slm@70.0F	Pass
15.0000	3.787V	15.2411	15.15	-0.47	±1.00	slm@70.0F	Pass
20.0000	5.042V	20.2898	20.17	-0.61	±1.00	slm@70.0F	Pass



Calibration Gas: N2
Standard Pressure Conditions: 1 atm
Standard Temperature Conditions: see Units
Estimated Measurement Uncertainty: +/-0.3% rdg

END OF REPORT

Quality Management System is assessed and registered by Intertek as conforming to the requirements of ISO9001:2008

Alpha Controls & Instrumentation Inc., Suite 6, 361 Steelcase Road West, Markham, Ontario L3R 3V8 www.alphacontrols.com (800) 567-8686

Form: ROC101 Rev 8 *data: C4P*

400- App-C Calibration Documents (page 32 of 64)

Intertek

Page 1 of 1

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	Rockwell International
Model:	S-275
Serial Number:	00938

Previous Calibration Comparision

Date	N/A	Acceptable Deviation (5%)	Deviation
y Factor	N/A	0	0.983
Acceptance	Out of Limits		

Average Gas Meter y Factor
0.983

Current Calibration

Acceptable y Deviation	N/A
Maximum y Deviation	N/A
Acceptance	N/A

Calibration Date:	06-02-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	6-month
Next Calibration Due:	12-01-16
Instrument Range:	1.000 cfm
Standard Temp.:	68.1 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	30.1 "Hg
Signature/Date:	Vincent Pelletier 2016-06-02

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	Sept. 02, 2015	
	Calib. Value	0.9931	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	700.100	705.285	711.504
Final Reference Meter	705.051	711.066	719.923
Initial DGM	501.239	506.448	512.697
Final DGM	506.211	512.369	521.162
Temp. Ref. Meter (°F), Tr	73.2	73.6	74.0
Temperature DGM (°F), Td	74.2	74.0	74.8
Time (Minutes)	51.0	30.0	30.0
Net Volume Ref. Meter, Vr	4.951	5.781	8.419
Net Volume DGM, Vd	4.972	5.921	8.465
Gas Meter y Factor =	**0.991**	**0.970**	**0.989**
Gas Meter y Factor Deviation (from avg.)	0.007	0.013	0.006
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.097490196

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-276_06-2016

400- App-C Calibration Documents (page 33 of 64)

AIR LIQUIDE

CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

Client: QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

Date d'analyse:	03/05/2016	No de série:	SG-140107-A
Code de produit:	SPG-4MX0024334	No d`ordre de fabrication:	16-SGM-1725
Qualité:	CERTIFIE	Pression:	6750 kPa (15°C)
Taille:	7AL		1000 psi (21°C)
Raccord de sortie du robinet:	CGA 590	Volume:	0,485 m3
		Date d'expiration:	03/05/2019

COMPOSANTS	CONCENTRATION NOMINALE	RÉSULTAT D'ANALYSE
MONOXYDE DE CARBONE	0,8 % molaire	0,798 % molaire
OXYGÈNE	20 % molaire	19,8 % molaire
AZOTE	BALANCE	BALANCE
DIOXYDE DE CARBONE	40 % molaire	39,5 % molaire

Analyse réalisée par:

FREDERIC GAGNON B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

La teneur en oxygène est mesurée à l'aide d'un analyseur d'oxygène Servomex.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.

Page 1 de 1
C16-SGM-1725-1
13/06/2016

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400- App-C Calibration Documents (page 34 of 64)

AIR LIQUIDE

CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

Client: QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

Date d'analyse:	03/05/2016	No de série:	SG-130251-A
Code de produit:	SPG-2MX0014570	No d`ordre de fabrication:	16-SGM-1718
Qualité:	CERTIFIE	Pression:	13500 kPa (15°C)
Taille:	7AL		2000 psi (21°C)
Raccord de sortie du robinet:	CGA 350	Volume:	807,0 L
		Date d'expiration:	03/05/2019

COMPOSANTS	CONCENTRATION NOMINALE	RÉSULTAT D'ANALYSE
MONOXYDE DE CARBONE	0,8 % molaire	0,770 % molaire
AZOTE	BALANCE	BALANCE

Analyse réalisée par:

FREDERIC GAGNON B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.

Page 1 de 1
C16-SGM-1718-1
13/06/2016

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400- App-C Calibration Documents (page 35 of 64)

AIR LIQUIDE

CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

Client: QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

Date d'analyse: 03/05/2016
Code de produit: SPG-2MX0024331
Qualité: CERTIFIE
Taille: 7AL
Raccord de sortie du robinet: CGA 350

No de série: SG-130201-A
No d`ordre de fabrication: 16-SGM-1727
Pression: 13500 kPa (15°C)
2000 psi (21°C)
Volume: 812,0 L
Date d'expiration: 03/05/2019

COMPOSANTS	CONCENTRATION NOMINALE	RÉSULTAT D'ANALYSE
MONOXYDE DE CARBONE	8 % molaire	7,97 % molaire
AZOTE	BALANCE	BALANCE

Analyse réalisée par:

FREDERIC GAGNON B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0,5% et +/- 5% pour les constituants en concentration inférieure 0,5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.

Page 1 de 1
C16-SGM-1727-1
13/06/2016

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400- App-C Calibration Documents (page 36 of 64)

AIR LIQUIDE

CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

Client: QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

Date d'analyse:	03/05/2016	No de série:	SG090157A
Code de produit:	SPG-2MX0024332	No d`ordre de fabrication:	16-SGM-1726
Qualité:	CERTIFIE	Pression:	7571,5 kPa (15°C)
Taille:	7AL		1121 psi (21°C)
Raccord de sortie du robinet:	CGA 580	Volume:	886,0 L
		Date d'expiration:	03/05/2019

COMPOSANTS	CONCENTRATION NOMINALE	RÉSULTAT D'ANALYSE
DIOXYDE DE CARBONE	40 % molaire	39,4 % molaire
AZOTE	BALANCE	BALANCE

Analyse réalisée par:

SAMIA AMRANI B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.

Page 1 de 1
C16-SGM-1726-1
13/06/2016

www.airliquide.ca

400- App-C Calibration Documents (page 37 of 64)

AIR LIQUIDE

CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

Client: QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

Date d'analyse: 02/05/2016
Code de produit: SPG-2MX0007686
Qualité: CERTIFIE
Taille: 7AL
Raccord de sortie du robinet: CGA 580

No de série: S980151E
No d`ordre de fabrication: 16-SGM-1717
Pression: 13500 kPa (15°C)
2000 psi (21°C)
Volume: 860,337 L
Date d'expiration: 02/05/2019

COMPOSANTS	CONCENTRATION NOMINALE	RÉSULTAT D'ANALYSE
DIOXYDE DE CARBONE	8 % molaire	8,08 % molaire
AZOTE	BALANCE	BALANCE

Analyse réalisée par:

SAMIA AMRANI B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction du la nature, du nombre et de la concentration des constituants du mélange.

Page 1 de 1
C16-SGM-1717-1
09/06/2016

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Date: 2016-02-04

Equipment: Test bench #4
T2 (Ambiant) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.59**	**%**	
	Ave A.D.	0.29	%
Standard	Reading	A.D.	
70.0	69.79	0.30	
70.0	69.80	0.29	
70.0	69.75	0.36	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.28**	**%**	
	Ave A.D.	0.14	%
Standard	Reading	A.D.	
200.0	199.73	0.14	
200.0	199.72	0.14	
200.0	199.64	0.18	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.03**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
600.0	599.89	0.02	
600.0	599.92	0.01	
600.0	599.86	0.02	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.01**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1000.0	1000.08	0.01	
1000.0	1000.04	0.00	
1000.0	1000.05	0.01	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.02**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1400.0	1400.12	0.01	
1400.0	1400.13	0.01	
1400.0	1400.08	0.01	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T3 (Dilution tunnel) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**0.98**	**%**	
	Ave A.D.	0.49	%
Standard	Reading	A.D.	
70.0	69.64	0.51	
70.0	69.67	0.47	
70.0	69.70	0.43	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.44**	**%**	
	Ave A.D.	0.22	%
Standard	Reading	A.D.	
200.0	199.56	0.22	
200.0	199.56	0.22	
200.0	199.56	0.22	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.09**	**%**	
	Ave A.D.	0.04	%
Standard	Reading	A.D.	
600.0	599.76	0.04	
600.0	599.73	0.04	
600.0	599.75	0.04	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.02**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1000.0	999.92	0.01	
1000.0	999.93	0.01	
1000.0	999.91	0.01	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.01**	**%**	
	Ave A.D.	0.00	%
Standard	Reading	A.D.	
1400.0	1399.96	0.00	
1400.0	1399.96	0.00	
1400.0	1399.90	0.01	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T4 (Firebox top)   Temperature: 68 F
Accuracy: 0.01   R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.16**	**%**	
	Ave A.D.	0.58	%
Standard	Reading	A.D.	
70.0	69.58	0.60	
70.0	69.61	0.56	
70.0	69.61	0.56	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.48**	**%**	
	Ave A.D.	0.24	%
Standard	Reading	A.D.	
200.0	199.53	0.24	
200.0	199.51	0.25	
200.0	199.54	0.23	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.10**	**%**	
	Ave A.D.	0.05	%
Standard	Reading	A.D.	
600.0	599.70	0.05	
600.0	599.70	0.05	
600.0	599.72	0.05	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.03**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1000.0	999.84	0.02	
1000.0	999.87	0.01	
1000.0	999.88	0.01	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.02**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1400.0	1399.89	0.01	
1400.0	1399.88	0.01	
1400.0	1399.89	0.01	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T5 (Firebox back) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.29**	**%**	
	Ave A.D.	0.64	%
Standard	Reading	A.D.	
70.0	69.53	0.67	
70.0	69.57	0.62	
70.0	69.60	0.57	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.54**	**%**	
	Ave A.D.	0.27	%
Standard	Reading	A.D.	
200.0	199.45	0.27	
200.0	199.46	0.27	
200.0	199.42	0.29	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.13**	**%**	
	Ave A.D.	0.06	%
Standard	Reading	A.D.	
600.0	599.63	0.06	
600.0	599.60	0.07	
600.0	599.60	0.07	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.05**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
1000.0	999.77	0.02	
1000.0	999.77	0.02	
1000.0	999.78	0.02	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.03**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
1400.0	1399.80	0.01	
1400.0	1399.76	0.02	
1400.0	1399.82	0.01	

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T6 (Firebox right) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.57**	**%**	
	Ave A.D.	0.79	%
Standard	Reading	A.D.	
70.0	69.43	0.81	
70.0	69.47	0.76	
70.0	69.48	0.75	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.62**	**%**	
	Ave A.D.	0.31	%
Standard	Reading	A.D.	
200.0	199.36	0.32	
200.0	199.40	0.30	
200.0	199.38	0.31	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.14**	**%**	
	Ave A.D.	0.07	%
Standard	Reading	A.D.	
600.0	599.57	0.07	
600.0	599.57	0.07	
600.0	599.55	0.07	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.06**	**%**	
	Ave A.D.	0.03	%
Standard	Reading	A.D.	
1000.0	999.73	0.03	
1000.0	999.72	0.03	
1000.0	999.72	0.03	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.04**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
1400.0	1399.73	0.02	
1400.0	1399.73	0.02	
1400.0	1399.73	0.02	

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T7 (Firebox left)
Temperature: 68 F
Accuracy: 0.01
R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.55**	**%**	
	Ave A.D.	0.78	%
Standard	Reading	A.D.	
70.0	69.50	0.71	
70.0	69.41	0.84	
70.0	69.41	0.85	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.67**	**%**	
	Ave A.D.	0.33	%
Standard	Reading	A.D.	
200.0	199.36	0.32	
200.0	199.31	0.35	
200.0	199.33	0.34	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.17**	**%**	
	Ave A.D.	0.09	%
Standard	Reading	A.D.	
600.0	599.48	0.09	
600.0	599.48	0.09	
600.0	599.49	0.08	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.07**	**%**	
	Ave A.D.	0.03	%
Standard	Reading	A.D.	
1000.0	999.66	0.03	
1000.0	999.67	0.03	
1000.0	999.68	0.03	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.05**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
1400.0	1399.66	0.02	
1400.0	1399.65	0.02	
1400.0	1399.68	0.02	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T8 (Firebox bottom)   Temperature: 68 F
Accuracy: 0.01   R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.74**	**%**	
	Ave A.D.	0.87	%
Standard	Reading	A.D.	
70.0	69.37	0.89	
70.0	69.41	0.85	
70.0	69.53	0.67	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.71**	**%**	
	Ave A.D.	0.35	%
Standard	Reading	A.D.	
200.0	199.29	0.35	
200.0	199.30	0.35	
200.0	199.24	0.38	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.18**	**%**	
	Ave A.D.	0.09	%
Standard	Reading	A.D.	
600.0	599.47	0.09	
600.0	599.45	0.09	
600.0	599.42	0.10	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.08**	**%**	
	Ave A.D.	0.04	%
Standard	Reading	A.D.	
1000.0	999.61	0.04	
1000.0	999.62	0.04	
1000.0	999.62	0.04	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.06**	**%**	
	Ave A.D.	0.03	%
Standard	Reading	A.D.	
1400.0	1399.62	0.03	
1400.0	1399.60	0.03	
1400.0	1399.62	0.03	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T11 (Probe temp 1) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**2.05**	**%**	
	Ave A.D.	1.02	%
Standard	Reading	A.D.	
70.0	69.27	1.05	
70.0	69.30	1.00	
70.0	69.31	0.99	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.80**	**%**	
	Ave A.D.	0.40	%
Standard	Reading	A.D.	
200.0	199.21	0.39	
200.0	199.20	0.40	
200.0	199.19	0.40	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.20**	**%**	
	Ave A.D.	0.10	%
Standard	Reading	A.D.	
600.0	599.41	0.10	
600.0	599.39	0.10	
600.0	599.36	0.11	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.09**	**%**	
	Ave A.D.	0.05	%
Standard	Reading	A.D.	
1000.0	999.54	0.05	
1000.0	999.52	0.05	
1000.0	999.53	0.05	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.07**	**%**	
	Ave A.D.	0.03	%
Standard	Reading	A.D.	
1400.0	1399.55	0.03	
1400.0	1399.54	0.03	
1400.0	1399.54	0.03	

Vincent Pelletier

Vincent Pelletier

400- App-C Calibration Documents (page 46 of 64)

Date: 2016-02-04

Equipment: Test bench #4
T14 (Probe temp 2) Temperature: 68 F
Accuracy: 0.01 R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.95**	**%**	
	Ave A.D.	0.98	%
Standard	Reading	A.D.	
70.0	69.35	0.93	
70.0	69.29	1.02	
70.0	69.29	1.02	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.79**	**%**	
	Ave A.D.	0.40	%
Standard	Reading	A.D.	
200.0	199.21	0.40	
200.0	199.21	0.40	
200.0	199.21	0.40	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.21**	**%**	
	Ave A.D.	0.10	%
Standard	Reading	A.D.	
600.0	599.37	0.10	
600.0	599.38	0.10	
600.0	599.35	0.11	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.10**	**%**	
	Ave A.D.	0.05	%
Standard	Reading	A.D.	
1000.0	999.55	0.04	
1000.0	999.41	0.06	
1000.0	999.55	0.05	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.06**	**%**	
	Ave A.D.	0.03	%
Standard	Reading	A.D.	
1400.0	1399.57	0.03	
1400.0	1399.57	0.03	
1400.0	1399.36	0.05	

Vincent Pelletier

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T15 (Spare 1)
Temperature: 68 F
Accuracy: 0.01
R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.75**	**%**	
	Ave A.D.	0.87	%
Standard	Reading	A.D.	
70.0	69.37	0.90	
70.0	69.41	0.85	
70.0	69.37	0.89	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.70**	**%**	
	Ave A.D.	0.35	%
Standard	Reading	A.D.	
200.0	199.29	0.35	
200.0	199.31	0.35	
200.0	199.29	0.35	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.18**	**%**	
	Ave A.D.	0.09	%
Standard	Reading	A.D.	
600.0	599.45	0.09	
600.0	599.48	0.09	
600.0	599.46	0.09	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.07**	**%**	
	Ave A.D.	0.04	%
Standard	Reading	A.D.	
1000.0	999.64	0.04	
1000.0	999.62	0.04	
1000.0	999.62	0.04	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.05**	**%**	
	Ave A.D.	0.02	%
Standard	Reading	A.D.	
1400.0	1399.65	0.02	
1400.0	1399.65	0.02	
1400.0	1399.62	0.03	

Vincent Pelletier

Date: 2016-02-04

Equipment: Test bench #4
T2 (Spare 2)
Temperature: 68 F
Accuracy: 0.01
R.H.: 18%
Reference: SBI-096

S.D.	0.01	%	
R.M.U.	0.01	%	
O.M.U	**1.33**	**%**	
	Ave A.D.	0.66	%
Standard	Reading	A.D.	
70.0	69.51	0.69	
70.0	69.56	0.63	
70.0	69.61	0.56	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**0.55**	**%**	
	Ave A.D.	0.27	%
Standard	Reading	A.D.	
200.0	199.46	0.27	
200.0	199.45	0.28	
200.0	199.47	0.27	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.13**	**%**	
	Ave A.D.	0.06	%
Standard	Reading	A.D.	
600.0	599.63	0.06	
600.0	599.60	0.07	
600.0	599.64	0.06	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.08**	**%**	
	Ave A.D.	0.04	%
Standard	Reading	A.D.	
1000.0	999.77	0.02	
1000.0	999.48	0.05	
1000.0	999.81	0.02	

S.D.	0.00	%	
R.M.U.	0.00	%	
O.M.U	**0.03**	**%**	
	Ave A.D.	0.01	%
Standard	Reading	A.D.	
1400.0	1399.81	0.01	
1400.0	1399.84	0.01	
1400.0	1399.83	0.01	

Vincent Pelletier

Vincent Pelletier

400- App-C Calibration Documents (page 49 of 64)

Rapport d'étalonnage No. CA0003-506-040116

METTLER TOLEDO

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, Ohio 43240
1-800-METTLER

ISO 9001 Registered

ANSI/NCSL Z540-1 Accrédité

Accrédité par l'American Association for Laboratory Accreditation (A2LA)
CERT.CALIBRATION #1902.02

Certificat d'étalonnage

Client

Société :	SBI Fabricant De Poeles		
Adresse :	250 Rue de Copenhague		
Ville :	Saint-Augustin-De-Desmaures	*État/Province :*	Quebec
Code postal :	G3A 2H3	Astea Customer ID:	300276257

Instrument

Constructeur :	Weigh-Tronix	*Modèle de terminal :*	IND560
Modèle :	DSL 4848-05	*# série du terminal:*	00927386KL
No de série :	B00927386KL	*# série de l'imprimant*	N/A
Capacité :	500 kg		N/A
Résolution :	0,02 kg	*Nbre de Divisions:*	25000
Classe :	III	*Procédure utilisée :*	NIST Handbook 44
No./ID d'inventaire:	SBI-014		

Procédure: Le présent certificat est émis conformément aux conditions de certification accordées par l'A2LA, en vertu de la norme ISO/IEC 17025. A2LA a évalué la capacité de mesure du laboratoire et la traçabilité des normes nationales reconnues.

Date de calibrage :	1-avr-2016	*Date, prochaine Cal.*	31-mars-2017
Signataire autorisé (A2LA) :	Dany Careau	*Signature:*	ELECTRONIC SIGNATURE

Étalons de travail

Retracabilité: Les poids de test utilisés se réfèrent au National Institute of Standards and Technology.

Jeu de poids no :	*Traçabilité NIST No.:*	*Classe ASTM/OIML*	*Date d'étalonnage :*	*Date proch. étalonnage*
0718	M15-050	M1	22-avr-2015	22-avr-2016
142	MT00997	F1	7-mai-2014	30-avr-2016
Q1	1415126	M1	1-juin-2015	1-juin-2016

Version Logiciel : 4.6.2.10

Page 1 sur 3

400- App-C Calibration Documents (page 50 of 64)

Rapport d'étalonnage No. CA0003-506-040116

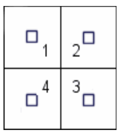
METTLER TOLEDO

Résultats de mesure

La température : 22 °C

Les conditions ambiantes ont été vérifiées afin d'assurer l'exactitude de l'étalonnage.

Test de variation



		Avant Réglage	Après Réglage
Poids Appliqués	*Position*	*Valeur lue*	*Valeur lue*
1: 100 kg	*Position 1*	99,92 kg	99,96 kg
2: 100 kg	*Position 2*	99,98 kg	100,04 kg
3: 100 kg	*Position 3*	99,94 kg	99,98 kg
4: 100 kg	*Position 4*	99,94 kg	99,98 kg
Erreur maximum :		0,08 kg	0,08 kg
Max Erreur Admissible :		0,10 kg	0,1 kg

Linéarité

	Avant réglage					
	Poids Appliqués	*Valeur lue*	*Erreur*		*Erreur admissible*	*Dans la Tolérance*
Zero 1,00	0,00 kg	0,00 kg	0,00 kg	0 d	1 d	OUI
2,00	40,00 kg	40,00 kg	0,00 kg	0 d	2 d	OUI
3,00	80,00 kg	79,98 kg	-0,02 kg	1 d	3 d	OUI
4,00	120,00 kg	119,96 kg	-0,04 kg	2 d	5 d	OUI
5,00	160,00 kg	159,96 kg	-0,04 kg	2 d	5 d	OUI
Max 6,00	200,00 kg	199,94 kg	-0,06 kg	3 d	5 d	OUI

☐ Méthode de substitution utilisée

Version Logiciel : 4.6.2.10

Page 2 sur 3

400- App-C Calibration Documents (page 51 of 64)

Rapport d'étalonnage No. CA0003-506-040116

METTLER TOLEDO

	Après réglage					
	Poids Appliqués	*Valeur lue*	*Erreur*		*Erreur admissible*	*Dans la Tolérance*
Zero 1,00	0,00 kg	0,00 kg	0,00 kg	0 d	1 d	OUI
2,00	40,00 kg	40,00 kg	0,00 kg	0 d	2 d	OUI
3,00	80,00 kg	80,00 kg	0,00 kg	0 d	3 d	OUI
4,00	120,00 kg	120,00 kg	0,00 kg	0 d	5 d	OUI
5,00	160,00 kg	160,00 kg	0,00 kg	0 d	5 d	OUI
Max 6,00	200,00 kg	200,00 kg	0,00 kg	0 d	5 d	OUI

☐ Méthode de substitution utilisée

Un réglage de la balance a été requis
Si non, les résultats "avant réglage" correspondent aux résultats tel que laissé.

☑ **OUI** ☐ **NON**

Répétabilité

Poids appliqués : 100,00 kg

	Chargé	*Vide*	*Différence*
1	100,00 kg	0,00 kg	100 kg
2	100,00 kg	0,00 kg	100 kg
3	100,00 kg	0,00 kg	100 kg
	Erreur maximale :	0,00 kg	0,0 d
	Tolérance :	0,10 kg	5 d

Incertitude

Mesure de l'incertitude = 0,012 kg

L'incertitude de mesure représente les incertitudes étendues selon un facteur de sécurité K=2 générant un niveau de confiance approximatif de 95 %. Des dispositions doivent être prises en matière d'environnement au lieu d'étalonnage, d'incertitude induite par l'article en étalonnage et d'effets indésirables causés par le transport du matériel d'étalonnage. Ces facteurs pourraient entraîner une incertitude plus grande que le CMC.

Remarques

Aucune.

Version Logiciel : 4.6.2.10

Page 3 sur 3

400- App-C Calibration Documents (page 52 of 64)

Intertek

Page 1 of 1

Dry Gas Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	90R054300

Previous Calibration Comparision

Date	2015-09-08	Acceptable Deviation (5%)	Deviation
y Factor	0.994	0.0497	0.009
Acceptance			

Average Gas Meter y Factor
1.003

Calibration Date:	03-30-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	6-months
Next Calibration Due:	03-08-16
Instrument Range:	1.000 cfm
Standard Temp.:	73 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	30.09 "Hg
Signature/Date:	2016-03-30

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.023
Acceptance	Acceptable

Reference Standard *		
Standard	Model	Standard Test Meter
Calibrator	S/N	07J264834
	Calib. Date	Sept. 02, 2015
	Calib. Value	0.9931 y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	579.840	584.385	589.425
Final Reference Meter	584.385	589.425	614.643
Initial DGM	467.453	471.857	476.954
Final DGM	471.857	476.954	501.989
Temp. Ref. Meter (°F), Tr	66.6	70.9	71.9
Temperature DGM (°F), Td	67.0	69.5	73.4
Time (Minutes)	102.0	40.0	91.0
Net Volume Ref. Meter, Vr	4.545	5.040	25.218
Net Volume DGM, Vd	4.404	5.097	25.035
Gas Meter y Factor =	**1.026**	**0.979**	**1.003**
Gas Meter y Factor Deviation (from avg.)	0.023	0.023	0.000
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.043176471

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-046_03-2016

400- App-C Calibration Documents (page 53 of 64)

Intertek

Page 1 of 1

Dry Gas Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	98Z332226

Previous Calibration Comparision

Date	2015-09-08	Acceptable Deviation (5%)	Deviation
y Factor	1.000	0.05	0.006
Acceptance			

Average Gas Meter y Factor
1.006

Calibration Date:	03-30-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	6-months
Next Calibration Due:	09-26-16
Instrument Range:	1.000 cfm
Standard Temp.:	73 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	30.09 "Hg
Signature/Date:	Vincent Pelletier 2016-03-30

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.014
Acceptance	Acceptable

Reference Standard *		
Standard Calibrator	Model	Standard Test Meter
	S/N	07J264834
	Calib. Date	Sept. 02, 2015
	Calib. Value	0.9931 y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	614.643	667.231	672.581
Final Reference Meter	667.231	672.581	692.897
Initial DGM	956.596	1008.026	1013.254
Final DGM	1008.026	1013.254	1033.598
Temp. Ref. Meter (°F), Tr	73.3	72.2	69.0
Temperature DGM (°F), Td	73.8	69.4	69.2
Time (Minutes)	1028.0	35.0	67.0
Net Volume Ref. Meter, Vr	52.588	5.350	20.316
Net Volume DGM, Vd	51.43	5.228	20.344
Gas Meter y Factor =	**1.016**	**1.011**	**0.992**
Gas Meter y Factor Deviation (from avg.)	0.010	0.004	0.014
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.050029183

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-047_03-2016

400- App-C Calibration Documents (page 54 of 64)

ULRICH

Ulrich Métrologie Inc.
Ulrich Metrology Inc.
9912, Côte-de-Liesse
Montréal (Québec) H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

CLAS NRC CNRC CLAS 1666-01

ACCREDITATION ISO 17025
SCC Scope Number 220

CALIBRATION CERTIFICATE

Certificate no.:	525294	**Calibration date:**	April 07, 2016
Identification:	SBI-096	**Certificate issued:**	April 07, 2016
Description:	CALIBRATOR, OMEGA CL23A	**Interval:**	12 months
Size:	TC K/J/T	**Due date:**	April 07, 2017
Manufacturer:	OMEGA	**Procedure no.:**	MET/CAL
Model no.:	CL23A	**Environment:**	CLAS Type 2 Laboratory
Serial no.:	T-256137	**Temperature:**	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	YUK

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens
David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

Notes:

9V battery replaced.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

166727P

Page 1 of 1

400- App-C Calibration Documents (page 55 of 64)

ULRICH

Ulrich Métrologie inc.
Ulrich Metrology inc.
8912, Côte-de-Liesse
Motnréal (Québec) H8T 1A1

Tél. (514) 631-6653
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info@ulrich.ca
www.ulrich.ca

CALIBRATION DATA

Certificate no.: 525294
Identification: SBI-096
Description: CALIBRATOR THERMOMETER
Serial no.: T-256137
Procedure: Omega CL23A: 5520A-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
7870009	CALIBRATOR	FLUKE	5520A	2016/01/06	2017/01/31

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
Temperature measurements are performed by electrical simulation.						
DISPLAY CALIBRATION						
Did all segments of the display illuminate?						
Result of Operator Evaluation					PASS	
THERMOMETER CALIBRATION						
K Type Thermocouple						
-200.0degF		-200.1	-201.0	-199.0	PASS	1.7
-60.0degF		-59.9	-61.0	-59.0	PASS	3.1
-40.0degF		-40.0	-40.5	-39.5	PASS	1.5
32.0degF		31.9	31.5	32.5	PASS	1.7
1240.0degF		1240.0	1239.5	1240.5	PASS	1.1
1260.0degF		1260.0	1259.5	1260.5	PASS	1.1
2500.0degF		2500.0	2499.0	2501.0	PASS	1.4
J Type Thermocouple						
-200.0degF		-200.3	-201.0	-199.0	PASS	2.1
-60.0degF		-60.0	-61.0	-59.0	PASS	3.5
-40.0degF		-40.1	-40.5	-39.5	PASS	1.7
32.0degF		31.9	31.5	32.5	PASS	2.0
1240.0degF		1239.9	1239.5	1240.5	PASS	1.6
1260.0degF		1259.9	1259.5	1260.5	PASS	1.6
1400.0degF		1399.8	1399.4	1400.6	PASS	1.8
T Type Thermocouple						
-200.0degF		-199.9	-201.0	-199.0	PASS	2.3
-60.0degF		-59.8	-61.0	-59.0	PASS	2.3
-40.0degF		-40.0	-40.5	-39.5	PASS	1.2
32.0degF		32.0	31.5	32.5	PASS	1.7
750.0degF		749.9	749.5	750.5	PASS	2.0
CALIBRATOR CALIBRATION						
K Type Thermocouple						
-200.0degF		-199.7	-201.0	-199.0	PASS	1.7
-60.0degF		-59.9	-61.0	-59.0	PASS	3.1
-40.0degF		-39.9	-40.5	-39.5	PASS	1.5
32.0degF		32.0	31.5	32.5	PASS	1.7

400- App-C Calibration Documents (page 56 of 64)

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info@ulrich.ca
www.ulrich.ca

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
1240.0degF		1240.2	1239.5	1240.5	PASS	1.1
1260.0degF		1260.2	1259.5	1260.5	PASS	1.1
2500.0degF		2500.5	2499.0	2501.0	PASS	1.4
J Type Thermocouple						
-200.0degF		-200.2	-201.0	-199.0	PASS	2.1
-60.0degF		-60.2	-61.0	-59.0	PASS	3.5
-40.0degF		-40.1	-40.5	-39.5	PASS	1.7
32.0degF		31.8	31.5	32.5	PASS	2.0
1240.0degF		1240.1	1239.5	1240.5	PASS	1.6
1260.0degF		1260.1	1259.5	1260.5	PASS	1.6
1400.0degF		1399.9	1399.4	1400.6	PASS	1.8
T Type Thermocouple						
-200.0degF		-200.3	-201.0	-199.0	PASS	2.3
-60.0degF		-60.3	-61.0	-59.0	PASS	2.3
-40.0degF		-40.1	-40.5	-39.5	PASS	1.2
32.0degF		31.7	31.5	32.5	PASS	1.7
750.0degF		749.8	749.5	750.5	PASS	2.0

End of Test Data

Calibration Data for Certificate No. 525294 Rtrslt01 Page 2 of 2

400- App-C Calibration Documents (page 57 of 64)

MICRO PRECISION CALIBRATION INC.

MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

ilac-MRA A2LA ACCREDITED
Calibration Laboratory
CERT # 935.01

Certificate of Calibration

Date: Apr 22, 2016 **Cert No. 222200812318776**

Customer:
STOVE BUILDERS INTERNATIONAL INC.
PORTES 11-12
250 DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC G3A 2H3

		Work Order #:	SAC-70078354
		Purchase Order #:	REWORK
MPC Control #:	DA5991	Serial Number:	79977
Asset ID:	SBI-097	Department:	N/A
Gage Type:	ANEMOMETER	Performed By:	ERICK CONKLIN
Manufacturer:	EUROTRON INSTRUMENTS	Received Condition:	IN TOLERANCE
Model Number:	VT 50	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	April 22, 2016
Temp/RH:	68.0°F / 43.0%	Cal. Interval:	12 MONTHS
		Cal. Due Date:	April 22, 2017

Calibration Notes:

Test Points

Seq.	Description	Standard	Tolerance -	Tolerance +	As Found	As Left	UOM	Result	Uncertainty
1	Temperature Tested at:(Deg F)	-4.0	-4.7	-3.3	-3.7	-3.7	Deg F	Passed	0.05
2	Tested at: (Deg F)	45.0	43.5	46.5	45.9	45.9	Deg F	Passed	0.05
3	Tested at: (Deg F)	90.0	87.6	92.4	91.2	91.2	Deg F	Passed	0.05
4	Tested at: (Deg F)	135.0	131.7	138.3	133.2	133.2	Deg F	Passed	0.05
5	Tested at: (Deg F)	176.0	171.8	180.1	173.4	173.4	Deg F	Passed	0.05
6	Air Velocity Tested At:	500	473	527	489	489	Fpm	Passed	14.5
7	Air Velocity Tested At:	1,000	930	1070	982	982	Fpm	Passed	29
8	Air Velocity Tested At:	2,000	1900	2100	1,984	1,984	Fpm	Passed	58
9	Air Velocity Tested At:	3,000	2870	3130	2,952	2,952	Fpm	Passed	87
10	Air Velocity Tested At:	4,000	3840	4160	4,020	4,020	Fpm	Passed	80
11	Air Velocity Tested At:	5,000	4810	5190	4,879	4,879	Fpm	Passed	100
12	Air Velocity Tested At:	6,000	5780	6220	5,963	5,963	Fpm	Passed	120

Calibrating Technician: Erick Conklin
ERICK CONKLIN

QC Approval: Robert S Means
Robert Means

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO 17025:2005, ANSI/NCSL Z540-1, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.

Page 1 of 2 (CERT, Rev 3)

400- App-C Calibration Documents (page 58 of 64)

MICRO PRECISION CALIBRATION INC.

MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

Calibration Laboratory
CERT # 935.01

Certificate of Calibration

Date: Apr 22, 2016 **Cert No. 222200812318776**

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CR6800	HUMIDITY GENERATOR/ ENVIRONMENTAL CHAMBER	2500	0012263	THUNDER SCIENTIFIC CORPORATION	Aug 7, 2016	222008122801952
CL7456	STANDARD PLATINUM RESISTANCE THERMOMETER PROBE	5681	1595	FLUKE	Dec 4, 2016	A7B16006
CL7223	BLACK STACK	1560/2560	A07486/A07485/A0 7728	HART SCIENTIFIC, INC.	Nov 2, 2016	222008122718022
CJ5100	WIND TUNNEL WITH CONTROLLER	JS-500	375/305	INTERACTIVE INSTRUMENTS	Oct 29, 2016	222008122715516
AE2821	ANEMOMETER	AM-4822	N272316	LANDTEK	Oct 29, 2016	222008122715506

Procedures Used in this Event

Procedure Name	Description
CUSTOMER SPECIFICATIONS	Customer Specifications

Calibrating Technician: Erick Conklin

ERICK CONKLIN

QC Approval: Robert S Means

Robert Means

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO 17025:2005, ANSI/NCSL Z540-1, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

Page 2 of 2 (CERT, Rev 3)

400- App-C Calibration Documents (page 59 of 64)

CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 51068

LABORATORY ACCREDITATION BUREAU a division of A-S-B ACCREDITED ISO/IEC 17025 Certificate # L2115-1 Calibration

Customer Information

Customer: SBI St-Augustin

Address : 250, De Copenhague
Doors 11-12
St-Augustin-de-Desmaures

Customer PO #: 45864

Calibration Procedure Information

Procedure ID: GTP FLOW_INDI Revision #: 7 Revision Date: 1/6/2013

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10126	Graftel	N/A	LFE-D System	7/6/2016
10126-T	Graftel	9202	Temperature Sensor	8/17/2018
51202	Paroscientific	760-100A	Pressure, 100 Psia	8/17/2016
10127	Furness	352	Delta P	7/6/2016
60030	Paroscientific	760-100A	Pressure, 100 psia	5/7/2016
10159	HOBO	U12-011	Environment Monitor System	11/18/2015

Sensor Information

Manufacturer: American Meter
Model #: DTM-200A
Instrument ID#: SBI-103
Serial #: 07J264834

Description: Gas Meter
Rated Accuracy: ± 1 % of Reading
Range: 0 to 250 scfh

Method Used: Laminar
Accuracy Specified By: AmericanMeter
Condition: Functional

Comments: Calibration Date: 09/02/2015

The instruments(s) listed on this certificate have been calibrated against standards traceable to the National Institue of Standards & Technology (NIST) or compared to nationally or internationally recognized consensus standards. The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel, LLC. Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2005, ANSI/NCSL Z540-I-1994 and ISO 9001: 2008. All results contained within this certificate relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel, LLC. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.

Performed By: ____________ Date: 9/2/2015

I.B. Caoili
Calibration Technician

Page 1 of 2

GRAFTEL, LLC. 870 Cambridge Drive, Elk Grove Village, IL 60007 847.364.2600
www.graftel.com

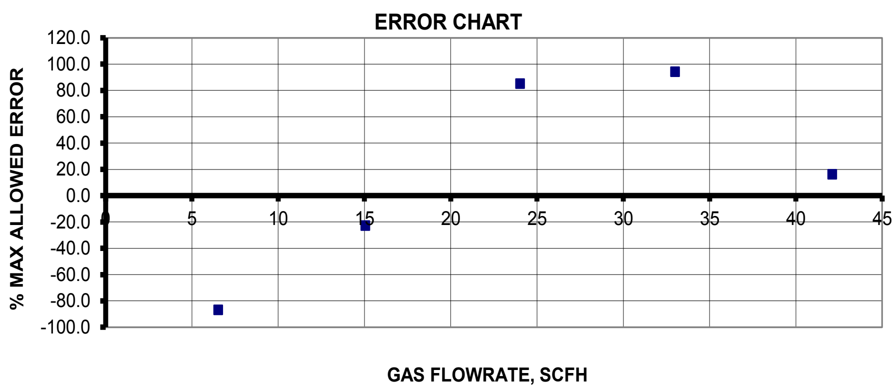
400- App-C Calibration Documents (page 60 of 64)

ATTACHMENT TO CALIBRATION CERTIFICATE 51068

AS FOUND / AS LEFT DATA

Page 2 of 2

Air Flow Rate From Standard, scfh	Air Vol From Standard, scf	Air Vol From Meter, cf	Air vol From Meter, scf	Diff Air Vol STD - METER scf	% Proof	Measurement Uncertainty, scf	STATUS
6.527	0.287	0.3	0.289	-0.002	99.138	0.002	Pass
15.052	0.967	1.0	0.969	-0.002	99.773	0.005	Pass
24.025	0.984	1.0	0.976	0.008	100.859	0.005	Pass
33.003	1.982	2.0	1.963	0.019	100.951	0.010	Pass
42.116	1.982	2.0	1.979	0.003	100.163	0.010	Pass



INSTRUMENT SPECIFICATIONS		
Test Gas	Air	
Standard Pressure,Meter	14.73	psia
Standard Temperature,Meter	60	F
Rated Accuracy	1	% Rding
Full Scale Flow Rate	250	scfh Natural Gas @ 1/2 inch WC
LABORATORY AMBIENT CONDITIONS		
Pressure	14.39	psia
Humidity	52.04	% RH
Temperature	71.40	F

Flow - Humidity - Temperature - Pressure - Design - Consulting - Engineering

NIST Traceable Calibration Data Sheet

Graftel, LLC. 870 Cambridge Drive, Elk Grove Village, IL.60007
P. 847-364-2600 F. 847-364-2899

www.graftel.com

Date: 2016-04-19

Equipment: SBI-153 | Temperature: 70.2°F
Accuracy: 0.001 | 1 R.H.: 32.7%
Reference: SBI-194

S.D.	0.00	%	
R.M.U.	0.09	%	
O.M.U	**0.58**	**%**	
	Ave A.D.	0.27	%
Standard	Reading	A.D.	
MΩ			
1.100	1.097	0.27	
1.100	1.097	0.27	
1.100	1.097	0.27	

S.D.	0.01	%	
R.M.U.	0.83	%	
O.M.U	**2.00**	**%**	
	Ave A.D.	0.56	%
Standard	Reading	A.D.	
120	119	0.83	
120	120	0.00	
120	119	0.83	

Vincent Pelletier

Technician: Vincent Pelletier

400- App-C Calibration Documents (page 62 of 64)

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CLAS NRC CNRC CLAS 1006-01

ACCREDITATION ISO 17025
SCC Scope Number 220

CALIBRATION CERTIFICATE

Certificate no.:	525229	**Calibration date:**	April 07, 2016
Identification:	SBI-194	**Certificate issued:**	April 07, 2016
Description:	MULTIMETER, RADIO SHACK 22-168A	**Interval:**	12 months
Manufacturer:	RADIO SHACK	**Due date:**	April 07, 2017
Model no.:	22-168A	**Procedure no.:**	MET/CAL
Serial no.:	FC388201	**Environment:**	CLAS Type 2 Laboratory
		Temperature:	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	NFS

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens
David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

Notes:

1.5A fuse was received blown. It was replaced.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

248501 P

Page 1 of 1

400- App-C Calibration Documents (page 63 of 64)

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CALIBRATION DATA

Certificate no.: 525229
Identification: SBI-194
Description: MULTIMETER
Serial no.: FC388201
Procedure: MICRONTA 22-168A: 5520A-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
8608002	CALIBRATOR	FLUKE	5520A	2016/03/02	2017/03/31

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	ACCEPTANCE LIMITS HIGH	PASS/ FAIL	TUR
DC VOLTAGE CALIBRATION						
200 mV Range						
190.0mV		189.9	187.8	192.2	PASS	
2V Range						
1.900V		1.898	1.878	1.922	PASS	
-1.900V		-1.897	-1.922	-1.878	PASS	
20V Range						
19.00V		18.99	18.78	19.22	PASS	
200V Range						
190.0V		190.1	187.8	192.2	PASS	
1000V Range						
950V		950	938	962	PASS	
AC VOLTAGE CALIBRATION						
200 mV Range						
190.0mV @ 60Hz		187.3	185.8	194.2	PASS	
2V Range						
1.900V @ 60Hz		1.872	1.858	1.942	PASS	
20V Range						
19.00V @ 60Hz		18.73	18.58	19.42	PASS	
200V Range						
190.0V @ 60Hz		187.6	185.8	194.2	PASS	
750V Range						
700V @ 60Hz		691	678	723	PASS	
FREQUENCY CALIBRATION						
1.900kHz @ 5V		1.904	1.809	1.990	PASS	
RESISTANCE CALIBRATION						
200 Ohm Range						
190.0 Ohm		190.3	186.8	193.2	PASS	
2 kOhm Range						
1.900 kOhm		1.900	1.870	1.930	PASS	
20 kOhm Range						
19.00 kOhm		18.98	18.70	19.30	PASS	
200 kOhm Range						
190.0 kOhm		190.1	187.0	193.0	PASS	
2 MOhm Range						

400- App-C Calibration Documents (page 64 of 64)

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PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
1.900 MOhm		1.901	1.870	1.930	PASS	
20 MOhm Range						
19.00 MOhm		19.01	18.50	19.50	PASS	
2000 MOhm Range						
1100 MOhm		1107	935	1266	PASS	
CONTINUITY CALIBRATION						
Is the beeper on when 30 Ohms resistance is applied?						
Result of Operator Evaluation					PASS	
Is the beeper off when 100 Ohms resistance is applied?						
Result of Operator Evaluation					PASS	
DC CURRENT CALIBRATION						
200 µA Range						
190.0uA		189.7	187.0	193.0	PASS	
2 mA Range						
1.900mA		1.899	1.870	1.930	PASS	
20 mA Range						
19.00mA		19.06	18.47	19.54	PASS	
200 mA Range						
190.0mA		191.7	184.7	195.3	PASS	
20 A Range						
10.00A		9.89	9.30	10.70	PASS	
AC CURRENT CALIBRATION						
200 µA Range						
190.0uA @ 60Hz		187.0	184.8	195.2	PASS	
2 mA Range						
1.900mA @ 60Hz		1.897	1.848	1.952	PASS	
20 mA Range						
19.00mA @ 60Hz		18.80	18.15	19.85	PASS	
200 mA Range						
190.0mA @ 60Hz		188.9	181.5	198.5	PASS	
20 A Range						
10.00A @ 60Hz		9.92	8.98	11.02	PASS	
CAPACITANCE CALIBRATION						
200 nF Range						
190.0nF		188.8	180.9	199.1	PASS	
20 µF Range						
19.00uF		18.48	17.30	20.70	PASS	
200 µF Range						
190.0uF		183.6	172.9	207.1	PASS	

End of Test Data

Calibration Data for Certificate No. 525229 Rtrslt01 Page 2 of 2

600- App-E Dry Gas Meter CAlibration Data

Appendix E

Dry Gas meter Calibration Data

600- App-E Dry Gas Meter CAlibration Data (page 2 of 4)

Intertek

Page 1 of 1

Dry Gas Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	90R054300

Previous Calibration Comparision

Date	2016-03-30	Acceptable Deviation (5%)	Deviation
y Factor	1.003	0.05015	0.012
Acceptance			

Average Gas Meter y Factor
1.015

Calibration Date:	06-14-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	Post Test
Next Calibration Due:	08-04-16
Instrument Range:	1.000 cfm
Standard Temp.:	73 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.8 "Hg
Signature/Date:	Vincent Pelletier 2016-06-14

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.025
Acceptance	Acceptable

Reference Standard *		
Standard	Model	Standard Test Meter
Calibrator	S/N	07J264834
	Calib. Date	Sept. 02, 2015
	Calib. Value	0.9931 y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	728.265	732.238	736.434
Final Reference Meter	732.238	736.434	739.292
Initial DGM	1249.067	1253	1257.17
Final DGM	1253	1257.17	1259.905
Temp. Ref. Meter (°F), Tr	78.7	79.2	79.3
Temperature DGM (°F), Td	79.5	79.6	80.1
Time (Minutes)	43.0	75.0	30.0
Net Volume Ref. Meter, Vr	3.973	4.196	2.858
Net Volume DGM, Vd	3.933	4.17	2.735
Gas Meter y Factor =	**1.005**	**1.000**	**1.039**
Gas Meter y Factor Deviation (from avg.)	0.010	0.015	0.025
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.091465116

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-046_06-2016 - PT

600- App-E Dry Gas Meter CAlibration Data (page 3 of 4)

Intertek

Page 1 of 1

Dry Gas Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	98Z332226

Previous Calibration Comparision

Date	2016-03-30	Acceptable	
		Deviation (5%)	Deviation
y Factor	1.006	0.0503	0.007
Acceptance			

Average Gas Meter y Factor
0.999

Calibration Date:	06-14-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	Post Test
Next Calibration Due:	08-04-16
Instrument Range:	1.000 cfm
Standard Temp.:	73 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.8 "Hg
Signature/Date:	Vincent Pelletier 2016-06-14

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.002
Acceptance	Acceptable

Reference Standard *		
Standard	Model	Standard Test Meter
Calibrator	S/N	07J264834
	Calib. Date	Sept. 02, 2015
	Calib. Value	0.9931 y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	719.913	722.591	725.504
Final Reference Meter	722.591	725.504	728.265
Initial DGM	1082.729	1085.396	1088.294
Final DGM	1085.396	1088.294	1091.036
Temp. Ref. Meter (°F), Tr	76.7	77.7	78.2
Temperature DGM (°F), Td	76.3	78.0	78.5
Time (Minutes)	30.0	34.0	30.0
Net Volume Ref. Meter, Vr	2.678	2.913	2.761
Net Volume DGM, Vd	2.667	2.898	2.742
Gas Meter y Factor =	**0.996**	**0.999**	**1.001**
Gas Meter y Factor Deviation (from avg.)	0.002	0.000	0.002
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.0889

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-047_06-2016 - PT

600- App-E Dry Gas Meter CAlibration Data (page 4 of 4)

Intertek

Page 1 of 1

Dry Gas Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	Rockwell International
Model:	S-275
Serial Number:	00938

Previous Calibration Comparision

Date	2016-06-02	Acceptable	
		Deviation (5%)	Deviation
y Factor	0.983	0.04915	0.004
Acceptance	Acceptable		

Average Gas Meter y Factor
0.987

Current Calibration

Acceptable y Deviation	N/A
Maximum y Deviation	N/A
Acceptance	N/A

Calibration Date:	06-14-16
Calibrated by:	Vincent Pelletier
Calibration Frequency:	6-month
Next Calibration Due:	12-13-16
Instrument Range:	1.000 cfm
Standard Temp.:	68.1 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.8 "Hg
Signature/Date:	Vincent Pelletier 2016-06-14

Reference Standard *		
Standard	Model	Standard Test Meter
Calibrator	S/N	07J264834
	Calib. Date	Sept. 02, 2015
	Calib. Value	0.9931 y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	739.292	744.509	751.327
Final Reference Meter	744.509	751.327	757.625
Initial DGM	565.410	570.710	577.527
Final DGM	570.710	577.527	583.821
Temp. Ref. Meter (°F), Tr	81.2	81.3	80.8
Temperature DGM (°F), Td	80.7	80.4	79.7
Time (Minutes)	31.0	40.0	37.0
Net Volume Ref. Meter, Vr	5.217	6.818	6.298
Net Volume DGM, Vd	5.3	6.817	6.294
Gas Meter y Factor =	**0.977**	**0.992**	**0.992**
Gas Meter y Factor Deviation (from avg.)	0.010	0.005	0.005
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.170967742

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

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

SBI-276_06-2016 - PT

700- App-F Unit Pre-Burn Documentation

Appendix F

Unit Pre-Burn documentation

700- App-F Unit Pre-Burn Documentation (page 2 of 13)

May 26th, 2016

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
0	374.80	78.59	108.19	362.69	419.93	490.36	449.78	413.41	7.13
10	652.57	78.71	149.20	641.25	409.48	484.63	448.22	405.47	53.58
20	722.49	80.58	154.64	753.26	439.60	471.97	435.77	443.36	48.47
30	741.92	83.01	158.66	820.59	465.06	469.61	419.39	465.05	44.03
40	749.28	85.93	163.11	859.36	485.21	470.89	403.27	473.06	39.85
50	758.02	86.68	166.29	881.74	502.78	473.88	390.45	481.46	35.72
60	754.23	86.79	165.39	883.82	518.50	479.88	382.63	495.88	31.89
70	742.28	88.26	163.53	903.03	527.35	487.69	377.16	509.66	28.41
80	737.61	88.08	162.42	912.96	534.94	496.22	375.90	525.85	25.25
90	708.95	89.48	157.61	866.59	540.13	505.67	375.30	541.46	22.54
100	679.86	89.21	153.48	820.84	539.12	516.35	376.69	552.14	20.39
110	642.17	88.62	147.92	761.13	537.54	529.48	379.92	557.32	18.60
120	599.99	89.33	142.31	708.45	533.75	545.20	383.33	557.90	17.23
130	561.27	88.17	136.83	652.99	525.16	558.00	387.89	551.54	16.26
140	524.34	87.20	132.48	584.64	513.40	566.25	394.18	543.19	15.58
150	490.16	86.99	128.04	528.87	500.85	567.26	400.90	532.38	15.04
160	467.16	86.71	125.20	492.11	486.83	562.90	405.89	520.87	14.56
170	451.34	86.54	122.89	468.56	467.56	556.71	409.10	509.98	14.15
180	439.57	85.94	121.15	455.19	451.47	550.12	411.52	499.88	13.68
190	427.70	85.22	119.62	441.03	437.81	542.37	412.70	490.83	13.28
200	419.54	85.15	118.17	430.07	426.24	534.40	413.48	481.36	12.90
210	412.13	85.10	117.30	419.55	416.80	527.60	413.62	473.07	12.55
220	401.86	84.72	115.98	404.76	409.98	521.29	413.41	465.84	12.18
230	393.65	84.64	114.91	394.82	404.44	514.33	411.14	460.01	11.85
240	389.97	84.62	114.17	390.24	398.72	507.61	408.91	453.63	11.48
250	382.66	84.23	113.34	382.82	394.54	501.20	406.69	447.41	11.15
260	378.22	84.03	112.41	375.81	391.46	494.36	404.69	442.45	10.83
270	372.57	83.52	111.77	368.82	388.43	486.24	402.50	437.19	10.50
280	367.14	83.55	111.11	365.47	384.67	477.36	399.81	432.04	10.18

700- App-F Unit Pre-Burn Documentation (page 3 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
290	363.35	83.65	110.65	362.82	381.12	470.43	397.25	421.73	9.85
300	357.11	83.40	109.95	356.02	378.19	464.21	394.02	408.97	9.58
310	352.31	83.60	109.36	348.39	373.37	457.46	390.05	398.36	9.30
320	345.43	83.42	108.45	339.37	369.50	450.68	385.00	388.08	9.04
330	339.76	83.53	107.72	331.40	365.19	444.06	379.89	379.35	8.80
340	332.27	83.39	106.88	321.23	360.06	437.45	374.73	370.22	8.56
350	324.73	82.66	106.03	310.65	353.44	430.21	367.44	362.24	8.35
360	319.69	82.67	105.24	302.91	345.12	422.98	360.88	353.12	8.14
370	313.80	82.68	104.62	295.55	336.65	416.46	353.48	346.54	7.95
380	305.72	82.53	103.62	287.69	328.68	410.34	347.55	338.43	7.76
390	298.74	82.33	102.82	279.19	320.32	404.09	341.96	330.78	7.59
400	292.16	82.43	102.13	271.25	313.19	397.73	336.81	322.93	7.42
410	285.81	82.29	101.29	264.79	306.29	391.17	332.32	314.90	7.26
420	280.43	81.98	100.65	259.34	299.48	384.82	327.75	307.85	7.11
430	275.37	81.85	99.95	253.74	292.89	378.68	323.04	300.57	6.95
440	271.40	81.60	99.25	248.24	286.46	372.59	319.05	293.73	6.80
450	266.12	81.47	98.74	243.06	280.94	366.95	315.25	286.63	6.67
460	260.83	81.41	98.14	237.82	275.59	361.52	311.75	280.09	6.53
470	255.42	81.22	97.47	232.17	270.20	355.77	308.87	274.52	6.41
480	250.68	81.12	96.81	226.85	264.89	349.78	305.63	268.75	6.30
490	245.64	80.98	96.38	222.00	259.96	343.77	302.64	262.96	6.18
500	240.45	80.78	95.62	216.58	255.45	337.75	299.54	257.06	6.08
510	235.92	80.63	94.98	211.08	250.79	331.69	296.45	250.78	5.98
520	229.66	80.66	94.35	205.68	245.93	325.61	293.67	244.82	5.88
530	223.24	80.39	93.63	199.66	240.86	319.03	290.30	239.54	5.80
540	218.66	80.29	92.98	194.78	235.62	312.21	286.68	232.77	5.71
550	213.83	80.11	92.31	190.22	230.53	305.65	284.46	226.82	5.64
560	208.18	79.97	91.76	185.26	225.73	299.30	281.97	220.87	5.55
570	201.37	79.81	91.08	179.54	221.07	292.83	278.43	215.23	5.50
580	194.48	79.52	90.39	173.78	216.27	285.68	276.09	209.74	5.42
590	188.80	79.45	89.78	168.48	210.99	278.03	273.39	204.07	5.37

700- App-F Unit Pre-Burn Documentation (page 4 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
600	183.47	79.31	89.21	163.83	205.59	270.25	270.28	197.90	5.31
610	179.05	79.26	88.62	159.86	200.72	262.89	267.58	192.58	5.27
620	174.30	79.20	88.11	156.15	195.78	255.89	264.61	187.22	5.22
630	170.65	79.04	87.63	152.72	191.11	249.29	262.12	182.20	5.18
640	166.56	78.95	87.17	149.74	186.65	243.10	259.26	177.95	5.14
650	163.10	78.79	86.76	146.49	182.70	237.23	256.48	173.85	5.09
660	159.18	78.86	86.36	143.51	179.14	231.74	254.05	169.84	5.07
670	156.04	78.92	85.97	140.90	175.56	226.39	251.79	165.97	5.04
680	152.57	78.84	85.61	138.08	172.26	221.18	249.33	162.32	5.03
690	149.00	78.82	85.27	135.38	168.95	216.04	246.39	158.95	5.01
700	145.86	78.66	84.90	132.82	165.74	210.96	244.28	155.89	4.99
710	142.79	78.50	84.63	130.42	162.55	206.01	241.79	152.86	4.97
720	139.89	78.53	84.30	128.07	159.31	201.17	239.17	149.96	4.95
730	137.09	78.45	83.97	125.87	156.23	196.41	236.90	146.95	4.94
740	134.40	78.47	83.72	123.76	153.22	191.91	234.40	144.22	4.92
750	132.06	78.38	83.47	121.86	150.47	187.58	231.83	141.66	4.91
760	129.69	78.20	83.20	120.02	147.88	183.45	228.76	139.16	4.90
770	127.68	78.27	83.00	118.36	145.27	179.47	226.37	136.78	4.89
780	125.55	78.24	82.75	116.79	143.01	175.75	223.81	134.48	4.88
790	123.74	78.22	82.58	115.38	140.62	172.24	221.35	132.26	4.86
800	122.14	78.07	82.34	114.05	138.44	168.91	219.06	130.28	4.86
810	120.57	77.95	82.15	112.78	136.54	165.82	216.77	128.44	4.84
820	118.96	77.92	81.97	111.61	134.66	162.92	214.48	126.74	4.84
830	117.36	77.89	81.76	110.44	132.95	160.18	212.46	125.00	4.82
840	116.06	77.86	81.57	109.33	131.22	157.58	210.48	123.39	4.81
850	114.93	77.74	81.45	108.32	129.75	155.13	208.46	121.96	4.80
860	113.62	77.60	81.20	107.36	128.15	152.80	206.42	120.49	4.80
870	112.52	77.62	81.10	106.44	126.82	150.62	204.38	119.12	4.77
880	111.02	77.47	80.66	105.63	125.55	148.58	202.42	117.91	4.77
890	109.86	77.41	80.37	104.95	124.35	146.79	200.19	116.59	4.75
900	108.78	77.38	80.10	104.20	123.07	145.06	198.10	115.50	4.75

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
910	107.97	77.32	79.93	103.48	122.05	143.35	195.67	114.46	4.74
920	107.10	77.19	79.78	102.83	121.00	141.74	193.36	113.43	4.72
930	106.26	77.25	79.74	102.19	119.95	140.21	191.30	112.44	4.72
940	105.46	77.12	79.66	101.59	119.13	138.77	189.17	111.51	4.71
950	104.74	77.14	79.54	101.06	118.39	137.45	187.11	110.66	4.70
960	104.20	77.10	79.45	100.54	117.65	136.24	185.06	109.85	4.69
970	103.60	76.98	79.35	100.06	116.90	135.20	183.13	109.14	4.68
980	103.01	76.94	79.29	99.71	116.25	134.31	181.45	108.48	4.67

May 30th, 2016

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
0	264.85	76.85	92.48	294.09	320.45	401.60	370.63	335.70	7.63
10	515.17	75.82	121.35	522.31	309.56	393.50	357.99	322.24	56.75
20	658.28	79.23	139.92	766.38	322.11	381.22	345.47	346.86	52.89
30	722.15	85.93	150.31	833.33	357.18	391.10	332.16	385.36	48.64
40	740.33	85.52	154.84	842.20	396.51	407.12	320.83	412.27	44.58
50	744.70	87.54	156.55	865.19	427.18	422.17	313.26	428.38	40.83
60	624.21	88.76	133.25	806.77	442.03	433.10	311.72	430.42	38.23
70	594.09	89.74	134.08	807.28	434.81	431.76	311.33	416.87	36.13
80	586.75	86.71	132.87	812.49	426.48	426.49	308.97	407.80	34.04
90	577.98	86.42	131.68	807.70	420.53	424.80	307.01	403.21	32.02
100	572.89	85.38	131.09	809.36	419.30	426.18	304.05	402.84	30.03
110	576.79	87.16	130.98	820.52	419.36	429.73	302.74	405.34	28.06
120	567.86	87.20	130.09	814.43	421.75	435.01	299.46	408.44	26.16
130	540.94	87.02	127.67	740.89	420.28	440.77	296.55	410.79	24.51
140	514.10	87.00	124.88	674.32	415.58	448.27	292.42	410.50	23.10
150	496.88	87.20	122.99	646.44	413.13	455.01	289.85	408.26	21.77
160	487.19	87.03	121.65	623.33	412.73	459.33	289.90	408.00	20.53

700- App-F Unit Pre-Burn Documentation (page 6 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
170	467.30	86.99	119.76	583.97	411.90	462.55	288.98	407.70	19.47
180	459.83	86.67	118.34	574.10	410.84	464.78	288.02	404.53	18.58
190	456.99	86.57	117.46	553.62	404.34	462.31	288.29	404.08	17.81
200	443.69	86.32	116.43	535.40	395.48	459.45	290.26	405.23	17.13
210	429.63	86.36	114.79	510.09	386.93	457.51	293.75	404.66	16.57
220	395.33	86.05	112.15	470.77	378.59	455.05	297.85	401.54	16.18
230	376.45	85.59	110.24	439.84	371.15	448.57	299.98	396.39	15.85
240	358.86	85.51	108.63	417.28	363.68	441.31	302.59	391.33	15.56
250	343.52	85.28	107.13	396.93	355.81	435.00	306.04	386.30	15.28
260	334.13	84.99	106.11	384.28	347.51	430.17	310.11	381.10	15.02
270	326.38	84.83	105.13	373.65	339.92	426.40	313.82	376.65	14.75
280	320.51	84.76	104.46	364.78	333.10	423.59	317.10	372.88	14.50
290	315.52	84.57	103.80	357.48	328.01	421.57	320.70	368.66	14.23
300	310.10	84.31	103.31	352.04	322.45	419.69	322.44	366.04	13.98
310	305.76	84.26	102.80	346.98	318.42	417.76	324.22	363.31	13.72
320	303.35	84.18	102.36	343.47	314.85	415.69	325.25	360.90	13.48
330	301.71	84.14	102.04	340.93	311.07	413.55	326.55	358.11	13.24
340	298.04	83.72	101.75	337.93	308.31	411.60	327.06	356.47	13.01
350	295.75	83.80	101.40	334.77	305.25	409.98	327.73	354.42	12.78
360	295.69	83.63	101.13	333.33	303.02	408.65	328.61	352.33	12.54
370	295.75	83.67	100.98	331.95	301.37	407.73	328.56	350.61	12.30
380	294.20	83.62	100.81	328.66	300.44	407.82	328.23	350.19	12.07
390	292.75	83.68	100.71	327.39	299.24	408.16	327.36	348.35	11.84
400	292.09	83.59	100.52	325.99	297.80	408.00	327.54	346.35	11.62
410	289.10	83.37	100.26	321.73	296.97	407.12	325.74	343.81	11.42
420	284.15	83.26	99.84	312.92	295.18	406.03	323.94	341.14	11.22
430	279.36	83.36	99.42	305.52	293.48	403.81	320.25	337.99	11.04
440	276.01	83.24	98.98	299.66	290.74	400.39	316.45	333.95	10.86
450	272.89	83.04	98.60	295.05	288.32	396.37	313.31	329.91	10.68
460	268.82	82.85	98.18	290.00	285.65	392.26	310.75	326.45	10.51
470	263.20	82.81	97.70	282.26	282.73	387.74	307.79	322.24	10.35

