



TEST REPORT

TEST OF A NON CATALYTIC WOOD BURNING FIREPLACE FOR EMISSIONS AND EFFICIENCY

PER EPA METHODS 28R AND ASTM E2515 and ASTM E2780, MAY 2015

Client:
Foyers Suprême
3594 Rue Jarry E,
Montréal,
QC H1Z 2G4

Model Name: Ambiance Elegance 36 (24SF model number)

Attention: Rafael Sanchez

TESTED BY:

Services Polytests inc.
695-B Gaudette
St-jean-sur-Richelieu, QC, J3B 7S7

TEST DATES: September 6th to 14th 2016

REPORT DATE: September 20th 2016

Revision 1: June 28th 2017

Revision 2: February 17th 2022

Project number: PI-20131

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Tested:

A handwritten signature in black ink, appearing to read "Maxime Martin".

Maxime Martin

written by:

A handwritten signature in black ink, appearing to read "Danick Power".

Danick Power, P. Eng.

Verified by third party certifier (PFS-TECO):

SUMMARY

1	Introduction	5
1.1	General.....	5
1.2	Test unit information	5
1.3	Results.....	5
1.4	Pretest information.....	6
2	Summary of test results.....	6
2.1	Emissions.....	6
2.2	Weighted average calculation	7
2.3	Test facility conditions	7
2.4	Fuel qualities	8
2.5	Dilution tunnel flow rate measurements and sampling data (ASTM E2515).....	8
2.6	Dilution tunnel dual train precision	9
2.7	General summary of results.....	9
3	Process description.....	10
3.1	Discussion	10
3.2	Unit dimensions	10
3.3	Air supply system	11
3.4	operation during test.....	12
3.5	Start-up operation	13
3.6	Sampling locations	13
3.7	Drawings	13
3.8	Emissions efficiency testing equipment list	13
4	Sampling methods	13
4.1	Particulate sampling	13
5	Quality assurance	14
5.1	Instrument calibration	14
5.1.1	Gas meters.....	14
5.1.2	SCALES	14
5.1.3	Gas analyzers.....	14
5.2	Test method procedures.....	14
5.2.1	Leak check procedures	14
5.2.2	Tunnel velocity flow measurement	14
5.2.3	Pm sampling proportionality (ASTM E2515)	14

List of Revision:

Revision 1:

Revision 2 February 17th 2022:

- Update comments p.12, 3.4 operation during testing for validities, anomalies, appropriateness.
- Negative weights on back filters addressed and handled properly, none on probe or gaskets.
- Clarification of two run at lowest setting trying for cat 1. P12
- Additional letter for TYPO's about mixing baffle in the original report.
- Table 2.6 p.9 updated for dual train precision in g/kg.
- Fuel density have been recalculating to exclude spacers and found compliant for each run as per clause 9.4.1.3 between 25 to 36 lb/ft³. Appendix 1 have been updated to represent those numbers.
- Preburn data for each test added in appendix 1
- Appendix 1 updated with correct molecular weight use at 29
- Section 3.6 MC tunnel assumed at 2%
- Appendix 9 test load photograph added details

List of appendixes

- APPENDIX 1: Raw data, forms and results
- APPENDIX 2: Proportionality results
- APPENDIX 3: Calibration data
- APPENDIX 4: Unit pre burn
- APPENDIX 5: Participants
- APPENDIX 6: Drawings and specifications
- APPENDIX 7: Operator's manual
- APPENDIX 8: Photographs of test set up
- APPENDIX 9: Test load photographs
- APPENDIX 10: Laboratory Operating Procedures
- APPENDIX 11: Sample calculations
- APPENDIX 12: Volume calculations
- APPENDIX 13: Operating instruction
- APPENDIX 14: Drawing Air flow pattern
- APPENDIX 15: WHA, 30 Day Notice, Coc, Others

1 INTRODUCTION

1.1 GENERAL

Laboratory

- Location: Services Polytests Inc., 695-B Gaudette St-jean-sur-Richelieu QC, Canada J3B 7S7
- Elevation: 100 feet above sea level

Test program

- Purpose: unit qualification NSPS 2020
- Test dates: September 6th to 14th 2016
- Test methods used:
 - Particulate emissions: ASTM E2780-10 ; methods 28R and ASMT E2515 as referred into 40 CFR Part 60 Subpart AAA
 - Efficiency: CSA B415.1-10

1.2 TEST UNIT INFORMATION

General

- Manufacturer: Foyers Suprême inc.
- Product type: non-catalytic Wood burning Zero-Clearance fireplace
- Combustion system: non-catalytic
- Unit tested: Ambiance Elegance 36 (24SF model number)

Particularities

The engine will have the model number of 24SF, which comprises the standard components related to the combustion of the unit (such as the firebox, the controls, and the baffle system). The engine will be under the model name Ambiance Elegance 36. In addition, two other models (Novo and Lotus) will be derived from the Ambiance Elegance 36, which will differ in cosmetics/aesthetics and in marketing strategies; these models will not alter the performance of the engine and will respect all k-list components.

1.3 RESULTS

Emission results obtained

- Weighted average emission rate: 1.77 grams/hour
- Maximum rate cap: 4.3 grams/hour at run 6

Conformity: NSPS Phase 2020

1.4 PRETEST INFORMATION

Unit condition: The unit was received by carrier on September 1st 2016 in good shape. The 50hrs of aging was done by the manufacturer during month of August 2016.

Set up

- Venting system type: 6-inch steel pipe and insulated chimney
- System height from floor: 15 feet
- Particularities: none

Break in period

- Duration: the unit was run for at least 50 hours at a category 2 burn rate with adequate documentation of fuel additions and flue and unit temperatures during month of August by the manufacturer.
- Fuel: cribwood

2 SUMMARY OF TEST RESULTS

2.1 EMISSIONS

Run Number	Test Date AAAA-MM-DD	Emission Rate (g/hr)	Burn Rate (kg/hr)	1st hour Emission Rate (g/hr)	CSA B415.1 CO emission (g/hr)	CSA B415.1 Emissions (g/MJ output)
1	2016-09-06	na	na	na	na	na
2	2016-09-07	1.16	0.81	7,46	71,86	0,106
3	2016-09-08	1.64	1.68	5.53	157.96	0,075
4	2016-09-09	1.73	2.134	4.49	142.83	0,063
5	2016-09-12	1.33	1.33	3.33	97.03	0,074
6	2016-09-13	4.3	0.804	24	98.65	0,403
7	2016-09-14	2.26	1.59	8,39	147,70	0,108

2.2 WEIGHTED AVERAGE CALCULATION

Test No.	Burn Rate Kg/hr	(E) Ave. Emission Rate g/hr	Overall Efficiency (%)	Heat Output (BTU/HR)	CSA B415.1 CO emission g/min
6	0,804	4,30	67,03	10 125	1,644
2	0,806	1,20	68,43	10 364	1,197
5	1,3	1,33	67,72	17 203	1,617
3	1,68	1,60	65,73	20 786	2,633
4	2,13	1,70	64,68	25 944	2,381
Weighted particulate emission average of 4 test runs: 1.77 grams per hour.					
Weighted average HHV efficiency of 4 test runs: 67.14 %.					
Average Co 1.83 gr/min					

2.3 TEST FACILITY CONDITIONS

Run Number	Room Temperature		Barometric pressure		Relative humidity		Air Velocity	
	Before (F)	After (F)	Before (in.Hg)	After (in.Hg)	Before (%)	After (%)	Before (ft/min)	After (ft/min)
1	na	na	na	na	na	na	na	na
2	80	81	30,032	29,914	66,5	47,4	19	18
3	81	84	29,766	29,766	65	60,5	18	22
4	80	84	29,766	29,855	65,5	48	24	21
5	76	81	30,150	30,121	48	35,9	22	18
6	78	85	30,091	29,914	48	43	12	15
7	79	81	29,914	30,062	58	38	17	19

2.4 FUEL QUALITIES

Run Number	Pre-test Load			Test Load						
	Loading Weight Wet Basis (lbs)	Moisture Content Dry Basis (%)	Coal bed Weight (lbs)	Weight Wet Basis (lbs)	Density Wet Basis (lbs/cuft)	Moisture Content Dry Basis (%)	Piece Length (in.)	Number of 2X4's	Number of 4x4's	Number of Spacers
1	na	na	na	na	na	na	na	na	na	na
2	17,95	21,20	3,3	16,44	7,341	21,81	22	2	2	12
3	18,02	20,28	3,3	16,16	7,216	20,50	22	2	2	12
4	19,87	20,49	3,2	15,79	7,048	21,30	22	2	2	12
5	18,52	19,70	3,5	16,16	7,216	21,24	22	2	2	12
6	17,97	20,32	3,4	16,27	7,262	20,80	22	2	2	12
7	20,24	20,33	3,5	15,79	7,050	19,98	22	2	2	12

2.5 DILUTION TUNNEL FLOW RATE MEASUREMENTS AND SAMPLING DATA (ASTM E2515)

Average dilution tunnel measurements				Sample Data			
Run Number	Burn Rate (Min)	Volumetric Flow Rate (dscf/min)	Total Temperatures (°R)	Volume sampled (DSCF)		Particulate catch (mg)	
				1	2	1	2
1	na	na	na	na	na	na	na
2	456	289,07	558,30	81,240	78,768	5,70	5,10
3	217	271,36	564,07	38,339	37,249	3,90	3,70
4	166	270,48	569,76	28,999	28,340	3,10	3,00
5	272	276,92	555,30	47,494	46,289	3,80	3,80
6	456	273,84	555,45	80,118	77,574	21,30	20,00
7	226	273,86	561,17	45,750	38,619	6,20	5,50

2.6 DILUTION TUNNEL DUAL TRAIN PRECISION

Run Number	Sample Ratio		Total Emission (g)			
	Train 1	Train 2	Train 1	Train 2	% Deviation	Deviation g/Kg
1	na	na	na	na	na	na
2	1622,57	1673,50	9,17	8,46	4,02%	0,116
3	1535,93	1580,88	5,99	5,85	1,19%	0,023
4	1548,33	1584,35	4,80	4,75	0,49%	0,008
5	1585,95	1627,23	5,96	6,13	1,33%	0,027
6	1558,57	1609,69	33,20	32,19	1,54%	0,164
7	1352,81	1602,61	8,31	8,76	2,65%	0,076

2.7 GENERAL SUMMARY OF RESULTS

Run Number	Burn Rate (kg/hr)	Average Surface Temperature (F)	Change in surface Temperature (F)	Initial Draft (in. H ² O)	static pressure tunnel (in. H ² O)	Primary Air Setting	Run Time (min)
1	na	na	na	na	na	na	na
2	0,806	296,13	-92,6	0,037	0,231	full close	456
3	1,682	417,56	41,0	0,042	0,215	Medium-high	217
4	2,134	485,51	64,4	0,038	0,218	Medium-high	166
5	1,334	391,23	26,4	0,037	0,224	fully close	272
6	0,804	306,66	-67,5	0,037	0,214	fully close	456
7	1,585	524,21	128,3	0,041	0,214	full close	226

3 PROCESS DESCRIPTION

3.1 DISCUSSION

During 1st test, Following the load insertion the bi-metallic control, jammed in intermediate position. The test is stop and control operation fixation is modified to allowed free movement of the bi-metallic slider. As the unit is modified, test series will begin with the next test. Following this 1st, all runs have been found appropriate, no anomalies happened and all runs below have been validate and found compliant. During some of the tests, negative weight has been found on back filter but none on probe and gasket, those were handled properly

3.2 UNIT DIMENSIONS

Baffle

- Location: between top of combustion chamber and hearth
- Restriction: 1 3/4 in x 24 in. at the front of unit
- Dimensions: covers the hearth area minus the restriction at front
- Material: Stainless steel baffle

Bricks

- Inside Firebox refractory brick 1 ¼ inch. tick cover all the sides and the back of the combustion chamber

Flue gas exhaust

- Location: top flue located at the top,
- Dimensions: 6 in. diameter
- Material: Stainless

Gasket

The door of the unit consists of three sections of gaskets, where 2 of them are holding the glass (SGI-260-0230) and 1 is sealing around the door onto the firebox (SGI-265-0125). Please refer to page 47 of 24SF_TECH_DRAW.pdf for information on dimensions, materials, and assembly details. The ANPGA gasket is located at the top edge of the flue and is used to seal the anchor plate onto the unit. Please refer to page 2 of 24SF_TECH_DRAW.pdf (5) for information on dimensions, materials, and assembly.

Overall unit dimension

- Firebox dimensions : 24 in wide x 12 in. deep x 13 ½ in. high
- Usable volume : 2.24 cuft
- Overall fireplace dimension : 35 inch wide x 20 ¾ inch deep x 34 ½ high

Convection fan

- Optional blower supplied with unit see appendix 6 for all detail

Catalyst

- none

Bi-metallic combustion air control

The Primary Air Control is a patented mechanism (Patent No: US 7,325,541 B2) that regulates the air flow into the firebox based on the temperature of the unit. It is located on the top of the firebox, at the front center of the unit. The combustion air control of the 24SF has two components: the Activator and the Burn Rate Selector. The left combustion control lever is the Activator. When starting a fire or adding a new load of wood, the Activator must be pushed in to allow a primary source of air to enter the firebox. The Activator will retract automatically with heat. The right combustion control lever is the Burn Rate Selector. The Burn Rate Selector can slide sideways to achieve different burn rates. When the Burn Rate Selector is positioned to the left, a maximum burn rate is achieved and when it is positioned to the right, a minimum burn rate is set. Please refer to page 42 of 24SF_Tech_DRAW.pdf for details on the Primary Air Control assembly.

3.3 AIR SUPPLY SYSTEM

Description

- Primary air: window wash design with air intake on the top of unit
- Secondary air: secondary tube design with air intake on the top of unit

Characterization

The following table shows the inlet and outlet sections of each system. The air introduction system number is referred to on a set of drawings in Appendix 6.

AIR INTRODUCTION SYSTEM		INLET (1) sq. in.			OUTLET (sq. in.)
Identification	Type	Imin	I _{max}	Controlled	
A *	Primary	0,05	4,75	yes	28,27
B *	Secondary	1,77	1,77	No	-
C *	Pilot	none	none	No	-

* This section would be filled by measuring and comparing with the manufacturer’s drawings included in the test report.

Legend

Identification: Tag name referred to on drawings in Appendix 14, section airflow pattern

Type: Characterization of air intake

Imin: Minimum air intake of a particular air channel

I_{max}: Maximum air intake of a particular air channel

Controlled: Determines if a provision for air control is present

Outlet: Total air outlet of a particular air channel

Note: surfaces are expressed in sq. Inches

3.4 OPERATION DURING TEST

Run #1

This run was performed on September 6th 2016. Following the load insertion the bi-metallic control, jammed in intermediate position. The test is stop and control operation fixation is modified to allowed free movement of the bi-metallic slider. As the unit is modified, test series will begin with the next test.

Following run 1, all runs have been found appropriate, no anomalies happened and all runs below have been validate and found compliant. During some of the tests, negative weight has been found on back filter but none on probe and gasket, those were handled properly

Run #2

This run was performed on September 7th 2016. It lasted 456 minutes and a category 2 burn rate was obtained at 0.81 kg/hr & emission at 1.16gr/hr. the optional blower was at on position and combustion air control was fully closed (Lowest possible setting)

Run #3

This run was performed on September 8th 2016. It lasted 217 minutes and a category 3 burn rate was obtained at 1.68 kg/hr & emission at 1.64gr/hr. the optional blower was at on position

Run #4

This run was performed on September 9th 2016. It lasted 166 minutes and a category 4 burn rate was obtained at 2.13 kg/hr & emission at 1.73gr/hr. the optional blower was at on position and combustion air control was fully opened.

Run #5

This run was performed on September 12th 2016. It lasted 272 minutes and a category 3 burn rate was obtained at 1.33 kg/hr & emission at 1.33gr/hr. the optional blower was at on position, the air inlet control was fully closed, we were aiming for a minimum burn rate, but the wood burn faster than it was supposed, probably due to hotter firebox.

Run #6

This run was performed on September 13th 2016. It lasted 456 minutes and a category 2 burn rate was obtained at 0.804 kg/hr & emission at 4.3gr/hr. the optional blower was at on position and combustion air inlet fully closed (lowest possible setting).

Run #7

This run was performed on September 14th 2016. It lasted 226 minutes and a medium burn rate was obtained at 1.58 kg/hr & emission at 2.26gr/hr. the optional blower was at off position, it was confirmation test without fan.

- Details: Refer to the front page of each test run data sheets found in appendix for the detailed test sequence showing air supply settings and adjustments, fuel bed adjustments and operational specifics of the test unit.

Test fuel cribs

- Type of wood: Douglas fir, grade c or better, 19 to 25% dry basis moisture content
- Description: for each test, description of the fuel crib is found on the front page of each test run data sheet together with photograph in appendix.

3.5 START-UP OPERATION

The complete manufacturer's firing procedure of each burn rate category is fully described in appendix 13.

3.6 SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 15 feet from the tunnel entrance. The tunnel has two elbows in the system ahead of the sampling section. The sampling section is a continuous 10 foot section of 6 inch diameter pipe straight over its entire length. Tunnel velocity pressure is determined by a standard pitot tube located 48 inches from the beginning of the sampling section. Thermocouple is installed on the pitot tube to measure the dry bulb temperature. MC is assumed, as allowed, to be 2%. Tunnel samplers are located 56 inches downstream of the pitot tube and 16 inches upstream from the end of this section.

3.7 DRAWINGS

Various drawings of the stack gas sampling train and of dilution tunnel system are found in Appendix 1.

3.8 EMISSIONS EFFICIENCY TESTING EQUIPMENT LIST

The complete test equipment list together with all corresponding calibration data can be found in Appendix 3.

4 SAMPLING METHODS

4.1 PARTICULATE SAMPLING

Particulates were sampled in strict accordance with ASTM E2515. This method uses two identical sampling systems with Gelman A/E 61631 binder free (or equivalent), 47 mm diameter filters. The dryers used in the sample systems are filled with "Drierite" before each test run.

5 QUALITY ASSURANCE

5.1 INSTRUMENT CALIBRATION

5.1.1 GAS METERS

At the conclusion of each test program the gas meters are verified using the reference dry gas meter. This process involves sampling the train operation for 1 cubic foot of volume. With readings made to .01 fr', the resolution is 1 %, giving an accuracy higher than the 2% required by the standard.

5.1.2 SCALES

Before each test program, the different scales used are checked with traceable calibration weights to ensure their accuracy.

5.1.3 GAS ANALYZERS

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

5.2 TEST METHOD PROCEDURES

5.2.1 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. 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, the vacuum is typically less than 2 inches of mercury. Thus, leakage rates reported are expected to be much higher than actual leakage during the tests.

5.2.2 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.

5.2.3 PM SAMPLING PROPORTIONALITY (ASTM E2515)

Proportionalities were calculated in accordance with ASTM E2515. The data and results are found in appendix.

APPENDIX 1: Raw data, forms and results

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

SUP

Description du test

Test standard	EPA
Run #	2
Date	2016-09-07
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	240	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	42620
Technicien	M.M

Fuel data

Fuel type	Dimension
Fuel specie	D. Fir
HHV	19810,0 kJ/kg
%C	48,7
%H	6,9
%O	43,9
%Ash	0,5
HHV	8519,2 Btu/lb
LHV	7451,0 Btu/lb

Default Fuel Values		
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	101,7	101,3
Barometer (in.Hg):	30,031999	29,913879
Dry Bulb (F):	76,28	80,96
Humidity (%):	66,5	47,4
Air velocity (ft/min)	19	18

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

	Final: 425170,410	Liter
	Initial: 422718,330	Liter
	Final: 367401,630	Liter
	Initial: 365048,420	Liter
	Final: 310,640	cuft
	Initial: 253,080	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent 199

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	42620
Technicien	M.M

Preload data sheet

Test Load Weight: Lower 14,11 Ideal 15,68 Upper 17,25

Load Volume: 0,6019 cu. ft Loading Density: 8,013 lbs./ft3

Number of Spaces: Spacer weight (lbs): Load Density (wet): 29,821 lbs./ft3 Dry Wood Density: 24,604901

Table with columns: Thick, Piece Size (in): Wide x Length, Weight lbs, Meter Moisture Content Dry Uncorrected %, Ave. MC x Weight, Volume Cubic Inches. Rows contain individual wood piece data.

SUM MC: 380,50867

PreTest Load Weight: 17,95 lbs. Dry Weight: 6,72 kg.

Average Moisture Content: % Dry: 21,20 Must be 18-28 Wet: 17,49 must be 15,2-22

Project nu. pi-20131 Date 42620 Technician M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,21 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,971

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,055	76,28	0,2345
B center	0,056	76,58	0,2366
A1	0,045	76,31	0,2121
A2	0,064	76,29	0,2530
A3	0,056	76,34	0,2366
A4	0,048	76,34	0,2191
B1	0,047	76,610	0,2168
B2	0,053	76,570	0,2302
B3	0,061	76,550	0,2470
B4	0,054	76,310	0,2324
AVERAGE	0,0539	76,4180	0,2318

Project nu.	pi-20131
Date	42620
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number															
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	95,1525	0,1270	0,1273	10,3491	110,1014	0,1255	0,1265	10,2001	107,6451	0,1283	0,1266	10,3142	0,1281	06/09/2016	18:00
Before (6)	95,1525	0,1271	0,1275	10,3490	110,1013	0,1256	0,1266	10,2002	107,6452	0,1284	0,1267	10,3142	0,1280	07/09/2016	08:30
After (1)	95,1541	0,1307	0,1274	10,3538	110,1016	0,1264	0,1267	10,2052	107,6462	0,1320	0,1268	10,3188	0,1281	08/09/2016	08:00
After (2)	95,1527	0,1306	0,1273	10,3503	110,1015	0,1254	0,1267	10,2013	107,6456	0,1317	0,1268	10,3154	0,1281	12/09/2016	08:00
After (3)	95,1527	0,1306	0,1273	10,3501	110,1015	0,1254	0,1267	10,2013	107,6456	0,1317	0,1268	10,3156	0,1281	14/09/2016	08:00
After (4)	95,1527	0,1306	0,1273	10,3501	110,1015	0,1254	0,1267	10,2013	107,6456	0,1317	0,1268	10,3156	0,1281	15/09/2016	08:00
After (5)															
After (6)	95,1527	0,1306	0,1273	10,3501	110,1015	0,1254	0,1267	10,2013	107,6456	0,1317	0,1268	10,3156	0,1281	15/09/2016	08:00
Difference	0,0002	0,0035	-0,0002	0,0011	0,0002	-0,0002	0,0001	0,0011	0,0004	0,0033	0,0001	0,0014	0,0001		
Total (mg)		4,6				5,8				5,2			0,1		
Total ajusté (mg)		4,50				5,70				5,10					

Project nu.	pi-20131
Date	42620
Technicien	m.m

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,2 g/hr
 Burn Rate : 0,806 Dry kg/hr

Test Duration: 456 min

PRESSURE FACTOR: DGM 1 0,97472
 DGM 2 0,98620
 DGM 3 1,00177

BAROMETRIC PRESSURE
 Average: 29,972939 in Hg
 Start: 30,031999 in Hg
 End: 29,913879 in Hg

TEMPERATURE FACTORS DGM 1 0,96928
 DGM 2 0,96884
 DGM 3 0,96774

DGM CONTROLLER VALUES

DGM 1 Final: 15014,752 Cuft
 Initial: 14928,157 Cuft

VOLUMES SAMPLED DGM 1 81,240 SCft
 DGM 2 78,768 SCft
 DGM 3 55,411 SCft

DGM 2 Final: 12974,666 Cuft
 Initial: 12891,564 Cuft

DGM #3 Final: 310,640 Cuft
 Initial: 253,080 Cuft

TOTAL TUNNEL VOLUME : 131818

TEMPERATURES

DGM 1 544,732 °R
 DGM 2 544,979 °R

SAMPLE RATIOS
 Sample Train 1: 1622,573
 Sample Train 2: 1673,501

CALIBRATION FACTORS

DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000071** g/dscf
 Sample Train 2 **0,000066** g/dscf
 Room **0,000002** g/dscf

TUNNEL FLOW RATE: 289,074 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **9,17** g
 Sample Train 2 **8,46** g

PARTICULATE CATCH
 Total Sample Train 1: 5,80 mg
 Total Sample Train 2: 5,20 mg
 Total Sample Train 1 1st hour: 4,60 mg

EMISSION RATES
 Sample Train 1 **1,21** g/hr
 Sample Train 2 **1,11** g/hr

1st hour emission rate **7,46** g/hr

DEVIATION: 4,02%

Cs Train 1 Train 2
 7,139E-05 6,60168E-05

Table with 28 columns containing numerical data for various categories and time periods. The data is organized in a grid-like structure with multiple rows and columns of values.