700- App-F Unit Pre-Burn Documentation (page 7 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
480	258.74	82.73	97.22	276.86	279.52	383.45	305.99	317.33	10.20
490	256.51	82.61	96.86	273.09	276.83	379.40	303.18	312.01	10.04
500	254.08	82.50	96.54	269.89	274.45	374.73	301.07	307.53	9.89
510	251.43	82.38	96.33	266.42	272.32	369.87	298.20	303.31	9.75
520	248.02	82.46	95.97	262.12	270.14	364.94	296.09	299.86	9.61
530	245.77	82.25	95.63	258.98	267.64	359.78	293.23	295.51	9.47
540	242.99	82.07	95.35	255.50	264.88	354.97	290.30	291.85	9.34
550	240.11	82.10	94.97	251.11	262.03	350.32	287.63	288.18	9.20
560	236.74	81.96	94.65	247.23	258.81	345.65	284.08	285.12	9.08
570	234.28	81.88	94.30	243.29	256.10	341.06	281.45	282.41	8.96
580	230.92	81.81	93.90	239.37	252.68	336.37	278.72	279.20	8.82
590	228.60	81.71	93.51	235.67	249.28	331.79	276.08	276.45	8.70
600	225.86	81.66	93.38	232.18	246.20	327.55	273.53	273.70	8.60
610	222.98	81.32	93.00	228.22	242.63	323.36	271.08	270.06	8.50
620	219.69	81.40	92.64	224.55	239.48	319.21	269.24	266.03	8.39
630	215.60	81.31	92.28	219.63	236.26	314.91	266.88	262.00	8.30
640	211.83	81.13	91.85	214.49	232.68	310.43	264.84	257.40	8.20
650	208.56	80.99	91.53	210.37	229.16	305.73	261.66	252.82	8.11
660	205.44	80.91	91.16	206.96	225.77	301.12	258.21	248.37	8.01
670	203.16	80.69	90.86	204.04	222.62	296.81	254.58	244.44	7.94
680	201.08	80.65	90.61	201.81	219.61	293.09	250.42	240.94	7.84
690	197.97	80.54	90.24	198.65	217.03	289.79	247.73	237.72	7.76
700	195.51	80.54	89.95	195.22	214.16	286.50	245.17	234.00	7.69

700- App-F Unit Pre-Burn Documentation (page 8 of 13)

May 31st, 2016

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
0	374.80	78.59	108.19	362.69	419.93	490.36	449.78	413.41	7.13
10	652.57	78.71	149.20	641.25	409.48	484.63	448.22	405.47	53.58
20	722.49	80.58	154.64	753.26	439.60	471.97	435.77	443.36	48.47
30	741.92	83.01	158.66	820.59	465.06	469.61	419.39	465.05	44.03
40	749.28	85.93	163.11	859.36	485.21	470.89	403.27	473.06	39.85
50	758.02	86.68	166.29	881.74	502.78	473.88	390.45	481.46	35.72
60	754.23	86.79	165.39	883.82	518.50	479.88	382.63	495.88	31.89
70	742.28	88.26	163.53	903.03	527.35	487.69	377.16	509.66	28.41
80	737.61	88.08	162.42	912.96	534.94	496.22	375.90	525.85	25.25
90	708.95	89.48	157.61	866.59	540.13	505.67	375.30	541.46	22.54
100	679.86	89.21	153.48	820.84	539.12	516.35	376.69	552.14	20.39
110	642.17	88.62	147.92	761.13	537.54	529.48	379.92	557.32	18.60
120	599.99	89.33	142.31	708.45	533.75	545.20	383.33	557.90	17.23
130	561.27	88.17	136.83	652.99	525.16	558.00	387.89	551.54	16.26
140	524.34	87.20	132.48	584.64	513.40	566.25	394.18	543.19	15.58
150	490.16	86.99	128.04	528.87	500.85	567.26	400.90	532.38	15.04
160	467.16	86.71	125.20	492.11	486.83	562.90	405.89	520.87	14.56
170	451.34	86.54	122.89	468.56	467.56	556.71	409.10	509.98	14.15
180	439.57	85.94	121.15	455.19	451.47	550.12	411.52	499.88	13.68
190	427.70	85.22	119.62	441.03	437.81	542.37	412.70	490.83	13.28
200	419.54	85.15	118.17	430.07	426.24	534.40	413.48	481.36	12.90
210	412.13	85.10	117.30	419.55	416.80	527.60	413.62	473.07	12.55
220	401.86	84.72	115.98	404.76	409.98	521.29	413.41	465.84	12.18
230	393.65	84.64	114.91	394.82	404.44	514.33	411.14	460.01	11.85
240	389.97	84.62	114.17	390.24	398.72	507.61	408.91	453.63	11.48
250	382.66	84.23	113.34	382.82	394.54	501.20	406.69	447.41	11.15
260	378.22	84.03	112.41	375.81	391.46	494.36	404.69	442.45	10.83
270	372.57	83.52	111.77	368.82	388.43	486.24	402.50	437.19	10.50
280	367.14	83.55	111.11	365.47	384.67	477.36	399.81	432.04	10.18

700- App-F Unit Pre-Burn Documentation (page 9 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
290	363.35	83.65	110.65	362.82	381.12	470.43	397.25	421.73	9.85
300	357.11	83.40	109.95	356.02	378.19	464.21	394.02	408.97	9.58
310	292.24	84.23	100.99	325.64	348.19	404.28	313.15	323.77	12.35
320	288.63	84.16	100.60	322.20	344.81	401.64	311.52	321.88	12.14
330	285.02	83.85	100.15	317.92	341.38	398.94	310.11	320.35	11.92
340	283.35	83.86	99.84	311.06	338.20	396.00	308.25	317.79	11.72
350	281.51	83.90	99.52	306.62	335.94	393.55	305.90	314.57	11.52
360	280.50	83.47	99.25	303.24	333.02	391.93	303.94	310.88	11.32
370	278.95	83.45	99.05	300.40	330.48	390.57	301.60	307.38	11.12
380	276.53	83.31	98.64	299.21	327.96	389.32	300.39	304.04	10.92
390	275.77	83.15	98.40	297.35	325.50	387.95	299.02	301.48	10.74
400	273.53	83.00	98.20	294.38	323.67	386.47	297.37	298.18	10.55
410	272.65	82.84	98.07	292.68	322.21	385.25	295.75	294.56	10.34
420	271.73	82.76	97.86	290.19	321.75	384.26	294.05	291.19	10.17
430	270.22	82.82	97.52	287.73	321.35	383.35	292.61	288.16	9.98
440	269.14	82.87	97.45	285.10	319.85	382.25	289.47	285.30	9.81
450	267.15	82.75	97.01	282.66	319.08	380.55	287.54	282.63	9.66
460	265.80	82.51	96.92	280.05	317.21	378.65	284.83	280.13	9.49
470	261.81	82.55	96.60	277.44	314.56	376.55	282.09	277.50	9.33
480	257.25	82.22	96.17	271.27	310.64	373.69	279.60	274.79	9.19
490	253.16	82.36	95.74	265.44	305.16	369.56	276.92	271.93	9.05
500	250.05	82.25	95.40	260.33	299.91	364.84	273.68	268.59	8.91
510	246.16	82.13	94.94	255.59	295.35	360.10	270.88	266.11	8.76
520	242.08	81.95	94.58	250.41	290.45	355.38	268.20	263.11	8.64
530	239.20	81.80	94.24	246.30	285.24	350.72	265.98	259.91	8.50
540	236.71	81.80	93.88	242.67	280.98	346.38	263.44	256.84	8.39
550	233.55	81.69	93.53	238.93	276.05	342.34	260.96	253.71	8.27
560	230.51	81.53	93.12	235.17	271.60	338.26	258.99	250.65	8.15
570	228.01	81.06	92.82	232.22	267.86	334.16	257.41	247.95	8.03
580	226.63	81.36	92.56	230.08	264.15	330.41	256.02	245.70	7.91
590	224.78	80.93	92.32	227.50	260.64	326.94	254.03	244.18	7.79

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
600	222.14	81.10	91.98	224.09	256.74	323.43	252.64	242.66	7.69
610	220.11	80.71	91.84	221.82	252.59	320.20	251.08	240.92	7.58
620	217.42	80.60	91.48	218.83	248.40	316.99	249.68	238.96	7.46
630	214.97	80.79	91.22	215.94	244.90	313.73	248.76	236.91	7.36
640	212.69	80.63	90.90	212.91	241.40	310.34	247.37	234.59	7.26
650	210.88	80.33	90.69	210.17	238.00	306.86	245.90	232.61	7.17
660	209.48	80.31	90.46	208.33	234.78	303.59	244.97	230.50	7.06
670	207.85	80.27	90.26	207.68	232.24	300.40	243.29	228.54	6.97
680	204.37	80.18	89.87	204.02	229.45	296.70	241.82	225.89	6.88

June 2nd, 2016

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
0	257.07	79.25	90.99	260.76	291.62	366.80	344.69	301.64	5.71
10	718.72	80.07	106.94	747.45	290.29	367.86	333.09	299.74	52.51
20	753.83	81.72	109.59	874.94	326.56	378.71	324.39	349.74	47.36
30	728.65	82.74	108.61	857.37	358.06	391.78	320.93	378.49	43.49
40	753.46	83.64	108.90	879.90	382.62	400.08	318.02	401.87	39.39
50	757.36	83.50	109.29	882.87	410.37	410.91	314.26	425.13	35.33
60	754.74	84.34	109.54	872.87	435.87	422.95	313.67	447.11	31.49
70	758.33	84.98	110.30	891.53	459.77	437.36	316.37	468.64	27.82
80	644.64	85.05	102.94	833.26	479.63	453.89	324.12	487.82	24.74
90	571.04	83.65	99.92	800.59	470.43	454.40	337.54	476.77	23.09
100	539.78	83.59	97.13	780.40	450.53	448.37	345.51	455.24	21.65
110	519.57	83.29	96.77	749.10	435.13	447.51	348.13	440.23	20.23
120	489.25	83.73	95.16	647.45	425.20	451.44	347.80	428.36	18.97
130	484.27	83.69	94.19	633.41	408.83	453.26	347.06	424.93	17.79
140	464.08	83.10	94.02	609.45	396.41	455.76	344.90	424.18	16.70
150	441.94	82.82	93.81	562.74	388.14	459.17	345.29	416.97	15.82

700- App-F Unit Pre-Burn Documentation (page 11 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
160	427.06	82.69	92.52	535.07	382.29	459.75	344.66	411.28	15.05
170	376.08	82.60	91.57	469.56	375.25	461.42	344.00	399.75	14.58
180	350.11	82.08	90.21	437.13	368.17	459.61	344.67	385.89	14.24
190	330.16	81.98	89.80	406.12	361.37	452.40	346.31	374.31	13.96
200	317.73	81.65	88.50	387.58	354.22	444.72	346.89	364.79	13.73
210	306.96	81.57	88.22	373.30	347.67	438.09	347.69	356.44	13.48
220	299.26	81.20	88.13	361.95	341.79	433.08	348.64	350.24	13.24
230	292.31	80.64	87.45	351.96	335.90	429.32	349.51	344.18	13.02
240	287.34	80.76	87.15	344.53	331.02	426.53	350.11	339.39	12.78
250	285.15	80.89	86.91	340.31	326.52	425.28	351.08	334.60	12.55
260	279.89	80.96	86.76	332.76	323.30	423.63	350.63	331.42	12.33
270	274.86	80.64	86.79	325.80	319.36	420.17	347.25	328.59	12.11
280	272.25	80.67	86.28	320.88	315.70	416.66	341.90	324.50	11.91
290	268.20	80.74	85.82	316.03	311.75	413.04	336.53	320.47	11.70
300	265.18	80.53	85.48	311.80	307.84	409.53	332.15	317.16	11.51
310	262.75	80.67	85.89	307.16	304.68	406.05	328.27	312.68	11.32
320	259.39	80.39	85.49	303.23	301.45	402.62	324.95	309.14	11.13
330	257.83	80.27	85.61	299.88	298.56	399.46	321.94	305.30	10.95
340	256.46	80.34	85.31	297.27	294.61	396.46	319.78	302.67	10.77
350	255.06	80.11	85.50	294.66	291.68	393.56	316.67	299.94	10.58
360	252.81	80.23	84.94	291.70	287.65	390.78	315.17	298.30	10.42
370	250.90	80.15	85.23	286.79	284.54	388.15	314.25	296.07	10.25
380	248.25	80.13	84.78	282.63	281.54	385.94	311.32	293.80	10.09
390	246.90	79.80	84.64	279.38	278.87	383.57	307.08	291.22	9.92
400	245.51	79.97	84.72	277.14	276.86	380.96	304.20	288.42	9.75
410	244.50	80.00	84.52	274.71	274.96	378.38	301.93	286.40	9.59
420	242.18	80.12	84.33	272.36	273.83	375.82	300.17	284.21	9.44
430	240.72	79.89	84.32	269.85	271.95	373.65	297.80	282.31	9.27
440	239.67	79.67	84.10	267.44	269.58	371.77	295.43	280.55	9.13
450	238.76	79.67	84.09	265.53	267.53	369.86	292.79	278.83	8.96
460	237.79	79.63	83.62	263.64	265.57	368.08	289.86	277.14	8.82

700- App-F Unit Pre-Burn Documentation (page 12 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
470	236.74	79.73	83.91	262.22	263.85	366.42	285.68	275.41	8.67
480	235.36	79.60	83.65	260.14	261.76	364.57	281.33	273.80	8.53
490	233.31	79.56	83.49	257.40	259.61	362.26	277.50	271.94	8.39
500	231.86	79.51	83.65	254.49	257.57	358.99	274.66	270.41	8.25
510	230.21	79.51	82.86	251.69	255.36	355.54	271.71	269.26	8.12
520	227.36	79.32	83.60	246.48	253.46	352.07	268.61	267.31	7.99
530	224.57	78.93	82.98	241.92	249.95	348.12	264.92	265.41	7.88
540	222.46	79.29	82.83	238.23	245.81	343.65	261.09	263.63	7.77
550	217.97	79.21	82.97	233.49	242.63	338.22	257.96	261.43	7.66
560	212.45	79.22	82.45	226.45	238.90	331.18	255.10	258.25	7.59
570	207.12	79.16	82.72	219.64	234.81	322.87	251.88	254.75	7.50
580	202.58	78.81	82.21	213.70	230.04	314.49	249.42	250.48	7.42
590	198.78	78.79	82.30	208.61	225.33	306.52	246.97	246.02	7.35
600	195.27	78.71	82.27	204.66	220.66	299.31	245.22	241.66	7.27
610	191.98	78.78	81.97	200.74	216.31	292.76	242.99	237.35	7.20
620	189.05	78.62	81.36	197.49	212.09	286.72	240.41	233.43	7.12
630	186.63	78.65	81.35	194.40	208.09	281.30	237.77	229.68	7.05
640	184.28	78.67	81.94	191.92	204.06	276.41	235.72	226.29	6.98
650	182.28	78.49	81.43	189.35	200.62	272.08	233.81	222.51	6.90
660	180.47	78.44	81.46	187.25	196.77	268.11	231.91	219.21	6.83
670	178.66	78.42	81.41	184.84	193.72	264.43	230.11	216.29	6.77
680	176.57	78.47	80.81	182.39	190.49	260.96	228.18	213.26	6.72
690	174.29	78.41	81.14	179.58	187.67	257.68	226.46	210.06	6.64
700	171.91	78.29	81.14	176.15	184.76	254.57	224.71	206.71	6.59
710	168.65	78.14	80.94	172.58	181.95	251.26	223.36	203.16	6.54
720	166.32	78.14	80.93	169.73	179.21	248.05	221.99	198.62	6.49
730	163.95	78.19	80.42	166.94	176.57	244.83	221.05	194.14	6.44
740	161.55	78.05	80.75	164.33	173.89	241.28	219.98	190.41	6.39
750	159.13	77.84	80.68	161.73	171.44	237.61	218.46	186.59	6.35
760	156.78	77.77	80.44	159.17	168.86	233.98	217.40	182.79	6.31
770	154.41	77.64	79.75	156.92	166.58	230.47	216.23	179.65	6.27

700- App-F Unit Pre-Burn Documentation (page 13 of 13)

Elapsed Time (min)	Flue temp °F	Room temp °F	Tunnel dry bulb °F	top °F	back °F	right °F	left °F	bottom °F	scale lbs
780	152.79	77.61	80.02	155.25	164.28	227.06	214.91	176.49	6.23
790	150.70	77.70	81.86	153.65	162.33	223.82	213.62	174.05	6.19
800	150.30	77.81	81.58	153.75	160.43	221.11	212.28	171.44	6.14
810	148.65	77.70	81.56	152.44	159.08	218.81	211.36	169.31	6.09
820	146.04	77.71	81.14	149.32	157.77	216.32	210.28	167.02	6.06
830	143.01	77.67	80.98	146.17	155.90	213.14	209.00	164.50	6.03
840	140.36	77.72	80.97	143.16	153.53	209.50	207.96	161.93	6.01
850	137.54	77.74	80.78	140.66	151.41	205.68	207.06	159.01	5.98
860	135.55	77.62	80.50	138.34	149.12	201.97	206.23	156.25	5.96
870	133.16	77.51	80.39	135.98	146.89	198.37	205.39	153.78	5.93
880	130.85	77.53	80.15	133.64	144.80	194.78	204.70	151.41	5.92
890	128.67	77.40	80.06	131.40	142.70	191.26	203.77	149.04	5.91
900	126.52	77.38	79.91	129.18	140.70	187.82	203.00	146.58	5.89
910	124.49	77.34	79.72	127.18	138.76	184.48	202.30	144.33	5.87
920	122.53	77.32	79.68	125.24	136.88	181.26	201.55	142.34	5.86
930	120.81	77.31	79.56	123.43	135.15	178.20	200.82	140.18	5.84
940	119.22	77.38	79.45	121.71	133.47	175.28	200.03	138.07	5.83
950	117.44	77.39	79.28	120.10	131.86	172.50	199.41	136.24	5.82
960	115.97	77.46	79.15	118.58	130.36	169.85	198.89	134.50	5.81
970	114.49	77.46	79.13	117.21	128.90	167.36	198.09	132.85	5.80
980	113.21	77.52	79.26	115.89	127.55	165.00	197.33	131.29	5.79
990	112.05	77.68	79.27	114.88	126.32	162.80	196.23	129.58	5.78

800- App-G Stack Loss Efficiency data and Results

Appendix G

Stack Loss Efficiency Data/Results

VERSION: 2.4 2010-04-15

Manufacturer:	SBI		Appliance Type:	Non-Cat (Cat, Non-Cat, Pellet)
Model:	FP-15 Series			
Date:	2016-06-10		Temp. Units	F (F or C)
Run:	3		Weight Units	lb (kg or lb)
Control #:	QC20160608			
Test Duration:	680			
Output Category:	2			

Default Fuel Values

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

Wood Moisture (% wet):	20.13
Load Weight (lb wet):	51.38
Burn Rate (dry kg/h):	1.64
Total Particulate Emissions:	12.265 g

Fuel Data

	Beech	
HHV	18 800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

	Averages	0.38	5.05	15.43	347.26	75.42
					Temp. (ºF)	
Elapsed	Fuel Weight	Flue Gas Composition (%)			Flue	Room
Time (min)	Remaining (lb)	CO	CO_2	O_2	Gas	Temp
0	51.38	0.35	3.75	15.53	293.6	75.5
10	46.59	1.27	13.67	6.89	695.2	75.8
20	41.44	0.91	13.76	6.98	760.1	76.7
30	36.80	1.66	14.61	6.12	802.0	77.5
40	32.13	1.01	14.74	6.24	820.4	78.4
50	28.38	0.63	11.15	10.15	697.7	79.3
60	26.08	0.50	11.05	10.08	615.2	79.1
70	23.76	0.52	11.38	9.70	597.9	78.2
80	21.49	0.43	11.42	9.73	599.2	78.1
90	19.31	0.44	11.59	9.46	595.2	79.4
100	17.20	0.46	11.48	9.46	590.9	78.4
110	15.22	0.36	11.11	9.52	574.9	79.5
120	13.50	0.23	10.16	10.66	564.8	80.0
130	12.05	0.22	9.35	11.24	540.7	79.3
140	10.82	0.30	8.94	11.41	521.2	76.8
150	9.84	0.15	7.36	12.86	497.3	79.8
160	9.25	0.29	6.46	13.70	457.9	79.1
170	8.70	0.35	5.84	14.58	423.2	77.6
180	8.25	0.40	5.38	14.88	401.3	73.9
190	7.91	0.44	4.91	15.33	369.5	73.1
200	7.60	0.46	4.81	15.47	348.6	71.9
210	7.32	0.42	4.72	15.53	335.1	72.3
220	7.02	0.43	4.70	15.59	325.3	72.1
230	6.75	0.43	4.65	15.61	318.0	71.8
240	6.48	0.46	4.36	15.98	310.5	72.1

800- App-G Stack Loss Efficiency data and Results (page 3 of 16)

250	6.24	0.41	4.22	16.10	301.0	71.7
260	5.99	0.40	4.13	16.20	296.4	71.6
270	5.75	0.41	4.09	16.15	289.6	70.8
280	5.55	0.41	4.03	16.23	287.3	71.3
290	5.34	0.37	3.97	16.33	284.3	71.2
300	5.11	0.36	3.82	16.48	279.9	71.4
310	4.90	0.35	3.81	16.53	276.9	71.6
320	4.69	0.38	3.60	16.71	275.2	71.8
330	4.52	0.36	3.57	16.77	272.4	71.2
340	4.30	0.37	3.52	16.81	269.8	70.4
350	4.14	0.36	3.50	16.89	268.1	71.2
360	3.94	0.33	3.39	16.98	265.0	71.1
370	3.76	0.34	3.37	17.01	262.6	71.2
380	3.59	0.33	3.30	17.07	261.2	71.7
390	3.41	0.31	3.20	17.18	259.0	71.9
400	3.24	0.31	3.15	17.27	257.3	71.8
410	3.08	0.30	3.00	17.40	255.0	70.8
420	2.91	0.29	2.91	17.51	252.9	72.3
430	2.74	0.29	2.85	17.58	250.9	72.1
440	2.59	0.28	2.77	17.66	248.9	71.1
450	2.44	0.28	2.74	17.69	246.6	71.4
460	2.30	0.27	2.68	17.78	244.5	71.0
470	2.17	0.27	2.63	17.80	242.2	73.1
480	2.05	0.26	2.62	17.83	241.8	76.5
490	1.93	0.2606	2.61	17.83	240.875	77.9416
500	1.82	0.2651	2.62	17.91	240.219	78.3901
510	1.72	0.2526	2.49	18.07	238.888	78.6828
520	1.61	0.2516	2.47	18.09	238.607	78.7297
530	1.51	0.2388	2.4	18.17	236.629	78.6965
540	1.41	0.2326	2.37	18.22	234.638	78.8208
550	1.30	0.2269	2.34	18.25	232.651	78.8207
560	1.21	0.2179	2.26	18.33	230.375	78.8257
570	1.10	0.2134	2.28	18.33	227.776	78.4933
580	1.00	0.2146	2.29	18.29	226.074	78.8713
590	0.89	0.205	2.26	18.36	225.566	78.8922
600	0.78	0.1977	2.15	18.49	223.598	78.5712
610	0.70	0.21	2.08	18.51	221.652	78.054
620	0.60	0.1967	1.99	18.65	219.603	78.1491
630	0.51	0.185	1.88	18.79	216.383	78.1663
640	0.42	0.172	1.76	18.93	211.938	77.9522
650	0.34	0.1652	1.69	19	207.626	77.9082
660	0.25	0.3363	1.7	17.49	203.728	78.0526
670	0.06	0.3788	3.28	17	217.58	78.0353
680	0.00	0.3486	3.06	17.28	221.354	78.0432

SpecDIRECT POWERED BY Intertek

Manufacturer: SBI
Model: FP-15 Series
Date: 06-10-16
Run: 3
Control #: QC20160608
Test Duration: 680 min

	HHV	LHV
Eff	65.06%	69.70%
Comb Eff	94.88%	94.88%
HT Eff	68.57%	73.46%
Output	20 095	kJ/h
Burn Rate	1.64	kg/h
Grams CO	1 343	g
Input	30 886	kJ/h
MC wet	20.13	

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.

Overall Heating Efficiency: 65.06%
Combustion Efficiency: 94.88%
Heat Transfer Efficiency: 68.57%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	29.43
Dry Moles Exhaust Gas (N_t)	630.39
Air Fuel Ratio (A/F)	18.04

%HC 1.32

Heat Output: 19 062 Btu/h 20 095 kJ/h
Heat Input: 29 299 Btu/h 30 886 kJ/h

Ultimate CO_2
$CO_{2\text{-ult}}$ 20.77
F_0 1.001

Burn Duration: 11.33 h
Burn Rate: 3.62 lb/h 1.643 kg/h
Stack Temp: 348.0 Deg. F 175.6 Deg. C

Combustion Efficiency: 94.88%
Total Input (kJ): 350 045 332 001 (Btu)
Total Output (kJ): 227 739 215 999 (Btu)
Efficiency: 65.06%
Total CO (g): 1343.27

Moisture of Wood (wet basis): 20.13
Initial Dry Weight W_{d0} (kg): 18.62
Moisture Content Dry 25.20

Moisture Content MC_{wb}: 20.13
Dry kg: 18.62
CA: 48.7
HY: 5.8
OX: 44.9

Load Weight (kg): 23.31

Fuel Heating Value in kJ/kg - CV	HHV	LHV		HHV	LHV
	18 800	17 549	Btu/lb	8088.0	7549.9