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 2
 Project #: pi-20131
 Test Duration: 456 min

	HHV	LHV
Eff	68,43%	73,96%
Comb Eff	93,69%	93,69%
HT Eff	73,04%	78,94%
Output	10 925	kJ/h
Burn Rate	0,81	kg/h
Grams CO	546	g
Input	15 966	kJ/h
MC wet	17,90	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,061

Overall Heating Efficiency: 68,43%
 Combustion Efficiency: 93,69%
 Heat Transfer Efficiency: 73,04%

	Air Fuel Ratio (A/F)	
	Dry Molecular Weight (M _d)	29,44
	Dry Moles Exhaust Gas (N _r):	461,42
	Air Fuel Ratio (A/F)	13,08

Heat Output:	10 364 Btu/h	10 925 kJ/h
Heat Input:	15 146 Btu/h	15 966 kJ/h
Burn Duration:	7,60 h	
Burn Rate:	1,78 lb/h	0,806 kg/h
Stack Temp:	325,2 Deg. F	162,9 Deg. C

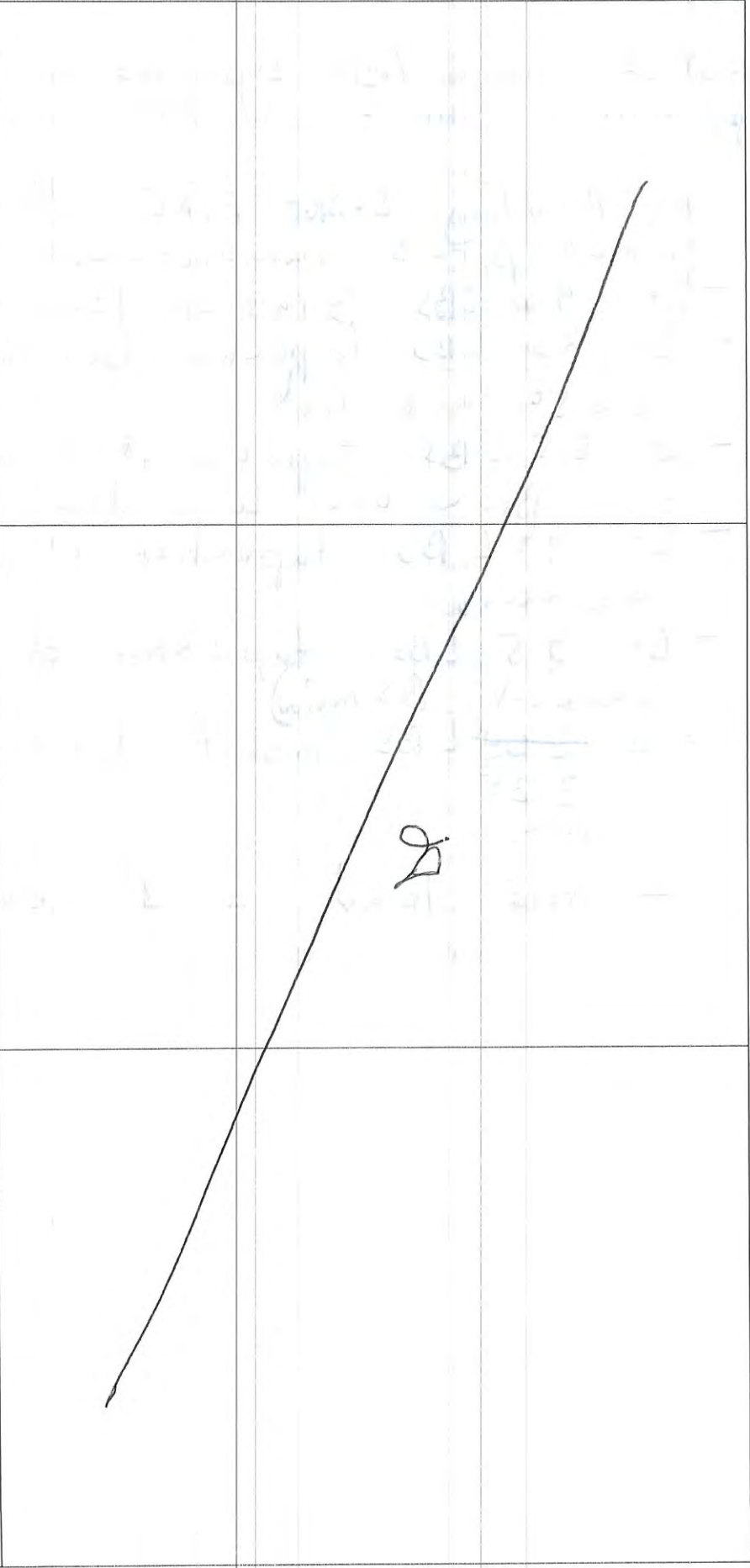
Date: 2016-09-07 Manufacturer: Foyer Supreme Model: NV200
 Project #: PJ 20131 Run: 2 Tech: MM Reviewer: [Signature]

- No kindling start FIRE 17.89 LBS
- PERMANENT port E immediately
- At 9.00 LBS BRASSER FEU
- At 7.00 LBS tapocher BRASSER and close air inlet
- At 5.5 LBS tapocher et Ramener les morceaux NON Brule dans le milieu
- At 4.4 LBS tapocher et Casser morceaux
- At 3.5 LBS tapocher et Feut channel (45 min)
- At ~~3.35~~ LBS insert load
3.35 min.
- mis load a 3" du lip avant

TEST LOAD CONFIGURATION

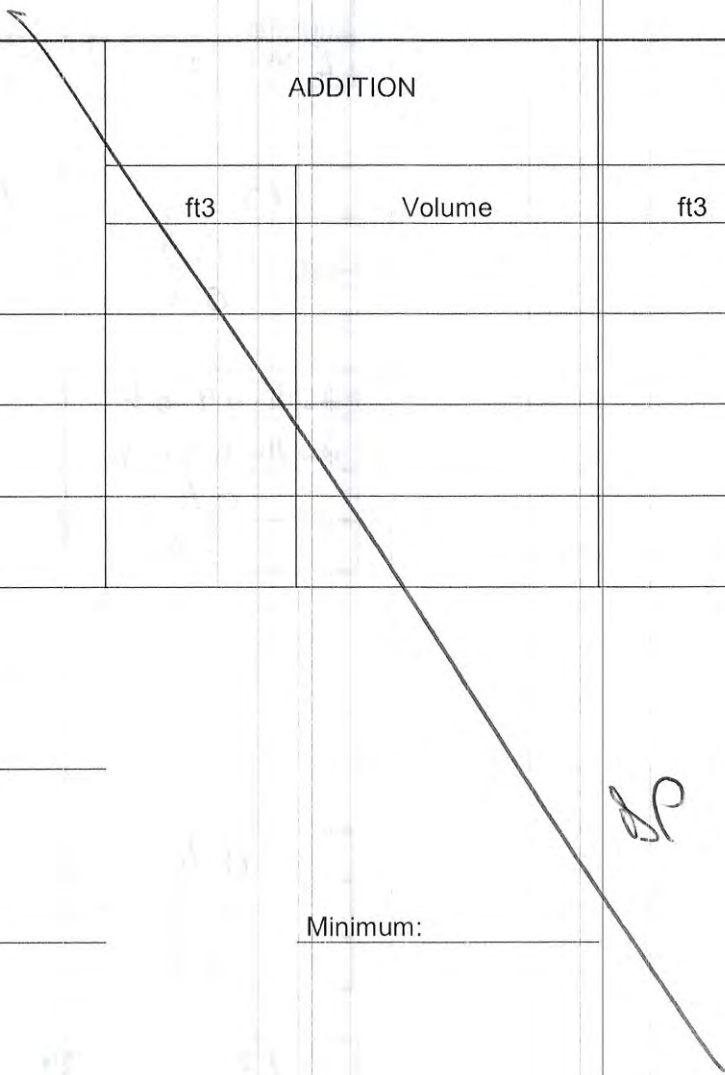
58 M...
 3.35 LBS
 3.35 min.

Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____

Side view	Front view	Top view
		

Date: _____ Manufacturer: _____ Model: _____

Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
Usable Firebox: _____				
Test load weight: _____				
	Minimum: _____		Maximum: _____	
Déviation: _____				

PRE / POST CHECKS

Date: 2016-09-07 Manufacturer: Foyer Supreme Model: MU200
 Project #: PT 20131 Run: 2 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	7:00	ok	ok
		Pre-Test	Post-Test

Facility Conditions:

Air Velocity from less than 2 feet
 Smoke Capture Check.....
 Picture.....

	19 (max50 Fpm)	18 (max50 Fpm)
	ok	ok
4 sides	ok	ok

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....
 Date Dilution Tunnel Cleaned.....
 Induced Draft Check (max 0.005 H2O).....
 Traverse before ignition.....
 Flow Rate 140 cfm ±10%.....

<u>2016-09-06</u>	ok
<u>2016-09-06</u>	
ok	
ok	

Temperature System:

Ambient (65°-90°F).....
 Wood Heater Surface (±125°F).....

ok	°F
ok	°F

Proportional Checks:

Thermocouple check.....
 Pitot Clean.....
 Pitot verification.....

ok
ok
ok

Sampling Train ID Numbers:

Probe.....
 Filter Front.....
 Filter Back.....
 Filter Thermocouple.....
 Filter (<90°F).....

Train 1 st hour	Train 1	Train 2
13	39	50
56	62	69
58	64	75
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

Date: 2016 09-07 Manufacturer: Foyer Supreme Model: NV200
 Project #: PI 10131 Run: 2 Tech: Mr Reviewer: DP

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	422715,86	425172,38	422717,60	425173,01	365047,52	367403,88
Initial 1minute DGM (Liter)	422715,85	425172,38	422717,56 422717,60	425173,01	365047,51	367403,88
Change © (Liter)	0,01	0	0,04	0	0,01	0
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Leakage Checks Flue Gas Sampler

	Pre Test	Post Test
Plugged Probe		
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

	Pre Test 3 H ₂ O static	Pre Test 0.4-0.5 H ₂ O velocity	Post Test 3 H ₂ O Static	Post Test 0.4-0.5 H ₂ O velocity
Plugged Probe				
Vacuum (inches Hg.)	3	.5	3	.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2016-07-07 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 2 Tech: MM Reviewer: D

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 2016-09-07 Manufacturer: foyer suprême Model: NV 200
 Project #: PJ 20131 Run: 2 Tech: MR Reviewer: SP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 101.3 (KPa.) Static pressure (P_q) 0.21 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.055	76.28
B - Centroid	3.00	3.50	4	0.056	76.58
A-1	0.40	0.50	0.50	0.045	76.31
A-2	1.50	1.75	2	0.064	76.29
A-3	4.50	5.25	6	0.056	76.34
A-4	5.60	6.5	7.5	0.048	76.34
B-1	0.40	0.50	0.50	0.047	76.61
B-2	1.50	1.75	2	0.053	76.57
B-3	4.50	5.25	6	0.061	76.55
B-4	5.60	6.5	7.5	0.054	76.31
AVERAGE					

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

Δ_p = manometer reading (inches H₂O)

T_s = average absolute dilution tunnel temperature (°F + 460)

P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$

P_q = static pressure in. H₂O
 { 13.6 }

M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

K_p = 85.49 pitot tube constant, (conversion factor for English units)

$\Delta_{p,avg}$ = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

Date: 2016-09-07 Manufacturer: Foyen Supreme Model: NV200
 Project #: PI 20131 Run: 2 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2,965	2,971	1,003	1,00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,86	17,87	9,69	10,00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0,003	2,965	1,001	0,003	0.02	0,003	0.15	0,002	0.05	✓	
CO ₂	0	17,83	9,70	0	0.02	0,04	0.5	0,06	0.5	✓	
O ₂	na	na	na	-	na	-	na	-	na	-	

TEST DATA LOG

Date: 2016-09-07 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 2 Tech: MM Reviewer: JP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	425 170, 41	367 401, 63	310 64
Initial (Liter)	422 718, 33	3650 48, 42	253, 08

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101, 7	101, 3
Dry Bulb (F):	76, 28	80, 96
Humidity (%):	66, 5	47, 4

Flow Meter

	Start	End
Flow meter reading	N.A	N.A

Flow Meter Verification

	Before	After
Flow meter Check (liters)	N.A	N.A
Scale Weight (Kg)	N.A	N.A

FUEL DATA

Date: 2016-09-07 Manufacturer: foyer Supreme Model: NV 200
 Project #: pI 20131 Run: 2 Tech: Mr Reviewer: JL

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*		
2 x 4 x 5 in.	0.676 lbs.	22.9	22.6	22.1
2 x 4 x 5 in.	0.664 lbs.	21.8	22.0	21.6
2 x 4 x 5 in.	0.686 lbs.	23.1	22.6	22.4
2 x 4 x 5 in.	0.672 lbs.	20.9	19.9	19.6
2 x 4 x 5 in.	0.700 lbs.	21.8	21.3	21.9
2 x 4 x 5 in.	0.664 lbs.	21.2	21.6	21.3
2 x 4 x 5 in.	0.694 lbs.	20.1	20.6	20.3
2 x 4 x 5 in.	0.704 lbs.	23.1	22.9	22.6
2 x 4 x 5 in.	0.692 lbs.	19.6	19.3	19.8
2 x 4 x 5 in.	0.646 lbs.	21.8	21.3	21.3
2 x 4 x 5 in.	0.710 lbs.	21.7	21.6	21.3
2 x 4 x 5 in.	0.714 lbs.	23.0	23.6	22.8
2 x 4 x 5 in.	0.652 lbs.	20.5	20.3	21.1
2 x 4 x 5 in.	0.694 lbs.	20.3	21.1	20.5
2 x 4 x 5 in.	0.842 lbs.	22.7	22.1	21.6
2 x 4 x 5 in.	0.720 lbs.	21.8	21.6	21.3
2 x 4 x 5 in.	0.724 lbs.	20.6	20.3	20.6
2 x 4 x 5 in.	0.718 lbs.	22.9	22.6	22.0
2 x 4 x 5 in.	0.690 lbs.	20.2	20.6	20.4
2 x 4 x 5 in.	0.620 lbs.	21.1	20.9	21.4
2 x 4 x 5 in.	0.678 lbs.	20.1	20.6	20.3
2 x 4 x 5 in.	0.670 lbs.	20.1	20.6	20.3
2 x 4 x 5 in.	0.640 lbs.	20.7	20.8	20.9

TEST LOAD WEIGHT: _____ lbs

FUEL DATA

Date: 5016-09-07 Manufacturer: Fayer Supreme Model: MV 200
 Project #: PI 20131 Run: 2 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*		
<u>2</u> x <u>4</u> x <u>5</u> in.	<u>0,684</u> lbs.	<u>20,3</u>	<u>21,1</u>	<u>20,8</u>
<u>2</u> x <u>4</u> x <u>5</u> in.	<u>0,696</u> lbs.	<u>20,1</u>	<u>20,6</u>	<u>20,3</u>
<u>2</u> x <u>4</u> x <u>5</u> in.	<u>0,698</u> lbs.	<u>20,6</u>	<u>20,4</u>	<u>20,5</u>
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			
x x in.	lbs.			

TEST LOAD WEIGHT: 17,89 lbs

FUEL DATA

Date: 2016-09-07 Manufacturer: Foyer Supreme Model: NV200
 Project #: PT 20131 Run: 2 Tech: MR Reviewer: [Signature]

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 22 in.	2,118 lbs.	22.4	23.2	23.1	23.4	23.1
1 1/2 x 3 1/2 x 22 in.	2,464 lbs.	22.7	22.4	23.4	23.1	22.9
3 1/2 x 3 1/2 x 22 in.	5,212 lbs.	21.9	20.9	21.6	21.8	21.3
3 1/2 x 3 1/2 x 22 in.	5,228 lbs.	22.1	21.8	22.6	20.6	21.1
1,5 x 3/4 x 5 in.	0,110 lbs.			19.6		
1,5 x 3/4 x 5 in.	0,122 lbs.			19.3		
1,5 x 3/4 x 5 in.	0,120 lbs.			20.1		
1,5 x 3/4 x 5 in.	0,118 lbs.			20.6		
1,5 x 3/4 x 5 in.	0,130 lbs.			20.0		
1,5 x 3/4 x 5 in.	0,118 lbs.			19.9		
1,5 x 3/4 x 5 in.	0,120 lbs.			19.8		
1,5 x 3/4 x 5 in.	0,120 lbs.			19.6		
1,5 x 3/4 x 5 in.	0,122 lbs.			19.3		
1,5 x 3/4 x 5 in.	0,118 lbs.			19.3		
1,5 x 3/4 x 5 in.	0,104 lbs.			19.4		
1,5 x 3/4 x 5 in.	0,108 lbs.			19.8		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 16,44 lbs Min 20%: 3,29 Max 25%: 3,11

Date: 2016-09-07 Manufacturer: foyer Super ME Model: MV260
 Project #: PI 131 Run: 2 Tech: MM Reviewer: DP

Pre-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1			
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
		13	56	58	9	34	62	64	12	150	
2016-09-06	18:00	95, 1525	0, 1270	0, 1273	10, 3491	116, 1014	0, 1255	0, 1265	10, 2001	0, 1281	
2016-09-07	8:30	95, 1525	0, 1271	0, 1275	10, 3490	110, 1013	0, 1256	0, 1266	10, 2002	0, 1280	

Post-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1			
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
		13	56	58	9	34	62	64	12	150	
2016-09-08	8:00	95, 1541	0, 1307	0, 1274	10, 3538	110, 1016	0, 1254	0, 1267	10, 2052	0, 1281	
2016-09-12	8:00	95, 1527	0, 1306	0, 1273	10, 3503	110, 1015	0, 1254	0, 1267	10, 2013	0, 1281	
2016-09-14	8:00	95, 1527	0, 1306	0, 1273	10, 3501	110, 1015	0, 1254	0, 1267	10, 2013	0, 1281	
2016-09-15	8:00	95, 1527	0, 1306	0, 1273	10, 3501	110, 1015	0, 1254	0, 1267	10, 2013	0, 1281	



DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2016-09-07 Project #: PI 20131 Run: 2 Manufacturer: foyer supreme Model: NV 200
 Tech: MM Reviewer: DP

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-06	18:00	1076451	0,1283	0,1266	10,3172
2016-09-07	8:30	1076452 1076462	0,1284	0,1267	10,3142

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-08	8:00	1076462	0,1320	0,1269	10,3188
2016-09-12	8:00	1076456	0,1317	0,1268	10,3154
2016-09-14	8:00	107,6456	0,1317	0,1268	10,3156
2016-09-16	8:00	107.6456	0,1317	0,1268	10,3156

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

SUP

Description du test

Test standard	EPA
Run #	3
Date	2016-08-09
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	Wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	9 août 2016
Technicien	M.M

Fuel data

Fuel type	Dimension
Fuel specie	D. Fir
HHV	19810,0 kJ/kg
%C	48,7
%H	6,9
%O	43,9
%Ash	0,5
HHV	8519,2 Btu/lb
LHV	7451,0 Btu/lb

Default Fuel Values		
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	100,8	100,8
Barometer (in.Hg):	29,766229	29,766229
Dry Bulb (F):	79,34	83,66
Humidity (%):	65	60,5
Air velocity (ft/min)	18	22

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

Final:	426341,510	Liter
Initial:	425175,670	Liter
Final:	368524,490	Liter
Initial:	367404,920	Liter
Final:	346,040	cuft
Initial:	310,640	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent

203

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	9 août 2016
Technicien	M.M

Preload data sheet

Test Load Weight:

Lower	Ideal	Upper
14,11	15,68	17,25

Load Volume: cu. ft

Loading Density: 8,043 lbs./ft3

Number of Spaces:
 Spacer weight (lbs):

Load Density (wet): 31,132 lbs./ft3
 Dry Wood Density: 25,8818

Thick	Piece Size (in):		Weight lbs	Meter Moisture Content				Ave. MC x Weight	Volume Cubic Inches
	Wide	x Length		Dry Uncorrected %					
2	4	5	0,724	19,7	19,9	20,1	14,4076	40,00	
2	4	5	0,682	19,3	19,6	19,9	13,3672	40,00	
2	4	5	0,694	19,6	19,7	20,6	13,856867	40,00	
2	4	5	0,756	19,4	19,5	20,1	14,868	40,00	
2	4	5	0,684	21,5	19,3	20,5	13,9764	40,00	
2	4	5	0,846	19,3	19,2	19,6	16,3842	40,00	
2	4	5	0,68	21,5	21,6	21,3	14,597333	40,00	
2	4	5	0,662	21,7	22,3	20,8	14,2992	40,00	
2	4	5	0,672	21,6	22,1	21,6	14,6272	40,00	
2	4	5	0,7	19,2	20,6	20,5	14,07	40,00	
2	4	5	0,718	19,6	20,3	21	14,5754	40,00	
2	4	5	0,69	19,1	20,6	19,8	13,685	40,00	
2	4	5	0,738	20,1	20,1	20,8	15,006	40,00	
2	4	5	0,786	21,1	20,2	20,5	16,1916	40,00	
2	4	5	0,694	19,3	20	21	13,9494	40,00	
2	4	5	0,788	20,7	20,6	20,8	16,3116	40,00	
2	4	5	0,714	19,5	19,9	19,8	14,0896	40,00	
2	4	5	0,67	21	21	20,5	13,958333	40,00	
2	4	5	0,722	20	20,5	21	14,801	40,00	
2	4	5	0,688	19,2	20,3	19,6	13,5536	40,00	
2	4	5	0,738	19,6	20,6	20,1	14,8338	40,00	
2	4	5	0,722	19,6	20,3	19,5	14,2956	40,00	
2	4	5	0,838	21	19,9	20,5	17,151067	40,00	
2	4	5	0,688	19,9	20,1	20,5	13,874667	40,00	
2	4	5	0,722	19,6	21	20,5	14,704733	40,00	
								0,00	
								0,00	

SUM MC 365,4354

PreTest Load Weight: lbs.

Dry Weight: kg.

Dry:

Average Moisture Content: %

Must be 18-28

Wet:

must be 15,2-22

Project nu.	pi-20131
Date	9 août 2016
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:		
Lower	Ideal	Upper
14,1	15,7	17,2

* For boilers, a loading density factor of 10 lb/ft3 is applied

Load Volume: 0,45 cu. ft

Loading Density: 7,2 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet): 33,0 lbs./ft3
Dry Wood Density: 27,4 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x Weight	Volume Cubic Inches	Ave. MC %
Thick	Wide	Length		Dry Uncorrected %							
1,5	3,5	22	2,21	21,10	20,40	20,40	20,90	19,60	45,30176	115,50	20,5
1,5	3,5	22	2,52	21,90	21,20	20,20	21,80	22,10	54,11456	115,50	21,4
3,5	3,5	22	5,36	20,60	20,50	21,10	20,90	20,80	111,29768	269,50	20,8
3,5	3,5	22	4,62	19,70	19,10	19,80	20,10	20,10	91,21216	269,50	19,8
1,5	0,75	5	0,11				19,80		2,178	5,63	19,8
1,5	0,75	5	0,12				20,10		2,4924	5,63	20,1
1,5	0,75	5	0,12				20,60		2,3896	5,63	20,6
1,5	0,75	5	0,11				20,30		2,2736	5,63	20,3
1,5	0,75	5	0,13				20,10		2,5326	5,63	20,1
1,5	0,75	5	0,12				19,60		2,3912	5,63	19,6
1,5	0,75	5	0,12				19,90		2,4278	5,63	19,9
1,5	0,75	5	0,12				20,60		2,4308	5,63	20,6
1,5	0,75	5	0,13				21,00		2,73	5,63	21,0
1,5	0,75	5	0,12				20,80		2,4544	5,63	20,8
1,5	0,75	5	0,12				20,30		2,3954	5,63	20,3
1,5	0,75	5	0,14				20,00		2,8	5,63	20,0
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
									SUM MCx	331,42196	20,3 %

Test Load Weight: 16,16 lbs.

Dry Weight: 6,08 kg.

Average Moisture Content: %
Dry: 20,50 Dry(EPA) 20,50
Dry(B415) 20,50

20,50
Must be 19-25

Wet: 17,02
must be 15,2-22

Coal Bed Range: 3,2 lbs. to

4,0 lbs.

TEST CHARGE: Coal bed weight: 3,25 lbs.

Project nu.	pi-20131
Date	9 août 2016
Technicien	m.m

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,25 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,970

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,050	79,76	0,2236
B center	0,050	79,06	0,2236
A1	0,042	79,8	0,2049
A2	0,052	79,61	0,2280
A3	0,056	79,71	0,2366
A4	0,046	79,69	0,2145
B1	0,040	79,170	0,2000
B2	0,050	79,160	0,2236
B3	0,052	78,970	0,2280
B4	0,047	78,910	0,2168
AVERAGE	0,0485	79,3840	0,2200

Project nu.	pi-20131
Date	9 août 2016
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number															
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	94,5442	0,1307	0,1261	10,1154	109,0933	0,1270	0,1270	10,2284	107,9731	0,1266	0,1271	9,9832	0,1289	07/09/2016	18:00
Before (6)	94,5442	0,1308	0,1260	10,1155	109,0934	0,1271	0,1271	10,2285	107,9730	0,1265	0,1271	9,9831	0,1288	08/09/2016	09:00
After (1)	94,5451	0,1332	0,1261	10,1198	109,0935	0,1264	0,1271	10,2322	107,9730	0,1285	0,1272	9,9870	0,1288	08/09/2016	16:00
After (2)	94,5447	0,1329	0,1261	10,1167	109,0936	0,1264	0,1271	10,2293	107,9730	0,1284	0,1272	9,9845	0,1288	12/09/2016	08:00
After (3)	94,5448	0,1328	0,1261	10,1164	109,0936	0,1264	0,1271	10,2293	107,9731	0,1285	0,1272	9,9847	0,1288	14/09/2016	08:00
After (4)	94,5447	0,1329	0,1261	10,1164	109,0936	0,1264	0,1271	10,2293	107,9731	0,1285	0,1272	9,9846	0,1288	15/09/2016	08:00
After (5)															
After (6)	94,5447	0,1329	0,1261	10,1164	109,0936	0,1264	0,1271	10,2293	107,9731	0,1285	0,1272	9,9846	0,1288	15/09/2016	08:00
Difference	0,0005	0,0021	0,0001	0,0009	0,0002	-0,0007	0,0000	0,0008	0,0001	0,0020	0,0001	0,0015	0,0000		
Total (mg)		3,6				3,9				3,7			0		
Total ajusté (mg)		3,60				3,90				3,70					

Project nu.	pi-20131
Date	9 août 2016
Technicien	m.m

84	445,73	79,61	101,51	6,77	0,0471	303,14	208,96	381,77	442,91	341,12
85	445,62	79,59	101,33	6,67	0,0463	305,31	209,79	387,18	444,75	342,51
86	446,85	79,75	101,13	6,57	0,0465	307,85	210,68	395,62	444,82	344,02
87	542,52	79,95	156,40	6,37	0,0446	310,02	216,90	392,74	450,26	345,92
88	551,13	79,99	114,03	6,17	0,0456	312,47	219,91	386,14	519,21	346,93
89	556,34	79,93	111,58	6,07	0,0444	315,59	222,37	381,66	565,20	349,75
90	562,76	79,57	110,60	5,87	0,0453	319,31	224,39	378,10	588,94	353,99
91	571,11	79,73	110,59	5,77	0,0456	322,44	226,11	377,41	603,77	357,40
92	575,77	80,08	109,81	5,67	0,0453	326,64	227,16	375,35	618,75	360,61
93	575,91	80,01	110,35	5,57	0,0475	329,61	228,04	374,09	628,24	364,22
94	572,36	80,08	110,00	5,47	0,0459	333,33	228,71	373,77	630,24	367,62
95	570,91	80,23	109,70	5,37	0,0444	336,08	229,98	373,14	623,33	369,43
96	574,64	80,26	109,61	5,27	0,0451	339,74	230,68	371,10	616,97	372,84
97	573,97	80,40	109,75	5,17	0,0465	343,13	231,76	368,42	611,71	376,74
98	491,28	80,69	160,41	6,10	0,0394	347,00	237,52	372,56	559,78	379,36
99	536,98	80,80	140,80	4,77	0,0402	351,41	240,47	377,50	523,53	383,75
100	562,73	80,57	116,36	4,67	0,0453	354,91	238,60	375,58	568,20	385,55
101	563,62	80,71	112,99	4,57	0,0453	357,84	239,40	375,91	589,26	388,92
102	555,18	80,73	111,26	4,56	0,0451	360,81	241,40	376,05	583,61	391,80
103	548,83	80,64	109,84	4,47	0,0458	363,80	244,22	376,72	571,49	395,57
104	543,34	80,19	108,58	4,37	0,0446	367,11	247,07	377,42	561,66	398,66
105	539,76	80,57	107,51	4,27	0,0473	369,92	249,68	376,41	551,78	401,83
106	536,15	80,03	107,55	4,27	0,0456	372,03	252,73	378,64	546,69	405,45
107	532,36	80,26	107,22	4,17	0,0458	374,22	255,62	383,39	539,10	408,17
108	530,10	80,35	107,32	4,07	0,0451	376,33	259,46	384,67	535,16	412,75
109	527,27	80,43	106,36	3,97	0,0460	378,44	260,78	386,07	526,25	415,60
110	506,30	80,52	137,45	7,89	0,0435	378,75	263,36	388,12	505,98	418,09
111	418,22	80,72	165,56	3,77	0,0422	380,64	269,26	391,60	439,15	421,80
112	457,15	80,86	112,63	3,67	0,0456	382,61	266,56	395,09	420,32	424,16
113	460,93	80,75	106,45	3,67	0,0458	382,43	266,06	398,83	416,80	426,62
114	454,29	80,62	103,76	3,67	0,0463	382,97	266,21	400,08	417,48	428,89
115	445,71	80,81	102,52	3,64	0,0451	382,87	267,03	402,23	412,67	430,46
116	411,09	80,94	137,60	6,14	0,0451	382,10	267,42	404,28	392,42	431,96
117	356,06	81,15	151,82	3,27	0,0404	381,90	267,04	403,22	354,44	432,91
118	397,54	81,18	110,59	3,47	0,0470	384,16	263,23	402,98	345,00	434,01
119	391,53	80,69	102,26	3,37	0,0463	383,66	260,35	403,33	347,05	433,17
120	384,86	80,61	99,91	3,37	0,0473	383,12	258,54	401,11	347,20	432,84
121	351,32	80,97	129,13	4,00	0,0456	381,20	259,35	401,64	337,40	432,87
122	352,08	81,03	102,51	3,37	0,0478	381,12	259,32	399,19	322,47	432,99
123	349,26	80,98	97,87	3,37	0,0465	379,65	259,48	394,87	317,94	432,84
124	342,57	81,20	96,12	3,37	0,0473	379,15	260,43	391,99	314,11	432,14
125	333,62	81,03	95,51	3,37	0,0470	377,31	258,73	388,25	310,42	431,10
126	324,88	80,49	94,30	3,37	0,0478	376,92	256,83	382,86	304,84	429,35
127	317,40	80,59	93,59	3,37	0,0486	374,05	255,70	379,78	298,12	427,21
128	310,20	80,71	92,68	3,37	0,0481	372,72	254,60	376,69	291,36	424,43
129	304,05	80,73	92,43	3,37	0,0473	370,76	254,17	373,30	285,29	422,26
130	298,28	80,51	91,49	3,35	0,0463	368,71	252,96	370,47	279,81	418,42
131	292,60	80,34	91,01	3,27	0,0467	366,33	251,25	368,58	275,65	415,69
132	286,95	80,40	91,05	3,36	0,0475	364,34	250,22	367,22	270,46	413,68
133	281,61	80,50	91,18	3,27	0,0481	362,50	248,70	365,47	266,98	409,24
134	277,24	80,41	90,88	3,27	0,0478	359,68	247,52	362,74	262,66	406,03
135	273,78	80,46	90,12	3,27	0,0460	357,72	246,05	362,42	259,15	402,11
136	269,41	80,45	90,19	3,27	0,0481	355,52	244,69	359,10	256,39	399,51
137	266,54	80,54	89,72	3,27	0,0481	353,38	243,24	358,35	253,37	395,46
138	262,96	80,38	89,91	3,27	0,0476	351,60	241,94	356,38	250,76	393,43
139	260,21	80,53	89,35	3,27	0,0478	348,86	240,61	353,01	248,31	390,38
140	257,47	80,52	89,47	3,27	0,0444	345,55	239,64	350,62	245,50	387,29
141	254,54	80,50	89,79	3,27	0,0470	344,05	238,47	348,40	242,86	384,76
142	251,93	80,49	89,23	3,27	0,0478	341,97	237,65	345,24	240,84	381,91
143	249,37	80,45	88,81	3,27	0,0481	340,09	236,37	341,17	239,21	378,75
144	247,02	80,54	88,41	3,27	0,0476	337,68	232,87	337,10	237,13	375,79
145	244,45	80,31	88,49	3,27	0,0448	334,54	229,17	334,36	235,00	372,84
146	242,08	80,39	88,31	3,27	0,0481	332,28	226,02	331,66	232,82	369,64
147	239,95	80,50	88,43	3,27	0,0473	329,94	223,99	330,80	230,47	366,49