INPUT DATA: Elapsed Time	INPUT DATA: Weight Remaining (kg)	INPUT DATA: % CO [e]	INPUT DATA: % CO_2 [d]	Oxygen Calculation: Excess Air EA	Oxygen Calculation: Total O_2	Oxygen Calculation: Calc. % O_2 [g]	Input Data: Flue Gas (°C)	Input Data: Room Temp (°C)	Combust Eff %	Heat Transfer %	Net Eff %	Air Fuel Ratio	Wet Wt Now Wt	% Wet Consumed x	Dry Wt. Now Wt_{dn}	% Dry Comsumed y	Total Input	Fuel Properties: Carbon /12= [a]	Fuel Properties: Hydrogen /1= [b]	Fuel Properties: Oxygen /16= [c]	Fuel Properties: Calorific Value	Mw Moisture Fuel Burnt	Mass Balance (moles/100 mole dry flue gas): [h]	[u]	[w]	[j]	[k]	kg Wood per 100 mole dfp Nk	Moles per kg of Dry Wood: CO_2	O_2	CO	HC	N_2	H_2O
	Averages	0.38	5.05	4.40	20.90	15.66	175.14	24.12	94.3%	67.9%	64.1%	30.46	3.87	83.38	3.12	83.23	350278	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	1.34	3.84	0.03	0.13	37.41	182.08	3.25	0.17	834.74	28.84
0	23.31	0.35	3.75	406.3%	20.91	16.98	145.3	24.2	93.7%	68.3%	63.9%	28.5	23.31	0.00	18.62	0.00	0	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	1.02	2.90	0.02	0.10	37.11	168.04	3.50	0.22	780.94	28.73
10	21.14	1.27	13.67	39.0%	20.82	6.51	368.4	24.4	92.7%	69.5%	64.5%	7.7	21.14	9.33	16.88	9.33	50171	4.06	5.80	2.81	18800.00	20.13	78.54	20.83	3.72	10.47	0.16	0.37	36.95	17.61	3.44	0.44	212.28	28.30
20	18.80	0.91	13.76	41.6%	20.82	6.61	404.5	24.8	94.7%	67.6%	64.0%	7.9	18.80	19.34	15.02	19.34	33338	4.06	5.80	2.81	18800.00	20.13	78.72	20.88	3.64	10.34	0.11	0.36	38.01	18.25	2.51	0.31	217.44	28.55
30	16.70	1.66	14.61	27.7%	20.81	5.37	427.8	25.3	91.3%	67.1%	61.2%	7.1	16.70	28.38	13.34	28.38	31719	4.06	5.80	2.81	18800.00	20.13	78.36	20.79	4.06	11.35	0.22	0.40	36.18	13.30	4.11	0.53	194.06	28.11
40	14.58	1.01	14.74	31.9%	20.81	5.57	438.0	25.8	94.5%	66.8%	63.2%	7.4	14.58	37.46	11.64	37.46	28699	4.06	5.80	2.81	18800.00	20.13	78.68	20.87	3.91	11.09	0.13	0.39	37.90	14.32	2.60	0.33	202.28	28.52
50	12.87	0.63	11.15	76.4%	20.85	9.38	369.8	26.3	95.6%	66.1%	63.2%	9.9	12.87	44.77	10.28	44.77	20628	4.06	5.80	2.81	18800.00	20.13	78.84	20.91	2.92	8.33	0.07	0.29	38.42	32.32	2.17	0.24	271.63	28.69
60	11.83	0.50	11.05	79.9%	20.85	9.55	324.0	26.1	96.5%	69.2%	66.8%	10.1	11.83	49.25	9.45	49.25	15740	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	2.86	8.18	0.05	0.28	38.90	33.62	1.75	0.19	277.74	28.80
70	10.78	0.52	11.38	74.6%	20.85	9.21	314.4	25.7	96.4%	70.3%	67.8%	9.8	10.78	53.77	8.61	53.77	15634	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	2.94	8.43	0.06	0.29	38.88	31.45	1.76	0.19	269.52	28.79
80	9.75	0.43	11.42	75.4%	20.85	9.21	315.1	25.6	97.1%	70.4%	68.3%	9.9	9.75	58.18	7.79	58.18	15129	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	2.93	8.41	0.04	0.29	39.22	31.64	1.46	0.15	271.09	28.88
90	8.76	0.44	11.59	72.7%	20.84	9.04	312.9	26.3	97.0%	70.8%	68.7%	9.7	8.76	62.41	7.00	62.41	14606	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	2.97	8.54	0.05	0.30	39.20	30.56	1.48	0.15	266.95	28.87
100	7.80	0.46	11.48	73.9%	20.84	9.13	310.5	25.8	96.8%	70.8%	68.5%	9.8	7.80	66.52	6.23	66.52	13950	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	2.96	8.47	0.05	0.29	39.08	31.09	1.58	0.17	268.69	28.84
110	6.91	0.36	11.11	81.1%	20.85	9.56	301.6	26.4	97.5%	70.9%	69.2%	10.2	6.91	70.38	5.52	70.38	12591	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	2.84	8.15	0.03	0.28	39.41	33.90	1.29	0.12	280.14	28.93
120	6.13	0.23	10.16	99.9%	20.86	10.58	296.0	26.7	98.3%	70.0%	68.8%	11.3	6.13	73.72	4.89	73.72	10803	4.06	5.80	2.81	18800.00	20.13	79.03	20.96	2.56	7.41	0.02	0.25	39.86	41.51	0.91	0.06	310.00	29.05
130	5.47	0.22	9.35	117.2%	20.86	11.41	282.6	26.3	98.4%	69.6%	68.4%	12.3	5.47	76.55	4.37	76.55	9155	4.06	5.80	2.81	18800.00	20.13	79.03	20.96	2.36	6.82	0.01	0.23	39.86	48.62	0.92	0.05	336.89	29.07
140	4.91	0.30	8.94	124.7%	20.87	11.77	271.8	24.9	97.5%	69.5%	67.8%	12.7	4.91	78.95	3.92	78.95	7517	4.06	5.80	2.81	18800.00	20.13	78.98	20.95	2.28	6.58	0.02	0.23	39.39	51.88	1.34	0.10	347.97	28.97
150	4.46	0.15	7.36	176.7%	20.88	13.45	258.5	26.5	98.8%	67.3%	66.5%	15.7	4.46	80.85	3.57	80.85	5346	4.06	5.80	2.81	18800.00	20.13	79.05	20.97	1.85	5.36	0.00	0.18	40.03	73.13	0.80	0.00	429.92	29.18
160	4.20	0.29	6.46	207.9%	20.89	14.28	236.6	26.2	96.9%	66.9%	64.8%	17.4	4.20	82.00	3.35	82.00	3878	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	1.67	4.80	0.02	0.17	38.99	86.22	1.73	0.10	476.68	28.97
170	3.95	0.35	5.84	235.7%	20.89	14.88	217.3	25.4	95.8%	66.9%	64.1%	18.9	3.95	83.06	3.15	83.06	3378	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	1.53	4.39	0.02	0.15	38.38	97.76	2.29	0.16	518.70	28.85
180	3.75	0.40	5.38	259.1%	20.89	15.31	205.2	23.3	94.7%	66.5%	62.9%	20.2	3.75	83.93	2.99	83.93	2686	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	1.43	4.09	0.03	0.14	37.77	107.48	2.84	0.22	553.88	28.73
190	3.59	0.44	4.91	288.3%	20.90	15.77	187.5	22.8	93.7%	66.9%	62.7%	21.8	3.59	84.60	2.87	84.60	2244	4.06	5.80	2.81	18800.00	20.13	78.88	20.92	1.33	3.78	0.04	0.13	37.22	119.53	3.33	0.27	598.00	28.63
200	3.45	0.46	4.81	294.3%	20.90	15.86	175.9	22.2	93.3%	68.0%	63.4%	22.1	3.45	85.22	2.75	85.22	2016	4.06	5.80	2.81	18800.00	20.13	78.87	20.92	1.31	3.72	0.04	0.13	37.00	122.01	3.53	0.29	606.79	28.59
210	3.32	0.42	4.72	304.3%	20.90	15.97	168.4	22.4	93.8%	68.7%	64.5%	22.7	3.32	85.75	2.65	85.75	1969	4.06	5.80	2.81	18800.00	20.13	78.89	20.93	1.27	3.63	0.03	0.13	37.27	126.08	3.30	0.26	622.86	28.66
220	3.18	0.43	4.70	305.1%	20.90	15.99	162.9	22.3	93.6%	69.4%	65.0%	22.8	3.18	86.34	2.54	86.34	1944	4.06	5.80	2.81	18800.00	20.13	78.89	20.92	1.27	3.62	0.03	0.13	37.17	126.43	3.39	0.27	623.94	28.64
230	3.06	0.43	4.65	308.9%	20.90	16.03	158.9	22.1	93.5%	69.8%	65.3%	23.0	3.06	86.86	2.45	86.86	1843	4.06	5.80	2.81	18800.00	20.13	78.89	20.92	1.26	3.59	0.03	0.13	37.12	128.00	3.44	0.27	629.72	28.63
240	2.94	0.46	4.36	331.3%	20.90	16.31	154.7	22.3	92.7%	69.2%	64.2%	24.2	2.94	87.39	2.35	87.39	1739	4.06	5.80	2.81	18800.00	20.13	78.87	20.92	1.20	3.39	0.04	0.12	36.67	137.20	3.84	0.31	663.33	28.55
250	2.83	0.41	4.22	348.3%	20.90	16.48	149.5	22.0	93.2%	69.4%	64.7%	25.2	2.83	87.85	2.26	87.85	1649	4.06	5.80	2.81	18800.00	20.13	78.89	20.93	1.15	3.27	0.03	0.11	36.93	144.17	3.63	0.27	690.30	28.63
260	2.72	0.40	4.13	358.8%	20.90	16.58	146.9	22.0	93.4%	69.5%	64.9%	25.8	2.72	88.34	2.17	88.34	1688	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	1.12	3.20	0.03	0.11	37.01	148.51	3.56	0.26	706.93	28.66
270	2.61	0.41	4.09	361.3%	20.90	16.61	143.1	21.5	93.1%	69.8%	65.0%	25.9	2.61	88.82	2.08	88.82	1520	4.06	5.80	2.81	18800.00	20.13	78.89	20.93	1.12	3.18	0.03	0.11	36.82	149.53	3.72	0.28	710.28	28.62
280	2.52	0.41	4.03	368.2%	20.90	16.67	141.8	21.9	93.1%	69.8%	65.0%	26.3	2.52	89.20	2.01	89.20	1385	4.06	5.80	2.81	18800.00	20.13	78.89	20.93	1.10	3.13	0.03	0.11	36.84	152.38	3.72	0.27	721.11	28.63
290	2.42	0.37	3.97	378.5%	20.91	16.75	140.2	21.8	93.7%	69.8%	65.4%	26.9	2.42	89.61	1.93	89.61	1499	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	1.08	3.07	0.03	0.11	37.12	156.60	3.48	0.24	737.76	28.70
300	2.32	0.36	3.82	397.3%	20.91	16.91	137.7	21.9	93.7%	69.5%	65.2%	28.0	2.32	90.06	1.85	90.06	1489	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	1.03	2.96	0.02	0.10	37.13	164.36	3.47	0.22	767.09	28.73
310	2.22	0.35	3.81	399.6%	20.91	16.92	136.1	22.0	93.9%	69.8%	65.5%	28.1	2.22	90.46	1.78	90.46	1424	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	1.03	2.94	0.02	0.10	37.21	165.28	3.40	0.21	770.78	28.75
320	2.13	0.38	3.60	422.3%	20.91	17.12	135.1	22.1	93.0%	68.9%	64.1%	29.4	2.13	90.87	1.70	90.87	1303	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	0.99	2.81	0.03	0.10	36.72	174.60	3.85	0.26	804.73	28.66
330	2.05	0.36	3.57	428.7%	20.91	17.16	133.6	21.8	93.3%	69.0%	64.4%	29.7	2.05	91.20	1.64	91.20	1328	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	0.97	2.78	0.02	0.10	36.88	177.24	3.71	0.24	815.12	28.70
340	1.95	0.37	3.52	434.6%	20.91	17.21	132.1	21.3	93.1%	68.9%	64.1%	30.1	1.95	91.63	1.56	91.63	1304	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	0.96	2.75	0.02	0.10	36.76	179.67	3.82	0.25	823.98	28.68
350	1.88	0.36	3.50	438.5%	20.91	17.23	131.2	21.8	93.2%	69.1%	64.4%	30.3	1.88	91.95	1.50	91.95	1221	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	0.96	2.73	0.02	0.10	36.83	181.30	3.76	0.24	830.33	28.70
360	1.79	0.33	3.39	457.9%	20.91	17.35	129.4	21.7	93.5%	68.8%	64.3%	31.4	1.79	92.33	1.43	92.33	1273	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	0.92	2.64	0.02	0.09	36.98	189.28	3.64	0.21	860.83	28.76
370	1.71	0.34	3.37	459.8%	20.91	17.37	128.1	21.8	93.3%	68.9%	64.3%	31.5	1.71	92.68	1.36	92.68	1208	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	0.92	2.63	0.02	0.09	36.87	190.05	3.74	0.22	863.47	28.73
380	1.63	0.33	3.30	472.4%	20.91	17.45	127.4	22.1	93.5%	68.7%	64.2%	32.2	1.63	93.02	1.30	93.02	1199	4.06	5.80	2.81	18800.00	20.13	78.92	20.93	0.90	2.57	0.02	0.09	36.94	195.29	3.68	0.21	883.43	28.76
390	1.55	0.31	3.20	491.5%	20.91	17.56	126.1	22.2	93.7%	68.4%	64.1%	33.3	1.55	93.36	1.24	93.36	1189	4.06	5.80	2.81	18800.00	20.13	78.93	20.94	0.87	2.49	0.02	0.09	37.03	203.17	3.61	0.18	913.46	28.81
400	1.47	0.31	3.15	500.5%	20.91	17.61	125.2	22.1	93.7%	68.3%	64.0%	33.8	1.47	93.70	1.17	93.70	1136	4.06	5.80	2.81	18800.00	20.13	78.93	20.94	0.86	2.45	0.02	0.09	37.01	206.87	3.64	0.18	927.38	28.81
410	1.40	0.30	3.00	530.3%	20.91	17.77	123.9	21.6	93.7%	67.4%	63.2%	35.5	1.40	94.01	1.12	94.01	1130	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	0.82	2.34	0.01	0.09	37.01	219.17	3.65	0.17	973.84	28.84
420	1.32	0.29	2.91	548.3%	20.91	17.86	122.7	22.4	93.6%	67.2%	62.9%	36.5	1.32	94.35	1.05	94.35	1137	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	0.79	2.27	0.01	0.08	36.92	226.59	3.74	0.17	1001.64	28.84
430	1.24	0.29	2.85	562.6%	20.92	17.92	121.6	22.3	93.7%	67.0%	62.8%	37.4	1.24	94.66	0.99	94.66	-512	4.06	5.80	2.81	18800.00	20.13	78.94	20.94	0.78	2.23	0.01	0.08	36.97	232.49	3.70	0.15	1024.07	28.87
440	1.18	0.28	2.77	581.7%	20.92	18.01	120.5	21.7	93.8%	66.6%	62.4%	38.5	1.18	94.95	1.11	94.05	-463	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.75	2.16	0.01	0.07	36.98	240.43	3.70	0.14	1054.06	28.89
450	1.11	0.28	2.74	588.8%	20.92	18.04	119.2	21.9	93.7%	66.7%	62.5%	38.9	1.11	95.24	1.04	94.40	1161	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.75	2.14	0.01	0.07	36.97	243.36	3.72	0.14	1065.09	28.90
460	1.05	0.27	2.68	603.4%	20.92	18.10	118.1	21.7	93.7%	66.4%	62.2%	39.7	1.05	95.52	0.98	94.72	1085	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.73	2.10	0.01	0.07	36.92	249.36	3.77	0.14	1087.63	28.90
470	0.99	0.27	2.63	616.3%	20.92	18.15	116.8	22.8	93.6%	66.4%	62.4%	40.4	0.99	95.77	0.93	95.02	1032	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.72	2.06	0.01	0.07	36.90	254.70	3.79	0.13	1107.77	28.91
480	0.93	0.26	2.62	621.2%	20.92	18.17	116.6	24.7	93.9%	67.0%	63.0%	40.7	0.93	96.02	0.87	95.31	962	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.71	2.05	0.01	0.07	37.03	256.79	3.68	0.11	1115.99	28.95
490	0.88	0.26	2.61	623.7%	20.92	18.18	116.0	25.5	93.9%	67.3%	63.2%	40.9	0.88	96.24	0.83	95.57	886	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.71	2.04	0.01	0.07	37.02	257.80	3.70	0.11	1119.78	28.95
500	0.83	0.27	2.62	620.1%	20.92	18.16	115.7	25.8	93.8%	67.5%	63.3%	40.6	0.83	96.45	0.78	95.81	854	4.06	5.80	2.81	18800.00	20.13	78.95	20.94	0.71	2.05	0.01	0.07	36.97	256.28	3.74	0.12	1113.90	28.93
510	0.78	0.25	2.49	657.5%	20.92	18.30	114.9	25.9	93.9%	66.6%	62.6%	42.8	0.78	96.65	0.73	96.05	865	4.06	5.80	2.81	18800.00	20.13	78.96	20.94	0.68	1.95	0.01	0.07	36.98	271.78	3.75	0.10	1172.47	28.97
520	0.73	0.25	2.47	663.3%	20.92	18.32	114.8	26.0	93.9%	66.5%	62.4%	43.1	0.73	96.87	0.69	96.31	823	4.06	5.80	2.81	18800.00	20.13	78.96	20.94	0.67	1.94	0.01	0.07	36.96	274.20	3.77	0.10	1181.57	28.98
530	0.69	0.24	2.40	687.3%	20.92	18.40	113.7	25.9	94.1%	66.2%	62.3%	44.5	0.69	97.05	0.65	96.52	800	4.06	5.80	2.81	18800.00	20.13	78.96	20.94	0.65	1.88	0.00	0.06	37.07	284.17	3.69	0.07	1219.49	29.03
540	0.64	0.23	2.37	698.2%	20.92	18.43	112.6	26.0	94.2%	66.2%	62.4%	45.1	0.64	97.26	0.60	96.76	839	4.06	5.80	2.81	18800.00	20.13	78.96	20.95	0.64	1.85	0.00	0.06	37.12	288.73	3.64	0.06	1236.89	29.05
550	0.59	0.23	2.34	709.3%	20.92	18.47	111.5	26.0	94.3%	66.2%	62.5%	45.8	0.59	97.46	0.56	97.00	802	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	0.63	1.83	0.00	0.06	37.17	293.36	3.60	0.05	1254.50	29.08
560	0.55	0.22	2.26	738.4%	20.92	18.55	110.2	26.0	94.5%	65.8%	62.2%	47.4	0.55	97.65	0.52	97.22	812	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	0.61	1.77	0.00	0.06	37.21	305.45	3.59	0.03	1300.27	29.12
570	0.50	0.21	2.28	733.2%	20.92	18.53	108.8	25.8	94.7%	66.4%	62.8%	47.2	0.50	97.86	0.47	97.47	827	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	0.61	1.78	0.00	0.06	37.32	303.33	3.49	0.02	1292.53	29.14
580	0.46	0.21	2.29	729.5%	20.92	18.52	107.8	26.0	94.6%	66.8%	63.2%	46.9	0.46	98.05	0.43	97.69	870	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	0.62	1.79	0.00	0.06	37.31	301.78	3.50	0.02	1286.65	29.13
590	0.40	0.21	2.26	742.8%	20.92	18.56	107.5	26.1	94.9%	66.6%	63.2%	47.7	0.40	98.28	0.38	97.96	885	4.06	5.80	2.81	18800.00	20.13	78.98	20.95	0.61	1.76	0.00	0.06	37.43	307.38	3.40	0.00	1308.10	29.17
600	0.36	0.20	2.15	784.9%	20.92	18.67	106.4	25.9	94.9%	65.8%	62.4%	50.1	0.36	98.48	0.34	98.20	743	4.06	5.80	2.81	18800.00	20.13	78.98	20.95	0.58	1.68	0.00	0.06	37.41	324.89	3.44	-0.02	1374.18	29.21
610	0.32	0.21	2.08	807.2%	20.92	18.74	105.4	25.6	94.3%	65.2%	61.5%	51.4	0.32	98.64	0.30	98.39	744	4.06	5.80	2.81	18800.00	20.13	78.97	20.95	0.56	1.64	0.00	0.06	37.08	333.99	3.74	0.01	1407.74	29.16
620	0.27	0.20	1.99	850.0%	20.92	18.83	104.2	25.6	94.6%	64.6%	61.1%	53.8	0.27	98.84	0.26	98.62	786	4.06	5.80	2.81	18800.00	20.13	78.98	20.95	0.54	1.56	0.00	0.05	37.18	351.90	3.68	-0.03	1475.65	29.23
630	0.23	0.19	1.88	906.0%	20.92	18.95	102.4	25.6	94.8%	63.8%	60.5%	57.1	0.23	99.02	0.22	98.84	710	4.06	5.80	2.81	18800.00	20.13	78.98	20.95	0.51	1.48	0.00	0.05	37.23	375.29	3.66	-0.06	1564.11	29.30
640	0.19	0.17	1.76	975.3%	20.92	19.08	100.0	25.5	95.0%	63.0%	59.9%	61.1	0.19	99.18	0.18	99.03	683	4.06	5.80	2.81	18800.00	20.13	78.99	20.95	0.47	1.39	-0.01	0.05	37.29	404.27	3.64	-0.11	1673.76	29.40
650	0.15	0.17	1.69	1019.8%	20.93	19.15	97.6	25.5	95.2%	62.8%	59.8%	63.6	0.15	99.35	0.14	99.23	674	4.06	5.80	2.81	18800.00	20.13	78.99	20.95	0.46	1.33	-0.01	0.05	37.32	422.92	3.65	-0.14	1744.28	29.45
660	0.12	0.34	1.70	920.2%	20.92	19.06	95.4	25.6	88.3%	63.8%	56.4%	57.3	0.12	99.51	0.11	99.42	1117	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	0.51	1.43	0.02	0.05	33.80	378.91	6.69	0.34	1569.03	28.50
670	0.03	0.38	3.28	467.8%	20.91	17.44	103.1	25.6	92.4%	74.1%	68.4%	31.9	0.03	99.89	0.02	99.87	1255	4.06	5.80	2.81	18800.00	20.13	78.90	20.93	0.91	2.58	0.03	0.09	36.35	193.30	4.20	0.28	874.43	28.62
680	0.00	0.35	3.06	509.5%	20.91	17.68	105.2	25.6	92.6%	72.6%	67.2%	34.3	0.00	100.00	0.00	100.00	233	4.06	5.80	2.81	18800.00	20.13	78.91	20.93	0.85	2.41	0.02	0.08	36.43	210.48	4.15	0.25	939.51	28.68

800- App-G Stack Loss Efficiency data and Results (page 5 of 16)

SpecDIRECT POWERED BY Intertek

									SUMS							AVERAGE	SUMS						
14.00	**448.29**	**6213.16**	**4588.33**	**4440.30**	**4395.60**	**6172.77**	**5306.69**	**297.27**	**16201.03**	**39913.35**	**64329.80**	**189783.91**	**10361.78**	**98036.58**	**47607.23**	**6757.01**	**122311.91**	**17931.80**	**104380.1**	**227965.9**	**17926.4**	**1343.3**	**78.3**
Moisture Present	Stack Temp K	Heat Content Change - Ambient to Stack Temperature / Flue Gas Constituent CO_2	O_2	CO	N_2	CH_4	H_2O	Room Temp K	Energy Losses (kJ/kg of Dry Fuel) / Flue Gas Constituent CO_2	O_2	CO	N_2	CH_4	H_2O Comb	H_2O Fuel MC	Total Loss Rate	Total Loss	Chemical Loss 1	Sensible and Latent Loss	Total Output	Chem Loss 2	Grams Produced CO	HC
14.00	418.46	4835.04	3634.00	3532.64	3493.73	4664.80	4227.00	297.34	179.43	610.65	1001.90	2728.40	198.30	1384.76	674.84	6778.28	0.00	0	0.00	0	0	0.00	0.00
14.00	641.59	14849.29	10669.12	10250.56	10163.07	15402.84	12226.92	297.51	548.62	187.83	1009.87	2157.38	397.02	1590.24	786.86	6677.82	17821.02	3642	14178.71	32350	3642	257.33	18.72
14.00	677.68	16587.14	11835.55	11350.08	11257.70	17385.46	13531.63	298.00	630.41	216.05	739.01	2447.83	282.76	1641.75	805.13	6762.93	11992.71	1752	10240.95	21345	1752	124.66	8.84
14.00	700.95	17722.28	12589.70	12058.82	11963.76	18697.47	14371.93	298.45	641.24	167.45	1212.85	2321.73	486.06	1639.70	816.89	7285.92	12292.62	2766	9526.78	19426	2766	194.19	14.44
14.00	711.17	18214.82	12913.97	12362.74	12266.71	19273.22	14732.01	298.94	690.25	184.87	768.90	2481.26	300.04	1673.87	821.93	6921.13	10565.41	1573	8992.47	18134	1573	111.27	8.06
14.00	642.99	14843.58	10658.24	10238.37	10151.35	15411.74	12211.82	299.43	570.23	344.51	635.77	2757.40	221.32	1611.62	786.65	6927.49	7601.20	912	6689.24	13027	912	66.61	4.29
14.00	597.14	12669.66	9178.26	8837.55	8758.00	12977.30	10547.70	299.30	492.80	308.54	509.72	2432.46	167.62	1570.29	763.34	6244.78	5228.34	552	4676.19	10512	552	40.95	2.49
14.00	587.55	12240.32	8884.70	8559.34	8481.36	12499.30	10217.09	298.81	475.85	279.46	513.63	2285.92	172.27	1560.20	758.72	6046.05	5027.83	556	4471.97	10606	556	41.02	2.54
14.00	588.29	12276.31	8909.61	8583.03	8504.90	12538.69	10245.27	298.77	481.45	281.89	425.95	2305.62	135.39	1565.44	759.11	5954.85	4791.96	440	4351.84	10337	440	32.92	1.93
14.00	586.04	12144.99	8816.98	8494.48	8417.00	12398.71	10139.78	299.47	476.03	269.42	431.07	2246.93	139.02	1561.96	757.63	5882.06	4569.89	432	4138.22	10036	432	32.17	1.91
14.00	583.63	12053.56	8755.67	8436.70	8359.48	12294.28	10071.23	298.93	471.09	272.24	460.06	2246.10	150.43	1558.61	756.67	5915.21	4389.32	442	3947.71	9561	442	32.80	1.98
14.00	574.76	11618.08	8453.00	8148.54	8073.21	11820.18	9728.35	299.57	457.90	286.58	376.05	2261.67	111.65	1553.33	751.87	5799.05	3883.72	319	3565.12	8707	319	24.22	1.33
14.00	569.16	11349.90	8266.58	7971.04	7896.89	11528.29	9517.15	299.83	452.36	343.12	265.26	2448.07	55.17	1553.92	748.91	5866.81	3371.15	180	3191.60	7432	180	14.67	0.56
14.00	555.77	10751.16	7851.91	7576.63	7505.00	10873.26	9047.98	299.43	428.53	381.79	266.81	2528.39	46.39	1541.31	742.35	5935.57	2890.56	149	2741.70	6265	149	12.52	0.40
14.00	544.94	10310.96	7548.76	7288.76	7218.87	10387.86	8705.70	298.05	406.12	391.60	388.40	2511.95	93.00	1525.91	737.55	6054.53	2420.96	188	2232.79	5096	188	14.98	0.66
14.00	531.67	9649.48	7081.01	6841.30	6774.81	9685.27	8172.58	299.68	386.27	517.87	231.73	2912.62	-0.93	1521.34	730.09	6298.98	1791.07	64	1726.99	3555	64	6.37	0.00
14.00	509.79	8687.05	6403.53	6194.00	6132.27	8656.27	7401.64	299.30	338.74	552.09	500.11	2923.15	94.32	1487.96	719.29	6615.67	1364.81	120	1244.57	2514	120	9.99	0.35
14.00	490.49	7867.74	5823.47	5638.92	5581.46	7787.56	6740.25	298.50	301.93	569.28	660.79	2895.07	146.65	1462.88	710.03	6746.64	1212.32	143	1069.78	2166	143	11.52	0.47
14.00	478.33	7416.38	5505.51	5335.07	5279.85	7305.48	6378.34	296.44	280.09	591.75	818.69	2924.39	200.17	1446.43	704.97	6966.49	995.44	143	852.25	1691	143	11.36	0.51
14.00	460.63	6669.90	4970.08	4820.87	4769.99	6529.20	5765.07	295.99	248.27	594.09	959.60	2852.47	243.75	1423.95	696.38	7018.51	837.65	141	696.16	1406	141	11.14	0.52
14.00	449.05	6200.26	4632.00	4495.89	4447.82	6043.46	5377.38	295.32	229.44	565.13	1014.53	2698.90	263.88	1410.62	690.95	6873.46	737.20	135	601.98	1279	135	10.60	0.51
14.00	441.56	5873.12	4394.30	4266.83	4220.86	5709.93	5103.94	295.57	218.86	554.05	949.37	2629.02	231.26	1406.37	687.12	6676.06	699.35	122	577.31	1270	122	9.69	0.43
14.00	436.07	5646.71	4229.93	4108.47	4063.95	5478.79	4914.91	295.42	209.91	534.80	972.12	2535.66	240.53	1399.93	684.47	6577.43	679.99	124	556.21	1264	124	9.80	0.44
14.00	432.02	5482.78	4110.81	3993.69	3950.21	5311.67	4777.88	295.24	203.52	526.18	986.02	2487.52	244.42	1395.58	682.56	6525.78	639.64	119	520.52	1203	119	9.43	0.43
14.00	427.86	5301.32	3978.13	3865.61	3823.36	5128.50	4624.93	295.41	194.40	545.80	1102.80	2536.15	281.46	1387.18	680.41	6728.20	622.21	126	495.72	1116	126	9.95	0.47
14.00	422.62	5090.80	3824.60	3717.53	3676.66	4915.10	4448.10	295.18	187.98	551.38	1040.13	2537.99	245.95	1385.96	677.94	6627.33	581.42	112	469.89	1068	112	8.91	0.39
14.00	420.02	4984.04	3746.51	3642.13	3601.99	4807.40	4358.05	295.14	184.44	556.41	1021.41	2546.34	232.35	1384.85	676.68	6602.48	592.71	111	481.43	1095	111	8.96	0.37
14.00	416.25	4843.90	3644.45	3543.72	3504.49	4665.06	4240.56	294.69	178.38	544.94	1067.03	2489.19	250.34	1379.54	675.03	6584.44	532.20	105	426.89	987	105	8.43	0.36
14.00	414.96	4778.53	3596.01	3496.81	3458.06	4600.46	4184.47	295.01	176.02	547.98	1065.01	2493.65	245.73	1378.43	674.25	6581.07	484.94	96	389.40	900	96	7.67	0.32
14.00	413.34	4714.52	3549.14	3451.55	3413.23	4536.00	4130.42	294.92	174.99	555.80	995.45	2518.13	210.86	1380.63	673.49	6509.35	518.97	95	423.84	980	95	7.76	0.30
14.00	410.88	4606.92	3469.86	3374.88	3337.32	4428.69	4038.80	295.06	171.07	570.29	994.32	2560.03	200.13	1379.15	672.21	6547.20	518.58	94	424.97	970	94	7.70	0.28
14.00	409.22	4534.91	3416.78	3323.53	3286.49	4356.94	3977.44	295.14	168.75	564.73	974.54	2533.17	190.63	1378.40	671.35	6481.57	490.85	87	403.54	933	87	7.22	0.26
14.00	408.28	4492.33	3385.30	3293.06	3256.33	4314.69	3941.03	295.24	164.94	591.08	1102.82	2620.47	232.32	1372.89	670.84	6755.36	468.03	92	376.48	834	92	7.47	0.29
14.00	406.73	4440.77	3347.80	3256.92	3220.52	4262.21	3897.88	294.91	163.76	593.38	1063.28	2625.12	212.18	1373.81	670.23	6701.75	473.22	89	384.09	854	89	7.34	0.27
14.00	405.27	4396.14	3315.49	3225.81	3189.69	4216.46	3860.75	294.50	161.59	595.70	1094.20	2628.26	222.02	1371.69	669.71	6743.17	467.69	90	377.33	836	90	7.42	0.28
14.00	404.31	4340.22	3273.69	3185.23	3149.55	4162.01	3812.21	294.93	159.84	593.53	1076.82	2615.16	212.57	1371.31	669.03	6698.26	435.00	83	352.11	786	83	6.84	0.25
14.00	402.57	4269.83	3221.84	3135.08	3099.90	4091.80	3752.29	294.89	157.88	609.82	1042.37	2668.48	187.49	1372.26	668.19	6706.50	454.03	82	371.60	819	82	6.91	0.23
14.00	401.28	4215.53	3181.72	3096.26	3061.47	4037.86	3705.89	294.92	155.43	604.68	1068.64	2643.49	197.59	1369.85	667.55	6707.22	431.02	81	350.45	777	81	6.72	0.23
14.00	400.51	4173.02	3149.97	3065.44	3030.98	3996.44	3669.03	295.20	154.14	615.15	1053.77	2677.67	184.38	1370.20	667.03	6722.34	428.67	78	350.49	770	78	6.58	0.21
14.00	399.28	4118.25	3109.37	3026.11	2992.05	3942.34	3622.02	295.31	152.51	631.74	1032.73	2733.13	165.06	1370.90	666.37	6752.44	426.99	75	351.99	762	75	6.39	0.19
14.00	398.31	4079.74	3080.96	2998.63	2964.84	3904.02	3589.17	295.28	150.99	637.37	1039.96	2749.54	163.21	1370.15	665.91	6777.13	409.65	72	337.62	727	72	6.15	0.18
14.00	397.04	4049.09	3059.03	2977.59	2943.97	3872.02	3564.08	294.71	149.86	670.46	1044.27	2866.97	148.69	1370.97	665.56	6916.77	415.87	71	344.84	714	71	6.15	0.16
14.00	395.90	3971.72	3000.79	2920.95	2887.96	3797.56	3496.30	295.52	146.65	679.95	1068.43	2892.70	149.08	1368.97	664.61	6970.38	421.66	73	348.71	716	73	6.33	0.16
14.00	394.75	3927.58	2968.24	2889.45	2856.78	3753.62	3458.66	295.43	145.21	690.10	1058.80	2925.54	137.19	1369.15	664.08	6990.06	-190.26	-32	-158.01	-321	-32	-2.82	-0.07
14.00	393.63	3903.78	2951.33	2873.26	2840.72	3728.52	3439.36	294.86	144.38	709.58	1058.40	2994.29	126.49	1369.72	663.81	7066.68	-174.11	-28.92	-145.19	-289	-29	-2.55	-0.06
14.00	392.37	3845.92	2908.27	2831.51	2799.40	3671.75	3389.44	295.02	142.17	707.75	1063.91	2981.61	124.97	1368.44	663.11	7051.97	435.48	72.73	362.74	725	73	6.44	0.14
14.00	391.22	3806.48	2879.30	2803.51	2771.68	3632.25	3355.99	294.82	140.54	717.97	1077.26	3014.56	122.66	1367.72	662.65	7103.36	409.91	68.60	341.31	675	69	6.09	0.13
14.00	389.92	3709.26	2805.84	2732.00	2700.98	3539.29	3270.40	295.98	136.88	714.64	1083.68	2992.05	118.36	1365.70	661.45	7072.77	388.16	65.37	322.78	644	65	5.83	0.12
14.00	389.72	3627.93	2743.31	2670.87	2640.59	3463.91	3197.13	297.89	134.35	704.44	1051.45	2946.86	102.06	1365.30	660.42	6964.90	356.50	58.52	297.98	606	59	5.28	0.09
14.00	389.19	3576.76	2704.46	2633.01	2603.17	3415.38	3151.81	298.67	132.40	697.21	1055.69	2914.97	102.56	1363.94	659.79	6926.57	326.35	54.10	272.26	559	56	4.88	0.09
14.00	388.83	3552.35	2686.07	2615.12	2585.48	3391.92	3130.40	298.92	131.31	688.38	1068.24	2879.96	109.91	1362.54	659.49	6899.83	313.47	53.06	260.41	541	54	4.76	0.09
14.00	388.09	3515.97	2658.90	2588.75	2559.39	3356.47	3098.86	299.08	130.01	722.63	1071.23	3000.81	90.58	1363.66	659.05	7037.97	323.95	53.01	270.94	541	52	4.83	0.07
14.00	387.93	3508.60	2653.40	2583.41	2554.11	3349.26	3092.47	299.11	129.69	727.55	1075.25	3017.86	89.07	1363.64	658.96	7062.01	308.97	50.50	258.47	514	54	4.61	0.07
14.00	386.83	3464.50	2620.68	2551.71	2522.73	3305.77	3054.57	299.09	128.41	744.71	1053.10	3076.45	66.50	1364.91	658.43	7092.52	301.67	47.21	254.46	498	45	4.39	0.05
14.00	385.73	3416.80	2585.18	2517.29	2488.67	3258.99	3013.41	299.16	126.84	746.42	1040.23	3078.20	55.04	1364.92	657.85	7069.52	315.64	48.48	267.15	524	48	4.55	0.04
14.00	384.62	3371.86	2551.79	2484.92	2456.64	3214.79	2974.71	299.16	125.35	748.59	1029.04	3081.86	44.21	1364.94	657.31	7051.30	300.67	45.37	255.29	501	48	4.30	0.03
14.00	383.36	3320.31	2513.47	2447.77	2419.88	3164.14	2930.30	299.16	123.55	767.74	1024.09	3146.50	26.09	1365.55	656.69	7110.21	307.28	45.00	262.27	505	42	4.34	0.02
14.00	381.91	3268.70	2475.27	2410.78	2383.27	3113.03	2886.08	298.98	121.98	750.83	996.82	3080.45	17.44	1365.17	656.07	6988.75	307.50	44.25	263.25	520	46	4.30	0.01
14.00	380.97	3222.29	2440.51	2377.03	2349.88	3067.98	2845.71	299.19	120.22	736.50	997.75	3023.49	19.95	1363.73	655.50	6917.14	320.09	46.71	273.38	550	43	4.53	0.02
14.00	380.69	3210.39	2431.65	2368.43	2341.37	3056.34	2835.42	299.20	120.17	747.43	968.92	3062.75	0.35	1365.48	655.36	6920.47	325.88	45.26	280.62	559	48	4.48	0.00
14.00	379.59	3172.85	2403.87	2341.54	2314.76	3019.15	2803.28	299.02	118.69	780.98	981.50	3180.90	-17.59	1366.43	654.91	7065.81	279.22	37.78	241.45	464	42	3.81	-0.01
14.00	378.51	3140.02	2379.71	2318.18	2291.62	2986.36	2775.36	298.74	116.42	794.81	1068.03	3226.02	6.87	1363.05	654.52	7229.72	286.00	42.18	243.83	458	38	4.15	0.00
14.00	377.37	3091.90	2343.80	2283.33	2257.15	2939.38	2733.69	298.79	114.96	824.78	1048.44	3330.76	-25.16	1365.18	653.93	7312.90	305.63	42.42	263.21	480	45	4.30	-0.02
14.00	375.58	3019.15	2289.53	2230.68	2205.05	2868.27	2670.72	298.80	112.40	859.23	1044.92	3448.94	-57.66	1366.74	653.05	7427.62	280.45	36.98	243.48	429	39	3.87	-0.04
14.00	373.12	2923.94	2218.58	2161.86	2136.96	2775.08	2588.43	298.68	109.05	896.91	1039.29	3576.77	-98.47	1368.58	651.90	7544.03	274.09	33.91	240.19	409	33	3.71	-0.06
14.00	370.72	2828.28	2147.13	2092.51	2068.36	2681.81	2505.48	298.65	105.55	908.07	1039.96	3607.79	-122.87	1368.69	650.74	7557.93	271.01	32.62	238.38	403	34	3.66	-0.08
14.00	368.55	2738.03	2079.57	2026.90	2003.45	2594.16	2426.99	298.73	92.55	787.96	1905.95	3143.47	301.73	1322.24	649.64	8203.55	487.61	130.37	357.25	630	76	11.13	0.32
14.00	376.25	3048.83	2311.74	2252.25	2226.39	2897.13	2696.52	298.73	110.83	446.86	1197.51	1946.82	248.78	1335.47	653.41	5939.68	396.60	95.89	300.72	859	121	7.85	0.30
14.00	378.35	3133.53	2374.88	2313.49	2286.99	2979.99	2769.77	298.73	114.16	499.85	1184.12	2148.66	220.19	1340.56	654.44	6161.97	76.28	17.26	59.02	156	35	1.44	0.05