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,6 g/hr
 Burn Rate : 1,682 Dry kg/hr

Test Duration: 217 min

PRESSURE FACTOR: DGM 1 0,96623
 DGM 2 0,97865
 DGM 3 0,99486

BAROMETRIC PRESSURE
 Average: 29,766229 in Hg
 Start: 29,766229 in Hg
 End: 29,766229 in Hg

TEMPERATURE FACTORS DGM 1 0,97054
 DGM 2 0,97043
 DGM 3 0,97285

DGM CONTROLLER VALUES

DGM 1 Final: 15056,109 Cuft
 Initial: 15014,937 Cuft

VOLUMES SAMPLED DGM 1 38,339 Scft
 DGM 2 37,249 Scft
 DGM 3 34,022 Scft

DGM 2 Final: 13014,320 Cuft
 Initial: 12974,783 Cuft

DGM #3 Final: 346,040 Cuft
 Initial: 310,640 Cuft

TOTAL TUNNEL VOLUME : 58885

TEMPERATURES

DGM 1 544,027 °R
 DGM 2 544,090 °R

SAMPLE RATIOS
 Sample Train 1: 1535,927
 Sample Train 2: 1580,881

CALIBRATION FACTORS

DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000102** g/dscf
 Sample Train 2 **0,000099** g/dscf
 Room **0,000000** g/dscf

TUNNEL FLOW RATE: 271,361 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **5,99** g
 Sample Train 2 **5,85** g

PARTICULATE CATCH
 Total Sample Train 1: 3,90 mg
 Total Sample Train 2: 3,70 mg
 Total Sample Train 1 1st hour: 3,60 mg

EMISSION RATES
 Sample Train 1 **1,66** g/hr
 Sample Train 2 **1,62** g/hr

1st hour emission rate **5,53** g/hr

DEVIATION: 1,19%

Cs Train 1 Train 2
 0,0001017 9,93328E-05

197,0	400,0	0,3	2,0	4,0	350,5	279,6	83,6	93,1	304,0	256,2	390,4	399,2	402,6	0,18	85,47	85,01	86,16	0,17	85,43	85,37	83,40	0,05	0,05	58,673181
198,0	401,0	0,3	2,0	4,0	349,3	277,9	83,3	93,2	302,4	254,7	388,5	398,2	402,8	0,18	85,49	85,02	86,15	0,17	85,44	85,42	83,41	0,04	0,05	57,529028
199,0	402,0	0,3	2,0	4,0	348,7	277,1	83,6	93,4	300,9	254,3	388,4	397,0	403,1	0,18	85,51	85,05	86,19	0,17	85,47	85,46	83,46	0,05	0,05	56,928381
200,0	403,0	0,2	2,0	4,0	348,0	276,6	83,7	93,2	299,7	253,6	387,6	395,7	403,2	0,18	85,57	85,09	86,23	0,17	85,53	85,48	83,51	0,05	0,05	56,160141
201,0	404,0	0,2	2,0	4,0	346,9	275,4	83,8	93,2	299,0	252,7	385,7	394,7	402,4	0,18	85,59	85,10	86,23	0,17	85,55	85,51	83,60	0,05	0,05	55,080985
202,0	405,0	0,2	2,0	4,0	346,2	274,9	83,6	93,2	298,0	252,1	384,9	393,1	403,1	0,18	85,67	85,13	86,25	0,17	85,55	85,52	83,62	0,05	0,05	54,431693
203,0	406,0	0,2	2,0	4,0	345,9	274,1	83,7	93,0	297,2	251,5	383,9	392,2	404,7	0,18	85,63	85,14	86,23	0,17	85,54	85,53	83,60	0,05	0,05	54,093008
204,0	407,0	0,2	1,9	3,7	344,7	272,6	83,9	93,1	295,9	251,1	382,1	390,8	403,6	0,18	85,64	85,16	86,23	0,17	85,57	85,56	83,61	0,05	0,05	52,910092
205,0	408,0	0,2	1,9	3,7	344,4	271,9	83,8	93,3	294,9	250,8	381,8	390,1	404,1	0,18	85,66	85,18	86,24	0,17	85,61	85,59	83,71	0,05	0,05	52,548547
206,0	409,0	0,2	1,9	3,8	343,6	271,0	83,8	92,8	294,0	250,0	380,4	388,0	405,8	0,18	85,71	85,21	86,28	0,17	85,63	85,61	83,72	0,04	0,05	51,844919
207,0	410,0	0,1	1,9	3,8	342,5	271,1	83,7	93,1	292,1	249,5	378,7	386,9	405,1	0,18	85,74	85,24	86,29	0,17	85,69	85,63	83,73	0,05	0,05	50,655862
208,0	411,0	0,1	1,9	3,7	341,6	271,8	83,7	93,3	291,6	248,3	377,5	386,1	404,6	0,18	85,71	85,24	86,33	0,17	85,68	85,65	83,74	0,04	0,05	49,824472
209,0	412,0	0,1	2,0	3,7	339,9	271,1	84,0	93,2	289,8	248,0	375,5	384,4	401,7	0,18	85,71	85,26	86,33	0,17	85,71	85,66	83,73	0,05	0,05	48,061264
210,0	413,0	0,1	2,0	3,6	339,3	271,3	83,9	93,3	288,7	247,3	374,5	383,3	402,8	0,18	85,75	85,29	86,35	0,17	85,74	85,71	83,75	0,04	0,05	47,484961
211,0	414,0	0,1	2,0	3,6	338,7	270,4	84,1	93,4	287,3	246,1	373,1	383,3	403,7	0,18	85,72	85,31	86,34	0,17	85,76	85,74	83,74	0,05	0,05	46,904321
212,0	415,0	0,1	2,0	3,7	337,7	269,8	84,1	93,2	286,2	245,7	372,4	382,0	402,1	0,18	85,78	85,33	86,36	0,17	85,79	85,77	83,84	0,05	0,05	45,870288
213,0	416,0	0,1	2,0	3,7	337,0	269,2	84,0	93,3	284,3	244,9	371,4	380,2	404,5	0,18	85,79	85,36	86,38	0,17	85,81	85,78	83,89	0,05	0,05	45,219044
214,0	417,0	0,1	2,0	3,7	336,0	268,5	84,1	93,2	282,7	244,3	370,1	379,0	403,9	0,18	85,82	85,39	86,41	0,17	85,84	85,80	83,88	0,05	0,05	44,183645
215,0	418,0	0,1	2,0	3,6	334,9	267,7	84,0	93,3	280,7	243,6	367,9	378,2	404,2	0,18	85,82	85,40	86,42	0,17	85,84	85,83	83,88	0,05	0,05	43,120684
216,0	419,0	0,1	2,0	3,7	334,0	266,2	84,2	93,1	280,5	242,8	366,9	378,0	401,6	0,18	85,82	85,40	86,41	0,17	85,84	85,85	83,82	0,05	0,05	42,171832
217,0	420,0	0,0	2,0	3,6	332,8	265,2	84,1	93,1	278,7	242,2	366,1	376,8	400,0	0,18	85,82	85,42	86,45	0,17	85,83	85,87	83,91	0,05	0,05	40,967001

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 3
 Project #: pi-20131
 Test Duration: 217 min

	HHV	LHV
Eff	65,73%	71,04%
Comb Eff	93,38%	93,38%
HT Eff	70,39%	76,08%
Output	21 912	kJ/h
Burn Rate	1,68	kg/h
Grams CO	571	g
Input	33 336	kJ/h
MC wet	17,02	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,061

Overall Heating Efficiency: 65,73%
 Combustion Efficiency: 93,38%
 Heat Transfer Efficiency: 70,39%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M _d)	29,69
Dry Moles Exhaust Gas (N _r):	421,69
Air Fuel Ratio (A/F)	12,01

Heat Output:	20 786 Btu/h	21 912 kJ/h
Heat Input:	31 623 Btu/h	33 336 kJ/h
Burn Duration:	3,62 h	
Burn Rate:	3,71 lb/h	1,683 kg/h
Stack Temp:	443,6 Deg. F	228,7 Deg. C

Date: 06/10-09-08 Manufacturer: Foyer Supreme Model: NV200
 Project #: PT 20131 Run: 3 Tech: MM Reviewer: SD

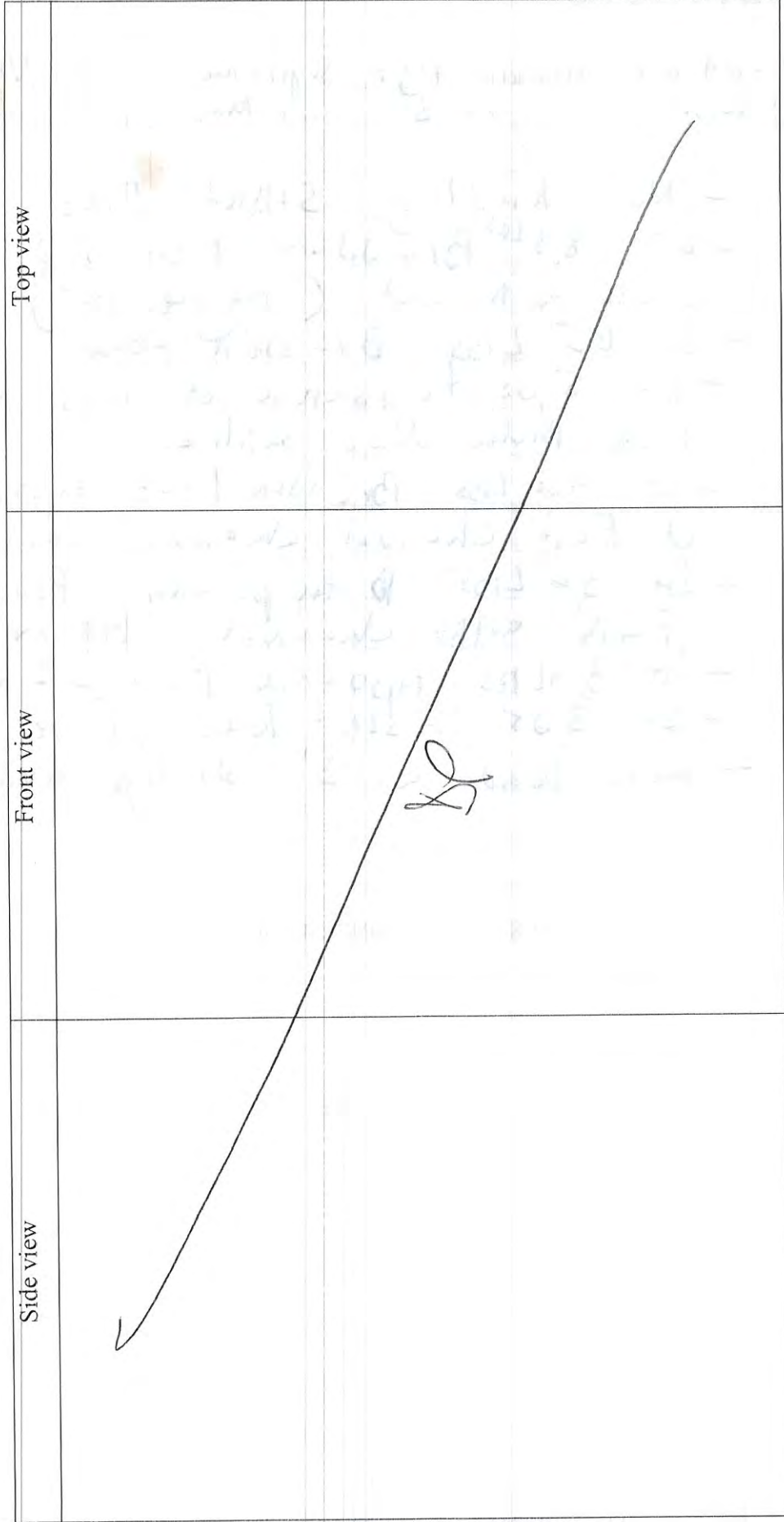
- No kindling START FINE 18'01 LBS
- At 8,3 LBS BRASSER Feux and close a.a inlet (angle 10°)
- At 6,5 LBS BRASSER Feux
- At 5,00 tapocher et puis morceaux Non Bruler dans millier
- At 4,00 LBS BRASSER Feux tapocher et fait channel channel dans millier
- At 3,6 LBS tapocher Feux fait autre channel (48 min)
- At 3,4 LBS tapocher Feux (52 min)
- At 3,25 instant load (1:18 min)
- puis load a 3" de lip avant

TEST LOAD CONFIGURATION

1.28 h.
3.3 LBS



Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____



Date: _____ Manufacturer: _____ Model: _____
 Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
<p>Usable Firebox: _____</p> <p>Test load weight: _____ Minimum: _____ Maximum: _____</p> <p>Déviation: _____</p>				

NP

PRE / POST CHECKS

Date: 2016-09-08 Manufacturer: Fager Supreme Model: NV200
 Project #: PI 20131 Run: 3 Tech: MM Reviewer: [Signature]

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
<u>EM 191</u>	<u>7:15</u>	<u>ok</u>	<u>ok</u>

Pre-Test Post-Test

Facility Conditions:

Air Velocity from less than 2 feet
 Smoke Capture Check.....
 Picture.....

<u>18</u> (max50 Fpm)	<u>22</u> (max50 Fpm)
<u>ok</u>	<u>ok</u>
4 sides <u>ok</u>	<u>ok</u>

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....
 Date Dilution Tunnel Cleaned.....
 Induced Draft Check (max 0.005 H2O).....
 Traverse before ignition.....
 Flow Rate 140 cfm ±10%.....

<u>2016-09-06</u>
<u>2016-09-06</u>
<u>ok</u>
<u>ok</u>

ok

Temperature System:

Ambient (65°-90°F).....
 Wood Heater Surface (±125°F).....

<u>ok</u>	°F
<u>ok</u>	°F

Proportional Checks:

Thermocouple check.....
 Pitot Clean.....
 Pitot verification.....

<u>ok</u>
<u>ok</u>
<u>ok</u>

Sampling Train ID Numbers:

Probe.....
 Filter Front.....
 Filter Back.....
 Filter Thermocouple.....
 Filter (<90°F).....

Train 1 st hour	Train 1	Train 2
<u>12</u>	<u>19</u>	<u>37</u>
<u>53</u>	<u>74</u>	<u>79</u>
<u>73</u>	<u>78</u>	<u>81</u>
<u>11</u>	<u>11</u>	<u>11</u>
<u>ok</u>	<u>ok</u>	<u>ok</u>

SAMPLING EQUIPMENT CHECK OUT

Date: 20 10-09-08 Manufacturer: Geyer Supreme Model: NV 100
 Project #: PT 20131 Run: 3 Tech: Mm Reviewer: NP

Leakage Checks Tunnel Samplers

Unplugged Flow Rate = .25cfm	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	42573,84	426342,25	42573,42	426343,86	367404,33	368525,24
Initial 1minute DGM (Liter)	42573,84	426342,25	42573,41	426343,85	367404,33	368525,24
Change © (Liter)	Ø	Ø	0,01	0,01	Ø	Ø
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Leakage Checks Flue Gas Sampler

Plugged Probe	Pre Test	Post Test
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

Plugged Probe	Pre Test 3 H2o static	Pre Test 0.4-0.5 H2o velocity	Post Test 3 H2o Static	Post Test 0.4-0.5 H2o velocity
Vacuum (inches Hg.)	3	4	3	5
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2016-09-08 Manufacturer: Fayer Supreme Model: NV 200
 Project #: PT 20131 Run: 3 Tech: MM Reviewer: PO

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 2016-09-08 Manufacturer: foyer supreme Model: NV 200
 Project #: PI 20131 Run: 3 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 100.8 (KPa.) Static pressure (P_q) 0.20 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.050	79.76
B - Centroid	3.00	3.50	4	0.050	79.06
A-1	0.40	0.50	0.50	0.042	79.80
A-2	1.50	1.75	2	0.052	79.61
A-3	4.50	5.25	6	0.056	79.71
A-4	5.60	6.5	7.5	0.046	79.69
B-1	0.40	0.50	0.50	0.040	79.17
B-2	1.50	1.75	2	0.050	79.16
B-3	4.50	5.25	6	0.052	78.97
B-4	5.60	6.5	7.5	0.047	78.91
				AVERAGE	

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

Δ_p = manometer reading (inches H₂O)

T_s = average absolute dilution tunnel temperature (°F + 460)

P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$

P_q = static pressure in. H₂O
 { 13.6 }

M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

K_p = 85.49 pitot tube constant, (conversion factor for English units)

Δ_p avg. = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

Date: 2016-09-08 Manufacturer: Fayer Supreme ME Model: NV 200
 Project #: PI 20131 Run: 3 Tech: MM Reviewer: SR

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2,956	2,971	1,003	1,00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,86	17,87	9,71	10,00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0,002	2,961	0,999	0,002	0.02	0,005	0.15	0,004	0.05	✓	
CO ₂	0	17,85	9,69	0	0.02	0,01	0.5	0,02	0.5	✓	
O ₂	na	na	na	-	na	-	na	-	na	-	

Date: 2016-09-08 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20121 Run: 3 Tech: MM Reviewer: JP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	426391,51	368529,49	346,04
Initial (Liter)	425125,67	367404,92	310,64

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	100,8	100,8
Dry Bulb (F):	79,34	83,66
Humidity (%):	65,0	60,5

Flow Meter

	Start	End
Flow meter reading	N.A	N.A

Flow Meter Verification

	Before	After
Flow meter Check (liters)	N.A	N.A
Scale Weight (Kg)	N.A	N.A

FUEL DATA

Date: 2016-09-08 Manufacturer: Foyer Supreme Model: NV 200
 Project #: p7 26131 Run: 3 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*		
2 x 4 x 5 in.	0.724 lbs.	197	199	201
2 x 4 x 5 in.	0.682 lbs.	193	196	199
2 x 4 x 5 in.	0.694 lbs.	196	197	206
2 x 4 x 5 in.	0.756 lbs.	194	195	201
2 x 4 x 5 in.	0.684 lbs.	215	193	205
2 x 4 x 5 in.	0.846 lbs.	193	192	196
2 x 4 x 5 in.	0.686 lbs.	215	216	213
2 x 4 x 5 in.	0.662 lbs.	217	223	208
2 x 4 x 5 in.	0.672 lbs.	216	221	216
2 x 4 x 5 in.	0.700 lbs.	192	206	205
2 x 4 x 5 in.	0.718 lbs.	196	203	210
2 x 4 x 5 in.	0.690 lbs.	191	206	198
2 x 4 x 5 in.	0.738 lbs.	201	201	208
2 x 4 x 5 in.	0.786 lbs.	211	202	205
2 x 4 x 5 in.	0.694 lbs.	193	200	210
2 x 4 x 5 in.	0.788 lbs.	207	206	208
2 x 4 x 5 in.	0.714 lbs.	195	199	198
2 x 4 x 5 in.	0.670 lbs.	210	210	205
2 x 4 x 5 in.	0.722 lbs.	200	205	210
2 x 4 x 5 in.	0.688 lbs.	192	203	196
2 x 4 x 5 in.	0.738 lbs.	196	206	201
2 x 4 x 5 in.	0.722 lbs.	196	203	195
2 x 4 x 5 in.	0.838 lbs.	210	199	205

TEST LOAD WEIGHT: 18.074 lbs

FUEL DATA

Date: 2016-09-08 Manufacturer: Foyer Supreme Model: MV 200
 Project #: PI 20131 Run: 3 Tech: mm Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size			Weight		Meter Moisture Content (% dry)*			
2	x 4	x 5 in.	0.688	lbs.	199		20.1	20.5
2	x 4	x 5 in.	0.722	lbs.	196		21.0	20.5
2	x 4	x 5 in.	0.710	lbs.	193		21.1	20.3
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				
	x	x in.		lbs.				

TEST LOAD WEIGHT: 18.014 lbs

FUEL DATA

Date: 2016-09-08 Manufacturer: Fayer Supreme Model: NV200
 Project #: PI 2011 Run: 3 Tech: MM Reviewer: _____

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 22 in.	2, 212 lbs.	21.1	20.4	20.4	20.9	19.6
1 1/2 x 2 1/2 x 22 in.	2, 524 lbs.	21.9	21.2	20.2	21.8	22.1
3 1/2 x 3 1/2 x 22 in.	5, 356 lbs.	20.6	20.5	21.1	20.9	20.8
3 1/2 x 3 1/2 x 22 in.	4, 616 lbs.	19.7	19.1	19.8	20.1	20.1
1 1/2 x 3/4 x 5 in.	0, 110 lbs.			19.8		
1 1/2 x 3/4 x 5 in.	0, 124 lbs.			20.1		
1 1/2 x 3/4 x 5 in.	0, 116 lbs.			20.6		
1 1/2 x 3/4 x 5 in.	0, 112 lbs.			20.3		
1 1/2 x 3/4 x 5 in.	0, 126 lbs.			20.1		
1 1/2 x 3/4 x 5 in.	0, 122 lbs.			19.6		
1 1/2 x 3/4 x 5 in.	0, 122 lbs.			19.9		
1 1/2 x 3/4 x 5 in.	0, 118 lbs.			20.6		
1 1/2 x 3/4 x 5 in.	0, 130 lbs.			20.8		
1 1/2 x 3/4 x 5 in.	0, 118 lbs.			20.8		
1 1/2 x 3/4 x 5 in.	0, 118 lbs.			20.3		
1 1/2 x 3/4 x 5 in.	0, 126 lbs.			20.0		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 16 1/6 lbs Min 20%: 3.23 Max 25%: 4.04

Date: 2016-09-07 3 Run: _____
 Project #: PT 20131 Manufacturer: foyer Supreme Model: NV200
 Tech: MM Reviewer: DL

Pre-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-07	18:00	94,5442	0,1307	0,1261	10,1154	109,0933	0,1270	0,1270	10,2284	0,1289	
2016-09-08	9:00	94,5442	0,1308	0,1260	10,1155	109,0934	0,1271	0,1271	10,2285	0,1288	

Post-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-08	12:00	94,5451	0,1332	0,1261	10,1198	109,0935	0,1264	0,1271	10,2322	0,1288	
2016-09-12	8:00	94,5447	0,1329	0,1261	10,1167	109,0936	0,1264	0,1271	10,2293	0,1288	
2016-09-14	8:00	94,5448	0,1328	0,1261	10,1164	109,0936	0,1264	0,1271	10,2293	0,1288	
2016-09-15	8:00	94,5447	0,1329	0,1261	10,1164	109,0936	0,1264	0,1271	10,2293	0,1288	



DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2016-09-07 Run: 3 Manufacturer: foyer supreme Model: NV700
 Project #: PL 20131 Tech: MS Reviewer: DD

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-07	18:00	107 9731	0, 1266	0, 1271	9 9832
2016-09-08	9:00	107 9730	0, 1265	0, 1271	9 9831

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-08	16:00	107 9730	0, 1285	0, 1272	9 9870
2016-09-12	8:00	107 9730 107 9730	0, 1284	0, 1272	9 9845
2016-09-14	8:00	107 9730	0, 1285	0, 1272	9 9847
2016-09-15	8:00	107 9731	0, 1285	0, 1272	9 9846

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

SUP

Description du test

Test standard	EPA
Run #	4
Date	2016-09-09
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	Wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	#####
Technicien	M.M

Fuel data

Fuel type	Dimension
Fuel specie	D. Fir
HHV	19810,0 kJ/kg
%C	48,7
%H	6,9
%O	43,9
%Ash	0,5
HHV	8519,2 Btu/lb
LHV	7451,0 Btu/lb

Default Fuel Values		
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	100,8	101,1
Barometer (in.Hg):	29,766229	29,854819
Dry Bulb (F):	77,18	83,66
Humidity (%):	65,5	48
Air velocity (ft/min)	24	21

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

	Final: 427222,520	Liter
	Initial: 426344,170	Liter
	Final: 369373,580	Liter
	Initial: 368525,750	Liter
	Final: 357,210	cuft
	Initial: 336,040	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent

216

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	9 septembre 2016
Technicien	M.M

Preload data sheet

Test Load Weight:

Lower	Ideal	Upper
14,11	15,68	17,25

Load Volume: cu. ft

Loading Density: 8,869

Number of Spaces:
 Spacer weight (lbs):

Load Density (wet): 42,911
 Dry Wood Density: 35,612167

Thick	Piece Size (in):		Weight lbs	Meter Moisture Content			Ave. MC x Weight
	Wide	x Length		Dry Uncorrected %			
2	4	5	0,618	20,1	19,9	20,6	12,4836
2	4	5	0,65	20,6	19,6	20,7	13,195
2	4	5	0,618	20,3	19,3	20,3	12,3394
2	4	5	1,08	21,1	19,1	20,6	21,888
2	4	5	0,622	22,4	20,6	19,8	13,020533
2	4	5	0,604	20,3	21	20,3	12,402133
2	4	5	0,746	19,6	20,3	20,6	15,044333
2	4	5	0,61	19,3	21,1	20,5	12,383
2	4	5	0,758	19,8	22	20,5	15,741133
2	4	5	0,804	19,6	19,8	19,9	15,8924
2	4	5	0,76	20,1	19,3	20,6	15,2
2	4	5	0,79	20,2	19,8	20,5	15,931667
2	4	5	0,774	20,7	20,3	21	15,996
2	4	5	0,774	19,9	20,4	20,3	15,6348
2	4	5	0,616	19,6	20,4	20,6	12,4432
2	4	5	0,61	19,8	20,5	20,5	12,362667
2	4	5	0,62	20,1	21	21,1	12,854667
2	4	5	0,804	21,6	20,8	20,3	16,8036
2	4	5	0,728	20,9	20,7	20,6	15,093867
2	4	5	0,764	20,8	21	20,3	15,8148
2	4	5	0,76	21	22,1	20,8	16,188
2	4	5	0,8	22	19,9	20,9	16,746667
2	4	5	0,766	22	21,1	21	16,366867
2	4	5	0,81	20,8	20,6	21	16,848
2	4	5	0,776	20,9	19,9	19,8	15,6752
2	4	5	0,826	20,6	20,6	20,8	17,070667
2	4	5	0,778	19,6	20,3	20,7	15,7156
							407,1358

PreTest Load Weight: lbs.

Dry Weight:

Average Moisture Content: %

Dry:

Wet:

Must be 18-28

Project nu.
Date
Technicien

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,25 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,958

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,049	76,13	0,2214
B center	0,050	76,1	0,2236
A1	0,039	76,16	0,1975
A2	0,054	76,17	0,2324
A3	0,048	76,03	0,2191
A4	0,045	76	0,2121
B1	0,041	76,020	0,2025
B2	0,049	76,010	0,2214
B3	0,053	75,730	0,2302
B4	0,046	75,780	0,2145
AVERAGE	0,0474	76,0130	0,2175

Project nu.	pi-20131
Date	9 septembre 2016
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number															
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108,7829	0,1284	0,1268	10,1528	108,9502	0,1280	0,1271	10,2561	110,2749	0,1267	0,1259	10,1088	0,1278	08/09/2016	18:00
Before (6)	108,7828	0,1283	0,1268	10,1530	108,9502	0,1280	0,1272	10,2562	110,2750	0,1267	0,1259	10,1089	0,1278	09/09/2016	09:00
After (1)	108,7832	0,1296	0,1271	10,1572	108,9502	0,1275	0,1271	10,2599	110,2752	0,1278	0,1262	10,1126	0,1280	09/09/2016	15:00
After (2)	108,7830	0,1293	0,1270	10,1545	108,9502	0,1274	0,1270	10,2574	110,2750	0,1277	0,1262	10,1104	0,1278	12/09/2016	08:00
After (3)	108,7830	0,1293	0,1270	10,1545	108,9503	0,1274	0,1270	10,2571	110,2751	0,1277	0,1263	10,1105	0,1278	14/09/2016	08:00
After (4)	108,7830	0,1293	0,1270	10,1545	108,9502	0,1274	0,1270	10,2572	110,2751	0,1277	0,1263	10,1104	0,1278	15/09/2016	08:00
After (5)															
After (6)	108,7830	0,1293	0,1270	10,1545	108,9502	0,1274	0,1270	10,2572	110,2751	0,1277	0,1263	10,1104	0,1278	15/09/2016	08:00
Difference	0,0002	0,0010	0,0002	0,0015	0,0000	-0,0006	-0,0002	0,0010	0,0001	0,0010	0,0004	0,0015	0,0000		
Total (mg)		2,9				3,1				3			0		
Total ajusté (mg)		2,90				3,10				3,00					

Project nu.	pi-20131
Date	9 septembre 2016
Technicien	m.m

84	548,82	77,94	101,40	8,27	0,0486	294,58	199,70	302,39	558,10	310,11
85	584,55	77,93	103,78	8,17	0,0473	295,10	200,62	303,68	583,89	311,66
86	608,99	77,80	104,39	8,07	0,0486	296,51	201,34	304,87	600,14	313,61
87	603,30	77,77	105,40	7,97	0,0456	297,62	202,08	305,96	615,11	314,90
88	593,33	78,26	104,80	7,81	0,0488	299,05	202,94	307,23	617,07	316,76
89	588,70	78,10	104,83	7,67	0,0478	300,30	203,34	309,03	611,51	318,49
90	583,47	77,95	106,17	7,57	0,0481	303,21	204,11	311,43	598,38	319,86
91	578,01	78,21	105,52	7,47	0,0441	305,84	204,95	315,39	586,23	321,43
92	570,00	78,09	104,81	7,37	0,0473	307,79	205,62	319,93	567,84	323,11
93	564,80	78,10	103,00	7,27	0,0483	308,89	206,04	323,88	553,96	325,17
94	560,58	78,12	105,25	7,17	0,0490	310,54	207,40	328,20	545,14	327,56
95	536,48	78,09	133,23	11,02	0,0458	312,58	209,72	335,09	532,28	329,87
96	528,65	78,79	187,10	8,17	0,0412	320,94	233,93	371,48	480,88	334,64
97	638,25	78,70	126,70	6,47	0,0465	323,40	223,44	377,78	542,46	338,77
98	650,77	78,56	120,69	6,27	0,0463	325,13	220,54	388,47	603,01	342,88
99	662,64	78,61	119,54	6,07	0,0453	328,72	221,33	396,70	631,74	347,95
100	667,96	78,49	118,59	5,97	0,0441	332,26	224,11	405,24	636,22	352,02
101	671,32	78,75	117,43	5,87	0,0475	336,06	227,58	412,92	634,78	357,67
102	667,25	78,86	117,75	5,67	0,0424	340,78	231,84	419,52	632,66	363,11
103	662,40	78,49	116,37	5,57	0,0475	344,95	236,25	422,03	622,69	368,84
104	661,12	78,49	115,01	5,38	0,0470	350,26	240,92	425,47	615,87	375,32
105	655,88	78,66	115,47	5,27	0,0470	355,30	245,28	432,43	613,81	382,34
106	655,39	78,92	113,67	5,17	0,0456	360,07	249,74	440,48	613,62	389,16
107	653,13	78,95	115,86	4,97	0,0451	364,60	253,56	452,98	612,92	396,53
108	588,73	79,46	166,53	7,08	0,0453	369,09	263,52	470,55	589,77	404,88
109	550,85	80,06	192,16	4,57	0,0400	380,32	283,91	491,17	535,70	416,56
110	583,27	79,64	126,58	4,45	0,0456	384,69	277,86	500,26	529,51	421,47
111	580,85	79,31	118,63	4,27	0,0481	388,74	276,65	510,51	531,69	425,56
112	572,39	79,65	114,69	4,27	0,0475	391,99	277,52	517,15	528,38	429,21
113	564,56	79,31	112,91	4,17	0,0470	396,55	279,74	518,58	523,31	433,55
114	556,84	79,37	110,04	4,17	0,0422	400,46	282,16	523,59	516,08	438,05
115	545,79	79,26	109,74	4,07	0,0458	404,95	284,87	527,14	508,01	442,14
116	535,46	79,39	108,42	4,07	0,0473	407,46	287,38	532,09	495,99	444,46
117	526,42	79,39	106,04	3,97	0,0451	410,15	289,17	536,95	480,52	446,71
118	513,31	79,21	104,65	3,97	0,0478	412,89	290,31	540,01	467,66	448,28
119	500,58	79,51	104,51	3,95	0,0483	414,89	291,20	541,63	457,02	451,55
120	492,47	79,06	103,13	3,87	0,0481	417,06	291,74	546,95	446,66	451,69
121	487,09	78,95	102,55	3,87	0,0488	418,13	292,09	549,68	437,36	452,48
122	482,05	78,93	101,86	3,77	0,0478	420,22	292,07	550,43	429,15	452,92
123	473,75	78,65	101,47	3,77	0,0500	420,42	291,63	552,35	420,32	453,24
124	466,71	78,84	101,59	3,71	0,0478	421,09	291,44	551,71	411,61	453,50
125	458,36	79,02	101,75	3,77	0,0453	421,42	291,44	551,00	404,24	453,20
126	450,33	78,65	101,44	3,67	0,0478	421,11	291,12	549,48	397,03	453,11
127	444,17	79,08	100,79	3,67	0,0437	421,30	290,38	548,68	391,22	454,39
128	438,18	78,95	99,81	3,67	0,0498	421,53	290,11	545,48	386,77	455,04
129	433,29	78,90	98,43	3,57	0,0490	420,13	289,18	543,23	381,70	454,31
130	427,98	78,40	98,25	3,57	0,0483	420,13	288,38	540,99	378,56	453,47
131	420,17	78,37	97,56	3,57	0,0483	421,04	287,53	539,10	376,68	452,97
132	413,09	78,33	98,17	3,57	0,0473	421,72	286,59	536,18	372,97	453,77
133	407,22	78,62	98,27	3,47	0,0483	422,22	286,10	529,56	369,46	453,25
134	402,29	78,58	97,46	3,47	0,0451	421,72	285,26	528,48	365,63	451,54
135	397,96	78,41	96,03	3,47	0,0483	421,40	285,13	524,06	360,53	450,10
136	394,06	78,81	95,70	3,47	0,0488	420,53	284,00	520,38	358,06	448,81
137	389,39	78,85	96,38	3,42	0,0488	422,04	283,41	512,13	355,89	448,18
138	385,53	78,80	96,35	3,42	0,0451	421,47	283,00	512,53	351,97	445,41
139	381,64	78,88	95,52	3,37	0,0483	421,62	282,17	509,54	350,04	445,39
140	377,49	78,88	95,32	3,37	0,0488	421,45	281,89	508,27	347,71	443,71
141	360,47	79,20	111,02	7,96	0,0481	421,02	282,56	502,21	344,28	442,81
142	320,87	79,24	111,99	3,27	0,0429	419,26	286,26	506,19	317,03	440,84
143	336,55	79,41	96,77	3,27	0,0488	420,23	284,66	509,44	310,18	439,19
144	337,89	79,14	94,69	3,27	0,0486	420,83	282,79	507,74	309,53	437,77
145	334,77	79,27	94,86	3,27	0,0444	420,56	281,27	506,11	307,26	436,76
146	331,34	79,23	93,97	3,27	0,0490	418,61	279,90	506,66	304,92	434,30
147	327,62	79,07	93,72	3,27	0,0498	417,45	277,75	501,48	303,16	431,20
148	324,53	78,76	93,19	3,27	0,0502	416,09	276,29	497,34	299,63	428,98
149	321,85	79,07	92,46	3,27	0,0486	412,65	275,08	499,54	295,38	424,88
150	318,78	78,64	90,51	3,27	0,0481	407,68	273,86	498,80	291,53	422,09
151	315,19	79,06	89,37	3,17	0,0490	405,97	272,46	498,53	288,70	418,83
152	312,63	79,31	89,17	3,17	0,0486	403,56	271,38	494,65	286,38	415,86
153	308,84	79,23	89,31	3,17	0,0488	400,80	269,37	493,60	284,21	413,77
154	305,66	79,19	89,39	3,17	0,0488	398,08	267,89	492,66	281,15	410,98
155	303,55	78,96	89,87	3,17	0,0483	396,00	266,55	490,51	279,08	408,45
156	300,90	78,80	89,16	3,17	0,0493	393,05	264,92	491,53	276,33	405,24
157	298,80	79,16	90,12	3,17	0,0493	389,81	262,91	490,21	273,50	403,27
158	297,15	78,49	89,76	3,17	0,0497	386,30	257,88	489,50	272,14	401,86

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,7 g/hr
 Burn Rate : 2,134 Dry kg/hr

Test Duration: 166 min

PRESSURE FACTOR: DGM 1 0,96753
 DGM 2 0,98086
 DGM 3 0,99634

BAROMETRIC PRESSURE
 Average: 29,810524 in Hg
 Start: 29,766229 in Hg
 End: 29,854819 in Hg

TEMPERATURE FACTORS DGM 1 0,97309
 DGM 2 0,97279
 DGM 3 0,97547

DGM CONTROLLER VALUES

DGM 1 Final: 15087,221 Cuft
 Initial: 15056,203 Cuft

VOLUMES SAMPLED DGM 1 28,999 Scft
 DGM 2 28,340 Scft
 DGM 3 20,431 Scft

DGM 2 Final: 13044,305 Cuft
 Initial: 13014,364 Cuft

DGM #3 Final: 357,210 Cuft
 Initial: 336,040 Cuft

TOTAL TUNNEL VOLUME : 44900

TEMPERATURES

DGM 1 542,604 °R
 DGM 2 542,769 °R

SAMPLE RATIOS
 Sample Train 1: 1548,326
 Sample Train 2: 1584,346

CALIBRATION FACTORS

DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000107** g/dscf
 Sample Train 2 **0,000106** g/dscf
 Room **0,000000** g/dscf

TUNNEL FLOW RATE: 270,484 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **4,80** g
 Sample Train 2 **4,75** g

PARTICULATE CATCH
 Total Sample Train 1: 3,10 mg
 Total Sample Train 2: 3,00 mg
 Total Sample Train 1 1st hour: 2,90 mg

EMISSION RATES
 Sample Train 1 **1,73** g/hr
 Sample Train 2 **1,72** g/hr

1st hour emission rate **4,49** g/hr

DEVIATION: 0,49%

Cs Train 1 Train 2
 0,0001069 0,000105858

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 4
 Project #: pi-20131
 Test Duration: 166 min

	HHV	LHV
Eff	64,68%	69,91%
Comb Eff	95,55%	95,55%
HT Eff	67,70%	73,17%
Output	27 350	kJ/h
Burn Rate	2,13	kg/h
Grams CO	395	g
Input	42 283	kJ/h
MC wet	17,56	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,062

Overall Heating Efficiency: 64,68%
 Combustion Efficiency: 95,55%
 Heat Transfer Efficiency: 67,70%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M _d)	29,79
Dry Moles Exhaust Gas (N _r):	407,00
Air Fuel Ratio (A/F)	11,62

Heat Output:	25 944 Btu/h	27 350 kJ/h
Heat Input:	40 110 Btu/h	42 283 kJ/h
Burn Duration:	2,77 h	
Burn Rate:	4,70 lb/h	2,134 kg/h
Stack Temp:	530,6 Deg. F	277,0 Deg. C



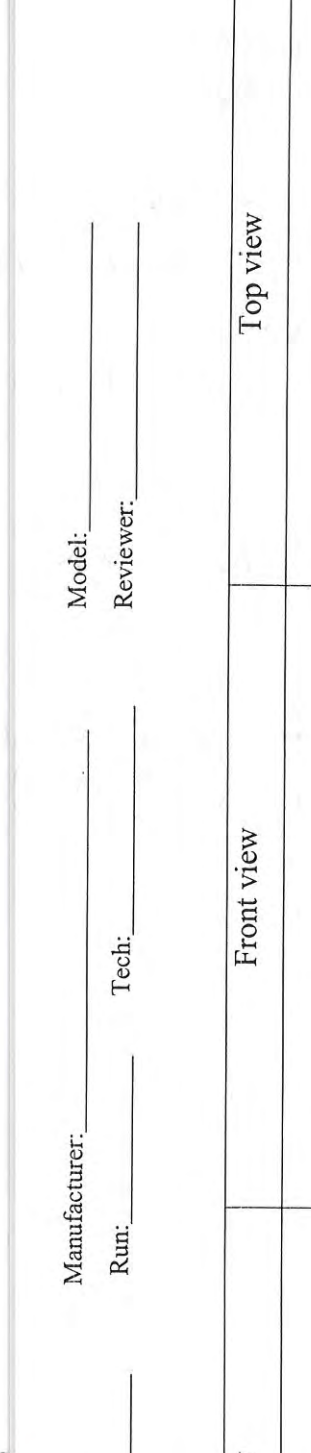
Date: 2016-09-09 Manufacturer: Fager Supreme Model: MV200
 Project #: PI 20131 Run: 4 Tech: MM Reviewer: DP

- No kindling Start FIRE 20,00 LBS
- At 11,00 LBS tapocher RAMENNEK morceaux
Vers milieu and close air inlet
- At 9,00 LBS tapocher et RAMENNEK morceaux
Vers milieu
- At 7,00 LBS tapocher, fat channel et mis
Morceaux sur cote (~~test~~ ^{MP} OPEN air
inlet)
- At 4,9 LBS tapocher fat channel
et mis morceaux non brulee sur cote
- At 34 LBS tapocher fat channel (45 min)
- At 320 insert load
- Fermer porte apres 45 sec.


TEST LOAD CONFIGURATION



Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____

Side view	Front view	Top view
		

Date: _____ Manufacturer: _____ Model: _____
 Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
Usable Firebox: _____				
<div style="text-align: center;">  </div>				
Test load weight: _____		Minimum: _____		Maximum: _____
Déviation: _____				

PRE / POST CHECKS

 Date: 2016-09-09

 Manufacturer: Foyer Supreme ME

 Model: NK 200

 Project #: PI 20131

 Run: 4

 Tech: MM

 Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	7:30	OK	OK

Pre-Test

Post-Test

Facility Conditions:

Air Velocity from less than 2 feet

	Pre-Test	Post-Test
(max 50 Fpm)	24	21
Smoke Capture Check	OK	OK
4 sides	OK	OK

Smoke Capture Check

Picture

Wood Heater Conditions:

Date Wood Heater Stack Cleaned

2016-09-06
2016-09-06
OK
OK

Date Dilution Tunnel Cleaned

Induced Draft Check (max 0.005 H2O)

Traverse before ignition

Flow Rate 140 cfm ±10%

OK

Temperature System:

Ambient (65°-90°F)

OK	°F
OK	°F

Wood Heater Surface (±125°F)

Proportional Checks:

Thermocouple check

Pitot Clean

Pitot verification

OK
OK
OK

Sampling Train ID Numbers:

Probe

Filter Front

Filter Back

Filter Thermocouple

Filter (<90°F)

	Train 1 st hour	Train 1	Train 2
Probe	15	17	39
Filter Front	61	70	72
Filter Back	68	71	77
Filter Thermocouple	11	11	12
Filter (<90°F)	OK	OK	OK

SAMPLING EQUIPMENT CHECK OUT

Date: 2016-09-09 Manufacturer: Foyer Supreme Model: NV200
 Project #: PT 20131 Run: 4 Tech: MM Reviewer: DP

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	426343, 92	427223, 22	426344, 03	427223, 31	368525, 61	369374, 31
Initial 1minute DGM (Liter)	426343, 91	427223, 21	426344, 00	427223, 28	368525, 60	369374, 31
Change © (Liter)	0,01	0,01	0,03	0,03	0,01	0,01
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Leakage Checks Flue Gas Sampler

Plugged Probe	Pre Test	Post Test
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mm/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

Plugged Probe	Pre Test 3 H ₂ O static	Pre Test 0.4-0.5 H ₂ O velocity	Post Test 3 H ₂ O Static	Post Test 0.4-0.5 H ₂ O velocity
Vacuum (inches Hg.)	3	4	3	0.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2016-09-09 Manufacturer: Foyer Supreme Model: NV200
 Project #: PI 20131 Run: 4 Tech: MM Reviewer: [Signature]

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 2016-09-09 Manufacturer: Foyer Supreme Model: NU 200
 Project #: PI 20131 Run: 4 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

 Barometric pressure (P_{bar}) 100.8 (KPa.) Static pressure (P_q) 0.20 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.049	76.13
B - Centroid	3.00	3.50	4	0.050	76.10
A-1	0.40	0.50	0.50	0.039	76.16
A-2	1.50	1.75	2	0.054	76.17
A-3	4.50	5.25	6	0.048	76.03
A-4	5.60	6.5	7.5	0.045	76.00
B-1	0.40	0.50	0.50	0.041	76.02
B-2	1.50	1.75	2	0.049	76.01
B-3	4.50	5.25	6	0.053	75.73
B-4	5.60	6.5	7.5	0.046	75.78
AVERAGE					

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

Where,

 C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

 Δ_p = manometer reading (inches H₂O)

 T_s = average absolute dilution tunnel temperature (°F + 460)

 P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$
 P_q = static pressure in. H₂O
 { 13.6 }

 M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

 K_p = 85.49 pitot tube constant, (conversion factor for English units)

 Δ_p avg. = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

Date: 2016-09-09 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 4 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2,951	2,971	0,999	1,00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,85	17,87	969	10,00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0,003	2,943	1,002	0,003	0.02	0,007	0.15	0,003	0.05	✓	
CO ₂	0	17,78	9,70	0	0.02	0,07	0.5	0,01	0.5	✓	
O ₂	na	na	na	-	na	-	na	-	na	-	

TEST DATA LOG

Date: 2016-09-09 Manufacturer: Fayer Supreme ME Model: MV 200
 Project #: PI 20131 Run: 4 Tech: MS Reviewer: SP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	427222, 52	369373, 58	357, 21
Initial (Liter)	426344, 17	368525, 75	336, 09

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	100, 8	101, 1
Dry Bulb (F):	77, 18	83, 66
Humidity (%):	65, 5	48

Flow Meter

	Start	End
Flow meter reading	M.A	M.A

Flow Meter Verification

	Before	After
Flow meter Check (liters)	M.A	M.A
Scale Weight (Kg)	M.A	M.A

FUEL DATA

Date: 2016 09 09 Manufacturer: Foye Supreme Model: NV 200
 Project #: PI 20131 Run: 4 Tech: MM Reviewer: BP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*		
2 x 4 x 5 in.	0.618 lbs.	201	199	206
2 x 4 x 5 in.	0.650 lbs.	206	196	203
2 x 4 x 5 in.	0.618 lbs.	203	193	203
2 x 4 x 5 in.	1.08 lbs.	211	191	206
2 x 4 x 5 in.	0.622 lbs.	222	206	198 198 M.M
2 x 4 x 5 in.	0.604 lbs.	203	210	203
2 x 4 x 5 in.	0.746 lbs.	196	203	206
2 x 4 x 5 in.	0.610 lbs.	193	211	205
2 x 4 x 5 in.	0.758 lbs.	198	220	205
2 x 4 x 5 in.	0.804 lbs.	196	198	199
2 x 4 x 5 in.	0.76 lbs.	201	193	206
2 x 4 x 5 in.	0.79 lbs.	202	198	205
2 x 4 x 5 in.	0.774 lbs.	207	203	210
2 x 4 x 5 in.	0.774 lbs.	199	204	203
2 x 4 x 5 in.	0.616 lbs.	196	204	206
2 x 4 x 5 in.	0.610 lbs.	198	205	205
2 x 4 x 5 in.	0.62 lbs.	201	210	211
2 x 4 x 5 in.	0.804 lbs.	216	208	203
2 x 4 x 5 in.	0.728 lbs.	209	207	206
2 x 4 x 5 in.	0.764 lbs.	208	210	203
2 x 4 x 5 in.	0.760 lbs.	210	221	208
2 x 4 x 5 in.	0.800 lbs.	220	199	209
2 x 4 x 5 in.	0.76 lbs.	220	211	210

TEST LOAD WEIGHT: _____ lbs

FUEL DATA

Date: 2016-09-09 Manufacturer: fyer supreme Model: M 200
 Project #: PT 20131 Run: 4 Tech: Mr Reviewer: BO

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*
2 x 4 x 5 in.	0,816 lbs.	20,8
2 x 4 x 5 in.	0,776 lbs.	20,9
2 x 4 x 5 in.	0,826 lbs.	20,6
2 x 4 x 5 in.	0,778 lbs.	19,6
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	
x x in.	lbs.	