800- App-G Stack Loss Efficiency data and Results (page 6 of 16)

Intertek Testing Services NA, Inc.

Manufacturer: SBI
Model: FP-15 Series
Date: 06-10-16
Run: 3
Control #: QC20160608
Test Duration: 680
Output Category: 2

Technicians: Claude Pelland

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	65.1%	69.7%
Combustion Efficiency	94.9%	94.9%
Heat Transfer Efficiency	69%	73.5%

Output Rate (kJ/h)	20 095	19 062	(Btu/h)
Burn Rate (kg/h)	1.64	3.62	(lb/h)
Input (kJ/h)	30 886	29 299	(Btu/h)

Test Load Weight (dry kg)	18.62	41.04	dry lb
MC wet (%)	20.13		
MC dry (%)	25.20		
Particulate (g)	12.265		
CO (g)	1 343		
Test Duration (h)	11.33		

Emissions	Particulate	CO
g/MJ Output	0.05	5.90
g/kg Dry Fuel	0.66	72.14
g/h	1.08	118.52
lb/MM Btu Output	0.13	13.71

Air/Fuel Ratio (A/F)	18.04

VERSION: 2.4 2010-04-15

800- App-G Stack Loss Efficiency data and Results (page 7 of 16)

VERSION: 2.4 2010-04-15

Manufacturer:	SBI		Appliance Type:	Non-cat (Cat, Non-Cat, Pellet)
Model:	FP-15 Series			
Date:	2016-06-08		Temp. Units	F (F or C)
Run:	1		Weight Units	lb (kg or lb)
Control #:	QC20160608			
Test Duration:	250			
Output Category:	High			

Default Fuel Values

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

Wood Moisture (% wet):	17.84
Load Weight (lb wet):	43.22
Burn Rate (dry kg/h):	3.87
Total Particulate Emissions:	15.415 g

Fuel Data

	Beech	
HHV	18 800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Temp. (ºF) Flue Gas	Room Temp
	Averages	0.33	7.85	13.06	598.06	83.54
0	43.22	0.21	6.42	12.44	600.3	82.4
10	39.55	2.24	12.61	5.96	739.2	81.3
20	33.85	1.49	15.54	5.31	847.5	82.8
30	28.60	0.75	15.16	6.39	893.7	83.9
40	24.13	0.59	14.94	6.44	888.5	84.1
50	19.95	0.21	14.33	7.42	877.4	85.3
60	16.34	0.16	13.84	7.57	838.7	85.6
70	13.14	0.02	12.27	9.22	807.1	85.8
80	10.64	0.02	11.48	9.73	763.4	85.9
90	8.51	0.01	10.04	11.10	732.1	86.0
100	6.91	0.01	9.06	12.08	685.6	86.6
110	5.61	0.02	8.16	13.03	647.9	85.9
120	4.57	0.03	7.56	13.62	615.6	85.0
130	3.73	0.05	6.54	14.60	585.0	84.5
140	3.12	0.14	5.55	15.40	544.6	83.8
150	2.67	0.27	5.38	15.47	508.6	83.3
160	2.29	0.33	4.63	16.39	484.3	82.8
170	1.95	0.34	4.22	16.63	449.1	83.3
180	1.63	0.35	4.10	16.69	429.1	82.5
190	1.29	0.25	3.69	17.27	414.7	82.1
200	1.02	0.22	3.34	17.62	396.1	81.6
210	0.80	0.21	3.18	17.64	379.5	82.0
220	0.55	0.20	3.22	17.68	368.1	81.6
230	0.31	0.20	3.08	17.80	359.2	81.5
240	0.05	0.20	2.95	17.95	352.1	81.4
250	-0.16	0.17	2.71	18.22	342.2	81.0

800- App-G Stack Loss Efficiency data and Results (page 8 of 16)

Manufacturer: SBI
Model: FP-15 Series
Date: 06-08-16
Run: 1
Control #: QC20160608
Test Duration: 250 min

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.

	HHV	LHV
Eff	**62.39%**	**66.83%**
Comb Eff	**95.92%**	**95.92%**
HT Eff	**65.04%**	**69.68%**
Output	**45 352**	**kJ/h**
Burn Rate	**3.87**	**kg/h**
Grams CO	**911**	**g**
Input	**72 695**	**kJ/h**
MC wet	**17.84**	

Ultimate CO_2

$CO_{2\text{-ult}}$ 20.77

F_0 1.003

Overall Heating Efficiency: 62.39%
Combustion Efficiency: 95.92%
Heat Transfer Efficiency: 65.04%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	29.77
Dry Moles Exhaust Gas (N_r):	447.40
Air Fuel Ratio (A/F)	12.81

%HC 1.32

Heat Output: 43 021 Btu/h 45 352 kJ/h
Heat Input: 68 959 Btu/h 72 695 kJ/h

Burn Duration: 4.17 h

Burn Rate: 8.52 lb/h 3.867 kg/h

Stack Temp: 598.0 Deg. F 314.4 Deg. C

Combustion Efficiency:
Total Input (kJ):
Total Output (kJ):
Efficiency:
Total CO (g):

	Averages	**0.33**	**7.85**	**2.53**	**20.87**	**12.86**	**314.48**	**28.63**	**97.0%**	**61.0%**	**59.2%**	**19.98**	**4.79**	**75.59**	**3.93**	**75.59**	**302531**	**4.06**	**5.80**	**2.81**	**18800.00**
INPUT DATA				**Oxygen Calculation**			**Input Data**											**Fuel Properties**			
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)**	**Combust Eff %**	**Heat Transfer %**	**Net Eff %**	**Air Fuel Ratio**	**Wet Wt Now Wt**	**% Wet Consumed x**	**Dry Wt. Now Wt_{dn}**	**% Dry Comsumed y**	**Total Input**	**Carbon /12= [a]**	**Hydrogen /1= [b]**	**Oxygen /16= [c]**	**Calorific Value**
0	19.61	0.21	6.42	213.4%	20.89	14.36	315.7	28.0	97.9%	58.6%	57.4%	17.7	19.61	0.00	16.11	0.00	0	4.06	5.80	2.81	18800.00
10	17.95	2.24	12.61	39.9%	20.82	7.09	392.9	27.4	87.2%	67.2%	58.6%	7.7	17.95	8.48	14.74	8.48	45664	4.06	5.80	2.81	18800.00
20	15.36	1.49	15.54	22.0%	20.80	4.52	453.1	28.2	92.5%	67.6%	62.5%	6.8	15.36	21.67	12.62	21.67	38380	4.06	5.80	2.81	18800.00
30	12.98	0.75	15.16	30.6%	20.81	5.28	478.7	28.8	96.0%	65.9%	63.3%	7.3	12.98	33.82	10.66	33.82	34088	4.06	5.80	2.81	18800.00
40	10.95	0.59	14.94	33.8%	20.82	5.58	475.8	29.0	96.8%	65.8%	63.7%	7.5	10.95	44.18	8.99	44.18	30309	4.06	5.80	2.81	18800.00
50	9.05	0.21	14.33	42.9%	20.82	6.39	469.7	29.6	98.9%	65.5%	64.7%	8.1	9.05	53.84	7.44	53.84	27272	4.06	5.80	2.81	18800.00
60	7.42	0.16	13.84	48.4%	20.83	6.91	448.1	29.8	99.1%	66.1%	65.5%	8.4	7.42	62.19	6.09	62.19	23869	4.06	5.80	2.81	18800.00
70	5.96	0.02	12.27	69.0%	20.84	8.56	430.6	29.9	100.0%	64.8%	64.8%	9.6	5.96	69.60	4.90	69.60	19985	4.06	5.80	2.81	18800.00
80	4.83	0.02	11.48	80.7%	20.85	9.36	406.3	29.9	100.1%	65.1%	65.1%	10.3	4.83	75.38	3.97	75.38	16228	4.06	5.80	2.81	18800.00
90	3.86	0.01	10.04	106.7%	20.86	10.81	388.9	30.0	100.2%	63.4%	63.5%	11.7	3.86	80.31	3.17	80.31	13066	4.06	5.80	2.81	18800.00
100	3.14	0.01	9.06	129.1%	20.87	11.80	363.1	30.3	100.3%	63.1%	63.3%	13.0	3.14	84.01	2.58	84.01	10145	4.06	5.80	2.81	18800.00
110	2.55	0.02	8.16	154.0%	20.87	12.71	342.2	29.9	100.3%	62.4%	62.6%	14.4	2.55	87.01	2.09	87.01	8216	4.06	5.80	2.81	18800.00
120	2.07	0.03	7.56	173.6%	20.88	13.30	324.2	29.4	100.1%	62.2%	62.3%	15.5	2.07	89.43	1.70	89.43	6611	4.06	5.80	2.81	18800.00
130	1.69	0.05	6.54	215.3%	20.89	14.32	307.2	29.2	100.0%	60.2%	60.2%	17.9	1.69	91.38	1.39	91.38	5054	4.06	5.80	2.81	18800.00
140	1.42	0.14	5.55	265.1%	20.89	15.27	284.8	28.8	98.6%	58.2%	57.4%	20.7	1.42	92.77	1.16	92.77	3687	4.06	5.80	2.81	18800.00
150	1.21	0.27	5.38	267.8%	20.90	15.38	264.8	28.5	96.6%	59.9%	57.9%	20.8	1.21	93.81	1.00	93.81	2924	4.06	5.80	2.81	18800.00
160	1.04	0.33	4.63	319.0%	20.90	16.11	251.3	28.2	95.2%	57.5%	54.7%	23.6	1.04	94.70	0.85	94.70	2526	4.06	5.80	2.81	18800.00
170	0.89	0.34	4.22	355.8%	20.90	16.51	231.7	28.5	94.6%	57.8%	54.7%	25.7	0.89	95.48	0.73	95.48	2294	4.06	5.80	2.81	18800.00
180	0.74	0.35	4.10	367.1%	20.90	16.63	220.6	28.1	94.3%	58.7%	55.4%	26.3	0.74	96.22	0.61	96.22	2311	4.06	5.80	2.81	18800.00
190	0.59	0.25	3.69	426.7%	20.91	17.09	212.6	27.9	95.6%	56.9%	54.4%	29.8	0.59	97.00	0.48	97.00	2164	4.06	5.80	2.81	18800.00
200	0.46	0.22	3.34	484.0%	20.91	17.46	202.3	27.6	96.1%	55.7%	53.5%	33.0	0.46	97.65	0.38	97.65	1748	4.06	5.80	2.81	18800.00
210	0.36	0.21	3.18	513.6%	20.91	17.63	193.0	27.8	96.2%	56.1%	53.9%	34.7	0.36	98.16	0.30	98.16	1635	4.06	5.80	2.81	18800.00
220	0.25	0.20	3.22	508.1%	20.91	17.59	186.7	27.5	96.5%	57.7%	55.7%	34.4	0.25	98.72	0.21	98.72	1708	4.06	5.80	2.81	18800.00
230	0.14	0.20	3.08	533.1%	20.91	17.73	181.8	27.5	96.2%	57.4%	55.2%	35.9	0.14	99.29	0.11	99.29	1748	4.06	5.80	2.81	18800.00
240	0.02	0.20	2.95	559.7%	20.91	17.87	177.8	27.5	96.1%	56.9%	54.7%	37.4	0.02	99.88	0.02	99.88	1264	4.06	5.80	2.81	18800.00
250	-0.07	0.17	2.71	621.9%	20.92	18.12	172.3	27.2	96.7%	55.4%	53.6%	41.0	-0.07	100.36	-0.06	100.36	-364	4.06	5.80	2.81	18800.00

SpecDIRECT POWERED BY Intertek

800- App-G Stack Loss Efficiency data and Results (page 9 of 16)

Moisture Content M_{Cwb}: 17.84

95.92%
302 895 287 281 (Btu)
188 967 179 226 (Btu)
62.39%
911.22

Moisture of Wood (wet basis): 17.84
Initial Dry Weight Wt_{do} (kg): 16.11
Moisture Content Dry 21.71

Dry kg : 16.11
CA: 48.7
HY: 5.8
OX: 44.9

Load Weight (kg): **19.61**

	HHV	LHV		HHV	LHV
Fuel Heating Value in kJ/kg - CV:	**18 800**	**17 549**	Btu/lb	**8088.0**	**7549.9**

17.84	78.96	20.94	2.02	5.81	0.03	0.20	39.00	104.95	1.75	0.08	547.46	29.02	12.06	587.63	12288.98	8848.83	8506.64	8432.98	12704.87	10148.36	301.78	12515.32	17550.46
Mw Moisture	Mass Balance (moles/100 mole dry flue gas)					kg Wood per 100 mole dfp	Moles per kg of Dry Wood						Moisture	Stack Temp	Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent						Room Temp		
Fuel Burnt	[h]	[u]	[w]	[j]	[k]	Nk	CO_2	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
17.84	79.01	20.96	1.63	4.73	0.01	0.16	39.51	88.39	1.28	0.04	486.19	29.09	12.06	588.85	12210.81	8856.95	8530.99	8453.61	########	10182.73	301.17	482.41	782.83
17.84	78.06	20.71	3.73	10.23	0.29	0.37	34.01	19.14	6.03	0.79	210.55	27.60	12.06	666.04	15920.14	11379.08	10917.37	10827.45	########	13017.38	300.53	541.50	217.74
17.84	78.45	20.81	4.24	11.92	0.19	0.42	36.83	10.71	3.53	0.46	185.95	28.25	12.06	726.22	18879.80	13342.45	12761.73	12664.99	########	15203.84	301.39	695.43	142.92
17.84	78.81	20.91	3.94	11.25	0.09	0.39	38.69	13.47	1.91	0.24	201.11	28.70	12.06	751.89	20165.53	14183.23	13548.15	13449.24	########	16135.01	301.97	780.10	191.09
17.84	78.89	20.93	3.84	11.00	0.07	0.38	39.11	14.61	1.54	0.19	206.50	28.80	12.06	748.97	20010.37	14081.15	13452.50	13353.89	########	16021.70	302.12	782.53	205.78
17.84	79.07	20.97	3.59	10.37	0.02	0.36	40.19	17.92	0.59	0.05	221.76	29.07	12.06	742.80	19670.88	13856.18	13241.23	13143.38	########	15771.26	302.74	790.55	248.30
17.84	79.09	20.98	3.45	9.99	0.01	0.34	40.33	20.13	0.46	0.03	230.48	29.11	12.06	721.30	18571.20	13132.48	12563.01	12467.33	########	14967.78	302.94	749.01	264.41
17.84	79.15	20.99	3.03	8.80	-0.01	0.30	40.79	28.46	0.07	-0.03	263.10	29.24	12.06	703.78	17689.42	12549.15	12015.50	11921.74	########	14318.87	303.01	721.52	357.15
17.84	79.14	20.99	2.83	8.23	-0.01	0.28	40.81	33.27	0.06	-0.04	281.32	29.26	12.06	679.46	16480.66	11744.47	11258.82	11168.02	########	13421.57	303.08	672.53	390.75
17.84	79.13	20.99	2.47	7.20	-0.01	0.25	40.84	43.99	0.05	-0.06	321.89	29.29	12.06	662.09	15626.42	11171.91	10719.33	10630.88	########	12781.47	303.16	638.17	491.42
17.84	79.13	20.99	2.23	6.50	-0.02	0.22	40.87	53.25	0.04	-0.07	356.93	29.32	12.06	636.28	14366.38	10320.85	9915.62	9831.06	########	11827.29	303.47	587.12	549.53
17.84	79.12	20.99	2.01	5.87	-0.02	0.20	40.82	63.56	0.09	-0.08	395.76	29.34	12.06	615.32	13381.37	9652.66	9283.82	9202.49	########	11076.96	303.08	546.21	613.50
17.84	79.10	20.98	1.87	5.45	-0.02	0.19	40.73	71.66	0.18	-0.08	426.13	29.34	12.06	597.37	12554.21	9088.39	8749.42	8671.00	########	10442.00	302.59	511.27	651.27
17.84	79.09	20.98	1.62	4.73	-0.01	0.16	40.62	88.96	0.30	-0.09	491.22	29.36	12.06	580.39	11773.32	8551.84	8240.23	8164.82	########	9836.67	302.32	478.24	760.80
17.84	79.04	20.96	1.40	4.07	0.00	0.14	39.85	109.69	1.00	-0.03	567.53	29.23	12.06	557.91	10753.89	7846.72	7569.80	7498.62	########	9039.25	301.91	428.58	860.67
17.84	78.97	20.95	1.40	4.02	0.01	0.14	38.80	110.91	1.94	0.10	569.46	28.98	12.06	537.95	9856.46	7220.91	6973.44	6906.30	9919.28	8329.47	301.67	382.38	800.88
17.84	78.94	20.94	1.23	3.52	0.02	0.12	37.97	132.07	2.70	0.17	647.27	28.84	12.06	524.43	9259.73	6802.59	6574.22	6509.92	9277.46	7854.14	301.38	351.55	898.42
17.84	78.93	20.94	1.13	3.23	0.02	0.11	37.63	147.24	3.02	0.19	703.71	28.80	12.06	504.85	8378.64	6179.45	5978.07	5918.32	8341.82	7143.88	301.65	315.25	909.89
17.84	78.92	20.93	1.10	3.15	0.02	0.11	37.45	151.91	3.18	0.20	720.90	28.77	12.06	493.75	7906.37	5844.89	5657.86	5600.58	7841.51	6762.32	301.22	296.10	887.91
17.84	78.96	20.95	0.97	2.81	0.01	0.10	38.11	176.50	2.63	0.09	815.47	28.99	12.06	485.78	7566.16	5602.79	5425.87	5370.44	7483.48	6485.79	301.00	288.32	988.92
17.84	78.98	20.95	0.88	2.54	0.00	0.09	38.30	200.24	2.49	0.04	905.63	29.10	12.06	475.42	7127.42	5289.52	5125.39	5072.42	7024.09	6127.54	300.70	272.97	1059.19
17.84	78.98	20.95	0.83	2.42	0.00	0.08	38.33	212.49	2.48	0.02	951.99	29.14	12.06	466.19	6719.13	4995.80	4843.10	4792.56	6601.39	5790.79	300.95	257.53	1061.58
17.84	78.99	20.95	0.84	2.44	0.00	0.08	38.48	210.26	2.35	0.00	943.92	29.17	12.06	459.88	6458.06	4808.27	4662.93	4613.93	6330.50	5575.89	300.69	248.50	1010.97
17.84	78.99	20.95	0.81	2.34	0.00	0.08	38.32	220.61	2.50	0.01	982.60	29.16	12.06	454.93	6248.44	4657.05	4517.49	4469.76	6114.38	5402.36	300.63	239.42	1027.38
17.84	78.99	20.95	0.78	2.25	0.00	0.08	38.25	231.63	2.58	0.00	1024.04	29.17	12.06	450.99	6081.47	4536.37	4401.37	4354.67	5942.74	5263.79	300.60	232.60	1050.74
17.84	79.00	20.95	0.71	2.06	0.00	0.07	38.51	257.51	2.38	-0.06	1122.48	29.30	12.06	445.49	5857.14	4374.32	4245.44	4200.12	5711.97	5077.73	300.35	225.53	1126.43

800- App-G Stack Loss Efficiency data and Results (page 10 of 16)

SUMS					AVERAGE	SUMS						
13186.93	96613.77	1865.50	40818.37	16973.66	7674.00	113927.14	12370.70	101556.4	188603.4	12370.7	911.2	56.8
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
373.22	4110.09	37.15	1575.42	653.25	8014.37	0.00	0	0.00	0	0	0.00	0.00
1772.25	2279.77	711.89	1573.11	687.44	7783.69	18906.04	5842	13063.89	26758	5842	410.09	30.51
1044.95	2355.06	419.38	1671.84	713.82	7043.40	14379.15	2879	11500.64	24001	2879	201.96	15.05
565.26	2704.83	216.19	1725.03	725.05	6907.56	12524.75	1361	11163.93	21563	1361	96.78	6.88
455.49	2757.56	169.13	1727.97	723.68	6822.15	10998.49	967	10031.21	19310	967	69.36	4.79
173.89	2914.63	47.85	1736.65	720.66	6632.53	9621.51	309	9312.72	17651	309	23.84	1.22
137.12	2873.53	29.67	1715.64	710.97	6480.35	8227.68	204	8024.13	15641	204	16.49	0.66
21.38	3136.65	-29.63	1704.35	703.14	6614.56	7031.64	-9	7040.69	12954	-9	2.16	-0.55
18.30	3141.83	-37.34	1679.10	692.32	6557.48	5660.23	-16	5676.65	10567	-16	1.50	-0.57
14.22	3421.94	-53.46	1662.39	684.60	6859.28	4767.02	-27	4793.98	8298	-27	0.94	-0.66
10.31	3509.00	-67.46	1636.18	673.09	6897.76	3722.30	-30	3752.74	6423	-30	0.53	-0.64
26.90	3641.97	-74.33	1615.02	664.03	7033.30	3073.86	-21	3094.47	5143	-21	1.13	-0.57
53.91	3694.93	-73.85	1596.34	656.38	7090.25	2493.26	-7	2500.47	4118	-7	1.82	-0.46
87.37	4010.74	-83.00	1579.68	649.07	7482.90	2011.78	1	2010.98	3043	1	2.26	-0.40
291.48	4255.72	-25.22	1549.49	639.45	8000.16	1568.85	51	1518.07	2118	51	5.51	-0.09
561.63	3932.85	86.55	1515.75	630.89	7910.94	1230.42	99	1131.85	1694	99	8.43	0.24
780.48	4213.66	150.19	1494.64	625.16	8514.11	1143.77	122	1021.34	1382	122	10.14	0.36
871.36	4164.79	168.53	1472.05	616.59	8518.45	1039.23	124	914.75	1254	124	10.30	0.37
916.50	4037.46	181.55	1459.58	611.99	8391.09	1031.51	133	898.93	1280	133	10.93	0.40
758.34	4379.45	82.50	1462.75	608.65	8568.92	986.13	95	891.09	1177	95	8.47	0.17
717.91	4593.75	34.09	1457.76	604.33	8739.99	812.59	69	743.88	935	69	6.49	0.06
714.32	4562.45	16.50	1449.91	600.27	8662.56	753.17	62	690.68	881	62	6.04	0.03
674.78	4355.19	3.04	1445.14	597.67	8335.29	757.11	61	696.54	951	61	5.97	0.00
719.64	4392.01	8.24	1439.50	595.58	8421.76	783.10	67	716.48	965	67	6.52	0.01
741.11	4459.37	2.69	1436.07	593.91	8516.49	572.48	49	523.25	691	49	4.85	0.00
684.84	4714.56	-55.35	1437.00	591.66	8724.68	-168.92	-12	-156.92	-195	-12	-1.29	0.02

800- App-G Stack Loss Efficiency data and Results (page 11 of 16)

Intertek Testing Services NA Inc.

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	FP-15 Series		
Date:	06-08-16		
Run:	1		
Control #:	QC20160608		
Test Duration:	250		
Output Category:	High		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	62.4%	66.8%
Combustion Efficiency	95.9%	95.9%
Heat Transfer Efficiency	65%	69.7%

Output Rate (kJ/h)	45 352	43 021	**(Btu/h)**
Burn Rate (kg/h)	3.87	8.52	**(lb/h)**
Input (kJ/h)	72 695	68 959	**(Btu/h)**

Test Load Weight (dry kg)	16.11	35.51	**dry lb**
MC wet (%)	17.84		
MC dry (%)	21.71		
Particulate (g)	15.415		
CO (g)	911		
Test Duration (h)	4.17		

Emissions	**Particulate**	**CO**
g/MJ Output	0.08	4.82
g/kg Dry Fuel	0.96	56.56
g/h	3.70	218.69
lb/MM Btu Output	0.19	11.21

Air/Fuel Ratio (A/F)	12.81

VERSION: **2.4** **2010-04-15**

VERSION: 2.4 2010-04-15

Manufacturer:	SBI	Appliance Type:	Non-Cat	(Cat, Non-Cat, Pellet)			
Model:	FP-15 Series						
Date:	2016-06-09	Temp. Units	F	(F or C)	Default Fuel Values		
Run:	2	Weight Units	lb	(kg or lb)		D. Fir	Oak
Control #:	QC20160608				HHV (kJ/kg)	19 810	19 887
Test Duration:	770				%C	48.73	50
Output Category:	1	Fuel Data			%H	6.87	6.6
			Beech		%O	43.9	42.9
Wood Moisture (% wet):	19.92	HHV	18 800	kJ/kg	%Ash	0.5	0.5
Load Weight (lb wet):	51.83	%C	48.7				
Burn Rate (dry kg/h):	1.47	%H	5.8				
Total Particulate Emissions:	19.145 g	%O	44.9				
		%Ash	0.6				

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Temp. (ºF) Flue Gas	Room Temp
	Averages	0.51	4.84	15.69	308.78	77.67
0	51.83	0.29	2.33	17.10	233.3	76.9
10	47.86	0.94	13.45	7.45	704.6	77.2
20	42.31	1.46	13.82	7.37	780.6	79.0
30	37.38	2.15	14.06	6.89	764.5	80.5
40	32.46	1.98	13.95	6.86	762.0	81.2
50	27.86	1.88	13.94	6.77	761.8	82.2
60	23.57	1.27	14.43	6.53	764.4	82.8
70	20.14	1.73	10.04	11.02	637.1	82.6
80	18.21	1.33	8.98	11.74	541.0	82.2
90	16.51	0.94	9.96	11.00	507.9	81.5
100	14.84	1.82	10.34	10.22	509.3	80.6
110	13.28	0.58	9.39	11.31	502.3	80.4
120	12.03	0.63	9.47	11.06	495.5	80.3
130	10.89	0.57	8.05	12.43	477.7	81.1
140	10.11	0.50	7.41	12.88	437.5	80.3
150	9.54	0.58	5.81	14.89	405.3	80.2
160	9.23	0.60	4.99	15.25	353.5	79.8
170	8.99	0.55	5.02	15.29	324.5	79.5
180	8.76	0.53	5.05	15.23	306.6	79.7
190	8.53	0.50	5.10	15.13	295.3	79.3
200	8.29	0.51	5.17	15.15	288.7	79.3
210	8.05	0.49	5.17	15.11	283.6	79.0
220	7.80	0.47	5.18	15.12	281.2	78.8
230	7.55	0.46	5.16	15.16	279.7	78.4
240	7.31	0.45	5.20	15.16	278.0	78.6
250	7.07	0.45	5.27	15.09	278.2	78.6
260	6.83	0.43	5.23	15.17	280.1	78.7
270	6.59	0.42	5.08	15.39	279.3	78.9
280	6.37	0.44	4.96	15.51	276.3	78.9
290	6.14	0.43	4.82	15.54	273.5	78.8

800- App-G Stack Loss Efficiency data and Results (page 13 of 16)

300	5.93	0.41	4.82	15.50	271.7	78.6
310	5.72	0.43	4.74	15.65	271.3	78.7
320	5.50	0.41	4.70	15.71	270.8	78.4
330	5.29	0.40	4.58	15.85	269.8	78.5
340	5.08	0.39	4.37	16.07	266.5	78.6
350	4.90	0.37	4.30	16.20	263.6	78.7
360	4.72	0.36	4.16	16.29	260.3	78.5
370	4.54	0.37	4.02	16.47	257.5	78.2
380	4.37	0.38	3.94	16.51	254.4	78.2
390	4.21	0.39	3.78	16.66	251.8	78.5
400	4.03	0.36	3.73	16.70	249.5	78.5
410	3.88	0.35	3.70	16.77	247.5	78.1
420	3.71	0.35	3.65	16.81	245.6	78.3
430	3.55	0.34	3.67	16.81	244.4	78.0
440	3.39	0.33	3.56	16.92	243.6	78.0
450	3.24	0.33	3.48	17.01	242.2	77.9
460	3.08	0.31	3.43	17.09	240.7	78.0
470	2.91	0.32	3.42	17.08	239.3	77.9
480	2.76	0.31	3.34	17.26	240.1	77.9
490	2.61	0.3029	3.22	17.37	238.591	77.7273
500	2.48	0.2989	3.1	17.48	235.762	77.7703
510	2.34	0.2985	2.91	17.65	233.311	77.7729
520	2.21	0.2989	2.89	17.65	230.275	77.2326
530	2.09	0.2884	2.88	17.7	228.403	77.2108
540	1.95	0.2816	2.85	17.7	227.455	77.1758
550	1.82	0.2818	2.88	17.67	226.645	76.8662
560	1.69	0.2614	2.82	17.77	225.424	76.7595
570	1.56	0.2549	2.75	17.86	224.523	76.532
580	1.43	0.2489	2.68	17.92	222.712	76.5502
590	1.32	0.2467	2.58	18.07	220.949	76.7129
600	1.21	0.2368	2.5	18.12	219.033	76.5991
610	1.10	0.2327	2.44	18.18	216.716	76.3479
620	0.99	0.2155	2.22	18.46	214.214	76.1048
630	0.87	0.2095	2.15	18.51	209.457	73.7699
640	0.75	0.1989	2.02	18.69	204.904	73.3005
650	0.66	0.1987	1.95	18.74	199.692	70.7158
660	0.57	0.1966	1.86	18.83	194.588	72.3042
670	0.44	0.3862	1.75	18.94	190.672	66.8672
680	0.30	0.1889	1.73	18.97	185.371	65.2408
690	0.29	0.1841	1.65	19.04	181.111	73.4056
700	0.26	0.1802	1.59	19.09	178.485	74.8565
710	0.23	0.1769	1.59	19.1	175.793	75.3445
720	0.18	0.1741	1.55	19.15	173.017	75.5004
730	0.15	0.166	1.48	19.23	170.553	75.5184
740	0.12	0.162	1.43	19.32	167.441	75.5131
750	0.08	0.1654	1.42	19.31	164.368	75.422
760	0.05	0.4232	1.75	17.6	161.921	75.266
770	0.00	0.3606	2.66	17.76	169.371	75.0965

800- App-G Stack Loss Efficiency data and Results (page 14 of 16)

Manufacturer: SBI
Model: FP-15 Series
Date: 06-09-16
Run: 2
Control #: QC20160608
Test Duration: 770 min

	HHV	LHV
Eff	63.47%	68.00%
Comb Eff	91.73%	91.73%
HT Eff	69.19%	74.12%
Output	17 510	kJ/h
Burn Rate	1.47	kg/h
Grams CO	2 125	g
Input	27 587	kJ/h
MC wet	19.92	

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
$CO_{2\text{-ult}}$ 20.77
F_0 1.000

Overall Heating Efficiency: 63.47%
Combustion Efficiency: 91.73%
Heat Transfer Efficiency: 69.19%

Air Fuel Ratio (A/F)

Dry Molecular Weight (M_d)	29.41
Dry Moles Exhaust Gas (N_T)	637.62
Air Fuel Ratio (A/F)	18.24

%HC 1.32

Heat Output: 16 610 Btu/h 17 510 kJ/h
Heat Input: 26 170 Btu/h 27 587 kJ/h
Burn Duration: 12.83 h
Burn Rate: 3.23 lb/h 1.467 kg/h
Stack Temp: 309.8 Deg. F 154.3 Deg. C

Combustion Efficiency: 91.73%
Total Input (kJ): 354 039 335 789 (Btu)
Total Output (kJ): 224 715 213 132 (Btu)
Efficiency: 63.47%
Total CO (g): 2125.33

Moisture of Wood (wet basis): 19.92
Initial Dry Weight W_d (kg): 18.83
Moisture Content Dry 24.88

Moisture Content MC_{wb}: 19.92
Dry kg: 18.83
CA: 48.7
HY: 5.8
OX: 44.9

Load Weight (kg): 23.52

Fuel Heating Value in kJ/kg - CV	HHV	LHV		HHV	LHV
	18 800	17 549	Btu/lb	8088.0	7549.9

Elapsed Time	INPUT DATA: Weight Remaining (kg)	% CO [e]	% CO_2 [d]	Oxygen Calculation: Excess Air EA	Total O_2	Calc. % O_2 [g]	Input Data: Flue Gas (°C)	Room Temp (°C)	Combust Eff %	Heat Transfer %	Net Eff %	Air Fuel Ratio	Wet Wt Now Wt	% Wet Consumed x	Dry Wt. Now W_{dry}	% Dry Consumed y	Total Input	Fuel Properties: Carbon /12= [a]	Hydrogen /1= [b]	Oxygen /16= [c]	Calorific Value	Mw Moisture Fuel Burn	Mass Balance (moles/100 mole dry flue gas): [h]	[u]	[w]	[j]	[k]	kg Wood per 100 mole dfp Nk	Moles per kg of Dry Wood: CO_2	O_2	CO	HC	N_2	H_2O
	Averages	0.51	4.84	4.61	20.90	15.80	153.77	25.37	93.2%	70.9%	66.1%	31.64	3.53	84.99	2.86	84.79	354228	4.06	5.80	2.81	18800.00	19.92	78.85	20.92	1.33	3.76	0.04	0.13	36.80	191.05	3.80	0.23	867.07	28.72
0	23.52	0.29	2.33	692.0%	20.92	18.44	111.8	24.9	92.3%	65.8%	60.7%	44.6	23.52	0.00	18.83	0.00	0	4.06	5.80	2.81	18800.00	19.92	78.93	20.94	0.65	1.86	0.01	0.06	36.10	285.73	4.54	0.19	1222.92	28.80
10	21.71	0.94	13.45	44.4%	20.83	6.91	373.7	25.1	94.5%	69.1%	65.3%	8.1	21.71	7.66	17.39	7.66	46068	4.06	5.80	2.81	18800.00	19.92	78.71	20.88	3.57	10.13	0.12	0.36	37.87	19.45	2.63	0.33	221.59	28.52
20	19.20	1.46	13.82	36.0%	20.82	6.27	415.9	26.1	91.9%	67.0%	61.5%	7.6	19.20	18.37	15.37	18.37	35784	4.06	5.80	2.81	18800.00	19.92	78.45	20.81	3.81	10.68	0.19	0.38	36.48	16.55	3.85	0.50	207.08	28.18
30	16.96	2.15	14.06	28.2%	20.81	5.68	406.9	26.9	88.7%	67.7%	60.0%	7.1	16.96	27.88	13.58	27.88	33640	4.06	5.80	2.81	18800.00	19.92	78.11	20.72	4.06	11.22	0.28	0.40	34.81	14.06	5.32	0.70	193.41	27.78
40	14.73	1.98	13.95	30.5%	20.81	5.88	405.5	27.4	89.4%	67.7%	60.5%	7.2	14.73	37.38	11.79	37.38	32536	4.06	5.80	2.81	18800.00	19.92	78.20	20.74	3.99	11.05	0.26	0.40	35.20	14.82	4.98	0.65	197.29	27.87
50	12.64	1.88	13.94	31.3%	20.81	5.94	405.4	27.9	89.9%	67.7%	60.9%	7.3	12.64	46.26	10.12	46.26	30359	4.06	5.80	2.81	18800.00	19.92	78.25	20.76	3.96	10.99	0.24	0.39	35.43	15.09	4.77	0.62	198.90	27.93
60	10.69	1.27	14.43	32.3%	20.82	5.75	406.9	28.2	93.1%	68.4%	63.7%	7.4	10.69	54.53	8.56	54.53	26343	4.06	5.80	2.81	18800.00	19.92	78.55	20.84	3.91	11.01	0.16	0.39	37.14	14.80	3.27	0.42	202.16	28.34
70	9.14	1.73	10.04	76.5%	20.85	9.94	336.2	28.1	87.6%	66.4%	58.2%	9.7	9.14	61.14	7.32	61.14	18293	4.06	5.80	2.81	18800.00	19.92	78.29	20.77	2.95	8.13	0.22	0.29	34.20	33.87	5.89	0.74	266.67	27.69
80	8.26	1.33	8.98	101.5%	20.86	11.21	282.8	27.9	89.2%	68.7%	61.2%	11.2	8.26	64.86	6.62	64.86	12412	4.06	5.80	2.81	18800.00	19.92	78.48	20.82	2.58	7.16	0.16	0.26	35.01	43.72	5.18	0.63	305.98	27.91
90	7.49	0.94	9.96	90.5%	20.85	10.42	264.4	27.5	92.8%	71.9%	66.7%	10.6	7.49	68.15	6.00	68.15	11522	4.06	5.80	2.81	18800.00	19.92	78.68	20.87	2.71	7.65	0.11	0.27	36.92	38.63	3.50	0.41	291.63	28.35
100	6.73	1.82	10.34	70.9%	20.84	9.59	265.2	27.0	87.4%	72.1%	63.0%	9.4	6.73	71.37	5.39	71.37	11011	4.06	5.80	2.81	18800.00	19.92	78.25	20.76	3.05	8.39	0.23	0.30	34.08	31.62	5.99	0.76	257.90	27.65
110	6.03	0.58	9.39	108.4%	20.86	11.18	261.3	26.9	95.3%	71.3%	68.0%	11.7	6.03	74.37	4.83	74.37	9588	4.06	5.80	2.81	18800.00	19.92	78.85	20.92	2.47	7.04	0.06	0.25	38.23	45.53	2.35	0.25	321.04	28.68
120	5.46	0.63	9.47	105.8%	20.86	11.08	257.5	26.8	94.9%	71.7%	68.1%	11.6	5.46	76.79	4.37	76.79	8169	4.06	5.80	2.81	18800.00	19.92	78.83	20.91	2.50	7.13	0.07	0.25	38.04	44.49	2.52	0.27	316.63	28.63
130	4.94	0.57	8.05	140.9%	20.87	12.54	247.6	27.3	94.6%	70.0%	66.2%	13.5	4.94	78.99	3.96	78.99	6567	4.06	5.80	2.81	18800.00	19.92	78.84	20.91	2.14	6.09	0.06	0.21	37.86	58.95	2.69	0.28	370.80	28.62
140	4.59	0.50	7.41	162.7%	20.88	13.22	225.3	26.8	95.0%	70.7%	67.1%	14.8	4.59	80.50	3.67	80.50	4621	4.06	5.80	2.81	18800.00	19.92	78.87	20.92	1.96	5.59	0.05	0.19	38.02	67.83	2.56	0.24	404.75	28.69
150	4.33	0.58	5.81	224.9%	20.89	14.79	207.4	26.8	92.7%	68.2%	63.2%	18.2	4.33	81.60	3.47	81.60	2989	4.06	5.80	2.81	18800.00	19.92	78.82	20.91	1.59	4.50	0.06	0.16	36.78	93.60	3.69	0.36	498.91	28.46
160	4.19	0.60	4.99	271.4%	20.90	15.60	178.6	26.6	91.4%	68.9%	63.0%	20.8	4.19	82.18	3.35	82.18	1886	4.06	5.80	2.81	18800.00	19.92	78.80	20.90	1.39	3.92	0.06	0.14	36.04	112.70	4.36	0.42	569.18	28.33
170	4.08	0.55	5.02	273.3%	20.90	15.60	162.5	26.4	92.3%	71.2%	65.7%	20.9	4.08	82.66	3.27	82.66	1625	4.06	5.80	2.81	18800.00	19.92	78.83	20.91	1.38	3.91	0.05	0.14	36.49	113.43	3.97	0.37	573.09	28.44
180	3.97	0.53	5.05	272.2%	20.90	15.58	152.6	26.5	92.5%	72.7%	67.2%	20.9	3.97	83.10	3.18	83.10	1570	4.06	5.80	2.81	18800.00	19.92	78.84	20.91	1.39	3.93	0.05	0.14	36.63	112.99	3.85	0.35	571.78	28.47
190	3.87	0.50	5.10	270.8%	20.90	15.54	146.3	26.3	93.0%	73.6%	68.5%	20.8	3.87	83.55	3.10	83.55	1606	4.06	5.80	2.81	18800.00	19.92	78.85	20.92	1.39	3.95	0.04	0.14	36.88	112.40	3.63	0.32	570.16	28.53
200	3.76	0.51	5.17	265.5%	20.89	15.47	142.6	26.3	92.9%	74.3%	69.1%	20.5	3.76	84.01	3.01	84.01	1619	4.06	5.80	2.81	18800.00	19.92	78.85	20.91	1.41	4.00	0.05	0.14	36.84	110.22	3.66	0.33	561.85	28.52
210	3.65	0.49	5.17	267.0%	20.89	15.48	139.8	26.1	93.3%	74.7%	69.6%	20.6	3.65	84.46	2.93	84.46	1667	4.06	5.80	2.81	18800.00	19.92	78.86	20.92	1.41	3.99	0.04	0.14	37.01	110.82	3.51	0.31	564.54	28.56
220	3.54	0.47	5.18	267.5%	20.90	15.48	138.4	26.0	93.5%	74.9%	70.0%	20.6	3.54	84.95	2.83	84.95	1706	4.06	5.80	2.81	18800.00	19.92	78.87	20.92	1.40	3.99	0.04	0.14	37.14	110.98	3.40	0.29	565.47	28.59
230	3.43	0.46	5.16	269.5%	20.90	15.50	137.6	25.8	93.6%	74.9%	70.1%	20.8	3.43	85.43	2.74	85.43	1657	4.06	5.80	2.81	18800.00	19.92	78.87	20.92	1.39	3.97	0.04	0.14	37.22	111.82	3.33	0.28	568.86	28.61
240	3.32	0.45	5.20	267.8%	20.90	15.47	136.7	25.9	93.8%	75.2%	70.6%	20.7	3.32	85.89	2.66	85.89	1647	4.06	5.80	2.81	18800.00	19.92	78.88	20.92	1.40	3.99	0.04	0.14	37.34	111.09	3.22	0.27	566.43	28.64
250	3.21	0.45	5.27	263.2%	20.89	15.40	136.8	25.9	93.9%	75.3%	70.7%	20.4	3.21	86.36	2.57	86.36	1657	4.06	5.80	2.81	18800.00	19.92	78.88	20.92	1.42	4.04	0.04	0.14	37.37	109.20	3.19	0.27	559.34	28.64
260	3.10	0.43	5.23	267.3%	20.90	15.45	137.8	25.9	94.2%	75.1%	70.8%	20.7	3.10	86.82	2.48	86.82	1649	4.06	5.80	2.81	18800.00	19.92	78.89	20.93	1.40	4.00	0.03	0.14	37.53	110.88	3.05	0.25	566.09	28.68
270	2.99	0.42	5.08	277.7%	20.90	15.61	137.4	26.0	94.2%	74.8%	70.4%	21.2	2.99	87.29	2.39	87.29	1573	4.06	5.80	2.81	18800.00	19.92	78.89	20.93	1.36	3.89	0.03	0.14	37.48	115.13	3.10	0.25	582.03	28.68
280	2.89	0.44	4.96	285.0%	20.90	15.72	135.7	26.1	93.8%	74.7%	70.1%	21.6	2.89	87.71	2.31	87.71	1524	4.06	5.80	2.81	18800.00	19.92	78.89	20.92	1.34	3.81	0.04	0.13	37.29	118.17	3.28	0.27	593.01	28.64
290	2.79	0.43	4.82	295.9%	20.90	15.86	134.2	26.0	93.8%	74.5%	69.9%	22.3	2.79	88.15	2.23	88.15	1498	4.06	5.80	2.81	18800.00	19.92	78.89	20.93	1.30	3.71	0.03	0.13	37.26	122.65	3.30	0.26	609.87	28.65
300	2.69	0.41	4.82	297.3%	20.90	15.87	133.2	25.9	94.1%	74.6%	70.2%	22.3	2.69	88.56	2.15	88.56	1456	4.06	5.80	2.81	18800.00	19.92	78.90	20.93	1.30	3.70	0.03	0.13	37.41	123.20	3.18	0.24	612.33	28.69
310	2.59	0.43	4.74	301.5%	20.90	15.94	132.9	25.9	93.6%	74.4%	69.6%	22.6	2.59	88.97	2.08	88.97	1471	4.06	5.80	2.81	18800.00	19.92	78.88	20.92	1.28	3.65	0.03	0.13	37.15	124.93	3.41	0.27	618.19	28.63
320	2.50	0.41	4.70	306.3%	20.90	15.99	132.7	25.8	93.9%	74.3%	69.8%	22.8	2.50	89.39	2.00	89.39	1458	4.06	5.80	2.81	18800.00	19.92	78.89	20.93	1.27	3.61	0.03	0.13	37.30	126.91	3.28	0.25	626.08	28.67
330	2.40	0.40	4.58	316.8%	20.90	16.12	132.1	25.8	93.9%	74.1%	69.5%	23.4	2.40	89.80	1.92	89.80	1448	4.06	5.80	2.81	18800.00	19.92	78.90	20.93	1.24	3.52	0.03	0.12	37.29	131.23	3.29	0.25	642.34	28.68
340	2.30	0.39	4.37	336.6%	20.90	16.34	130.3	25.9	93.9%	73.7%	69.2%	24.6	2.30	90.21	1.84	90.21	1343	4.06	5.80	2.81	18800.00	19.92	78.90	20.93	1.18	3.36	0.03	0.12	37.28	139.38	3.31	0.24	673.12	28.70
350	2.22	0.37	4.30	344.6%	20.90	16.42	128.6	25.9	94.1%	73.7%	69.3%	25.0	2.22	90.55	1.78	90.55	1202	4.06	5.80	2.81	18800.00	19.92	78.91	20.93	1.16	3.31	0.03	0.12	37.36	142.65	3.24	0.22	685.68	28.73
360	2.14	0.36	4.16	359.5%	20.90	16.56	126.9	25.9	94.1%	73.5%	69.1%	25.9	2.14	90.89	1.72	90.89	1206	4.06	5.80	2.81	18800.00	19.92	78.92	20.93	1.12	3.20	0.02	0.11	37.37	148.79	3.24	0.22	708.88	28.74
370	2.06	0.37	4.02	373.1%	20.91	16.70	125.3	25.7	93.7%	73.2%	68.6%	26.6	2.06	91.24	1.65	91.24	1192	4.06	5.80	2.81	18800.00	19.92	78.91	20.93	1.09	3.11	0.03	0.11	37.16	154.36	3.43	0.23	729.41	28.71
380	1.99	0.38	3.94	381.1%	20.91	16.78	123.5	25.7	93.5%	73.1%	68.4%	27.1	1.99	91.56	1.59	91.56	1056	4.06	5.80	2.81	18800.00	19.92	78.91	20.93	1.07	3.05	0.03	0.11	37.03	157.67	3.55	0.24	741.59	28.69
390	1.91	0.39	3.78	397.7%	20.91	16.93	122.1	25.8	93.0%	72.8%	67.6%	28.0	1.91	91.88	1.53	91.88	1165	4.06	5.80	2.81	18800.00	19.92	78.90	20.93	1.04	2.95	0.03	0.10	36.73	164.50	3.83	0.27	766.62	28.63
400	1.83	0.36	3.73	407.3%	20.91	17.00	120.8	25.8	93.4%	72.8%	68.0%	28.5	1.83	92.22	1.47	92.22	1138	4.06	5.80	2.81	18800.00	19.92	78.91	20.93	1.01	2.90	0.02	0.10	36.98	168.47	3.62	0.24	782.23	28.70
410	1.76	0.35	3.70	412.7%	20.91	17.03	119.7	25.6	93.6%	72.8%	68.2%	28.9	1.76	92.52	1.41	92.52	1121	4.06	5.80	2.81	18800.00	19.92	78.92	20.93	1.00	2.87	0.02	0.10	37.07	170.66	3.53	0.22	790.76	28.73
420	1.68	0.35	3.65	419.2%	20.91	17.08	118.7	25.7	93.6%	72.8%	68.2%	29.2	1.68	92.85	1.35	92.85	1129	4.06	5.80	2.81	18800.00	19.92	78.92	20.93	0.99	2.83	0.02	0.10	37.04	173.37	3.56	0.22	800.92	28.73
430	1.61	0.34	3.67	417.8%	20.91	17.07	118.0	25.6	93.8%	73.0%	68.5%	29.2	1.61	93.16	1.29	93.16	-941	4.06	5.80	2.81	18800.00	19.92	78.92	20.93	0.99	2.84	0.02	0.10	37.16	172.80	3.46	0.21	799.04	28.76
440	1.54	0.33	3.56	434.2%	20.91	17.18	117.5	25.6	93.9%	72.6%	68.2%	30.1	1.54	93.46	1.45	92.32	-869	4.06	5.80	2.81	18800.00	19.92	78.93	20.94	0.96	2.75	0.02	0.10	37.20	179.56	3.43	0.20	824.69	28.78
450	1.47	0.33	3.48	445.5%	20.91	17.27	116.8	25.5	93.8%	72.4%	67.9%	30.7	1.47	93.75	1.38	92.66	1247	4.06	5.80	2.81	18800.00	19.92	78.93	20.94	0.94	2.70	0.02	0.09	37.13	184.20	3.50	0.20	842.02	28.78
460	1.40	0.31	3.43	454.8%	20.91	17.32	115.9	25.6	94.0%	72.4%	68.0%	31.3	1.40	94.06	1.31	93.02	1298	4.06	5.80	2.81	18800.00	19.92	78.93	20.94	0.93	2.65	0.02	0.09	37.23	188.03	3.42	0.18	856.78	28.81
470	1.32	0.32	3.42	454.9%	20.91	17.33	115.2	25.5	93.8%	72.4%	67.9%	31.3	1.32	94.38	1.24	93.40	1256	4.06	5.80	2.81	18800.00	19.92	78.93	20.94	0.93	2.65	0.02	0.09	37.12	188.09	3.51	0.19	856.72	28.79
480	1.25	0.31	3.34	469.5%	20.91	17.42	115.6	25.5	94.0%	72.0%	67.7%	32.1	1.25	94.67	1.18	93.73	1213	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.90	2.59	0.02	0.09	37.22	194.11	3.43	0.17	879.73	28.83
490	1.18	0.30	3.22	489.7%	20.91	17.54	114.8	25.4	93.9%	71.5%	67.2%	33.2	1.18	94.97	1.11	94.08	1143	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.87	2.50	0.01	0.09	37.16	202.44	3.50	0.17	911.01	28.83
500	1.12	0.30	3.10	511.2%	20.91	17.66	113.2	25.4	93.8%	71.2%	66.8%	34.5	1.12	95.22	1.06	94.38	1056	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.84	2.41	0.01	0.08	37.08	211.31	3.58	0.17	944.32	28.84
510	1.06	0.30	2.91	547.5%	20.91	17.86	111.8	25.4	93.5%	70.4%	65.8%	36.5	1.06	95.48	1.00	94.68	1060	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.79	2.28	0.01	0.08	36.87	226.24	3.78	0.17	1000.20	28.83
520	1.00	0.30	2.89	551.5%	20.91	17.88	110.2	25.1	93.4%	70.6%	65.9%	36.7	1.00	95.73	0.95	94.98	1020	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.79	2.26	0.01	0.08	36.84	227.88	3.81	0.17	1006.31	28.83
530	0.95	0.29	2.88	555.7%	20.91	17.89	109.1	25.1	93.7%	70.7%	66.3%	37.0	0.95	95.97	0.89	95.26	1043	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.78	2.25	0.01	0.08	36.97	229.65	3.70	0.16	1013.32	28.86
540	0.89	0.28	2.85	563.4%	20.92	17.92	108.6	25.1	93.8%	70.7%	66.3%	37.4	0.89	96.23	0.84	95.57	1076	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.77	2.22	0.01	0.08	37.02	232.85	3.66	0.15	1025.53	28.88
550	0.83	0.28	2.88	557.1%	20.91	17.89	108.1	24.9	93.8%	70.9%	66.6%	37.1	0.83	96.49	0.78	95.86	1056	4.06	5.80	2.81	18800.00	19.92	78.94	20.94	0.78	2.24	0.01	0.08	37.06	230.24	3.63	0.15	1015.75	28.88
560	0.77	0.26	2.82	574.2%	20.92	17.96	107.5	24.9	94.3%	70.7%	66.6%	38.1	0.77	96.74	0.72	96.16	1051	4.06	5.80	2.81	18800.00	19.92	78.95	20.94	0.76	2.19	0.01	0.08	37.26	237.38	3.45	0.11	1043.25	28.95
570	0.71	0.25	2.75	591.4%	20.92	18.04	107.0	24.7	94.3%	70.3%	66.3%	39.0	0.71	96.99	0.67	96.46	1030	4.06	5.80	2.81	18800.00	19.92	78.96	20.94	0.74	2.14	0.01	0.07	37.27	244.48	3.45	0.10	1070.12	28.97
580	0.65	0.25	2.68	609.3%	20.92	18.11	106.0	24.8	94.4%	70.1%	66.1%	40.1	0.65	97.24	0.61	96.74	947	4.06	5.80	2.81	18800.00	19.92	78.96	20.94	0.72	2.08	0.01	0.07	37.27	251.91	3.46	0.09	1098.19	28.99
590	0.60	0.25	2.58	634.9%	20.92	18.21	105.0	24.8	94.2%	69.7%	65.6%	41.5	0.60	97.45	0.57	96.99	895	4.06	5.80	2.81	18800.00	19.92	78.96	20.94	0.70	2.01	0.01	0.07	37.18	262.51	3.56	0.09	1137.99	29.00
600	0.55	0.24	2.50	659.1%	20.92	18.30	103.9	24.8	94.4%	69.3%	65.4%	42.9	0.55	97.67	0.52	97.25	900	4.06	5.80	2.81	18800.00	19.92	78.96	20.95	0.68	1.95	0.00	0.07	37.23	272.53	3.53	0.07	1175.98	29.04
610	0.50	0.23	2.44	677.3%	20.92	18.36	102.6	24.6	94.4%	69.2%	65.3%	43.9	0.50	97.88	0.47	97.50	872	4.06	5.80	2.81	18800.00	19.92	78.96	20.95	0.66	1.90	0.00	0.07	37.22	280.08	3.55	0.06	1204.45	29.05
620	0.45	0.22	2.22	753.0%	20.92	18.59	101.2	24.5	94.5%	67.6%	63.9%	48.3	0.45	98.08	0.43	97.74	933	4.06	5.80	2.81	18800.00	19.92	78.97	20.95	0.60	1.74	0.00	0.06	37.19	311.51	3.61	0.02	1323.11	29.13
630	0.39	0.21	2.15	780.5%	20.92	18.67	98.6	23.2	94.5%	67.3%	63.6%	49.9	0.39	98.33	0.37	98.03	990	4.06	5.80	2.81	18800.00	19.92	78.97	20.95	0.58	1.69	0.00	0.06	37.20	322.94	3.62	0.01	1366.28	29.16
640	0.34	0.20	2.02	836.3%	20.92	18.80	96.1	22.9	94.6%	66.7%	63.1%	53.1	0.34	98.56	0.32	98.30	844	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.55	1.59	0.00	0.05	37.19	346.16	3.66	-0.02	1453.98	29.22
650	0.30	0.20	1.95	866.9%	20.92	18.87	93.2	21.5	94.4%	66.4%	62.7%	54.8	0.30	98.73	0.28	98.50	713	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.53	1.54	0.00	0.05	37.08	358.84	3.78	-0.02	1501.59	29.22
660	0.26	0.20	1.86	910.1%	20.92	18.97	90.3	22.4	94.3%	66.6%	62.8%	57.3	0.26	98.90	0.24	98.70	879	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.51	1.47	0.00	0.05	36.96	376.82	3.91	-0.03	1569.21	29.24
670	0.20	0.39	1.75	872.5%	20.92	18.98	88.2	19.4	86.9%	64.9%	56.4%	54.4	0.20	99.15	0.19	99.00	1088	4.06	5.80	2.81	18800.00	19.92	78.88	20.92	0.53	1.50	0.02	0.05	33.08	358.75	7.30	0.45	1491.03	28.27
680	0.14	0.19	1.73	982.6%	20.92	19.10	85.2	18.5	94.2%	65.4%	61.7%	61.4	0.14	99.42	0.13	99.32	596	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.47	1.38	0.00	0.05	36.87	407.02	4.03	-0.06	1683.06	29.30
690	0.13	0.18	1.65	1032.7%	20.93	19.18	82.8	23.0	94.2%	66.9%	63.0%	64.3	0.13	99.44	0.12	99.34	162	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.45	1.32	0.00	0.04	36.80	427.90	4.11	-0.08	1761.79	29.34
700	0.12	0.18	1.59	1073.6%	20.93	19.25	81.4	23.8	94.2%	67.0%	63.1%	66.6	0.12	99.50	0.11	99.41	254	4.06	5.80	2.81	18800.00	19.92	78.98	20.95	0.44	1.27	0.00	0.04	36.76	444.98	4.17	-0.10	1826.19	29.38
710	0.10	0.18	1.59	1075.8%	20.93	19.25	79.9	24.1	94.4%	67.7%	63.9%	66.8	0.10	99.56	0.10	99.48	308	4.06	5.80	2.81	18800.00	19.92	78.99	20.95	0.43	1.27	0.00	0.04	36.84	445.97	4.10	-0.11	1830.11	29.40
720	0.08	0.17	1.55	1105.0%	20.93	19.29	78.3	24.2	94.4%	67.8%	64.0%	68.5	0.08	99.65	0.08	99.58	301	4.06	5.80	2.81	18800.00	19.92	78.99	20.95	0.42	1.24	-0.01	0.04	36.82	458.18	4.14	-0.12	1876.17	29.42
730	0.07	0.17	1.48	1162.1%	20.93	19.36	77.0	24.2	94.5%	67.4%	63.7%	71.8	0.07	99.70	0.07	99.65	261	4.06	5.80	2.81	18800.00	19.92	78.99	20.95	0.40	1.18	-0.01	0.04	36.85	482.20	4.13	-0.16	1967.01	29.50
740	0.05	0.16	1.43	1204.9%	20.93	19.42	75.2	24.2	94.6%	67.4%	63.8%	74.2	0.05	99.77	0.05	99.73	299	4.06	5.80	2.81	18800.00	19.92	78.99	20.95	0.39	1.15	-0.01	0.04	36.84	500.17	4.17	-0.18	2034.83	29.54
750	0.04	0.17	1.42	1210.4%	20.93	19.42	73.5	24.1	94.4%	68.0%	64.1%	74.5	0.04	99.85	0.03	99.82	286	4.06	5.80	2.81	18800.00	19.92	78.99	20.95	0.39	1.14	-0.01	0.04	36.72	502.33	4.28	-0.17	2042.72	29.52
760	0.02	0.42	1.75	856.0%	20.92	18.96	72.2	24.0	85.7%	72.0%	61.7%	53.4	0.02	99.91	0.02	99.89	507	4.06	5.80	2.81	18800.00	19.92	78.87	20.92	0.54	1.52	0.03	0.05	32.45	351.56	7.85	0.54	1462.24	28.10
770	0.00	0.36	2.66	587.8%	20.92	18.08	76.3	23.9	91.3%	76.8%	70.1%	38.6	0.00	100.00	0.00	100.00	189	4.06	5.80	2.81	18800.00	19.92	78.90	20.93	0.75	2.13	0.02	0.07	35.70	242.58	4.84	0.29	1058.89	28.59