TEST LOAD WEIGHT: 19,87 lbs

FUEL DATA

Date: 2016-09-09 Manufacturer: Fayer Supreme Model: NV 200
 Project #: PT 20131 Run: 4 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 22 in.	2,27 lbs.	195	202	206	203	208
1 1/2 x 3 1/2 x 22 in.	2,18 lbs.	20	210	200	213	205
3 1/2 x 3 1/2 x 22 in.	4,996 lbs.	212	217	218	205	208
3 1/2 x 3 1/2 x 22 in.	4,856 lbs.	215	230	228	224	228
1 1/2 x 3/4 x 5 in.	0,122 lbs.			196		
1 1/2 x 3/4 x 5 in.	0,122 lbs.			193		
1 1/2 x 3/4 x 5 in.	0,130 lbs.			201		
1 1/2 x 3/4 x 5 in.	0,120 lbs.			203		
1 1/2 x 3/4 x 5 in.	0,120 lbs.			210		
1 1/2 x 3/4 x 5 in.	0,120 lbs.			196		
1 1/2 x 3/4 x 5 in.	0,124 lbs.			193		
1 1/2 x 3/4 x 5 in.	0,122 lbs.			206		
1 1/2 x 3/4 x 5 in.	0,134 lbs.			203		
1 1/2 x 3/4 x 5 in.	0,124 lbs.			211		
1 1/2 x 3/4 x 5 in.	0,118 lbs.			216		
1 1/2 x 3/4 x 5 in.	0,120 lbs.			22		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 15,29 lbs Min 20%: 3,16 Max 25%: 3,94

Date: 2016-09-08 4
 Project #: PI 20131 Run: _____

Manufacturer: foyer s.p.a. m.f.
 Tech: N.M. Reviewer: SO

Model: MU 200

Pre-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1						
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
		15	61	68	4	17	70	71	7					80
2016-09-08	18:00	108, 7829	0, 1284	0, 1268	10, 1528	108, 9502	0, 1280	0, 1271	10, 2561					0, 1278
2016-09-09	19:00	108, 7828	0, 1283	0, 1268	10, 1530	108, 9502	0, 1280	0, 1272	10, 2562					0, 1278

Post-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1						
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
		15	61	68	4	17	70	71	7					80
2016-09-09	15:00	108, 7832	0, 1296	0, 1271	10, 1572	108, 9502	0, 1275	0, 1271	10, 2599					0, 1280
2016-09-12	8:00	108, 7830	0, 1293	0, 1270	10, 1545	108, 9502	0, 1274	0, 1270	10, 2574					0, 1278
2016-09-14	8:00	108, 7830	0, 1293	0, 1270	10, 1545	108, 9503	0, 1274	0, 1270	10, 2571					0, 1278
2016-09-15	8:00	108, 7830	0, 1293	0, 1270	10, 1545	108, 9503	0, 1274	0, 1270	10, 2572					0, 1278

Date: 2016-09-08

4

Project #: PT 20131 Run: _____

Manufacturer: foyer supr-mé

Tech: MM Reviewer: SP

Model: NV 200

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time	39	72	77	20
2016-09-08	18:00	110, 2759	0, 1267	0, 1259	10, 1088
2016-09-09	9:00	110, 2750	0, 1267	0, 1259	10, 1089

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time	39	72	77	20
2016-09-09	15:00	110, 2752	0, 1278	0, 1262	10, 1126
2016-09-12	8:00	110, 2750	0, 1277	0, 1262	10, 1104
2016-09-14	8:00	110, 2751	0, 1277	0, 1263	10, 1105
2016-09-16	8:00	110, 2751	0, 1277	0, 1263	10, 1104

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

Description du test

Test standard	EPA
Run #	4
Date	2016-09-12
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	Wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	#####
Technicien	M.M

Fuel data

Fuel type	Dimension	
Fuel specie	D. Fir	
HHV		19810,0 kJ/kg
%C		48,7
%H		6,9
%O		43,9
%Ash		0,5
HHV		8519,2 Btu/lb
LHV		7451,0 Btu/lb

	Default Fuel Values	
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	102,1	102
Barometer (in.Hg):	30,150119	30,120589
Dry Bulb (F):	68,54	80,96
Humidity (%):	48	35,9
Air velocity (ft/min)	22	18

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

	Final: 428641,080	Liter
	Initial: 427224,180	Liter
	Final: 370740,610	Liter
	Initial: 369375,140	Liter
	Final: 392,100	cuft
	Initial: 357,210	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent

241

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	#####
Technicien	M.M

Preload data sheet

Test Load Weight:

Lower	Ideal	Upper
14,11	15,68	17,25

Load Volume: cu. ft

Loading Density: 8,266 lbs./ft3

Number of Spaces:
 Spacer weight (lbs):

Load Density (wet): 29,626 lbs./ft3
 Dry Wood Density: 24,750547

Thick	Piece Size (in):			Weight lbs	Meter Moisture Content				Ave. MC x Weight	Volume Cubic Inches
	Wide	x	Length		Dry Uncorrected %					
2	4		5	0,658	19,2				12,6336	40,00
2	4		5	0,604	19,1				11,5364	40,00
2	4		5	0,768	21,1				16,2048	40,00
2	4		5	0,74	21,7				16,058	40,00
2	4		5	0,722	20,6				14,8732	40,00
2	4		5	0,71	19,5				13,845	40,00
2	4		5	0,71	19				13,49	40,00
2	4		5	0,702	19,2				13,4784	40,00
2	4		5	0,666	19,7				13,1202	40,00
2	4		5	0,698	19				13,262	40,00
2	4		5	0,734	20,2				14,8268	40,00
2	4		5	0,708	19,4				13,7352	40,00
2	4		5	0,67	19,6				13,132	40,00
2	4		5	0,684	20				13,68	40,00
2	4		5	0,714	19,6				13,9944	40,00
2	4		5	0,662	20,3				13,4386	40,00
2	4		5	0,666	19,9				13,2534	40,00
2	4		5	0,624	19,3				12,0432	40,00
2	4		5	0,728	19,6				14,2688	40,00
2	4		5	0,64	19,1				12,224	40,00
2	4		5	0,65	19,6				12,74	40,00
2	4		5	0,716	19,5				13,962	40,00
2	4		5	0,666	19,2				12,7872	40,00
2	4		5	0,63	19,6				12,348	40,00
2	4		5	0,702	19,4				13,6188	40,00
2	4		5	0,706	19,6				13,8376	40,00
2	4		5	0,638	19,3				12,3134	40,00
										0,00

SUM MC 364,705

PreTest Load Weight: lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:

Must be 18-28

Wet:

must be 15,2-22

Project nu.	pi-20131
Date	#####
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
14,1	15,7	17,2

* For boilers, a loading density factor of 10 lb/ft3 is applied

Load Volume: cu. ft Loading Density: 7,2 lbs./ft3

Number of Spaces: Load Density (wet): 33,3 lbs./ft3

Spacer weight: lbs Dry Wood Density: 27,5 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
1,5	3,5	22	2,13	20,90	21,60	23,10	22,10	20,90	46,22016	115,50	21,7
1,5	3,5	22	2,38	22,30	22,10	22,30	22,30	22,60	53,21088	115,50	22,3
3,5	3,5	22	5,23	21,00	21,10	22,20	22,60	21,80	113,78716	269,50	21,7
3,5	3,5	22	5,10	20,20	20,10	20,50	20,90	19,60	103,24496	269,50	20,3
1,5	0,75	5	0,10			20,10			2,0904	5,63	20,1
1,5	0,75	5	0,11			20,60			2,3072	5,63	20,6
1,5	0,75	5	0,11			20,30			2,233	5,63	20,3
1,5	0,75	5	0,11			21,00			2,226	5,63	21,0
1,5	0,75	5	0,13			19,90			2,6666	5,63	19,9
1,5	0,75	5	0,11			19,60			2,0776	5,63	19,6
1,5	0,75	5	0,11			19,30			2,123	5,63	19,3
1,5	0,75	5	0,11			20,60			2,2248	5,63	20,6
1,5	0,75	5	0,11			20,30			2,233	5,63	20,3
1,5	0,75	5	0,11			20,80			2,2048	5,63	20,8
1,5	0,75	5	0,11			20,70			2,1942	5,63	20,7
1,5	0,75	5	0,11			20,60			2,266	5,63	20,6
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
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										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
									SUM MCx	343,30976	20,6 %

Test Load Weight: lbs. Dry Weight: kg.

Average Moisture Content: %

Dry: Dry(EPA) Wet:
 Dry(B415) 21,24 Must be 19-25 must be 15,2-22

Coal Bed Range: lbs. to lbs.

TEST CHARGE: Coal bed weight: lbs.

Project nu.	pi-20131
Date	#####
Technicien	m.m

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,22 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,968

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,052	71,6	0,2280
B center	0,053	71,54	0,2302
A1	0,041	71,61	0,2025
A2	0,058	71,48	0,2408
A3	0,053	71,52	0,2302
A4	0,049	71,91	0,2214
B1	0,042	70,520	0,2049
B2	0,054	71,540	0,2324
B3	0,056	71,300	0,2366
B4	0,050	71,280	0,2236
AVERAGE	0,0508	71,4300	0,2251

Project nu.	pi-20131
Date	#####
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	10	850	852	1	16	862	887	6	43	853	861	10	888		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	109,1633	0,1281	0,1258	10,1360	108,7542	0,1280	0,1280	11,1015	94,6425	0,1270	0,1259	11,0565	0,1301	09/09/2016	18:00
Before (6)	109,1633	0,1280	0,1259	10,1360	108,7543	0,1281	0,1281	11,1016	94,6426	0,1269	0,1259	11,0564	0,1300	12/09/2016	10:00
After (1)	109,1634	0,1305	0,1253	10,1386	108,7548	0,1279	0,1279	11,1051	94,6430	0,1295	0,1256	11,0597	0,1301	12/09/2016	17:00
After (2)	109,1634	0,1296	0,1252	10,1372	108,7549	0,1277	0,1277	11,1038	94,6430	0,1292	0,1255	11,0581	0,1301	14/09/2016	08:00
After (3)	109,1634	0,1296	0,1251	10,1372	108,7548	0,1277	0,1277	11,1037	94,6430	0,1292	0,1254	11,0581	0,1301	21/09/2016	08:00
After (4)															
After (5)															
After (6)	109,1634	0,1296	0,1251	10,1372	108,7548	0,1277	0,1277	11,1037	94,6430	0,1292	0,1254	11,0581	0,1301	21/09/2016	08:00
Difference	0,0001	0,0016	-0,0008	0,0012	0,0005	-0,0004	-0,0004	0,0021	0,0004	0,0023	-0,0005	0,0017	0,0001		
Total (mg)		2,1				3,9				3,9			0,1		
Total ajusté (mg)		2,00				3,80				3,80					

Project nu. pi-20131
 Date #####
 Technicien m.m

data 2016-09-12 epa PI 20131 run 5 cat1
preburn

171	178,29	75,17	81,34	3,57	0,0512	312,55	210,10	403,85	227,16	324,52
172	177,17	75,36	81,08	3,57	0,0458	311,25	209,54	399,72	226,45	321,81
173	176,06	75,06	80,97	3,57	0,0505	308,75	208,33	398,85	224,71	320,55
174	174,61	75,28	81,20	3,57	0,0498	306,36	206,65	394,37	223,93	318,34
175	173,88	75,21	80,87	3,57	0,0468	304,03	205,92	394,34	222,16	316,19
176	172,95	74,87	81,02	3,57	0,0514	301,82	204,76	391,63	221,67	314,37
177	171,90	74,90	80,87	3,57	0,0512	299,82	203,94	388,75	220,61	312,69
178	170,81	75,06	81,09	3,57	0,0514	297,92	202,97	385,55	219,42	311,00
179	169,81	75,30	80,81	3,48	0,0475	295,61	202,34	385,22	218,10	308,69
180	169,03	75,28	80,79	3,47	0,0463	294,06	201,59	383,44	217,48	306,47
181	168,76	75,35	80,90	3,47	0,0487	292,42	200,89	380,54	217,04	304,28
182	168,12	75,47	80,73	3,47	0,0502	290,76	200,19	379,70	216,46	303,76
183	167,34	75,61	80,79	3,47	0,0517	288,95	199,27	377,69	215,53	301,66
184	166,40	75,55	80,53	3,47	0,0512	287,51	198,26	374,68	214,99	299,95
185	165,96	75,45	80,47	3,56	0,0510	285,63	197,69	375,86	213,54	298,28
186	165,17	75,56	80,58	3,47	0,0512	284,41	197,12	374,72	212,21	296,89
187	164,64	75,48	80,41	3,47	0,0468	282,81	196,16	373,11	210,98	295,74
188	164,03	75,43	80,39	3,47	0,0510	281,68	194,83	371,09	210,15	293,82

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,3 g/hr
 Burn Rate : 1,334 Dry kg/hr

Test Duration: 272 min

PRESSURE FACTOR: DGM 1 0,97778
 DGM 2 0,99070
 DGM 3 1,00720

BAROMETRIC PRESSURE
 Average: 30,135354 in Hg
 Start: 30,150119 in Hg
 End: 30,120589 in Hg

TEMPERATURE FACTORS DGM 1 0,97758
 DGM 2 0,97676
 DGM 3 0,97990

DGM CONTROLLER VALUES
 DGM 1 Final: 15137,317 Cuft
 Initial: 15087,280 Cuft

VOLUMES SAMPLED DGM 1 47,494 SCft
 DGM 2 46,289 SCft
 DGM 3 34,194 SCft

DGM 2 Final: 13092,581 Cuft
 Initial: 13044,360 Cuft

DGM #3 Final: 392,100 Cuft
 Initial: 357,210 Cuft

TOTAL TUNNEL VOLUME : 75323

TEMPERATURES
 DGM 1 540,107 °R
 DGM 2 540,561 °R

SAMPLE RATIOS
 Sample Train 1: 1585,950
 Sample Train 2: 1627,227

CALIBRATION FACTORS
 DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000082** g/dscf
 Sample Train 2 **0,000084** g/dscf
 Room **0,000003** g/dscf

TUNNEL FLOW RATE: 276,924 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **5,96** g
 Sample Train 2 **6,13** g

PARTICULATE CATCH
 Total Sample Train 1: 3,90 mg
 Total Sample Train 2: 3,90 mg
 Total Sample Train 1 1st hour: 2,10 mg

EMISSION RATES
 Sample Train 1 **1,32** g/hr
 Sample Train 2 **1,35** g/hr

1st hour emission rate **3,33** g/hr

DEVIATION: 1,33%

Cs Train 1 Train 2
 8,212E-05 8,42525E-05

Table with multiple columns containing numerical data points, likely representing environmental measurements or calculations. The data is organized in a grid-like structure with varying column widths.

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 4
 Project #: pi-20131
 Test Duration: 272 min

	HHV	LHV
Eff	67,72%	73,19%
Comb Eff	95,59%	95,59%
HT Eff	70,84%	76,56%
Output	18 135	kJ/h
Burn Rate	1,35	kg/h
Grams CO	440	g
Input	26 780	kJ/h
MC wet	17,52	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,061

Overall Heating Efficiency: 67,72%
 Combustion Efficiency: 95,59%
 Heat Transfer Efficiency: 70,84%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M _d)	29,71
Dry Moles Exhaust Gas (N _r):	458,32
Air Fuel Ratio (A/F)	13,11

Heat Output:	17 203 Btu/h	18 135 kJ/h
Heat Input:	25 404 Btu/h	26 780 kJ/h
Burn Duration:	4,53 h	
Burn Rate:	2,98 lb/h	1,352 kg/h
Stack Temp:	357,5 Deg. F	180,8 Deg. C

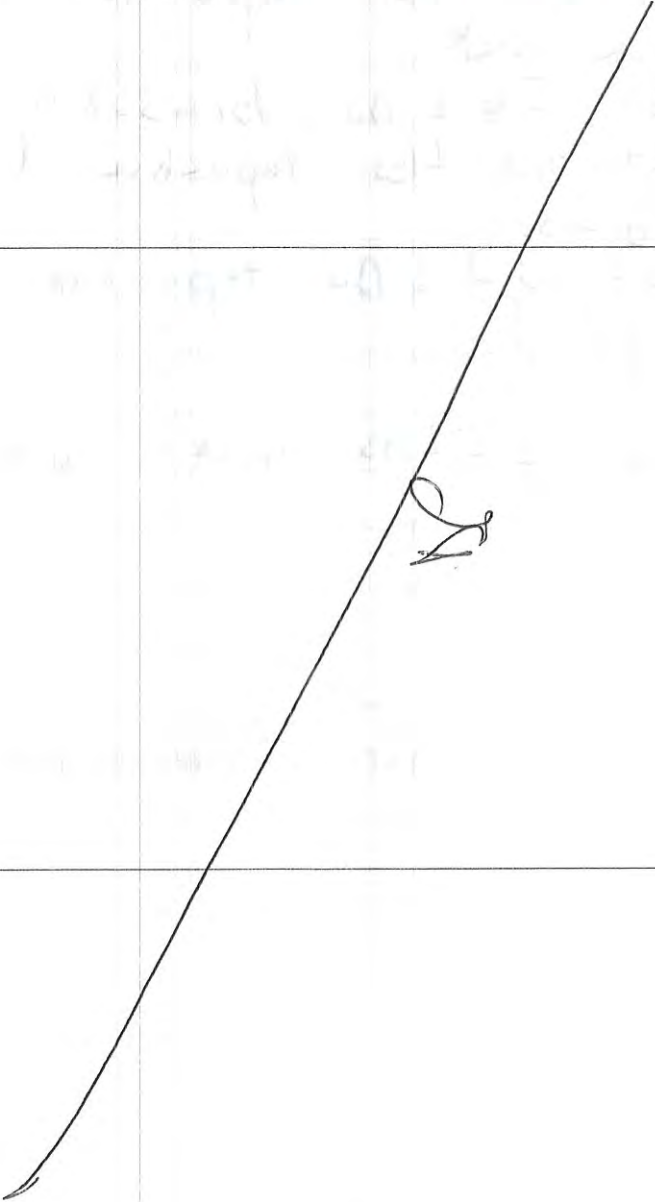
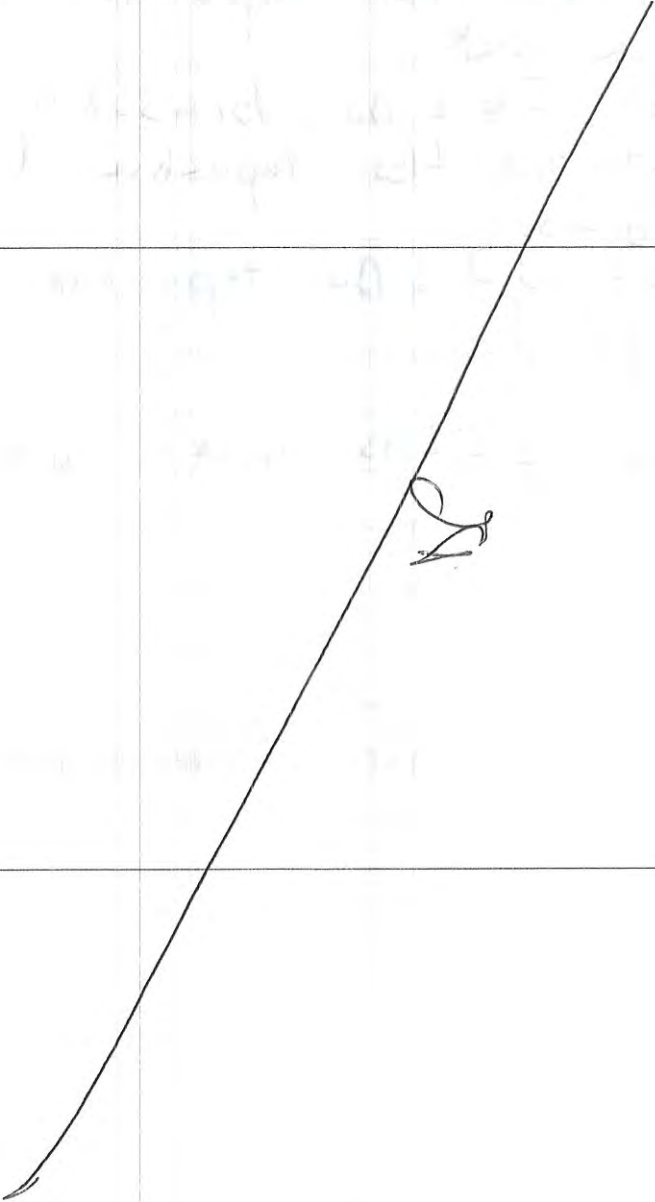

Date: 2016-09-12 Manufacturer: foyer supreme Model: MU 200
Project #: PI 20131 Run: 5 Tech: MM Reviewer: JP

- No kindling START FIRE 18.7 LBS
- At 11 LBS BRASSER FEUX
- At 8,00 LBS tapocher and close
a.n. nbb
- At 5,6 LBS BRASSER et tapocher FEUX
- At 4,00 LBS tapocher et mis a Niveau
BRASSE
- At 3.7 LBS tapocher et Fait channel
(1:01)
- At 3.5 LBS insert load (1:44)

TEST LOAD CONFIGURATION

1:44 h.
3.5 LBS.

Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____

Side view	Front view	Top view
		

Date: _____ Manufacturer: _____ Model: _____
 Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
Usable Firebox: _____ <i>SB</i>				
Test load weight: _____		Minimum: _____		Maximum: _____
Déviation: _____				

PRE / POST CHECKS

Date: 2016-09-12 Manufacturer: Foyer Supreme Model: M 200
 Project #: PI 20131 Run: 5 Tech: MM Reviewer: AP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	7:30	ok	ok

Pre-Test Post-Test

Facility Conditions:

Air Velocity from less than 2 feet
 Smoke Capture Check.....
 Picture.....

	Pre-Test	Post-Test
(max50 Fpm)	22	18
	ok	ok
4 sides	ok	ok

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....
 Date Dilution Tunnel Cleaned.....
 Induced Draft Check (max 0.005 H2O).....
 Traverse before ignition.....
 Flow Rate 140 cfm ±10%.....

2016-09-06	ok
2016-09-06	
ok	
ok	

Temperature System:

Ambient (65°-90°F).....
 Wood Heater Surface (±125°F).....

ok	°F
ok	°F

Proportional Checks:

Thermocouple check.....
 Pitot Clean.....
 Pitot verification.....

ok
ok
ok

Sampling Train ID Numbers:

Probe.....
 Filter Front.....
 Filter Back.....
 Filter Thermocouple.....
 Filter (<90°F).....

	Train 1 st hour	Train 1	Train 2
	10	16	43
	850	853	862
	852	861	887
	4	11	12
	ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

Date: 2016-09-12 Manufacturer: Fogor Supreme Model: NV 206
 Project #: PI 20131 Run: S Tech: MM Reviewer: D

Leakage Checks Tunnel Samplers

Unplugged Flow Rate = .25cfm	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	427223,64	428641,76	427223,70	428641,84	369379,70	370741,33
Initial 1minute DGM (Liter)	427223,64	428641,78	427223,70	428641,83	369379,70	370741,31
Change © (Liter)	∅	0,01	∅	0,01	∅	0,02
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok		ok	ok

Leakage Checks Flue Gas Sampler

Plugged Probe	Pre Test	Post Test
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

Plugged Probe	Pre Test 3 H2o static	Pre Test 0.4-0.5 H2o velocity	Post Test 3 H2o Static	Post Test 0.4-0.5 H2o velocity
Vacuum (inches Hg.)	3	-5	3	.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2016-09-12 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PL 26131 Run: 5 Tech: MR Reviewer: [Signature]

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 2016-09-12 Manufacturer: Fager Supreme Model: NV 206
 Project #: PT 20131 Run: 5 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 102.1 (KPa.) Static pressure (P_q) 0.22 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.052	71.60
B - Centroid	3.00	3.50	4	0.053	71.54
A-1	0.40	0.50	0.50	0.041	71.61
A-2	1.50	1.75	2	0.058	71.48
A-3	4.50	5.25	6	0.053	71.52
A-4	5.60	6.5	7.5	0.049	70.91
B-1	0.40	0.50	0.50	0.042	71.52
B-2	1.50	1.75	2	0.054	71.54
B-3	4.50	5.25	6	0.056	71.30
B-4	5.60	6.5	7.5	0.050	71.28
				AVERAGE	

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

Δ_p = manometer reading (inches H₂O)

T_s = average absolute dilution tunnel temperature (°F + 460)

P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$

P_q = static pressure in. H₂O
 { 13.6 }

M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

K_p = 85.49 pitot tube constant, (conversion factor for English units)

Δ_p avg. = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

 Date: 2016-09-12 Manufacturer: Foyer Supreme Model: NV200
 Project #: PI 20131 Run: 5 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2956	2971	0.999	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	1787	1787	9.70	10.00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0	2951	1.004	0	0.02	0.005	0.15	0.005	0.05	✓	
CO ₂	0	1777	9.80	0	0.02	0.1	0.5	0.1	0.5	✓	
O ₂	na	na	na	—	na	—	na	—	na	✓	

TEST DATA LOG

Date: 2016-09-12 Manufacturer: Fogon Supreme Model: NV200
 Project #: PI 20131 Run: 5 Tech: MM Reviewer: [Signature]

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	428641, 08	370740, 61	392, 10
Initial (Liter)	422224, 18	369375, 14	35721

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102, 1	102
Dry Bulb (F):	68, 54	80, 96
Humidity (%):	48	35, 9

Flow Meter

	Start	End
Flow meter reading	N.A	N.A

Flow Meter Verification

	Before	After
Flow meter Check (liters)	N.A	N.A
Scale Weight (Kg)	N.A	N.A

FUEL DATA

Date: 2016-09-12 Manufacturer: Fayer Supreme Model: NV 200
 Project #: PI 20131 Run: 5 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*
2 x 4 x 5 in.	0.658 lbs.	19.2
2 x 4 x 5 in.	0.604 lbs.	19.1
2 x 4 x 5 in.	0.768 lbs.	21.1
2 x 4 x 5 in.	0.740 lbs.	21.7
2 x 4 x 5 in.	0.722 lbs.	20.6
2 x 4 x 5 in.	0.710 lbs.	19.5
2 x 4 x 5 in.	0.710 lbs.	19.0
2 x 4 x 5 in.	0.702 lbs.	19.2
2 x 4 x 5 in.	0.666 lbs.	19.7
2 x 4 x 5 in.	0.698 lbs.	19.0
2 x 4 x 5 in.	0.734 lbs.	20.2
2 x 4 x 5 in.	0.708 lbs.	19.4
2 x 4 x 5 in.	0.670 lbs.	19.6
2 x 4 x 5 in.	0.684 lbs.	20.0
2 x 4 x 5 in.	0.714 lbs.	19.6
2 x 4 x 5 in.	0.662 lbs.	20.3
2 x 4 x 5 in.	0.666 lbs.	19.9
2 x 4 x 5 in.	0.674 lbs.	19.3
2 x 4 x 5 in.	0.728 lbs.	19.6
2 x 4 x 5 in.	0.640 lbs.	19.1
2 x 4 x 5 in.	0.650 lbs.	19.6
2 x 4 x 5 in.	0.716 lbs.	19.5
2 x 4 x 5 in.	0.666 lbs.	19.2

TEST LOAD WEIGHT: _____ lbs

FUEL DATA

Date: 2016 09-12 Manufacturer: foyer supreme Model: NV 200
 Project #: PI 20131 Run: S Tech: MM Reviewer: DO

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*			
2	x 4 x 5 in.	0.63 lbs.			196	
2	x 4 x 5 in.	0.702 lbs.			194	
2	x 4 x 5 in.	0.706 lbs.			196	
2	x 4 x 5 in.	0.638 lbs.			193	
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				
	x x in.	lbs.				

TEST LOAD WEIGHT: 18.51 lbs

FUEL DATA

Date: 26 09-12 Manufacturer: Fager Supreme Model: NV 200
 Project #: PJ 20131 Run: 5 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*						
1 1/2 x 3/4 x 22 in.	2,128 lbs.	20,9	21,6	22,1	22,1	20,9		
1 1/2 x 3/4 x 22 in.	2,384 lbs.	22,3	22,1	22,3	22,3	22,6		
3 1/2 x 3/4 x 22 in.	5,234 lbs.	21,0	21,1	22,2	22,6	21,8		
3 1/2 x 3/4 x 22 in.	5,096 lbs.	20,2	20,1	20,5	20,9	19,6		
1 1/2 x 3/4 x 5 in.	0,104 lbs.			20,1				
1 1/2 x 3/4 x 5 in.	0,112 lbs.			20,6				
1 1/2 x 3/4 x 5 in.	0,110 lbs.			20,3				
1 1/2 x 3/4 x 5 in.	0,106 lbs.			21,0				
1 1/2 x 3/4 x 5 in.	0,134 lbs.			19,9				
1 1/2 x 3/4 x 5 in.	0,106 lbs.			19,6				
1 1/2 x 3/4 x 5 in.	0,106 lbs.			19,3				
1 1/2 x 3/4 x 5 in.	0,110 lbs.			20,6				
1 1/2 x 3/4 x 5 in.	0,108 lbs.			20,3				
1 1/2 x 3/4 x 5 in.	0,110 lbs.			20,8				
1 1/2 x 3/4 x 5 in.	0,106 lbs.			20,7				
1 1/2 x 3/4 x 5 in.	0,110 lbs.			20,6				
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							
x x in.	lbs.							

TEST LOAD WEIGHT: 16,16 lbs Min 20%: 3,23 Max 25%: 4,04

Date: 2016-09-09 Project #: PT 20131 Run: 5 Manufacturer: foyer Model: MV 200
 Tech: MR Reviewer: ISP

Pre-test Weight Record		SYSTEM 1 - 1 st hour - 2 AM					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-09	18:00	10	850	852	1	16	862	887	6	888	
		946425	0, 1270	0, 1259	11, 0565	108, 7542	0, 1280	0, 1281	11, 1015	0, 1301	
2016-09-12	10:00	946426 946426	0, 1269	0, 1259	11, 0564 M.M.	108, 7543	0, 1281	0, 1280	11, 1016	0, 1300	

Post-test Weight Record		SYSTEM 1 - 1 st hour - 2 AM					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-12	17:00	10	850	852	1	16	862	887	6	888	
		946430	0, 1295	0, 1256	11, 0597	108, 7548	0, 1279	0, 1280	11, 1051	0, 1301	
2016-09-14	8:00	946430	0, 1292	0, 1254	11, 0581	108, 7548	0, 1277	0, 1277	11, 1037	0, 1301	
2016-09-21	8:00	946430	0, 1292	0, 1254	11, 0581	108, 7548	0, 1277	0, 1277	11, 1037	0, 1301	

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 01/09/09 Project #: PI 20 131 Run: S Manufacturer: Fager Supra ME Model: NU 200
 Tech: MM Reviewer: DO

SYSTEM 2 1 st Hour M.M.					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
		43	853	861	10
2/16-09-09	18:00	1091633	01281	01258	10, 1360
2/16-09-12	10:00	1091633	01280	01259	10, 1360

SYSTEM 2 1 st Hour M.M.					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
		43	853	861 01253	10, 1386 MM 10
2/16-09-12	17:00	1091634	01305	01253	10, 1386
2/16-09-14	8:00	1091634	01296	01251	10, 1372
2/16-09-21	8:00	1091634	01296	01251	10, 1373

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

Description du test

Test standard	EPA
Run #	6
Date	2016-09-13
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	Wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	#####
Technicien	M.M

Fuel data

Fuel type	Dimension
Fuel specie	D. Fir
HHV	19810,0 kJ/kg
%C	48,7
%H	6,9
%O	43,9
%Ash	0,5
HHV	8519,2 Btu/lb
LHV	7451,0 Btu/lb

Default Fuel Values		
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	101,9	101,3
Barometer (in.Hg):	30,091059	29,913879
Dry Bulb (F):	76,28	85,1
Humidity (%):	48	43
Air velocity (ft/min)	12	15

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

	Final: 431051,140	Liter
	Initial: 428642,170	Liter
	Final: 373050,980	Liter
	Initial: 370742,180	Liter
	Final: 450,280	cuft
	Initial: 392,200	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent

215

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	#####
Technicien	M.M

Preload data sheet

Test Load Weight:

Lower	Ideal	Upper
14,11	15,68	17,25

Load Volume: cu. ft

Loading Density: 8,022 lbs./ft3

Number of Spaces:
 Spacer weight (lbs):

Load Density (wet): 31,052 lbs./ft3
 Dry Wood Density: 25,80766

Thick	Piece Size (in):			Weight lbs	Meter Moisture Content Dry Uncorrected %				Ave. MC x Weight	Volume Cubic Inches
	Wide	x	Length							
2	4	5	0,732	20	20,1	20,6	20,6	14,8108	40,00	
2	4	5	0,682	19,3	19,6	20	13,389933	40,00		
2	4	5	0,676	19,9	19,3	20,6	13,474933	40,00		
2	4	5	0,696	20,3	20,6	20,3	14,1984	40,00		
2	4	5	0,672	19,3	19,8	19,4	13,104	40,00		
2	4	5	0,702	20	20,9	20,8	14,4378	40,00		
2	4	5	0,74	21,3	21	20,8	15,564667	40,00		
2	4	5	0,71	19,6	19,3	20,1	13,963333	40,00		
2	4	5	0,688	19,6	19,1	19,3	13,301333	40,00		
2	4	5	0,754	20,2	20,4	20,6	15,3816	40,00		
2	4	5	0,708	20,2	20,5	21	14,5612	40,00		
2	4	5	0,712	19,5	19,6	20	14,0264	40,00		
2	4	5	0,688	19,6	20,1	20,9	13,8976	40,00		
2	4	5	0,698	20	20,2	19,6	13,913467	40,00		
2	4	5	0,806	20,8	20,9	20,8	16,791667	40,00		
2	4	5	0,704	20,8	20,2	20,6	14,455467	40,00		
2	4	5	0,722	19,1	19,2	19,6	13,9346	40,00		
2	4	5	0,66	19,2	19,6	19,8	12,892	40,00		
2	4	5	0,682	20,6	20,2	20,9	14,026467	40,00		
2	4	5	0,692	20,3	20,2	20,6	14,093733	40,00		
2	4	5	0,762	21,2	21	21,4	16,1544	40,00		
2	4	5	0,71	20,6	20,5	20,7	14,626	40,00		
2	4	5	0,682	20,4	20,3	20,8	13,981	40,00		
2	4	5	1	22	22,1	22	22,033333	40,00		
2	4	5	0,692	20,6	20,4	20,4	14,162933	40,00		
								0,00		
								0,00		

SUM MC. 365,17707

PreTest Load Weight: lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:

Must be 18-28

Wet:

must be 15,2-22

Project nu.	pi-20131
Date	#####
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
14,1	15,7	17,2

* For boilers, a loading density factor of 10 lb/ft3 is applied

Load Volume: 0,45 cu. ft Loading Density: 7,3 lbs./ft3

Number of Spaces: 12 Load Density (wet): 33,5 lbs./ft3
 Spacer weight: lbs Dry Wood Density: 27,7 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content Dry Uncorrected %					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length							Weight	Cubic Inches	%
1,5	3,5	22	2,52	21,60	22,10	21,70	21,70	22,30	55,22512	115,50	21,9
1,5	3,5	22	2,41	22,10	20,90	20,80	21,30	21,40	51,4182	115,50	21,3
3,5	3,5	22	5,09	20,90	20,00	21,60	20,70	20,90	106,01544	269,50	20,8
3,5	3,5	22	4,88	19,80	20,70	19,00	19,60	21,20	97,8928	269,50	20,1
1,5	0,75	5	0,12			19,80			2,2968	5,63	19,8
1,5	0,75	5	0,16			20,10			3,2964	5,63	20,1
1,5	0,75	5	0,11			21,00			2,268	5,63	21,0
1,5	0,75	5	0,11			20,50			2,173	5,63	20,5
1,5	0,75	5	0,11			20,50			2,255	5,63	20,5
1,5	0,75	5	0,10			19,90			2,0696	5,63	19,9
1,5	0,75	5	0,11			21,00			2,268	5,63	21,0
1,5	0,75	5	0,10			21,00			2,142	5,63	21,0
1,5	0,75	5	0,10			20,50			2,05	5,63	20,5
1,5	0,75	5	0,10			20,50			2,132	5,63	20,5
1,5	0,75	5	0,10			20,80			2,0384	5,63	20,8
1,5	0,75	5	0,14			21,00			2,856	5,63	21,0
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
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										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
SUM MCx									338,39676		20,7 %

Test Load Weight: 16,27 lbs. Dry Weight: 6,11 kg.

Average Moisture Content: %
 Dry: 20,80 Dry(EPA) 20,80
 20,80 Dry(B415) 20,80

20,80 Wet: 17,22
 Must be 19-25 must be 15,2-22

Coal Bed Range: 3,3 lbs. to 4,1 lbs.

TEST CHARGE: Coal bed weight: 3,4 lbs.

Project nu.	pi-20131
Date	#####
Technicien	m.m

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,2 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,944

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,051	74,95	0,2258
B center	0,052	74,99	0,2280
A1	0,041	74,89	0,2025
A2	0,054	74,96	0,2324
A3	0,048	74,98	0,2191
A4	0,042	75	0,2049
B1	0,041	75,020	0,2025
B2	0,053	75,060	0,2302
B3	0,055	74,990	0,2345
B4	0,049	74,940	0,2214
AVERAGE	0,0486	74,9780	0,2201

Project nu.	pi-20131
Date	#####
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	2	855	856	11	30	858	859	31	864	33	860	863	32		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,1021	0,1261	0,1284	10,3131	110,2392	0,1285	0,1275	10,1704	109,3623	0,1269	0,1250	10,4147	0,1289	12/09/2016	18:30
Before (6)	61,1022	0,1261	0,1285	10,3130	110,2393	0,1284	0,1276	10,1703	109,3622	0,1270	0,1249	10,4148	0,1289	13/09/2016	09:00
After (1)	61,1026	0,1431	0,1281	10,3179	110,2393	0,1335	0,1276	10,1744	109,3624	0,1457	0,1249	10,4191	0,1289	13/09/2016	20:00
After (2)	61,1026	0,1401	0,1281	10,3144	110,2393	0,1335	0,1276	10,1711	109,3624	0,1453	0,1249	10,4163	0,1289	16/09/2016	08:00
After (3)	61,1026	0,1401	0,1281	10,3144	110,2393	0,1335	0,1276	10,1711	109,3624	0,1453	0,1249	10,4163	0,1289	22/09/2016	08:00
After (4)															
After (5)															
After (6)	61,1026	0,1401	0,1281	10,3144	110,2393	0,1335	0,1276	10,1711	109,3624	0,1453	0,1249	10,4163	0,1289	22/09/2016	08:00
Difference	0,0004	0,0140	-0,0004	0,0014	0,0000	0,0051	0,0000	0,0008	0,0002	0,0183	0,0000	0,0015	0,0000		
Total (mg)		15,4				21,3				20			0		
Total ajusté (mg)		15,40				21,30				20,00					

Project nu. pi-20131
 Date #####
 Technicien m.m

171	155,38	77,84	82,64	3,37	0,0456	300,43	201,70	365,11	216,73	320,85
172	154,12	77,76	82,27	3,37	0,0451	299,05	201,06	362,85	215,61	319,11
173	153,34	77,87	82,27	3,37	0,0498	297,63	200,46	361,38	214,44	317,06
174	152,19	78,00	82,32	3,37	0,0456	296,40	199,34	359,63	213,59	315,72
175	151,52	77,67	82,25	3,37	0,0477	294,52	198,61	358,55	213,93	313,51
176	150,92	77,87	82,29	3,37	0,0453	292,74	197,72	357,35	214,74	311,47
177	150,18	78,04	82,16	3,37	0,0453	290,34	196,54	356,34	215,26	309,34
178	149,95	78,01	82,26	3,37	0,0488	288,41	195,45	353,04	216,40	307,75

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 4,3 g/hr

Burn Rate : 0,804 Dry kg/hr

Test Duration: 456 min

PRESSURE FACTOR: DGM 1 0,97473
 DGM 2 0,98655
 DGM 3 1,00276

BAROMETRIC PRESSURE
 Average: 30,002469 in Hg
 Start: 30,091059 in Hg
 End: 29,913879 in Hg

TEMPERATURE FACTORS DGM 1 0,97299
 DGM 2 0,97217
 DGM 3 0,97370

DGM CONTROLLER VALUES

DGM 1 Final: 15222,428 Cuft
 Initial: 15137,356 Cuft

VOLUMES SAMPLED DGM 1 80,118 Scft
 DGM 2 77,574 Scft
 DGM 3 56,311 Scft

DGM 2 Final: 13174,171 Cuft
 Initial: 13092,637 Cuft

DGM #3 Final: 450,280 Cuft
 Initial: 392,200 Cuft

TOTAL TUNNEL VOLUME : 124869

TEMPERATURES

DGM 1 542,655 °R
 DGM 2 543,114 °R

SAMPLE RATIOS
 Sample Train 1: 1558,566
 Sample Train 2: 1609,685

CALIBRATION FACTORS

DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000266** g/dscf
 Sample Train 2 **0,000258** g/dscf
 Room **0,000000** g/dscf

TUNNEL FLOW RATE: 273,836 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **33,20** g
 Sample Train 2 **32,19** g

PARTICULATE CATCH
 Total Sample Train 1: 21,30 mg
 Total Sample Train 2: 20,00 mg
 Total Sample Train 1 1st hour: 15,40 mg

EMISSION RATES
 Sample Train 1 **4,37** g/hr
 Sample Train 2 **4,24** g/hr

1st hour emission rate **24,00** g/hr

DEVIATION: 1,54%

Cs Train 1 Train 2
 0,0002659 0,000257819

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 6
 Project #: pi-20131
 Test Duration: 456 min

	HHV	LHV
Eff	67,03%	72,44%
Comb Eff	91,49%	91,49%
HT Eff	73,26%	79,18%
Output	10 674	kJ/h
Burn Rate	0,80	kg/h
Grams CO	750	g
Input	15 924	kJ/h
MC wet	17,22	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,061

Overall Heating Efficiency: 67,03%
 Combustion Efficiency: 91,49%
 Heat Transfer Efficiency: 73,26%

	Air Fuel Ratio (A/F)	
Dry Molecular Weight (M _d)	29,48	
Dry Moles Exhaust Gas (N _r):	465,49	
Air Fuel Ratio (A/F)	13,21	

Heat Output:	10 125 Btu/h	10 674 kJ/h
Heat Input:	15 106 Btu/h	15 924 kJ/h
Burn Duration:	7,60 h	
Burn Rate:	1,77 lb/h	0,804 kg/h
Stack Temp:	310,4 Deg. F	154,7 Deg. C

Date: 2016 09-13 Manufacturer: foyer supreme Model: NV 200
 Project #: PL 20131 Run: G Tech: Mm Reviewer: DP

No kindling START FINE 18,00 LBS
 - Permen portle immediate ment
 - At 1,2 LBS BRASSER FEUX
 - At 8,00 LBS tapocher de BRASSER FEUX
 and close air inlet
 - At 5,6 LBS tapocher de BRASSER FEUX
 - At 4,00 LBS tapocher de mis a Niveau (47 min)
 - At 3,6 LBS tapocher mis Niveau de
 Fat channel (56 min)
 - At 3,4 LBS insert load (1:48)



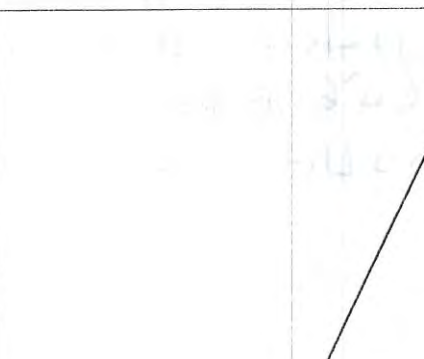
7:37

TEST LOAD CONFIGURATION

1:48
 3:4 LBS



Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____

Side view	Front view	Top view
		

Date: _____ Manufacturer: _____ Model: _____
 Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
<p>Usable Firebox: _____</p> <p>Test load weight: _____ Minimum: _____ Maximum: _____</p> <p>Déviation: _____</p>				

PRE / POST CHECKS

Date: 2016-09-13 Manufacturer: boyer supreme Model: NW 200
 Project #: p120131 Run: 6 Tech: MR Reviewer: DO

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	7:30	ok	ok

Pre-Test

Post-Test

Facility Conditions:

Air Velocity from less than 2 feet
 Smoke Capture Check.....
 Picture.....

Pre-Test	Post-Test
12 (max50 Fpm) ok	15 (max50 Fpm) ok
4 sides ok	ok

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....
 Date Dilution Tunnel Cleaned.....
 Induced Draft Check (max 0.005 H2O).....
 Traverse before ignition.....
 Flow Rate 140 cfm ±10%.....

2016-09-06	ok
2016-09-06	
ok	
ok	

Temperature System:

Ambient (65°-90°F).....
 Wood Heater Surface (±125°F).....

ok	°F
ok	°F

Proportional Checks:

Thermocouple check.....
 Pitot Clean.....
 Pitot verification.....

ok
ok
ok

Sampling Train ID Numbers:

Probe.....
 Filter Front.....
 Filter Back.....
 Filter Thermocouple.....
 Filter (<90°F).....

Train 1 st hour	Train 1	Train 2
02	30	33
855	858	860
856	859 859	863
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

 Date: 2016-09-13

 Manufacturer: Fogger Supreme

 Model: NL 200

 Project #: PI W131

 Run: 6

 Tech: MM

 Reviewer: SP
Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	428641,90	431051,95	428641,99	431051,99	370741,59	373054,70
Initial 1minute DGM (Liter)	428641,90	431051,99	428641,99	431051,99	370741,58	373054,70
Change © (Liter)	∅	0,01	∅	∅	0,01	∅
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Leakage Checks Flue Gas Sampler

Plugged Probe	Pre Test	Post Test
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

Plugged Probe	Pre Test 3 H2o static	Pre Test 0.4-0.5 H2o velocity	Post Test 3 H2o Static	Post Test 0.4-0.5 H2o velocity
Vacuum (inches Hg.)	3	.5	3	.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2016-09-13 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 6 Tech: MM Reviewer: DO

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 2016-09-13 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 6 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 101.9 (KPa.) Static pressure (P_q) 0.00 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.051	74.95
B - Centroid	3.00	3.50	4	0.052	74.99
A-1	0.40	0.50	0.50	0.041	74.89
A-2	1.50	1.75	2	0.054	74.96
A-3	4.50	5.25	6	0.048	74.98
A-4	5.60	6.5	7.5	0.042	75.00
B-1	0.40	0.50	0.50	0.041	75.02
B-2	1.50	1.75	2	0.053	75.06
B-3	4.50	5.25	6	0.055	74.99
B-4	5.60	6.5	7.5	0.049	74.94
				AVERAGE	

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

Δ_p = manometer reading (inches H₂O)

T_s = average absolute dilution tunnel temperature (°F + 460)

P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$

P_q = static pressure in. H₂O
 { 13.6 }

M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

K_p = 85.49 pitot tube constant, (conversion factor for English units)

$(\Delta_p)_{avg}$ = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

Date: 2016 09-13 Manufacturer: Foyer Supreme Model: NV200
 Project #: PI 20131 Run: 6 Tech: MM Reviewer: _____

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2,958	2,921	0,998	1,00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,88	17,87	9,72	10,00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0,004	2,968	1,008	0,004	0.02	0,003	0.15	0,010	0.05	✓	
CO ₂	0,00	17,79	9,73	0	0.02	0,08	0.5	0,01	0.5	✓	
O ₂	na	na	na	N.A	na	N.A	na	N.A	na	N.A	N.A

TEST DATA LOG

Date: 2016 09-13 Manufacturer: Fager Supreme Model: NV200
 Project #: PZ 20131 Run: 6 Tech: MM Reviewer: TS

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	431 051, 14	3 730 50, 98	4 50 28
Initial (Liter)	428 642, 17	3 70 742, 18	3 92, 20

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101,9	101,3
Dry Bulb (F):	76,28	85,1
Humidity (%):	48	43

Flow Meter

	Start	End
Flow meter reading	N.A	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	N.A	N.A
Scale Weight (Kg)	N.A	N.A

FUEL DATA

Date: 2016-09-13 Manufacturer: foyer Supreme Model: NV 200
 Project #: PL 20131 Run: 6 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*
2 x 4 x 5 in.	0.732 lbs.	20.0
2 x 4 x 5 in.	0.682 lbs.	19.3
2 x 4 x 5 in.	0.676 lbs.	19.9
2 x 4 x 5 in.	0.696 lbs.	20.3
2 x 4 x 5 in.	0.672 lbs.	19.3
2 x 4 x 5 in.	0.702 lbs.	20.0
2 x 4 x 5 in.	0.740 lbs.	21.3
2 x 4 x 5 in.	0.710 lbs.	19.6
2 x 4 x 5 in.	0.688 lbs.	19.6
2 x 4 x 5 in.	0.754 lbs.	20.2
2 x 4 x 5 in.	0.708 lbs.	20.2
2 x 4 x 5 in.	0.712 lbs.	19.5
2 x 4 x 5 in.	0.688 lbs.	19.6
2 x 4 x 5 in.	0.698 lbs.	20.0
2 x 4 x 5 in.	0.806 lbs.	20.8
2 x 4 x 5 in.	0.704 lbs.	20.8
2 x 4 x 5 in.	0.722 lbs.	19.1
2 x 4 x 5 in.	0.660 lbs.	19.2
2 x 4 x 5 in.	0.682 lbs.	20.6
2 x 4 x 5 in.	0.692 lbs.	20.3
2 x 4 x 5 in.	0.762 lbs.	21.2
2 x 4 x 5 in.	0.710 lbs.	20.6
2 x 4 x 5 in.	0.682 lbs.	20.4

TEST LOAD WEIGHT: _____ lbs

FUEL DATA

Date: 20 Nov 09-13 Manufacturer: foyer supreme Model: NV 200
 Project #: PI 20131 Run: 6 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*			
2 x 4 x 5 in.	1,00 lbs.	22,0		22,1	22,4
2 x 4 x 8 in.	0,672 lbs.	20,6		20,4	20,4
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				

TEST LOAD WEIGHT: 17,974 lbs

FUEL DATA

Date: 2016-09-13 Manufacturer: foyer supreme Model: NV200
 Project #: p1 20131 Run: 6 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 22 in.	2,524 lbs.	21,6	22,1	21,7	21,7	22,3
1 1/2 x 3 1/2 x 22 in.	2,414 lbs.	22,1	20,9	20,8	21,3	21,4
3 1/2 x 3 1/2 x 22 in.	5,092 lbs.	20,9	20,0	21,6	20,7	20,9
3 1/2 x 3 1/2 x 22 in.	7,88 lbs.	19,8	20,7	19,0	19,6	21,2
1 1/2 x 3/4 x 5 in.	0,116 lbs.			19,8		
1 1/2 x 3/4 x 5 in.	0,164 lbs.			20,1		
1 1/2 x 3/4 x 5 in.	0,108 lbs.			21,0		
1 1/2 x 3/4 x 5 in.	0,166 lbs.			20,5		
1 1/2 x 3/4 x 5 in.	0,110 lbs.			20,5		
1 1/2 x 3/4 x 5 in.	0,104 lbs.			19,9		
1 1/2 x 3/4 x 5 in.	0,108 lbs.			21,0		
1 1/2 x 3/4 x 5 in.	0,102 lbs.			21,0		
1 1/2 x 3/4 x 5 in.	0,100 lbs.			20,5		
1 1/2 x 3/4 x 5 in.	0,104 lbs.			20,5		
1 1/2 x 3/4 x 5 in.	0,098 lbs.			20,8		
1 1/2 x 3/4 x 5 in.	0,126 lbs.			21,0		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 16,27 lbs Min 20%: 3,25 Max 25%: 4,06

Date: 2016-09-12 Run: 6 Manufacturer: foyer supreme Model: M200

Project #: PI 20131 Tech: MM Reviewer: DE

Pre-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanc	
		02	855	856	11	30	858	859	31	864	
2016-09-12	18:30	61,1021	0,1261	0,1284	10,3131	110,2392	0,1285	0,1275	10,1704	0,1289	
2016-09-13	9:00	61,1022	0,1261	0,1285	10,3130	110,2393	0,1284	0,1276	10,1703	0,1289	

Post-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanc	
		02	855	856	11	30	858	859	31	864	
2016-09-13	20:00	61,1026	0,1431	0,1281	10,3179	110,2393	0,1335	0,1276	10,1744	0,1289	
2016-09-16	8:00	61,1026	0,1401	0,1281	10,3144	110,2393	0,1335	0,1276	10,1711	0,1289	
2016-09-22	8:00	61,1026	0,1401	0,1281	10,3144	110,2393	0,1335	0,1276	10,1711	0,1289	



DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2016-09-12 Project #: PI 20131 Run: 6 Manufacturer: Fogey Supreme Model: NV100
 Tech: MM Reviewer: isp

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time	860	863	32	
2016-09-12	18:30	1093623	01269	01250	104147
2016-09-12	9:00	1093622	01270	01249	104148

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time	860	863	32	
2016-09-13	20:00	1093624	01457	01249	104191
2016-09-16	8:00	1093624	01453	01249	104163
2016-09-22	8:00	1093624	01453	01249	104163

Paramètres

Tous les facteurs de corrections et autres paramètres qui peuvent être modifiés par l'utilisateur du fichier sont regroupés ici.

Code verrouillage:

Description du test

Test standard	EPA
Run #	7
Date	2016-09-14
Technicien	M.M
Project #	pi-20131

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	NV 200	
Combustion system	Non-Cat	
Appliance type	Wood fireplace	
Firebox volume	2,24	cu ft.
Appliance weight empty	na	lbs
Appliance weight full	na	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	na	BTU/h Donnée fournie par le manufacturier
Targeted category	1	
Targeted output	à définir	BTU/h
Cp steel	0,1	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,993	Dimensionless
Equipment number (DGM #1):	EM-078	
Calibration Factor (DGM #2):	0,992	Dimensionless
Equipment number (DGM #2):	EM-079	
Calibration Factor (DGM #3):	0,993	Dimensionless
Equipment number (DGM #3):	EM- 078	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	8	in.
Molecular weight	29	May be assumed to be 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi-20131
Date	#####
Technicien	<input type="text" value="M.M"/>

Fuel data

Fuel type	Dimension	
Fuel specie	D. Fir	
HHV		19810,0 kJ/kg
%C		48,7
%H		6,9
%O		43,9
%Ash		0,5
HHV		8519,2 Btu/lb
LHV		7451,0 Btu/lb

	Default Fuel Values	
	D. Fir	Oak/Maple
HHV	19 810	19 887
%C	48,73	50
%H	6,87	6,6
%O	43,9	42,9
%Ash	0,5	0,5
HHV (Btu/lb)	8519	8552
LHV (Btu/lb)	7451	7480

	Start	End
Barometer (kPa):	101,3	101,8
Barometer (in.Hg):	29,913879	30,061529
Dry Bulb (F):	79,16	80,78
Humidity (%):	58	38
Air velocity (ft/min)	17	19

DGM #1	Final: ##### cuft
	Initial: ##### cuft
DGM #2	Final: ##### cuft
	Initial: ##### cuft
DGM room	

	Final: 432427,350	Liter
	Initial: 431052,700	Liter
	Final: 374202,400	Liter
	Initial: 373055,430	Liter
	Final: 479,530	cuft
	Initial: 450,280	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du VRAI test commencent

289

Autres données à rentrer: dans preload data, load data, traverse et filter set weight

Project nu.	pi-20131
Date	#####
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
14,1	15,7	17,2

* For boilers, a loading density factor of 10 lb/ft3 is applied

Load Volume: 0,45 cu. ft Loading Density: 7,1 lbs./ft3

Number of Spaces: 12 Load Density (wet): 32,4 lbs./ft3

Spacer weight: lbs Dry Wood Density: 27,0 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x Weight	Volume Cubic Inches	Ave. MC %
Thick	Wide	Length		Dry Uncorrected %							
1,5	3,5	22	2,49	20,00	20,20	19,90	19,80	20,80	50,10832	115,50	20,1
1,5	3,5	22	2,38	19,70	20,00	19,90	19,60	20,20	47,23488	115,50	19,9
3,5	3,5	22	4,84	21,80	19,80	19,80	21,80	20,10	99,95308	269,50	20,7
3,5	3,5	22	4,74	19,40	19,30	19,10	19,70	19,40	91,89996	269,50	19,4
1,5	0,75	5	0,11			19,60			2,1952	5,63	19,6
1,5	0,75	5	0,11			19,30			2,0458	5,63	19,3
1,5	0,75	5	0,11			19,60			2,1168	5,63	19,6
1,5	0,75	5	0,11			19,50			2,223	5,63	19,5
1,5	0,75	5	0,11			20,10			2,2914	5,63	20,1
1,5	0,75	5	0,10			20,00			2	5,63	20,0
1,5	0,75	5	0,11			19,30			2,0844	5,63	19,3
1,5	0,75	5	0,11			19,20			2,1888	5,63	19,2
1,5	0,75	5	0,10			19,40			1,9788	5,63	19,4
1,5	0,75	5	0,11			19,40			2,134	5,63	19,4
1,5	0,75	5	0,12			19,60			2,352	5,63	19,6
1,5	0,75	5	0,14			19,20			2,688	5,63	19,2
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
								SUM MCx	315,49444		19,6 %

Test Load Weight: 15,79 lbs. Dry Weight: 5,97 kg.

Average Moisture Content: %

Dry: 19,98 Dry(EPA) 19,98 19,98

 Dry(B415) 19,98

Wet: 16,65

Must be 19-25 must be 15,2-22

Coal Bed Range: 3,2 lbs. to 3,9 lbs.