SpecDIRECT POWERED BY Intertek

800- App-G Stack Loss Efficiency data and Results (page 15 of 16)

									SUMS							AVERAGE	SUMS						
13.82	426.92	5257.51	3893.23	3770.29	3731.77	5200.06	4506.80	298.52	15027.13	38451.06	84939.79	181941.69	15953.77	108520.62	52253.55	6372.92	129317.28	29257.28	100060.0	224910.9	29263.9	2125.3	139.8
	Stack	Heat Content Change - Ambient to Stack Temperature						Room	Energy Losses (kJ/kg of Dry Fuel)							Total							
Moisture	Temp	Flue Gas Constituent						Temp	Flue Gas Constituent							Loss	Total	Chemical	Sensible and	Total	Chem	Grams Produced	
Present	K	CO_2	O_2	CO	N_2	CH_4	H_2O	K	CO_2	O_2	CO	N_2	CH_4	H_2O Comb	H_2O Fuel Mo	Rate	Loss	Loss 1	Latent Loss	Output	Loss 2	CO	HC
13.82	384.97	3427.68	2594.46	2526.57	2497.80	3267.09	3024.61	298.07	123.73	741.31	1296.85	3054.61	167.42	1353.43	649.43	7386.78	0.00	0	0.00	0	0	0.00	0.00
13.82	646.84	15073.59	10817.86	10390.28	10302.28	15662.66	12392.55	298.27	570.79	210.38	773.04	2282.87	295.79	1607.54	778.90	6519.30	15981.89	2541	13441.34	30106	2541	180.86	12.61
13.82	689.04	17099.74	12172.55	11665.80	11572.44	17985.70	13905.63	299.26	623.78	201.40	1135.70	2396.39	449.88	1631.16	799.81	7238.10	13777.04	2915	10861.59	22007	2915	205.42	15.09
13.82	680.09	16626.64	11853.79	11364.99	11273.04	17448.64	13548.58	300.07	578.81	166.61	1565.86	2180.30	632.41	1597.92	794.87	7516.79	13450.30	3804	9646.72	20190	3804	266.52	19.95
13.82	678.69	16540.86	11794.74	11308.92	11217.31	17354.00	13481.92	300.51	582.16	174.85	1466.52	2213.08	590.10	1601.42	793.95	7422.08	12845.11	3442	9402.85	19691	3442	241.47	18.01
13.82	678.57	16514.59	11775.08	11289.83	11198.43	17328.46	13459.08	301.05	585.18	177.65	1404.45	2227.35	563.94	1604.09	793.63	7356.31	11879.40	3074	8805.12	18480	3074	215.79	16.06
13.82	680.05	16575.99	11814.93	11327.01	11235.53	17401.52	13503.07	301.35	615.61	174.84	962.55	2271.42	380.46	1628.56	794.24	6827.68	9567.17	1820	7747.44	16776	1820	128.31	9.40
13.82	609.31	13166.77	9512.21	9152.42	9071.46	13543.79	10921.36	301.27	450.29	322.14	1719.56	2419.11	672.09	1519.78	758.56	7861.54	7649.41	2265	5384.51	10643	2265	160.36	11.58
13.82	555.94	10698.20	7810.51	7536.00	7464.90	10825.62	8999.24	301.01	374.57	341.48	1505.53	2284.08	571.27	1478.18	732.00	7287.12	4811.14	1341	3470.30	7601	1341	95.80	6.70
13.82	537.56	9877.15	7238.08	6990.53	6923.13	9935.68	8350.05	300.67	364.66	279.61	1013.52	2018.99	372.67	1483.09	723.03	6255.56	3833.78	832	3001.73	7688	832	59.98	4.06
13.82	538.34	9931.88	7277.80	7028.79	6961.04	9991.59	8395.72	300.15	338.48	230.16	1736.48	1795.27	684.77	1448.07	723.66	6956.90	4074.68	1389	2685.65	6937	1389	98.19	7.13
13.82	534.45	9760.67	7158.10	6914.64	6847.68	9806.74	8259.83	300.04	373.17	325.90	680.60	2198.41	224.04	1497.77	721.78	6021.68	3071.09	452	2619.24	6517	452	33.52	2.03
13.82	530.67	9592.88	7040.48	6802.39	6736.23	9626.27	8126.18	299.98	364.90	313.24	729.27	2132.88	245.89	1491.41	719.94	5997.51	2606.14	415	2190.98	5563	415	30.62	1.90
13.82	520.78	9133.93	6716.44	6492.53	6428.70	9137.69	7757.06	300.41	345.81	395.96	779.58	2383.77	247.80	1480.60	714.83	6348.36	2217.68	352	1865.77	4350	352	26.34	1.54
13.82	498.45	8159.78	6027.93	5833.98	5775.14	8102.23	6972.47	300.00	310.27	408.86	739.14	2337.46	219.42	1461.33	703.99	6180.48	1519.29	231	1287.81	3102	231	17.61	0.96
13.82	480.52	7377.30	5470.05	5299.09	5244.58	7281.13	6334.81	299.95	271.31	512.00	1064.78	2616.56	322.12	1431.50	695.18	6913.45	1099.04	217	882.09	1890	217	16.44	0.91
13.82	451.74	6147.04	4585.42	4448.99	4401.78	6006.53	5320.75	299.72	221.55	516.79	1254.63	2505.42	377.35	1396.52	681.17	6953.43	697.43	161	535.95	1188	161	12.26	0.68
13.82	435.67	5473.70	4097.13	3978.70	3935.74	5317.92	4759.41	299.51	199.76	464.74	1138.47	2255.56	328.05	1385.95	673.41	6445.93	557.18	125	431.95	1068	125	9.60	0.51
13.82	425.72	5050.83	3788.48	3680.91	3640.77	4889.86	4403.81	299.64	184.99	428.08	1104.21	2081.71	314.54	1377.28	668.49	6159.30	514.49	117	397.31	1056	117	9.01	0.47
13.82	419.45	4796.98	3603.05	3501.97	3463.52	4633.21	4190.12	299.41	176.89	404.97	1039.91	1974.76	288.44	1374.00	665.54	5924.52	505.99	112	393.75	1100	112	8.68	0.44
13.82	415.75	4643.55	3490.56	3393.32	3355.92	4478.98	4060.34	299.40	171.07	384.73	1047.90	1885.52	294.82	1369.60	663.75	5817.38	500.97	114	386.54	1118	114	8.82	0.45
13.82	412.93	4532.45	3409.22	3314.78	3278.13	4367.06	3966.52	299.24	167.75	377.80	1004.71	1850.63	275.91	1368.95	662.45	5708.20	506.03	112	393.65	1161	112	8.71	0.44
13.82	411.59	4479.15	3370.14	3277.03	3240.74	4313.49	3921.43	299.18	166.35	374.01	972.07	1832.55	261.97	1369.15	661.83	5637.94	511.73	111	400.85	1195	111	8.63	0.43
13.82	410.79	4454.87	3352.61	3260.16	3224.03	4288.49	3901.31	298.94	165.79	374.90	953.20	1834.04	252.91	1369.55	661.55	5611.94	494.61	105	389.38	1162	105	8.22	0.40
13.82	409.81	4410.47	3319.83	3228.44	3192.63	4244.38	3863.40	299.04	164.69	368.81	921.39	1808.40	240.50	1369.79	661.03	5534.60	484.79	101	384.03	1162	101	7.90	0.38
13.82	409.95	4416.00	3323.88	3232.35	3196.50	4249.93	3868.07	299.05	165.02	362.96	913.33	1787.93	239.62	1370.02	661.09	5499.97	484.63	101	384.05	1172	101	7.87	0.38
13.82	410.98	4457.34	3354.23	3261.69	3225.55	4291.39	3903.11	299.09	167.27	371.90	874.18	1825.94	220.86	1373.03	661.57	5494.76	481.94	95	386.86	1167	95	7.50	0.35
13.82	410.52	4434.59	3337.37	3245.35	3209.38	4268.93	3883.58	299.19	166.20	384.24	888.39	1867.95	221.19	1372.43	661.30	5561.71	465.27	92	373.38	1107	92	7.27	0.33
13.82	408.85	4363.84	3285.27	3194.97	3159.50	4198.31	3823.38	299.23	162.71	388.21	937.57	1873.61	237.94	1368.92	660.47	5629.43	456.41	94	362.04	1068	94	7.44	0.35
13.82	407.32	4302.67	3240.33	3151.53	3116.48	4137.03	3771.49	299.16	160.33	397.42	945.03	1900.66	235.16	1367.72	659.76	5666.07	451.57	93	358.43	1047	93	7.37	0.34
13.82	406.33	4266.09	3213.53	3125.66	3090.86	4100.22	3740.59	299.06	159.59	395.90	908.44	1892.61	219.02	1368.56	659.33	5603.45	434.04	86	347.56	1022	86	6.89	0.30
13.82	406.09	4255.30	3205.56	3117.94	3083.22	4089.51	3731.36	299.07	158.07	400.47	975.13	1906.03	244.85	1365.54	659.20	5709.28	446.67	95	352.15	1024	95	7.47	0.34
13.82	405.82	4249.49	3201.46	3114.02	3079.33	4083.32	3726.69	298.94	158.50	406.31	937.70	1927.90	226.42	1367.37	659.14	5683.33	440.67	89	351.28	1017	89	7.12	0.31
13.82	405.28	4225.08	3183.39	3096.53	3062.02	4059.15	3705.78	299.00	157.54	417.74	941.69	1966.86	222.38	1367.20	658.85	5732.28	441.54	89	352.74	1007	89	7.10	0.31
13.82	403.44	4146.95	3125.72	3040.72	3006.77	3981.47	3639.09	299.06	154.60	435.66	946.53	2023.93	213.62	1366.22	657.93	5798.50	414.25	82	332.15	929	82	6.62	0.27
13.82	401.79	4077.58	3074.50	2991.16	2957.71	3912.53	3579.86	299.09	152.36	438.57	926.42	2028.05	200.84	1365.88	657.11	5769.22	368.85	71	297.46	833	71	5.80	0.23
13.82	400.00	4008.84	3023.92	2942.25	2909.28	3843.84	3521.42	298.96	149.80	449.92	927.49	2062.34	193.17	1365.01	656.30	5804.03	372.28	71	301.06	834	71	5.83	0.22
13.82	398.41	3948.01	2979.13	2898.94	2866.40	3783.12	3469.67	298.84	146.71	459.87	982.03	2090.79	208.81	1361.86	655.58	5905.65	374.34	75	299.55	817	75	6.10	0.24
13.82	396.70	3878.67	2927.91	2849.37	2817.33	3714.26	3410.43	298.81	143.63	461.66	1015.76	2089.31	218.69	1359.11	654.77	5942.92	357.95	74	284.27	774	74	5.99	0.24
13.82	395.27	3814.04	2879.91	2802.85	2771.29	3650.64	3354.80	298.97	140.09	473.76	1093.87	2124.52	242.61	1354.98	654.00	6083.82	377.02	82	294.93	788	82	6.64	0.27
13.82	393.99	3761.67	2841.15	2765.32	2734.14	3598.79	3309.95	298.97	139.09	478.65	1033.36	2138.72	211.84	1356.95	653.38	6012.00	363.88	75	289.17	774	75	6.13	0.23
13.82	392.89	3723.63	2813.20	2738.30	2707.39	3560.71	3277.67	298.79	138.05	480.10	1008.96	2140.89	198.66	1357.42	652.93	5977.01	356.51	71	285.10	765	71	5.90	0.21
13.82	391.80	3676.06	2777.86	2704.06	2673.50	3513.88	3236.72	298.86	136.17	481.60	1017.73	2141.25	198.80	1356.23	652.37	5984.14	359.49	72	287.04	770	72	5.99	0.21
13.82	391.16	3655.09	2762.48	2689.20	2658.79	3492.82	3218.98	298.73	135.81	477.35	988.91	2124.47	187.42	1356.92	652.12	5923.00	-296.62	-58	-238.21	-645	-58	-4.85	-0.17
13.82	390.69	3635.98	2748.33	2675.49	2645.22	3473.94	3202.59	298.72	135.25	493.49	981.14	2181.48	175.15	1357.74	651.89	5976.14	-276.26	-53.00	-223.27	-593	-53	-4.45	-0.14
13.82	389.95	3608.09	2727.71	2655.53	2625.46	3446.28	3178.73	298.67	133.96	502.44	1000.78	2210.70	177.29	1356.83	651.56	6033.55	400.23	77.48	322.74	847	77	6.51	0.21
13.82	389.09	3571.49	2700.52	2629.18	2599.39	3410.25	3147.23	298.70	132.97	507.79	975.67	2227.11	161.62	1357.57	651.13	6013.88	415.32	77.88	337.44	883	78	6.61	0.20
13.82	388.31	3541.93	2678.65	2608.01	2578.43	3380.97	3121.93	298.64	131.48	503.83	1003.17	2208.98	173.18	1355.63	650.78	6027.04	402.57	77.92	324.65	853	78	6.57	0.21
13.82	388.76	3559.17	2691.41	2620.37	2590.66	3398.04	3136.69	298.67	132.49	522.44	979.77	2279.07	155.28	1357.94	650.98	6077.97	392.01	72.59	319.42	821	73	6.20	0.18
13.82	387.92	3529.52	2669.55	2599.21	2569.72	3368.52	3111.41	298.55	131.17	540.41	998.37	2341.05	152.08	1357.55	650.63	6171.26	375.06	69.33	305.73	768	75	5.95	0.17
13.82	386.35	3464.53	2621.27	2552.42	2523.41	3304.57	3055.47	298.58	128.48	553.89	1021.02	2382.91	149.90	1356.16	649.83	6242.22	350.70	65.24	285.46	706	64	5.62	0.15
13.82	384.99	3409.02	2580.03	2512.45	2483.86	3249.95	3007.68	298.58	125.70	583.71	1079.87	2484.36	154.92	1354.26	649.20	6432.01	362.50	69.02	293.48	697	70	5.97	0.16
13.82	383.30	3351.87	2537.87	2471.67	2443.48	3193.08	2958.94	298.28	123.49	578.33	1087.77	2458.90	156.13	1352.72	648.53	6405.87	347.46	66.93	280.53	672	69	5.79	0.15
13.82	382.26	3310.08	2506.80	2441.54	2413.67	3152.01	2922.93	298.27	122.37	575.69	1056.68	2445.81	140.69	1353.30	648.03	6342.58	351.72	65.87	285.85	691	63	5.75	0.14
13.82	381.74	3289.42	2491.45	2426.66	2398.95	3131.69	2905.14	298.25	121.79	580.13	1044.11	2460.20	131.15	1353.79	647.78	6338.95	362.75	66.72	296.03	713	68	5.86	0.13
13.82	381.29	3277.72	2482.93	2418.45	2390.81	3119.82	2895.33	298.08	121.46	571.66	1034.86	2428.47	130.73	1353.55	647.65	6288.37	353.19	64.95	288.25	703	65	5.70	0.13
13.82	380.61	3252.46	2464.19	2400.29	2372.83	3094.91	2873.61	298.02	121.19	584.94	985.74	2475.46	100.52	1356.09	647.35	6271.29	350.56	60.24	290.32	700	61	5.41	0.10
13.82	380.11	3236.97	2452.79	2389.26	2361.92	3079.44	2860.44	297.89	120.65	599.66	985.92	2527.53	91.15	1356.69	647.17	6328.77	346.76	58.54	288.21	683	59	5.30	0.09
13.82	379.10	3195.79	2422.11	2359.51	2332.48	3039.11	2824.86	297.90	119.12	610.16	987.83	2561.51	82.12	1356.61	646.67	6364.02	320.59	53.47	267.12	626	57	4.88	0.07
13.82	378.12	3152.65	2389.87	2328.22	2301.52	2997.08	2787.44	297.99	117.23	627.36	1014.47	2619.11	79.31	1355.82	646.16	6459.46	307.41	51.65	255.76	587	51	4.74	0.07
13.82	377.06	3111.96	2359.61	2298.88	2272.49	2957.13	2752.35	297.93	115.86	643.07	1006.11	2672.40	62.49	1356.56	645.67	6502.16	311.37	50.77	260.59	589	51	4.73	0.05
13.82	375.77	3065.22	2324.89	2265.23	2239.19	2911.13	2712.12	297.79	114.08	651.15	1012.48	2696.98	55.19	1356.15	645.12	6531.16	303.02	49.15	253.87	569	50	4.61	0.05
13.82	374.38	3014.20	2286.95	2228.45	2202.80	2861.01	2668.15	297.65	112.11	712.41	1029.81	2914.55	20.77	1358.47	644.51	6792.62	337.00	51.72	285.28	596	47	5.02	0.02
13.82	371.74	2957.03	2245.50	2188.53	2163.24	2802.51	2620.50	296.36	109.99	725.16	1033.62	2955.58	7.24	1358.50	643.85	6833.94	359.83	54.39	305.45	630	56	5.34	0.01
13.82	369.21	2865.07	2177.00	2122.09	2097.50	2712.45	2541.05	296.09	106.55	753.59	1044.01	3049.72	-19.14	1358.93	642.75	6936.41	311.50	45.68	265.82	533	52	4.60	-0.02
13.82	366.31	2803.38	2132.15	2078.86	2054.67	2649.62	2489.44	294.66	103.94	765.10	1076.96	3085.27	-22.01	1357.72	642.04	7009.02	265.68	39.69	225.98	447	40	4.01	-0.01
13.82	363.48	2655.98	2020.91	1970.61	1947.63	2508.40	2359.88	295.54	98.15	761.52	1113.13	3056.24	-30.45	1354.81	640.25	6993.66	326.90	50.25	276.65	552	40	5.11	-0.03
13.82	361.30	2683.85	2044.45	1994.14	1970.76	2529.61	2388.23	292.52	88.78	733.45	2080.35	2938.47	402.30	1310.69	640.64	8194.68	474.27	142.78	331.50	614	138	11.83	0.42
13.82	358.36	2600.47	1982.61	1934.23	1911.47	2447.34	2316.61	291.62	95.87	806.97	1146.95	3217.13	-56.23	1356.22	639.65	7206.55	228.31	34.31	194.00	367	65	3.57	-0.03
13.82	355.99	2333.38	1778.13	1734.53	1714.17	2197.85	2077.37	296.15	85.88	760.87	1169.24	3020.00	-74.20	1351.06	636.34	6949.20	59.83	9.37	50.46	102	4	0.99	-0.01
13.82	354.53	2244.51	1710.66	1668.77	1649.17	2113.60	1998.63	296.96	82.51	761.21	1186.02	3011.69	-89.68	1350.35	635.26	6937.36	93.55	14.69	78.86	160	15	1.57	-0.02
13.82	353.04	2174.66	1657.86	1617.38	1598.36	2046.84	1937.12	297.23	80.12	739.35	1166.56	2925.17	-99.12	1349.51	634.41	6796.00	111.21	17.36	93.85	196	14	1.88	-0.03
13.82	351.49	2110.03	1609.12	1569.95	1551.46	1984.88	1880.35	297.32	77.69	737.26	1176.78	2910.80	-110.93	1349.06	633.62	6774.29	108.63	16.99	91.64	193	20	1.86	-0.03
13.82	350.12	2055.28	1567.83	1529.78	1511.74	1932.34	1832.27	297.33	75.75	756.01	1176.14	2973.60	-143.03	1350.94	632.96	6822.36	94.89	14.28	80.60	167	13	1.61	-0.04
13.82	348.40	1986.82	1516.19	1479.54	1462.06	1866.72	1772.14	297.32	73.19	758.35	1187.14	2975.04	-162.15	1351.13	632.13	6814.83	108.26	16.19	92.07	190	15	1.86	-0.05
13.82	346.69	1921.11	1466.62	1431.30	1414.36	1803.73	1714.40	297.27	70.55	736.73	1216.58	2889.14	-152.47	1348.43	631.33	6740.27	102.72	16.13	86.59	184	18	1.83	-0.04
13.82	345.33	1870.62	1428.53	1394.24	1377.71	1755.32	1670.05	297.19	60.70	502.21	2231.45	2014.55	477.30	1282.67	630.71	7199.59	194.26	72.77	121.49	313	37	5.93	0.23
13.82	349.47	2038.18	1555.09	1517.43	1499.51	1915.60	1817.50	297.09	72.76	377.23	1376.82	1587.82	260.21	1309.11	632.75	5616.70	56.41	16.36	40.05	132	33	1.36	0.05

800- App-G Stack Loss Efficiency data and Results (page 16 of 16)

Intertek Testing Services NA, Inc

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	FP-15 Series		
Date:	06-09-16		
Run:	2		
Control #:	QC20160608		
Test Duration:	770		
Output Category:	1		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	63.5%	68.0%
Combustion Efficiency	91.7%	91.7%
Heat Transfer Efficiency	69%	74.1%

Output Rate (kJ/h)	17 510	16 610	**(Btu/h)**
Burn Rate (kg/h)	1.47	3.23	**(lb/h)**
Input (kJ/h)	27 587	26 170	**(Btu/h)**

Test Load Weight (dry kg)	18.83	41.51	**dry lb**
MC wet (%)	19.92		
MC dry (%)	24.88		
Particulate (g)	19.145		
CO (g)	2 125		
Test Duration (h)	12.83		

Emissions	Particulate	CO
g/MJ Output	0.09	9.46
g/kg Dry Fuel	1.02	112.86
g/h	1.49	165.61
lb/MM Btu Output	0.20	21.98

Air/Fuel Ratio (A/F)	18.24

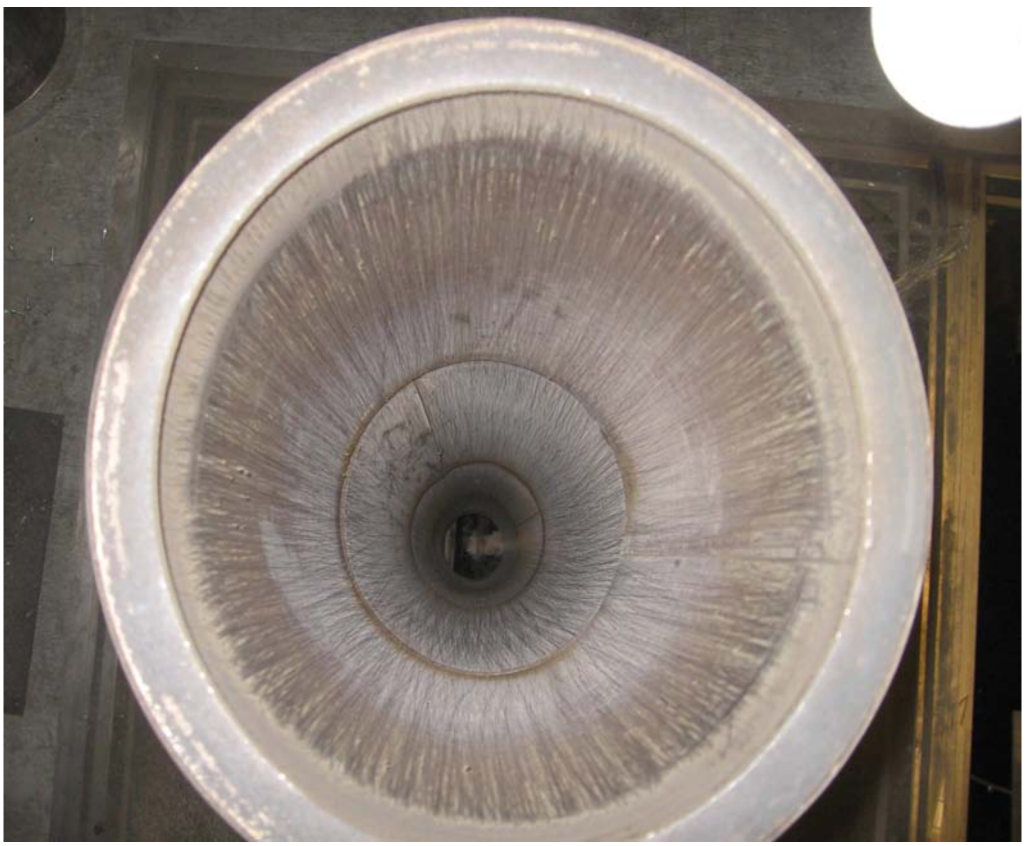
VERSION: 2.4 2010-04-15

900- App-H Tunnel Cleaning and Test Load Photographs

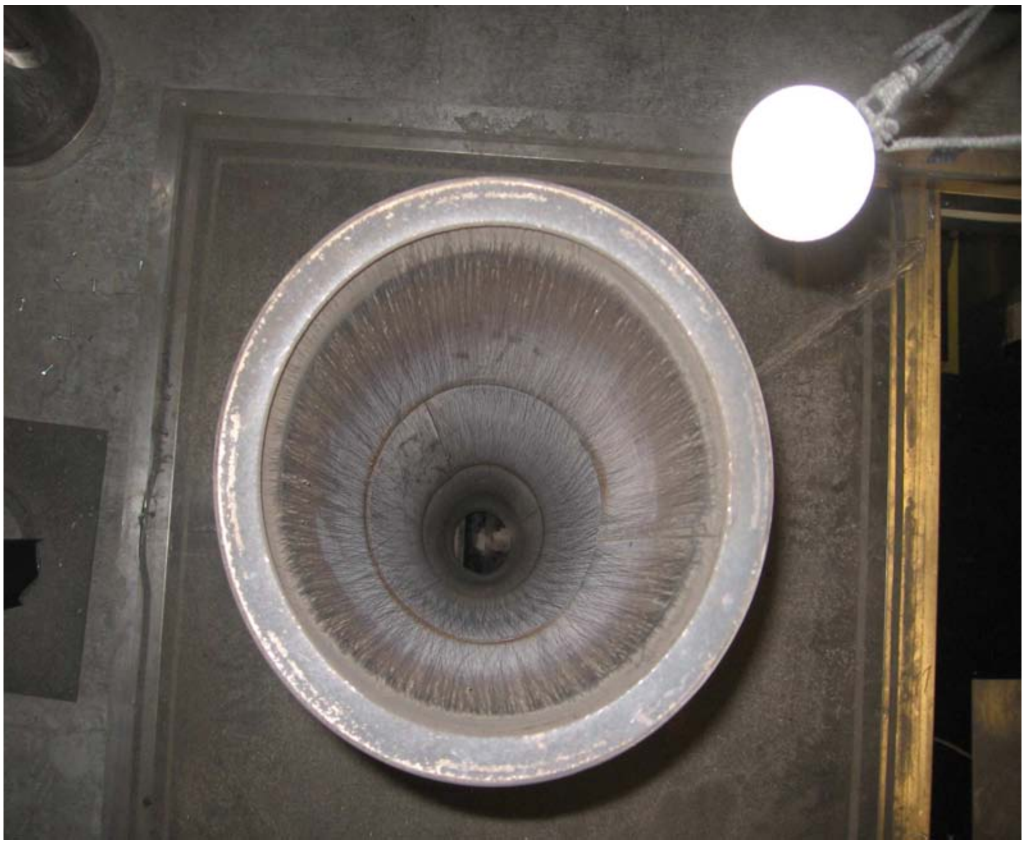
Appendix H

Tunnel Cleaning and test loads pics

900- App-H Tunnel Cleaning and Test Load Photographs (page 2 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 3 of 30)



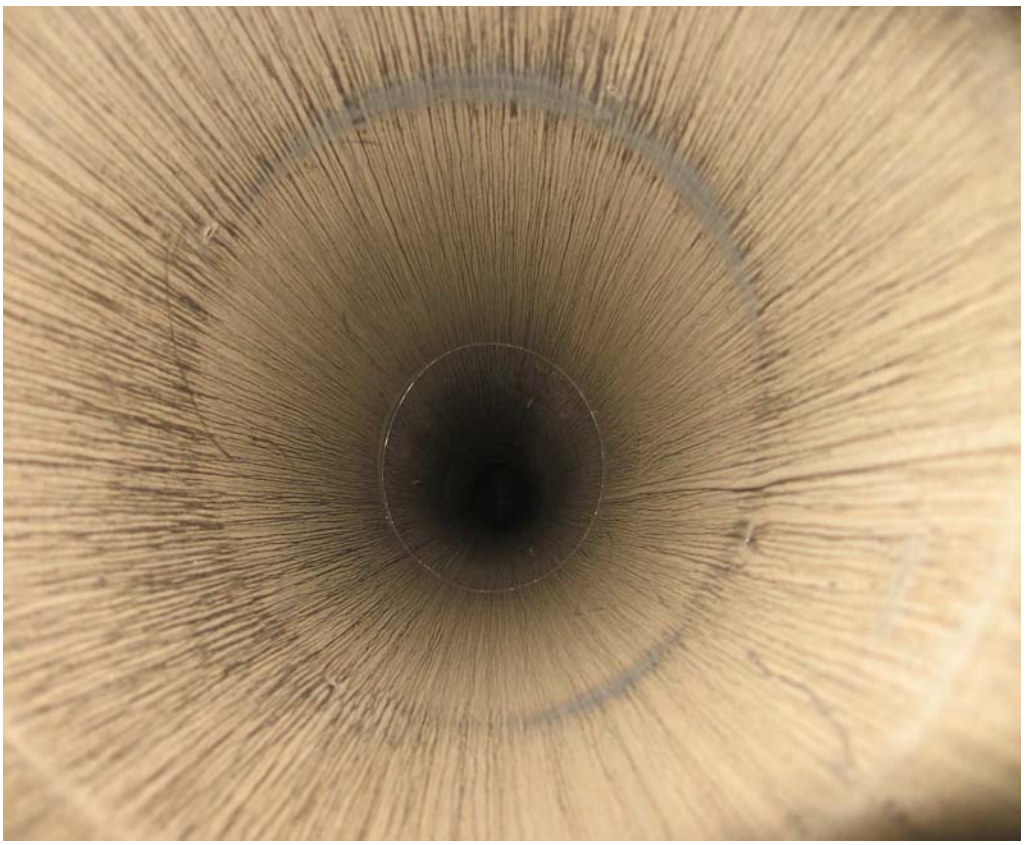
900- App-H Tunnel Cleaning and Test Load Photographs (page 4 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 5 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 6 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 7 of 30)