TEST CHARGE: Coal bed weight: 3,5 lbs.

Project nu.	pi-20131
Date	#####
Technicien	m.m

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,2 in. H2O
 Barometer: 29,900 in. Hg

Pour un tunnel de 12" et plus, prendre 6 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center			0,0000
B center			0,0000
A1			0,0000
A2			0,0000
A3			0,0000
A4			0,0000
A5			0,0000
A6			0,0000
B1			0,0000
B2			0,0000
B3			0,0000
B4			0,0000
B5			0,0000
B6			0,0000
AVERAGE	#DIV/0!	#DIV/0!	0,0000

PITOT CONSTANT=
0,946

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,048	78,46	0,2191
B center	0,049	78,19	0,2214
A1	0,039	78,45	0,1975
A2	0,054	78,48	0,2324
A3	0,049	78,34	0,2214
A4	0,040	78,12	0,2000
B1	0,039	78,300	0,1975
B2	0,049	77,990	0,2214
B3	0,049	77,470	0,2214
B4	0,043	76,530	0,2074
AVERAGE	0,0459	78,0330	0,2139

Project nu.	pi-20131
Date	#####
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	7	851	857	5	20	882	883	20	36	891	895	21	898		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,4775	0,1261	0,1272	11,2523	108,8420	0,1267	0,1282	10,1090	107,7396	0,1255	0,1280	10,2282	0,1283	13/09/2016	21:00
Before (6)	61,4775	0,1260	0,1272	11,2524	108,8421	0,1268	0,1281	10,1089	107,7397	0,1256	0,1279	10,2283	0,1284	14/09/2016	09:00
After (1)	61,4780	0,1311	0,1274	11,2557	108,8423	0,1261	0,1282	10,1119	107,7401	0,1300	0,1280	10,2315	0,1285	14/09/2016	14:30
After (2)	61,4780	0,1309	0,1274	11,2539	108,8423	0,1261	0,1281	10,1100	107,7401	0,1300	0,1280	10,2298	0,1285	26/09/2016	08:00
After (3)	61,4780	0,1309	0,1274	11,2531	108,8423	0,1261	0,1281	10,1096	107,7401	0,1300	0,1280	10,2290	0,1285	29/09/2016	08:00
After (4)	61,4780	0,1309	0,1274	11,2530	108,8423	0,1261	0,1281	10,1095	107,7401	0,1300	0,1280	10,2290	0,1285	30/09/2016	08:00
After (5)															
After (6)	61,4780	0,1309	0,1274	11,2530	108,8423	0,1261	0,1281	10,1095	107,7401	0,1300	0,1280	10,2290	0,1285	30/09/2016	08:00
Difference	0,0005	0,0049	0,0002	0,0006	0,0002	-0,0007	0,0000	0,0006	0,0004	0,0044	0,0001	0,0007	0,0001		
Total (mg)		6,2				6,3				5,6			0,1		
Total ajusté (mg)		6,10				6,20				5,50					

Project nu.	pi-20131
Date	#####
Technicien	m.m

171	321.06	79.43	94.10	3.68	0,0436	437,85	465,86	534,33	387,57	438,29
172	317.07	79.39	93.61	3.73	0,0446	435,26	464,44	533,44	382,71	436,43
173	312.50	79.50	93.28	3.67	0,0505	431,64	462,20	532,09	377,79	434,09
174	307.65	79.47	92.61	3.67	0,0502	429,92	459,24	530,97	373,46	431,84
175	304.00	79.50	92.14	3.67	0,0468	429,58	456,57	528,90	370,42	430,37
176	300.47	79.48	91.80	3.67	0,0465	426,88	453,89	528,31	365,48	427,87
177	296.31	79.62	91.56	3.67	0,0493	423,18	451,32	526,71	361,02	425,72
178	292.51	79.45	91.46	3.67	0,0505	420,76	449,53	525,07	357,08	423,19
179	288.64	79.36	91.85	3.67	0,0460	418,60	447,06	523,24	352,96	420,92
180	284.67	79.33	91.02	3.67	0,0460	416,97	444,13	520,84	349,91	418,71
181	281.14	79.36	90.90	3.67	0,0463	414,87	442,27	519,27	346,31	416,72
182	278.08	79.48	90.76	3.57	0,0463	411,91	438,72	517,48	343,00	414,48
183	274.52	79.42	89.96	3.67	0,0470	410,09	436,13	514,69	339,60	413,05
184	271.93	79.37	89.88	3.57	0,0448	408,52	434,32	513,13	336,96	410,01
185	268.52	79.45	89.89	3.67	0,0510	405,80	431,48	511,01	333,84	407,19
186	265.15	79.21	89.66	3.60	0,0460	403,35	428,91	508,75	331,11	404,54
187	261.88	79.33	89.08	3.67	0,0505	401,15	426,06	506,53	327,98	403,16
188	259.04	79.35	88.85	3.57	0,0468	398,88	424,09	504,49	324,90	400,07
189	256.28	79.44	88.78	3.57	0,0495	397,32	421,68	502,20	322,83	398,54
190	253.12	79.27	88.61	3.57	0,0495	395,14	419,07	500,03	321,05	396,05
191	250.81	79.46	88.37	3.57	0,0460	392,91	416,64	498,04	319,54	394,09
192	248.51	79.37	88.71	3.57	0,0510	390,43	414,17	495,34	317,75	392,40
193	246.56	79.19	87.85	3.57	0,0512	388,21	411,83	492,82	315,78	390,12
194	244.34	79.14	88.08	3.57	0,0475	386,68	409,06	490,20	313,59	388,14
195	241.78	79.11	88.19	3.57	0,0512	385,00	407,00	487,40	312,19	386,10
196	240.30	79.20	87.32	3.47	0,0512	381,88	404,91	484,77	309,86	384,81
197	237.97	79.10	87.44	3.57	0,0512	380,15	402,41	481,76	307,22	382,69
198	236.19	79.15	87.36	3.56	0,0460	378,43	400,58	479,52	304,62	380,61
199	234.20	79.25	87.35	3.57	0,0465	376,60	398,52	477,44	302,44	378,86
200	232.17	78.80	86.34	3.57	0,0475	374,09	394,95	475,24	300,75	376,63
201	230.13	79.13	87.25	3.52	0,0498	372,48	394,64	472,15	297,57	375,80
202	227.98	79.19	87.04	3.47	0,0507	370,32	391,93	469,49	295,05	373,34
203	226.35	79.11	86.71	3.47	0,0475	368,82	389,50	467,38	293,02	370,07
204	224.76	79.10	86.29	3.47	0,0510	367,20	387,20	465,46	290,77	368,03
205	223.23	78.94	86.31	3.47	0,0456	364,55	385,19	463,45	288,45	366,83
206	221.87	78.73	86.18	3.47	0,0456	362,57	383,23	461,23	286,73	364,43
207	219.91	79.02	86.39	3.47	0,0468	360,31	380,97	459,31	284,58	363,08
208	218.16	78.99	85.72	3.47	0,0498	358,62	378,70	456,80	282,77	361,52
209	217.29	78.80	85.31	3.47	0,0512	356,20	376,61	454,58	280,69	358,91
210	215.49	78.77	86.07	3.47	0,0514	353,88	374,06	452,32	278,96	357,39
211	213.88	78.91	86.03	3.47	0,0512	352,02	372,51	450,12	277,09	355,57
212	212.44	78.89	86.00	3.47	0,0509	349,95	371,11	448,36	275,56	353,88
213	210.89	78.91	85.90	3.47	0,0519	347,70	369,00	446,31	274,03	352,76
214	209.48	78.73	85.67	3.47	0,0488	345,99	367,35	443,91	272,61	351,06
215	208.25	78.85	85.24	3.47	0,0512	344,58	365,48	441,97	271,52	348,98
216	207.20	78.77	85.33	3.47	0,0460	343,38	363,80	440,51	270,74	347,10

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 2,3 g/hr

Burn Rate : 1,585 Dry kg/hr

Test Duration: 226 min

PRESSURE FACTOR: DGM 1 0,97297
 DGM 2 0,98643
 DGM 3 1,00226

BAROMETRIC PRESSURE
 Average: 29,987704 in Hg
 Start: 29,913879 in Hg
 End: 30,061529 in Hg

TEMPERATURE FACTORS DGM 1 0,97544
 DGM 2 0,97436
 DGM 3 0,97687

DGM CONTROLLER VALUES

DGM 1 Final: 15271,028 Cuft
 Initial: 15222,483 Cuft

VOLUMES SAMPLED DGM 1 45,750 SCft
 DGM 2 38,619 SCft
 DGM 3 28,438 SCft

DGM 2 Final: 13214,833 Cuft
 Initial: 13174,328 Cuft

DGM #3 Final: 479,530 Cuft
 Initial: 450,280 Cuft

TOTAL TUNNEL VOLUME : 61891

TEMPERATURES

DGM 1 541,297 °R
 DGM 2 541,896 °R

SAMPLE RATIOS
 Sample Train 1: 1352,807
 Sample Train 2: 1602,607

CALIBRATION FACTORS

DGM 1 0,9930
 DGM 2 0,9920
 DGM #3 0,9930

Paticulate concentration
 Sample Train 1 **0,000138** g/dscf
 Sample Train 2 **0,000145** g/dscf
 Room **0,000004** g/dscf

TUNNEL FLOW RATE: 273,856 Dscfm

TOTAL EMISSIONS
 Sample Train 1 **8,31** g
 Sample Train 2 **8,76** g

PARTICULATE CATCH
 Total Sample Train 1: 6,30 mg
 Total Sample Train 2: 5,60 mg
 Total Sample Train 1 1st hour: 6,20 mg

EMISSION RATES
 Sample Train 1 **2,20** g/hr
 Sample Train 2 **2,32** g/hr

1st hour emission rate **8,39** g/hr

DEVIATION: 2,65%

Cs Train 1 Train 2
 0,0001377 0,000145006

197,0	486,0	0,5	2,4	4,8	519,7	328,0	80,6	93,4	417,8	527,2	486,7	484,4	682,2	0,18	81,28	81,79	84,46	0,17	81,85	82,62	83,00	0,05	0,06	171,15674
198,0	487,0	0,5	2,5	4,7	518,8	326,2	80,9	92,9	417,5	526,1	486,6	483,6	680,4	0,18	81,26	81,78	84,42	0,17	81,83	82,60	82,98	0,05	0,06	170,30368
199,0	488,0	0,5	2,5	4,6	517,8	325,0	80,4	93,1	416,4	525,3	485,8	482,8	678,9	0,17	81,27	81,77	84,41	0,17	81,83	82,61	82,98	0,05	0,06	169,31706
200,0	489,0	0,5	2,5	4,5	516,6	324,4	81,2	93,3	415,0	524,6	485,2	481,9	676,3	0,18	81,24	81,77	84,39	0,17	81,77	82,60	82,94	0,05	0,06	168,07764
201,0	490,0	0,5	2,6	4,5	515,0	323,7	81,4	93,7	413,1	523,5	483,8	480,8	673,9	0,17	81,23	81,75	84,35	0,17	81,75	82,59	82,94	0,05	0,06	166,50571
202,0	491,0	0,4	2,6	4,4	514,0	323,1	81,2	93,7	411,7	522,0	484,1	479,7	672,3	0,18	81,21	81,74	84,37	0,17	81,74	82,59	82,90	0,05	0,06	165,42477
203,0	492,0	0,4	2,7	4,4	512,2	322,7	81,3	93,0	410,1	520,3	481,0	478,8	670,7	0,18	81,21	81,73	84,33	0,17	81,73	82,58	82,90	0,05	0,06	163,65567
204,0	493,0	0,4	2,7	4,3	511,1	320,9	81,4	92,9	409,1	519,1	481,4	478,0	668,1	0,17	81,18	81,72	84,31	0,17	81,68	82,58	82,89	0,05	0,06	162,5958
205,0	494,0	0,4	2,6	4,4	509,8	320,0	79,8	90,7	409,2	517,8	481,3	476,9	663,9	0,18	81,18	81,70	84,21	0,17	81,67	82,57	82,84	0,05	0,06	161,30537
206,0	495,0	0,4	2,6	4,3	509,0	318,9	80,8	91,4	408,2	514,7	483,4	475,8	662,8	0,18	81,08	81,66	84,09	0,17	81,63	82,54	82,79	0,05	0,06	160,45161
207,0	496,0	0,3	2,7	4,3	507,5	318,1	80,5	92,8	408,0	514,2	480,1	474,4	661,1	0,18	81,02	81,64	84,11	0,17	81,62	82,52	82,74	0,05	0,06	159,01813
208,0	497,0	0,3	2,6	4,3	506,4	317,5	81,0	92,1	407,2	513,3	477,9	473,5	660,3	0,17	80,98	81,62	84,07	0,17	81,56	82,51	82,72	0,05	0,06	157,89559
209,0	498,0	0,3	2,6	4,4	505,1	316,9	80,4	92,1	406,9	511,6	475,8	472,1	659,1	0,18	81,02	81,63	84,05	0,17	81,63	82,47	82,69	0,05	0,06	156,55513
210,0	499,0	0,3	2,7	4,2	503,6	315,8	81,4	92,1	406,4	510,4	473,2	470,8	657,1	0,17	81,01	81,63	84,02	0,17	81,60	82,47	82,68	0,05	0,06	155,04105
211,0	500,0	0,3	2,7	4,1	502,2	314,7	81,0	92,5	405,6	509,5	470,8	469,4	655,5	0,17	80,98	81,62	83,99	0,17	81,55	82,43	82,64	0,05	0,06	153,62574
212,0	501,0	0,3	2,7	4,1	501,3	312,6	80,6	92,3	404,4	508,8	470,8	468,2	654,3	0,18	81,00	81,64	83,97	0,17	81,57	82,45	82,66	0,05	0,06	152,76232
213,0	502,0	0,3	2,6	4,1	500,1	311,7	81,3	92,2	404,3	506,8	470,7	467,7	651,1	0,18	81,03	81,63	83,95	0,17	81,57	82,45	82,66	0,05	0,06	151,58476
214,0	503,0	0,2	2,7	4,0	498,2	310,7	81,1	92,2	403,5	505,2	468,2	466,2	648,2	0,18	81,07	81,61	83,90	0,17	81,58	82,43	82,64	0,05	0,06	149,7151
215,0	504,0	0,2	2,8	4,0	496,9	310,1	81,3	91,7	401,9	504,7	466,7	464,5	646,5	0,18	81,12	81,64	83,87	0,17	81,67	82,44	82,63	0,05	0,06	148,34177
216,0	505,0	0,2	2,6	4,1	494,7	308,0	81,0	92,4	399,7	501,9	465,4	463,1	643,3	0,18	81,13	81,63	83,89	0,17	81,68	82,44	82,60	0,05	0,06	146,17082
217,0	506,0	0,2	2,8	3,8	493,1	306,4	81,2	92,0	397,6	501,7	463,4	462,0	640,8	0,17	81,16	81,62	83,87	0,17	81,68	82,45	82,58	0,05	0,06	144,57432
218,0	507,0	0,2	2,8	3,9	491,3	304,3	80,9	92,1	396,7	500,0	462,1	460,6	636,9	0,18	81,11	81,61	83,85	0,17	81,68	82,45	82,59	0,05	0,06	142,72905
219,0	508,0	0,1	2,8	3,7	489,7	303,0	80,8	91,8	395,4	498,2	461,6	459,6	633,5	0,17	81,10	81,61	83,82	0,17	81,65	82,43	82,57	0,05	0,06	141,14468
220,0	509,0	0,1	2,8	3,7	488,4	301,4	80,6	91,3	394,1	497,0	460,3	459,0	631,4	0,18	81,11	81,61	83,76	0,17	81,67	82,43	82,58	0,05	0,06	139,83148
221,0	510,0	0,1	2,8	3,7	486,6	300,4	81,1	91,1	393,4	494,8	459,2	457,8	627,7	0,18	81,13	81,63	83,74	0,17	81,66	82,42	82,54	0,05	0,06	138,05911
222,0	511,0	0,1	2,8	3,7	484,8	298,3	80,3	90,9	391,5	493,2	458,4	456,4	624,5	0,17	81,15	81,63	83,73	0,17	81,71	82,42	82,50	0,05	0,05	136,28719
223,0	512,0	0,1	2,8	3,6	482,8	297,5	80,9	89,8	389,9	491,6	456,4	455,6	620,7	0,17	81,12	81,61	83,65	0,17	81,67	82,38	82,48	0,05	0,05	134,29811
224,0	513,0	0,1	2,7	3,6	480,7	295,8	81,1	90,2	387,7	490,7	453,6	453,9	617,6	0,17	81,19	81,62	83,61	0,17	81,70	82,35	82,45	0,05	0,05	132,16931
225,0	514,0	0,1	2,6	3,7	479,1	294,1	81,1	90,7	386,4	488,7	452,4	452,6	615,3	0,17	81,25	81,64	83,62	0,17	81,75	82,35	82,44	0,05	0,05	130,55417
226,0	515,0	0,1	2,6	3,6	477,9	292,2	81,0	91,3	384,7	488,2	452,1	451,3	613,4	0,18	81,30	81,64	83,60	0,17	81,79	82,37	82,42	0,05	0,05	129,39224
225,0	516,0	0,0	2,6	3,6	476,8	289,8	80,9	91,5	384,1	485,3	453,4	450,4	610,8	0,18	81,32	81,65	83,57	0,17	81,80	82,37	82,42	0,05	0,05	128,28364

Manufacturer: FOYER SUPREME
 Model: NV 200

Run: 7
 Project #: pi-20131
 Test Duration: 226 min

	HHV	LHV
Eff	66,72%	72,11%
Comb Eff	93,54%	93,54%
HT Eff	71,33%	77,10%
Output	20 956	kJ/h
Burn Rate	1,59	kg/h
Grams CO	556	g
Input	31 409	kJ/h
MC wet	16,65	

Note: In the "Input data", "Calc. % O₂", "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

Ultimate CO₂
 CO_{2-ut} 19,64
 F_o
 1,062

	Air Fuel Ratio (A/F)
Overall Heating Efficiency: 66,72%	Dry Molecular Weight (M _d) 29,77
Combustion Efficiency: 93,54%	Dry Moles Exhaust Gas (N _r): 397,41
Heat Transfer Efficiency: 71,33%	Air Fuel Ratio (A/F) 11,32

Heat Output:	19 879 Btu/h	20 956 kJ/h
Heat Input:	29 795 Btu/h	31 409 kJ/h
Burn Duration:	3,77 h	
Burn Rate:	3,49 lb/h	1,586 kg/h
Stack Temp:	443,7 Deg. F	228,7 Deg. C

No Fail

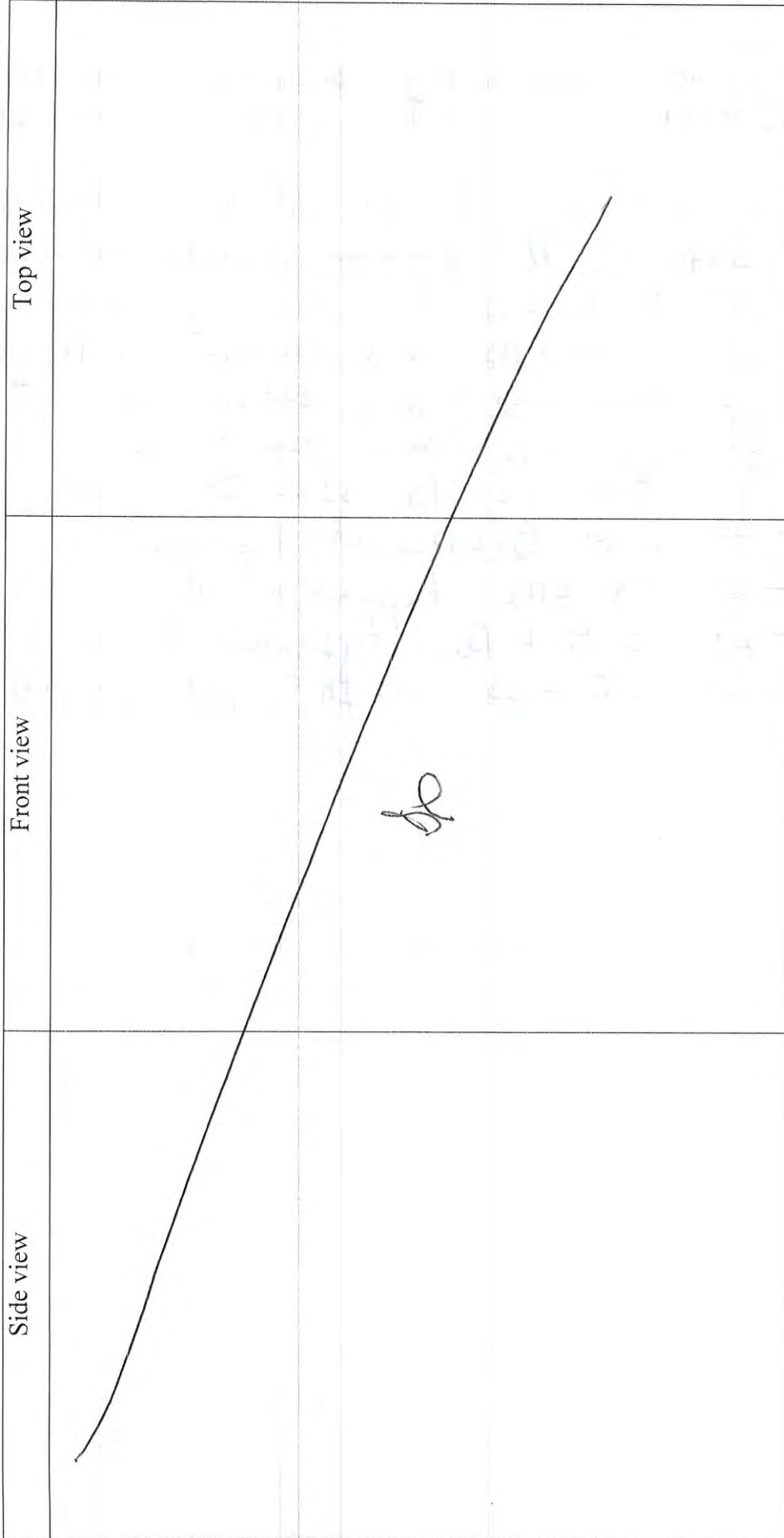
Date: 2016-09-14 Manufacturer: foyer supreme Model: NV200
 Project #: PT 20131 Run: 7 Tech: MM Reviewer: DP

- No kindling START FINE 20 LBS
- Setting 1/8" spacer immediately
- At 18.00 LBS mis setting mortar
- At 17.00 LBS mis setting a High
- At 16.00 LBS mis setting a mortar
- At 14.00 LBS mis setting a 1/8"
- At 9.00 LBS Brassier et tapocher
- At 6.00 Brassier et tapocher
- At 4.5 LBS tapocher FCB channel (1/14 m)
- At 3.9 LBS tapocher et McFast channel (1/25)
- At 3.5 LBS mis set load (2:23)
-

TEST LOAD CONFIGURATION

21 27 H
3.5 LBS

Date: _____ Manufacturer: _____ Model: _____
Project #: _____ Run: _____ Tech: _____ Reviewer: _____



Date: _____ Manufacturer: _____ Model: _____
 Project #: _____ Run: _____ Tech: _____ Reviewer: _____

	ADDITION		SUBSTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
Usable Firebox: _____				
<i>DP</i>				
Test load weight: _____		Minimum: _____		Maximum: _____
Déviation: _____				

Date: 2016-09-14 Manufacturer: Foyer Supreme Model: NV200
 Project #: PI 20131 Run: 7 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	7:00	ok	ok

Pre-Test Post-Test

Facility Conditions:

Air Velocity from less than 2 feet

	17 (max50 Fpm)	19 (max50 Fpm)
Smoke Capture Check.....	ok	ok
Picture.....	ok	ok
4 sides	ok	ok

Smoke Capture Check.....

Picture.....

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

Induced Draft Check (max 0.005 H2O).....

Traverse before ignition.....

Flow Rate 140 cfm ±10%.....

2016-09-06	ok
2016-09-06	
ok	
ok	
ok	ok

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface (±125°F).....

ok	°F
ok	°F

Proportional Checks:

Thermocouple check.....

Pitot Clean.....

Pitot verification.....

ok
ok
ok

Sampling Train ID Numbers:

Probe.....

Filter Front.....

Filter Back.....

Filter Thermocouple.....

Filter (<90°F).....

Train 1 st hour	Train 1	Train 2
7	20	36
851	882	891
857	883	895
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

Date: 2016-09-14 Manufacturer: Fujer Supreme Model: NV 200
 Project #: PT 2131 Run: 7 Tech: MM Reviewer: DP

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Unplugged Flow Rate = .25cfm						
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	431052.49	432248.01	431052.55	432248.05	373055.10	374603.11
Initial 1minute DGM (Liter)	431052.48	432248.00	431052.54	432248.05	373055.03	374603.10
Change © (Liter)	0.01	0.01	0.01	∅	0.07	0.01
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Leakage Checks Flue Gas Sampler

	Pre Test	Post Test
Plugged Probe		
Vacuum (inches Hg.)	-5	-5
Rotometer Reading (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

	Pre Test 3 H2o static	Pre Test 0.4-0.5 H2o velocity	Post Test 3 H2o Static	Post Test 0.4-0.5 H2o velocity
Plugged Probe				
Vacuum (inches Hg.)	3	.5	3	.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: Jul 09 14 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 3 Tech: MM Reviewer: DO

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4.4 lbs, Class F	4.4 lbs
Wood	EM-090	4.4 lbs, Class F	4.4 lbs
Analytical	EM-128	100 mg, Class S	100 mg
Analytical	EM-129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

ANALYTICAL SCALE: 50%-150% of dry filter weight, ± 0.1 mg
PLATFORM SCALE: 20%-80% of ideal test load weight, ± 0.1 lbs or 1%
WOOD SCALE: 20%-80% of ideal test load weight, ± 0.01 lbs or 1%

Date: 02/16-09-14 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 7 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 101.3 (KPa.) Static pressure (P_q) 0.19 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0,048	78,46
B - Centroid	3.00	3.50	4	0,049	78,19
A-1	0.40	0.50	0.50	0,039	78,45
A-2	1.50	1.75	2	0,054	78,48
A-3	4.50	5.25	6	0,049	78,39
A-4	5.60	6.5	7.5	0,040	78,12
B-1	0.40	0.50	0.50	0,039	78,30
B-2	1.50	1.75	2	0,049	77,99
B-3	4.50	5.25	6	0,049	77,47
B-4	5.60	6.5	7.5	0,043	76,53
				AVERAGE	

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.

Δ_p = manometer reading (inches H₂O)

T_s = average absolute dilution tunnel temperature (°F + 460)

P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$

P_q = static pressure in. H₂O
 { 13.6 }

M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)

K_p = 85.49 pitot tube constant, (conversion factor for English units)

Δ_p avg. = average of the square roots of the velocity heads (Δ_p) measured at each traverse point.