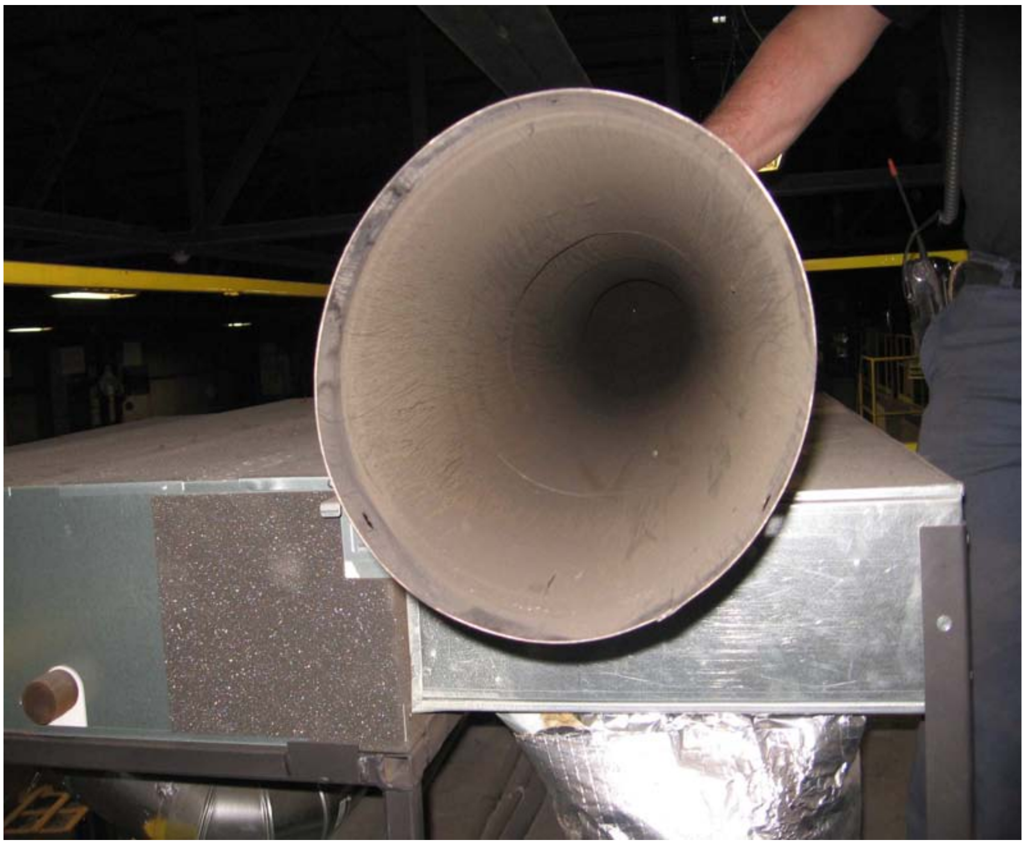
900- App-H Tunnel Cleaning and Test Load Photographs (page 8 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 9 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 10 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 11 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 12 of 30)

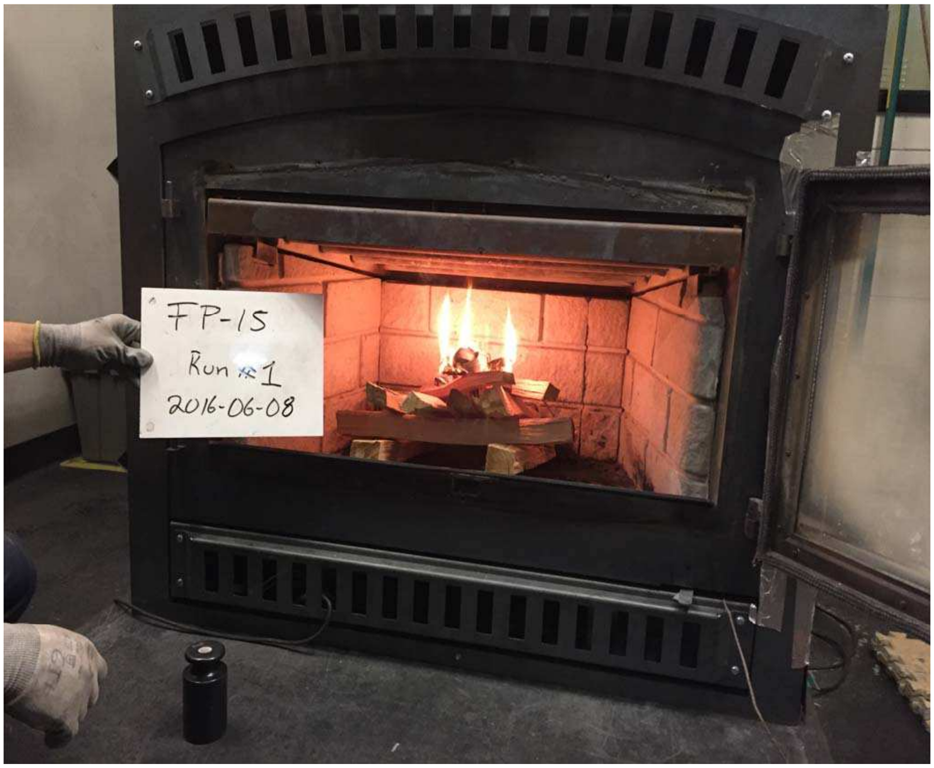
900- App-H Tunnel Cleaning and Test Load Photographs (page 13 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 14 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 15 of 30)

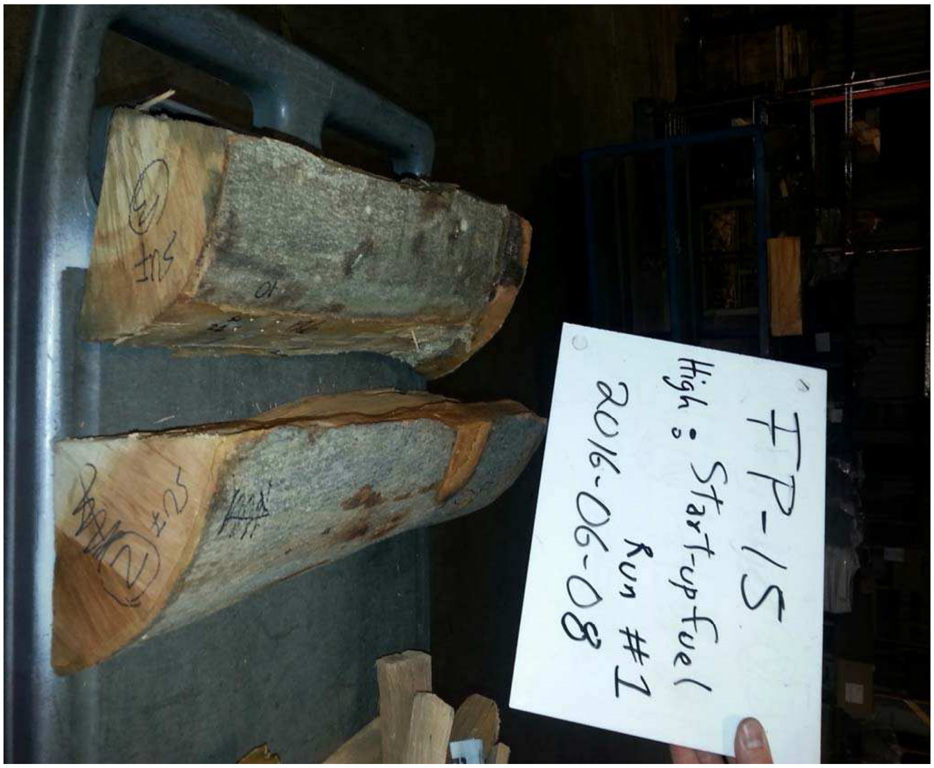
900- App-H Tunnel Cleaning and Test Load Photographs (page 16 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 17 of 30)



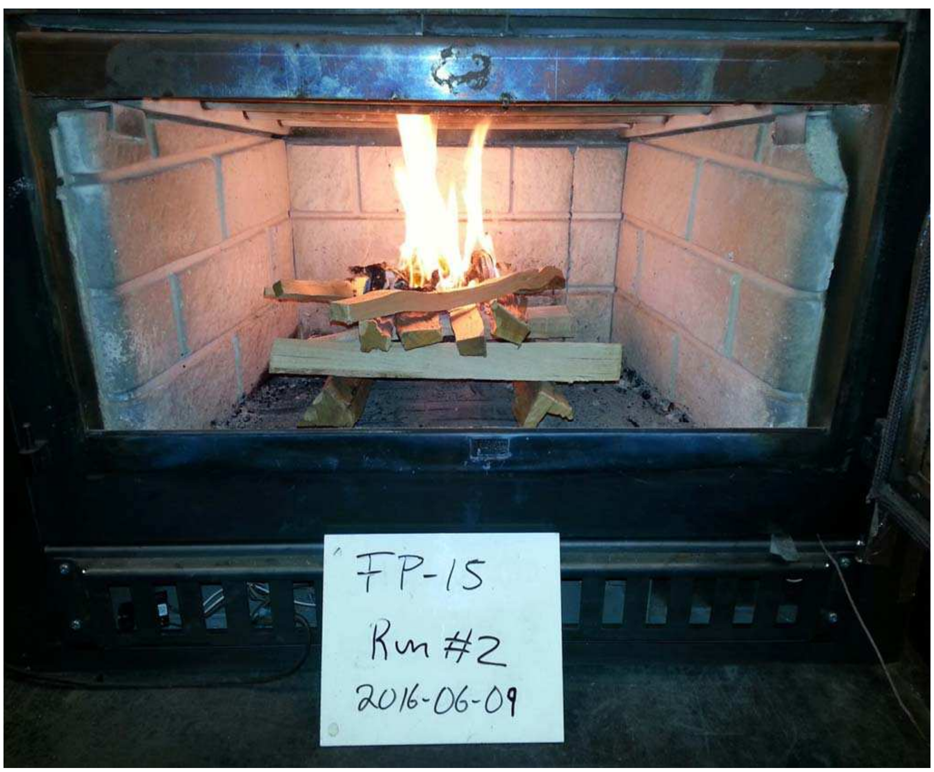
900- App-H Tunnel Cleaning and Test Load Photographs (page 18 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 19 of 30)

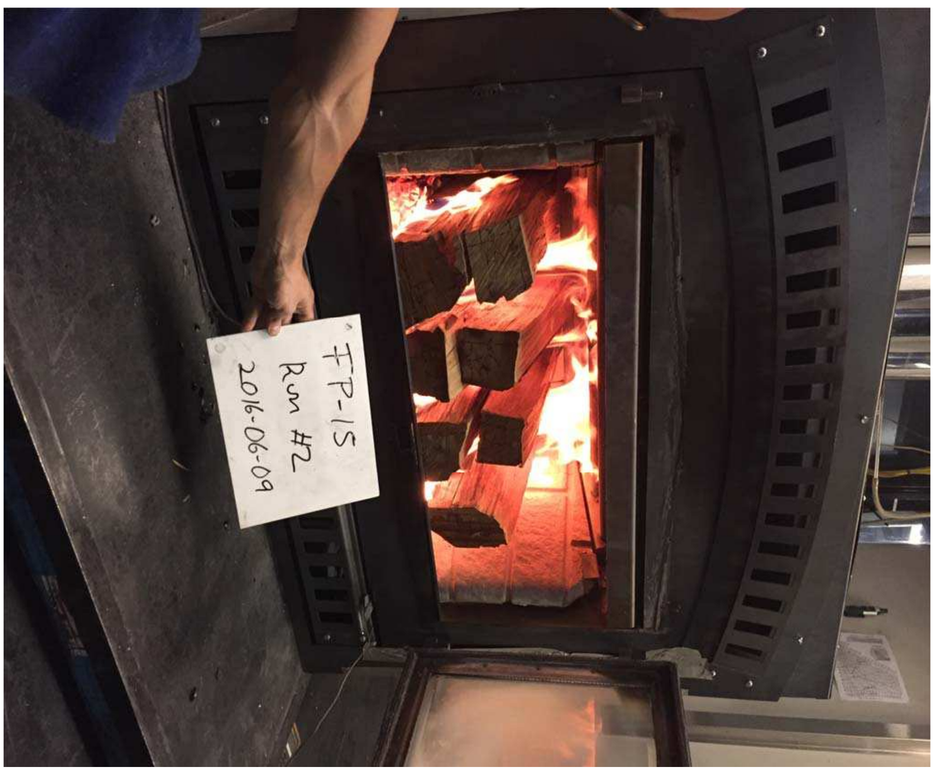


900- App-H Tunnel Cleaning and Test Load Photographs (page 20 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 21 of 30)

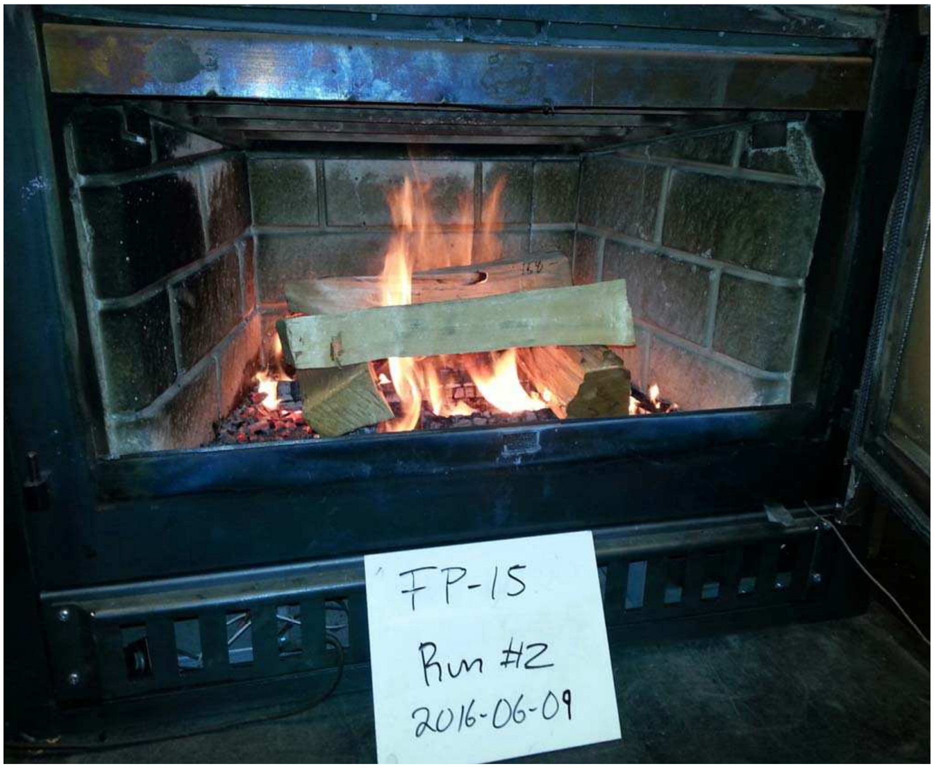


900- App-H Tunnel Cleaning and Test Load Photographs (page 22 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 23 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 24 of 30)

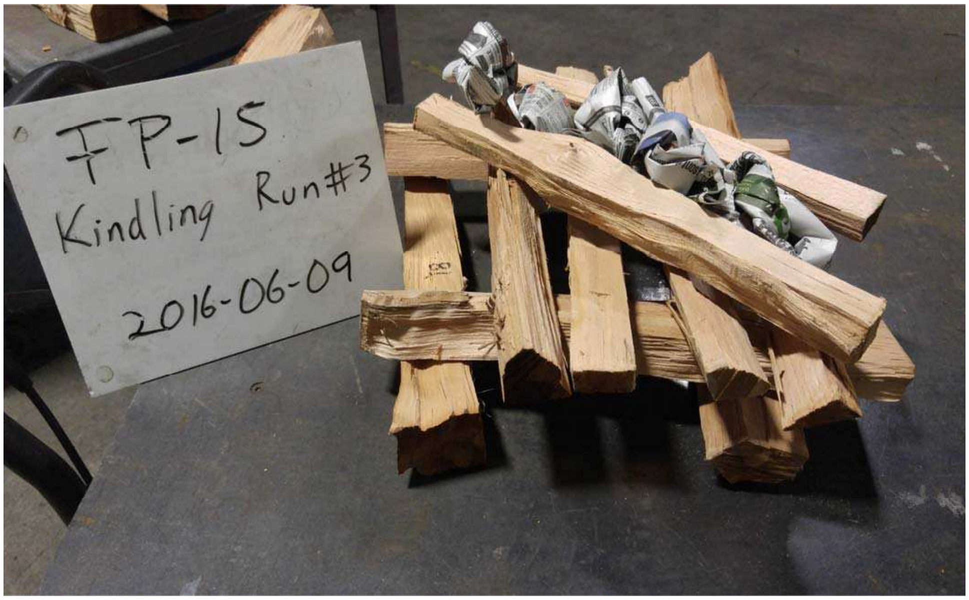


900- App-H Tunnel Cleaning and Test Load Photographs (page 25 of 30)

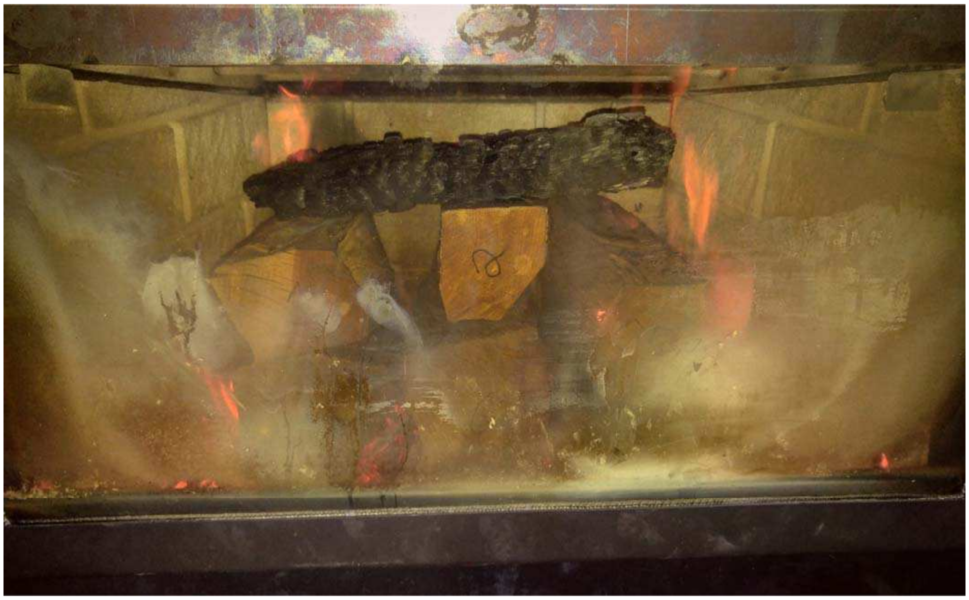
900- App-H Tunnel Cleaning and Test Load Photographs (page 26 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 27 of 30)

900- App-H Tunnel Cleaning and Test Load Photographs (page 28 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 29 of 30)



900- App-H Tunnel Cleaning and Test Load Photographs (page 30 of 30)

A10- App-I EPA Correspondence

Appendix I

EPA Correspondence

A10- App-I EPA Correspondence (page 2 of 8)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JAN 21 2016

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Vincent Pelletier, Jr. Eng.
Stove Builder International
Chemical Engineer
250 rue de Copenhague
Saint-Augustin-de-Desmaures
Quebec Canada, G3A 2H3

Dear Mr. Pelletier,

I am writing in response to your January 20, 2016 letter regarding the HE 350 wood stove and equivalent model FP-15 and Horizon. You are requesting an alternative test method using cordwood as referenced in Section 60.534 (a) (ii) of 40 CFR Part 60 Subpart AAA, Standards of Performance for New Residential Wood Heaters. You request to use the procedures and specifications found in the ASTM draft cordwood test method, ASTM work Item WK47329, titled "Standard Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel."

With the caveats listed below, we approve your alternative method request for testing the HE 350 wood stove and equivalent model FP-15 and Horizon wood stoves. As required in Subpart AAA Standards of Performance for New Residential Wood Heaters Section 60.534 (d), the manufacturer or approved test lab must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run and Section 60.534 (e) the manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon monoxide emissions of the tested wood heater using Canadian Standards Administration (CSA) Method B415.1-10. For particulate matter emission concentrations ASTM 2515-11 should be used, four inch filters are also acceptable to use.

The following changes to ASTM work Item WK47329, titled "Standard Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel" must be followed:

1. The wood heater must be aged for 50 hours as stated in Appendix A-8 to Part 60 Test Methods 26 through 30B, procedures section 2.1.4 and not the 48 hours a stated in WK47329 section 9.1.4.

2. The end of test criteria is defined when the weight scale indicates the remaining weight of the test fuel as 0.0 lbs (0.00 kg) or less for 30 seconds. This criteria should be used for the high fire, low and medium burn rates.

3. Section 9.5.1 Start-up Condition. The average heater surface temperature per 9.2.2 and flue-gas temperature per 9.2.4 at the start of the test run must be less than a 10°F above ambient for the high fire test category.

4. Section 9.6.14 Invalid Test Run. The test run shall be considered invalid if less than the full test fuel weight has been consumed and there is no measurable weight loss (<0.1 lb (0.05 kg) or 1.0% of the test fuel weight, whichever is greater) for at least 30 minutes.

A10- App-I EPA Correspondence (page 3 of 8)

5. Coal bed conditions prior to loading test fuel. The coal bed should a level plane without valleys or ridges for all test runs in the high fire, low and medium burn rate categories.

6. The pre burn cycle burn rate category, leading into a test run, should be the same as the attempted burn rate category of the actual test. Example: If a low burn category is the desired test, the preburn should be at a low burn setting and likewise for the medium low, medium high and high burn rate categories.

The following changes to ASTM E2515-11 "Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel" must be followed:

1. The filter temperature must be maintained between 80 and 90 degree F during testing.

2. A glass cyclone must be used between the sampling probe and filter holders when the total particulate catch is expected to exceed 100 mg or when water droplets are present in the stack gas. This cyclone and its contents must be included in the pre-test weighing and post-test desiccation and weighing.

3. Filters must be weighed in pairs to reduce weighing error propagation. See ASTM E2515-11 Section 10.2.1 Analytical Procedure.

4. Sample filters must be Pall TX-40 or equivalent Teflon coated glass fiber, and of 47 mm, 90 mm, 100 mm or 110 mm.

5. Only one point is allowed outside the +/- 10% proportionality range per test run.

Please include this approval in your certification test report. If you have additional questions regarding these decisions, please contact Michael Toney of my staff at (919) 541-5247.

Sincerely,

Steffan Johnson, Group Leader
Measurement Technology Group

cc: Michael Toney, EPA/AQAD (143-02)
Rafael Sanchez, EPA/OECA (2227A)
Adam Baumgart-Getz, EPA/OID (C311M)
David Cole, EPA/OID (C311M)
Amanda Aldridge, EPA/OID (C311M)

A10- App-I EPA Correspondence (page 4 of 8)

Fabricant de poêles international inc.
Stove Builder International Inc.

April 21st, 2016

Air Branch/Wood Heater Program Lead
Monitoring, Assistance, and Media Programs Division
Office of Compliance
U.S. EPA
1200 Pennsylvania Ave., NW
MS:2227A
Washington, DC 20004
Attn: Rafael Sanchez

Subject: 30 days notice for certification of model line name **HE350**

Dear Mr. Sanchez

The model line **HE350** and equivalent model FP-15 and Horizon are affected wood heaters under the amended U.S. Environmental Protection Agency 40 CFR Part 60 Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces; Final Rule, Subpart AAA §60.530.

Under section §60.534 (g), Stove Builder International Inc. ("SBI") is required to provide a 30 days' notice before the date of certification testing to begin. We would therefore like to notify you that we intend to start a certification program on the model line stated above on May 30th, 2016. This certification program is planned to end on June 3rd, 2016.

On January 20th, 2016 SBI requested to use an alternative test method using cordwood as referenced in Section 60.534 (a) (ii) of 40 CFR Part 60 Subpart AAA, Standards of Performance for New Residential Wood Heaters for certification of this model line. In a letter dated January 21st, 2016 you approved the use of ASTM work item WK47329, titled "Standard Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel" with caveats. (See letter attached)

We would therefore like to inform you that we'll be using ASTM work item WK47329 in conjunction with ASTM 2515-11 and CSA B415.1-10 for certification of this model line.

I would like to inform you that we'll be adding two additional model names to this certification which are the Monaco XL and Kozy Heat. Just like the FP-15 and the Horizon, these models will only be aesthetically different compared to the HE350.

The accredited laboratory performing the test will be a division of **Intertek Testing NA Ltd** located at:

250, rue De Copenhague, Saint-Augustin-de-Desmaures, Qc G3A 2H3 • Tél. : 418 878-3040 • Fax : 418 878-3001
www.sbi.international.com

A10- App-I EPA Correspondence (page 5 of 8)

1829, 32nd Avenue, Lachine
Quebec, Canada, H8T 3J1

And contact information at Intertek will be the following:

Claude Pelland, Eng
claude.pelland@intertek.com

Current address of Stove Builder International Inc. can be found at the bottom of this document and contact information at SBI will be:

Vincent Pelletier, Jr. Eng.
vpelletier@sbi-international.com

Should you need additional documents, please let us know.

Sincerely,

Vincent Pelletier

Vincent Pelletier, Jr. Eng.
Chemical Engineer
Stove Builder International Inc.

A10- App-I EPA Correspondence (page 6 of 8)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JAN 21 2016

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Vincent Pelletier, Jr. Eng.
Stove Builder International
Chemical Engineer
250 rue de Copenhague
Saint-Augustin-de-Desmaures
Quebec Canada, G3A 2H3

Dear Mr. Pelletier,

I am writing in response to your January 20, 2016 letter regarding the HE 350 wood stove and equivalent model FP-15 and Horizon. You are requesting an alternative test method using cordwood as referenced in Section 60.534 (a) (ii) of 40 CFR Part 60 Subpart AAA, Standards of Performance for New Residential Wood Heaters. You request to use the procedures and specifications found in the ASTM draft cordwood test method, ASTM work Item WK47329, titled "Standard Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel."

With the caveats listed below, we approve your alternative method request for testing the HE 350 wood stove and equivalent model FP-15 and Horizon wood stoves. As required in Subpart AAA Standards of Performance for New Residential Wood Heaters Section 60.534 (d), the manufacturer or approved test lab must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run and Section 60.534 (e) the manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon monoxide emissions of the tested wood heater using Canadian Standards Administration (CSA) Method B415.1-10. For particulate matter emission concentrations ASTM 2515-11 should be used, four inch filters are also acceptable to use.

The following changes to ASTM work Item WK47329, titled "Standard Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel" must be followed:

1. The wood heater must be aged for 50 hours as stated in Appendix A-8 to Part 60 Test Methods 26 through 30B, procedures section 2.1.4 and not the 48 hours a stated in WK47329 section 9.1.4.

2. The end of test criteria is defined when the weight scale indicates the remaining weight of the test fuel as 0.0 lbs (0.00 kg) or less for 30 seconds. This criteria should be used for the high fire, low and medium burn rates.

3. Section 9.5.1 Start-up Condition. The average heater surface temperature per 9.2.2 and flue-gas temperature per 9.2.4 at the start of the test run must be less than a 10°F above ambient for the high fire test category.

4. Section 9.6.14 Invalid Test Run. The test run shall be considered invalid if less than the full test fuel weight has been consumed and there is no measurable weight loss (<0.1 lb (0.05 kg) or 1.0% of the test fuel weight, whichever is greater) for at least 30 minutes.

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A10- App-I EPA Correspondence (page 7 of 8)

5. Coal bed conditions prior to loading test fuel. The coal bed should a level plane without valleys or ridges for all test runs in the high fire, low and medium burn rate categories.

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The following changes to ASTM E2515-11 "Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel" must be followed:

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4. Sample filters must be Pall TX-40 or equivalent Teflon coated glass fiber, and of 47 mm, 90 mm, 100 mm or 110 mm.

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Please include this approval in your certification test report. If you have additional questions regarding these decisions, please contact Michael Toney of my staff at (919) 541-5247.

Sincerely,

Steffan Johnson, Group Leader
Measurement Technology Group

cc: Michael Toney, EPA/AQAD (143-02)
Rafael Sanchez, EPA/OECA (2227A)
Adam Baumgart-Getz, EPA/OID (C311M)
David Cole, EPA/OID (C311M)
Amanda Aldridge, EPA/OID (C311M)

A10- App-I EPA Correspondence (page 8 of 8)

SBI Notre passion devient source d'énergie
We Turn passion Into Energy

Fabricant de poêles international inc.
Stove Builder International Inc.

May 24th, 2016

Air Branch/Wood Heater Program Lead
Monitoring, Assistance, and Media Programs Division
Office of Compliance
U.S. EPA
1200 Pennsylvania Ave., NW
MS:2227A
Washington, DC 20004
Attn: Rafael Sanchez

Subject: Start of program certification of model line name **HE350** delayed

Dear Mr. Sanchez

In a letter dated April 21st, SBI informed EPA that we wanted to start a test program on May 30th, 2016 on the model line **HE350**.

We would like to inform EPA that this program has to be delayed due to an outstanding event. My wife very recently gave birth earlier than expected and I will be not be at work for the next two weeks and will have limited access to my e-mails.

We have another test program for which we have notified EPA with a 30-days' notice that will start on June 6th and we would like the test program of the model line **HE350** to follow this certification.

The accredited laboratory and contact person will remain the same and they have already been informed of that delay.

Should you need additional documents, please let me know.

Sincerely,

Vincent Pelletier

Vincent Pelletier, Jr. Eng.
Chemical Engineer
Stove Builder International Inc.

250, rue De Copenhague, Saint-Augustin-de-Desmaures, Qc G3A 2H3 • Tél. : 418 878-3040 • Fax : 418 878-3001
www.sbi.international.com