CONTINUOUS ANALYZERS

Date: 20 Nov 09 14 Manufacturer: Fager Supreme Model: NV 200
 Project #: PI 20131 Run: 7 Tech: MR Reviewer: BP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2,954	2,971	1,00	1,00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,83	17,87	9,69	10,00
Tolerance CO ₂		+/- 0.02		+/- 0.5		+/- 0.5
O ₂ informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0.01	2,949	1,000	0.001	0.02	0.02 0.02	0.15	0	0.05	✓	
CO ₂	0	17,80	9,69	0	0.02	0.03	0.5	0	0.5	✓	
O ₂	na	na	na	NA	na	N.A	na	N.A	na	✓	

Date: 2016-09-14 Manufacturer: Fogon Supreme ML Model: NV200
 Project #: PZ 20131 Run: 7 Tech: MM Reviewer: DO

RAW DRY GAS METER READINGS

	System 1	System 2	Blanck
Final (Liter)	432247, 35	374202, 40	479, 53
Initial (Liter)	431052, 70	373055, 43	450, 28

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101,3	101,8
Dry Bulb (F):	79,6	80,78
Humidity (%):	58	38

Flow Meter

	Start	End
Flow meter reading	N.A	N.A

Flow Meter Verification

	Before	After
Flow meter Check (liters)	N.A	N.A
Scale Weight (Kg)	N.A	N.A

FUEL DATA

Date: 2016-09-14 Manufacturer: Foyer Supreme Model: NV 200
 Project #: PI 20131 Run: 7 Tech: MM Reviewer: BP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*		
2 x 4 x 5 in.	0.642 lbs.	203	206	207
2 x 4 x 5 in.	0.788 lbs.	193	191	196
2 x 4 x 5 in.	0.628 lbs.	196	194	192
2 x 4 x 5 in.	0.690 lbs.	212	213	216
2 x 4 x 5 in.	0.836 lbs.	199	197	201
2 x 4 x 5 in.	0.698 lbs.	210	212	214
2 x 4 x 5 in.	0.632 lbs.	196	193	192
2 x 4 x 5 in.	0.692 lbs.	204	216	223
2 x 4 x 5 in.	0.674 lbs.	210	221	229
2 x 4 x 5 in.	0.646 lbs.	193	196	202
2 x 4 x 5 in.	0.638 lbs.	196	193	202
2 x 4 x 5 in.	0.680 lbs.	216	223	229
2 x 4 x 5 in.	0.742 lbs.	206	213	220
2 x 4 x 5 in.	0.642 lbs.	210	205	202
2 x 4 x 5 in.	0.624 lbs.	196	193	198
2 x 4 x 5 in.	0.822 lbs.	206	202	208
2 x 4 x 5 in.	0.704 lbs.	200	215	228
2 x 4 x 5 in.	0.640 lbs.	196	198	202
2 x 4 x 5 in.	0.688 lbs.	200	198	205
2 x 4 x 5 in.	0.680 lbs.	196	199	203
2 x 4 x 5 in.	0.620 lbs.	196	192	201
2 x 4 x 5 in.	0.708 lbs.	193	196	199
2 x 4 x 5 in.	0.634 lbs.	193	194	196

TEST LOAD WEIGHT: 2024 lbs

FUEL DATA

Date: 2016-09-14 Manufacturer: foyer supreme Model: NV 200
 Project #: PI 20131 Run: 7 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*			
2 x 4 x 5 in.	0.692 lbs.	19.9	20.5	21.0	
2 x 4 x 5 in.	0.622 lbs.	19.6	20.4	19.3	
2 x 4 x 5 in.	0.664 lbs.	21.0	21.8	21.9	
2 x 4 x 5 in.	0.662 lbs.	19.2	19.1	19.3	
2 x 4 x 5 in.	0.632 lbs.	19.6	19.1	19.3	
2 x 4 x 5 in.	0.638 lbs.	20.0	20.4	21.0	
2 x 4 x 5 in.	0.644 lbs.	20.3	20.6	20.6	
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				

TEST LOAD WEIGHT: 20.24 lbs

FUEL DATA

Date: 2-16-29-14 Manufacturer: foyer supreme Model: NV200
 Project #: p2 10 131 Run: 7 Tech: MJM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 22 in.	2,488 lbs.	200	202	199	198	208
1 1/2 x 3 1/2 x 22 in.	2,376 lbs.	197	200	199	196	202
3 1/2 x 3 1/2 x 22 in.	4,838 lbs.	218	198	198	218	201
3 1/2 x 3 1/2 x 22 in.	4,742 lbs.	194	193	191	197	194
1 1/2 x 3/4 x 5 in.	0,112 lbs.			196		
1 1/2 x 3/4 x 5 in.	0,106 lbs.			193		
1 1/2 x 3/4 x 5 in.	0,108 lbs.			196		
1 1/2 x 3/4 x 5 in.	0,114 lbs.			195		
1 1/2 x 3/4 x 5 in.	0,114 lbs.			201		
1 1/2 x 3/4 x 5 in.	0,100 lbs.			200		
1 1/2 x 3/4 x 5 in.	0,108 lbs.			193		
1 1/2 x 3/4 x 5 in.	0,114 lbs.			192		
1 1/2 x 3/4 x 5 in.	0,102 lbs.			194		
1 1/2 x 3/4 x 5 in.	0,110 lbs.			194		
1 1/2 x 3/4 x 5 in.	0,120 lbs.			196		
1 1/2 x 3/4 x 5 in.	0,130 lbs.			192		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 15,79 lbs Min 20%: 3,16 Max 25%: 3,94

Date: 2016-09-13 Project #: PT 20131 Run: 7 Manufacturer: foyer supreme Model: NU 200
 Tech: MM Reviewer: DP

Pre-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-13	21:00	614775	01261	01272	11, 25, 23	108, 8420	01267	01282	10, 1090	01283	
2016-09-14	9:00	614775	01260	01272	11, 25, 24	108, 8421	01268	01281	10, 1089	01284	

Post-test Weight Record		SYSTEM 1 - 1 st hour					SYSTEM 1				
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
2016-09-13	21:00	614780	01311	01274	11, 25, 57	108, 8423	01261	01282	10, 1119	01285	
2016-09-26	8:00	614780	01309	01274	11, 25, 39	108, 8423	01261	01281	10, 1100	01285	
2016-09-29	8:00	614780	01309	01274	11, 25, 31	108, 8423	01261	01281	10, 1096	01285	
2016-09-30	8:00	614780	01309	01274	11, 25, 30	108, 8423	01261	01281	10, 1095	01285	



DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2016-09-13 Project #: PT120131 Run: 7 Manufacturer: foyer supreme Model: MU 200
 Tech: MR Reviewer: RP

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-13	21:00	1077396	0,1255	0,1280	10,2282
2016-09-14	9:00	1077397	0,1256	0,1279	10,2283

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2016-09-14	16:30	1077401	0,1300	0,1280	10,2315
2016-09-20	8:00	1077401	0,1300	0,1280	10,2298
2016-09-29	8:00	1077401	0,1300	0,1280	10,2290
2016-09-30	8:00	1077401	0,1300	0,1280	10,2290

APPENDIX 2: Proportionality results

Average	Average	Average						Average
14,86	Inlet +	Inlet +						0,225
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,51	99,27	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
15,238	540,1	540,5			0,176	0,167	0	0,2311627
15,116	540,1	540,6	98,60	96,93	0,176	0,167	1	0,2305024
15,082	540,2	540,6	98,95	96,93	0,175	0,167	2	0,2300622
15,052	540,2	540,6	99,40	97,85	0,175	0,167	3	0,2289564
15,009	540,2	540,6	100,73	98,95	0,175	0,167	4	0,2274004
15,024	540,2	540,6	101,31	99,63	0,175	0,167	5	0,2267301
14,932	540,3	540,7	103,02	101,57	0,175	0,167	6	0,2240435
15,111	540,3	540,7	103,57	102,00	0,175	0,167	7	0,2249248
14,795	540,3	540,7	106,82	104,76	0,175	0,167	8	0,2192206
15,022	540,4	540,8	105,84	103,70	0,175	0,167	9	0,2219802
14,461	540,4	540,8	109,24	107,58	0,175	0,167	10	0,2140673
14,916	540,5	540,9	105,71	103,96	0,175	0,167	11	0,221292
15,149	540,6	540,9	103,79	102,34	0,175	0,167	12	0,2247067
15,095	540,6	541,0	103,96	102,57	0,175	0,167	13	0,2240279
15,057	540,7	541,0	104,49	102,55	0,175	0,167	14	0,2235747
15,064	540,7	541,1	104,00	102,20	0,175	0,167	15	0,2240276
14,938	540,8	541,2	104,83	102,56	0,175	0,166	16	0,2224358
15,107	540,9	541,2	103,36	101,47	0,175	0,166	17	0,2251569
15,090	540,9	541,3	103,27	101,47	0,175	0,167	18	0,2251568
14,982	541,0	541,3	103,74	102,15	0,175	0,167	19	0,2235744
14,609	541,0	541,3	106,51	104,90	0,175	0,167	20	0,2180582
14,387	541,1	541,4	108,18	106,28	0,175	0,167	21	0,2145424
14,820	541,1	541,4	105,26	103,53	0,175	0,167	22	0,2208341
14,862	541,2	541,5	105,23	103,43	0,175	0,167	23	0,2212941
15,058	541,2	541,5	103,80	102,12	0,175	0,167	24	0,2240286
15,041	541,2	541,5	103,89	102,48	0,175	0,167	25	0,223575
15,083	541,3	541,6	104,08	102,49	0,175	0,167	26	0,2240287
14,828	541,3	541,6	105,65	104,20	0,175	0,167	27	0,2203749
14,905	541,4	541,7	104,65	102,95	0,175	0,167	28	0,2219809
14,911	541,4	541,7	104,72	102,43	0,175	0,166	29	0,2224368
14,902	541,4	541,8	104,13	102,46	0,175	0,166	30	0,2224375
15,047	541,5	541,8	103,23	101,43	0,175	0,167	31	0,224707
14,757	541,5	541,8	104,93	103,25	0,175	0,166	32	0,2203753
14,878	541,6	541,9	104,09	102,37	0,175	0,166	33	0,2224375
15,038	541,6	541,9	102,98	101,52	0,175	0,167	34	0,2247075
14,982	541,7	542,0	103,10	101,66	0,175	0,167	35	0,224029
14,347	541,7	542,0	107,99	106,34	0,175	0,167	36	0,2143532
14,952	541,7	542,0	103,52	101,71	0,175	0,167	37	0,223575
14,988	541,8	542,0	103,41	101,47	0,175	0,166	38	0,224029
14,968	541,8	542,1	103,39	101,71	0,175	0,166	39	0,2235751
14,969	541,9	542,1	103,66	102,10	0,175	0,167	40	0,2235755
14,902	541,9	542,2	103,93	102,61	0,175	0,167	41	0,2224379
14,920	541,9	542,2	103,34	101,96	0,174	0,167	42	0,2231213
14,967	542,0	542,3	103,19	101,64	0,175	0,167	43	0,2240293
14,822	542,0	542,3	103,96	102,61	0,175	0,167	44	0,2219932
14,888	542,1	542,3	103,59	101,59	0,175	0,167	45	0,2231214
15,014	542,1	542,4	102,49	100,77	0,175	0,166	46	0,2251588
14,434	542,2	542,4	106,67	104,80	0,175	0,167	47	0,2164269
14,126	542,2	542,4	108,86	107,48	0,175	0,167	48	0,2116874
14,901	542,2	542,5	103,11	101,42	0,175	0,167	49	0,2235757
14,971	542,3	542,5	102,39	101,08	0,175	0,167	50	0,2247076
14,970	542,3	542,5	102,47	100,77	0,175	0,167	51	0,2247079
14,939	542,3	542,6	102,96	101,04	0,175	0,166	52	0,2240297
14,824	542,4	542,6	103,29	101,93	0,175	0,166	53	0,2224381

14,967	542,4	542,6	102,31	100,99	0,174	0,167	54	0,2247084
15,072	542,4	542,6	101,44	100,25	0,174	0,167	55	0,2262828
15,004	542,5	542,7	102,13	100,82	0,174	0,167	56	0,2251591
14,866	542,5	542,7	103,29	101,76	0,175	0,167	57	0,223122
14,928	542,5	542,7	102,78	101,16	0,175	0,167	58	0,2240302
14,747	542,5	542,7	104,09	102,02	0,175	0,166	59	0,221336
14,742	542,5	542,8	103,92	102,14	0,175	0,166	60	0,2212954
14,889	542,6	542,8	102,99	101,09	0,175	0,166	61	0,223513
14,900	542,6	542,8	102,87	101,65	0,175	0,166	62	0,223576
14,917	542,7	542,9	102,47	101,25	0,174	0,167	63	0,2240302
14,448	542,7	542,9	106,26	104,66	0,175	0,167	64	0,2168949
14,820	542,7	542,9	103,51	101,67	0,175	0,166	65	0,2224383
14,894	542,8	543,0	103,24	101,26	0,175	0,166	66	0,2235761
14,896	542,8	543,0	102,72	101,04	0,175	0,166	67	0,2235763
14,925	542,8	543,0	102,62	100,95	0,174	0,166	68	0,2240299
14,859	542,8	543,1	102,78	101,34	0,174	0,166	69	0,2231223
14,916	542,8	543,1	102,71	101,01	0,174	0,166	70	0,2240306
14,916	542,9	543,1	103,01	101,13	0,175	0,166	71	0,2240303
14,988	542,9	543,2	101,99	100,34	0,175	0,166	72	0,2251598
14,988	542,9	543,2	102,14	100,58	0,175	0,166	73	0,2251598
14,979	543,0	543,3	102,06	100,23	0,175	0,166	74	0,2251594
15,063	543,0	543,3	101,38	99,94	0,174	0,166	75	0,2262814
14,951	543,1	543,3	102,57	100,85	0,175	0,167	76	0,224709
14,842	543,1	543,3	102,77	101,30	0,175	0,167	77	0,2231225
15,046	543,1	543,3	101,49	99,76	0,174	0,166	78	0,2262832
15,046	543,1	543,4	101,18	99,75	0,174	0,166	79	0,2262838
14,966	543,1	543,4	101,90	100,14	0,174	0,166	80	0,2251605
14,893	543,1	543,4	102,32	100,53	0,174	0,166	81	0,2240309
14,891	543,2	543,5	102,19	100,41	0,174	0,166	82	0,2240305
15,046	543,2	543,5	101,36	99,61	0,174	0,166	83	0,2262837
14,964	543,2	543,5	101,88	100,41	0,174	0,166	84	0,2251599
14,891	543,2	543,5	102,46	101,11	0,175	0,167	85	0,2240313
14,690	543,3	543,6	103,69	102,29	0,174	0,167	86	0,2208709
14,631	543,3	543,6	104,36	102,58	0,174	0,166	87	0,2200067
15,046	543,3	543,6	101,14	99,65	0,174	0,166	88	0,2262845
14,942	543,3	543,6	101,77	100,11	0,174	0,166	89	0,2247095
14,973	543,4	543,7	101,94	100,26	0,174	0,166	90	0,22516
15,049	543,4	543,7	101,34	99,49	0,174	0,166	91	0,2262838
14,864	543,4	543,7	102,79	101,03	0,175	0,166	92	0,2235281
14,972	543,4	543,7	101,95	100,25	0,175	0,166	93	0,2251608
14,866	543,5	543,8	102,70	100,91	0,175	0,166	94	0,2235775
15,072	543,5	543,8	101,01	99,45	0,174	0,166	95	0,2267332
14,389	543,5	543,8	106,02	104,00	0,174	0,166	96	0,2164287
14,782	543,5	543,8	102,94	101,33	0,174	0,166	97	0,22244
15,063	543,5	543,8	101,06	99,54	0,174	0,166	98	0,2267331
14,513	543,5	543,9	104,92	103,24	0,174	0,166	99	0,2185286
14,841	543,5	543,9	102,27	100,85	0,174	0,166	100	0,2235778
14,907	543,6	543,9	101,48	100,28	0,174	0,166	101	0,2247106
14,858	543,6	543,9	102,09	100,52	0,174	0,166	102	0,2240315
14,902	543,6	544,0	101,68	100,04	0,174	0,166	103	0,2247099
15,079	543,6	544,0	100,46	98,96	0,174	0,166	104	0,2274037
14,866	543,6	544,0	102,22	100,34	0,175	0,166	105	0,2243394
15,010	543,7	544,1	100,54	99,09	0,175	0,166	106	0,2267341
14,997	543,7	544,1	100,85	99,38	0,174	0,166	107	0,2265059
14,900	543,7	544,1	101,08	99,65	0,174	0,166	108	0,2251611
14,819	543,7	544,1	101,80	100,19	0,174	0,166	109	0,2240324
14,856	543,8	544,1	101,33	99,54	0,174	0,166	110	0,2247108
15,023	543,8	544,2	99,94	98,35	0,174	0,166	111	0,2274047
14,805	543,8	544,2	101,62	99,88	0,174	0,166	112	0,2240325
14,943	543,8	544,2	100,61	98,86	0,174	0,166	113	0,2262849
14,967	543,9	544,2	100,41	98,57	0,174	0,166	114	0,2267408

14,932	543,9	544,3	100,30	99,11	0,174	0,166	115	0,2262855
15,003	543,9	544,3	100,05	98,26	0,174	0,166	116	0,2274049
14,820	544,0	544,3	100,90	99,42	0,174	0,166	117	0,2247117
14,307	544,0	544,3	104,46	102,92	0,174	0,166	118	0,2168971
14,740	544,0	544,4	101,66	100,01	0,174	0,166	119	0,2235788
14,990	544,1	544,4	99,83	98,22	0,174	0,166	120	0,227405
14,985	544,1	544,4	100,00	98,21	0,174	0,166	121	0,2274048
14,336	544,1	544,4	104,39	102,58	0,174	0,166	122	0,217599
14,935	544,2	544,5	100,19	98,55	0,174	0,166	123	0,2267357
14,905	544,2	544,5	100,16	98,33	0,174	0,166	124	0,2262862
14,827	544,2	544,5	100,79	99,16	0,174	0,166	125	0,2251704
15,045	544,2	544,5	99,14	97,38	0,174	0,166	126	0,2285184
15,071	544,3	544,5	99,01	97,48	0,174	0,166	127	0,228962
14,892	544,3	544,6	100,24	98,44	0,174	0,166	128	0,2262856
15,038	544,3	544,6	98,92	97,50	0,174	0,166	129	0,2285177
14,891	544,4	544,6	100,01	98,61	0,174	0,166	130	0,2262855
15,069	544,4	544,7	98,69	97,34	0,174	0,166	131	0,2289617
14,961	544,5	544,7	99,46	98,16	0,174	0,166	132	0,2274056
15,038	544,5	544,7	99,24	97,54	0,174	0,166	133	0,2285189
14,161	544,5	544,8	105,22	103,15	0,174	0,165	134	0,2152557
14,919	544,6	544,8	99,97	98,31	0,174	0,166	135	0,2267349
15,060	544,6	544,8	98,79	97,26	0,174	0,166	136	0,2289622
14,882	544,7	544,9	100,05	98,45	0,174	0,166	137	0,2262873
15,091	544,7	544,9	98,57	96,88	0,174	0,166	138	0,2294058
14,878	544,8	545,0	99,87	98,43	0,174	0,166	139	0,2261842
14,983	544,8	545,0	99,46	97,64	0,174	0,166	140	0,2278535
14,987	544,8	545,0	99,37	97,64	0,174	0,166	141	0,2278522
14,885	544,9	545,0	100,33	98,28	0,174	0,166	142	0,2262842
14,954	544,9	545,1	99,29	97,69	0,174	0,165	143	0,2274064
14,985	544,9	545,1	99,22	97,86	0,174	0,166	144	0,2278518
14,731	545,0	545,1	100,68	99,31	0,174	0,166	145	0,2240338
14,775	545,0	545,2	100,72	98,77	0,174	0,165	146	0,2247134
14,982	545,0	545,2	99,63	97,56	0,174	0,165	147	0,2278522
14,952	545,1	545,2	99,34	97,71	0,174	0,165	148	0,2274072
15,023	545,1	545,3	99,00	97,09	0,174	0,165	149	0,2285203
15,022	545,1	545,3	98,97	97,42	0,174	0,165	150	0,2285202
15,049	545,1	545,3	98,55	97,09	0,174	0,166	151	0,2289636
15,020	545,2	545,4	98,51	97,28	0,173	0,166	152	0,2285209
14,770	545,2	545,4	100,59	98,70	0,174	0,165	153	0,2247135
14,945	545,2	545,4	99,34	97,73	0,174	0,165	154	0,2274077
14,945	545,3	545,5	99,65	97,57	0,174	0,165	155	0,2274079
15,051	545,3	545,5	99,04	97,11	0,174	0,165	156	0,2289641
14,971	545,3	545,5	99,10	97,49	0,174	0,166	157	0,2278542
15,018	545,3	545,5	98,79	97,14	0,174	0,165	158	0,2285207
14,795	545,4	545,5	100,09	98,75	0,174	0,165	159	0,2251646
14,940	545,4	545,6	99,01	97,82	0,173	0,166	160	0,2274081
14,939	545,4	545,6	99,08	97,68	0,173	0,166	161	0,227408
14,939	545,4	545,6	99,30	97,35	0,174	0,165	162	0,2273958
14,939	545,5	545,7	99,40	97,61	0,174	0,165	163	0,2274082
14,791	545,5	545,7	100,31	98,58	0,174	0,165	164	0,2251648
14,762	545,5	545,7	100,37	98,80	0,174	0,165	165	0,2247141
14,967	545,5	545,7	98,98	97,43	0,174	0,165	166	0,2278534
15,041	545,6	545,8	98,50	97,11	0,174	0,166	167	0,2289645
14,933	545,6	545,8	99,13	97,33	0,174	0,165	168	0,2274082
14,935	545,6	545,8	99,58	97,50	0,174	0,165	169	0,2274085
14,968	545,6	545,8	98,91	97,17	0,174	0,165	170	0,227854
14,940	545,7	545,9	99,31	97,43	0,174	0,165	171	0,2274076
14,672	545,7	545,9	100,79	99,21	0,174	0,165	172	0,2233456
14,896	545,8	545,9	99,53	98,10	0,173	0,165	173	0,2267378
14,896	545,8	546,0	99,42	97,69	0,174	0,165	174	0,2267385
14,941	545,8	546,0	99,02	97,35	0,173	0,165	175	0,2274086

15,014	545,9	546,0	98,67	96,64	0,173	0,165	176	0,2285221
14,869	545,9	546,1	99,72	97,91	0,174	0,165	177	0,2262901
14,849	546,0	546,1	99,85	97,83	0,174	0,165	178	0,2260477
14,939	546,0	546,2	98,97	97,27	0,173	0,165	179	0,2274095
14,788	546,0	546,2	100,28	98,50	0,173	0,165	180	0,2250822
15,013	546,1	546,2	98,45	97,01	0,173	0,165	181	0,2285223
14,792	546,1	546,3	99,84	98,10	0,173	0,165	182	0,2251663
15,041	546,1	546,3	98,54	96,68	0,173	0,165	183	0,2289655
14,788	546,1	546,3	100,11	98,35	0,174	0,165	184	0,2251229
14,936	546,2	546,3	99,29	97,31	0,174	0,165	185	0,2274082
14,894	546,2	546,4	99,50	97,67	0,174	0,165	186	0,2267386
14,864	546,2	546,4	99,72	98,07	0,174	0,165	187	0,2262903
14,760	546,3	546,5	100,19	98,40	0,173	0,165	188	0,2247155
15,013	546,3	546,5	98,69	96,98	0,173	0,165	189	0,2285222
14,894	546,4	546,5	99,31	97,62	0,173	0,165	190	0,2267266
14,763	546,4	546,6	100,29	98,55	0,173	0,165	191	0,2247154
14,942	546,5	546,6	99,21	97,36	0,174	0,165	192	0,2274095
14,972	546,5	546,7	98,80	97,10	0,173	0,165	193	0,2278549
14,971	546,5	546,7	98,59	97,18	0,173	0,165	194	0,227855
14,941	546,6	546,7	99,08	97,36	0,173	0,165	195	0,2274103
14,943	546,6	546,8	98,98	97,51	0,173	0,165	196	0,2274098
14,974	546,7	546,8	98,91	97,24	0,173	0,165	197	0,2278552
14,869	546,7	546,9	99,68	97,83	0,173	0,165	198	0,2262912
14,973	546,8	546,9	98,89	96,87	0,173	0,165	199	0,2278557
15,017	546,8	547,0	98,61	96,84	0,173	0,165	200	0,2285232
14,972	546,9	547,0	98,78	96,98	0,173	0,165	201	0,2278556
14,945	546,9	547,1	99,06	97,18	0,173	0,165	202	0,2274101
15,047	546,9	547,1	98,31	96,79	0,173	0,165	203	0,2289661
14,332	547,0	547,1	103,30	101,53	0,173	0,165	204	0,2180738
14,770	547,0	547,2	99,96	98,62	0,173	0,165	205	0,2247168
14,411	547,1	547,2	102,63	100,99	0,173	0,165	206	0,2192301
14,771	547,2	547,3	100,10	98,10	0,173	0,165	207	0,2247164
14,950	547,2	547,3	99,00	97,29	0,173	0,164	208	0,2274101
14,907	547,3	547,4	99,24	97,57	0,173	0,165	209	0,2267399
14,937	547,3	547,5	99,03	97,36	0,173	0,165	210	0,2271952
14,954	547,4	547,5	99,38	97,74	0,173	0,165	211	0,2274109
15,025	547,4	547,6	98,39	96,99	0,173	0,165	212	0,2285237
14,952	547,5	547,6	99,06	97,28	0,173	0,165	213	0,2274106
14,983	547,5	547,6	98,57	96,89	0,173	0,165	214	0,2278564
15,027	547,5	547,7	98,52	96,77	0,173	0,164	215	0,2285247
14,733	547,6	547,7	100,39	98,64	0,173	0,165	216	0,2240387
14,955	547,6	547,8	98,80	97,32	0,173	0,165	217	0,2274109
14,989	547,6	547,8	98,70	97,26	0,173	0,165	218	0,227932
14,985	547,7	547,8	98,80	97,31	0,173	0,165	219	0,2278566
15,087	547,7	547,9	98,19	96,40	0,173	0,165	220	0,229411
14,911	547,7	547,9	99,06	97,38	0,173	0,164	221	0,2267409
15,028	547,7	547,9	98,55	96,63	0,173	0,164	222	0,2285243
14,603	547,7	547,9	101,10	99,63	0,173	0,165	223	0,2220631
14,882	547,7	548,0	99,15	97,90	0,173	0,165	224	0,2262922
14,910	547,8	548,0	99,30	97,76	0,173	0,165	225	0,2267412
14,911	547,8	548,0	99,20	97,63	0,173	0,165	226	0,226742
14,371	547,8	548,0	103,14	101,01	0,173	0,165	227	0,2185358
14,261	547,8	548,1	103,81	101,94	0,173	0,164	228	0,2169038
14,777	547,8	548,1	100,24	98,21	0,173	0,164	229	0,224718
14,910	547,9	548,1	99,12	97,61	0,173	0,165	230	0,2267417
14,953	547,9	548,1	98,97	96,90	0,173	0,164	231	0,2274119
14,807	548,0	548,2	99,81	98,35	0,173	0,164	232	0,2251685
14,955	548,0	548,2	98,92	97,29	0,173	0,165	233	0,2274117
14,881	548,0	548,2	99,49	97,82	0,173	0,165	234	0,2262926
14,910	548,0	548,2	98,96	97,67	0,173	0,165	235	0,2267418
14,775	548,0	548,3	99,99	97,98	0,173	0,164	236	0,2246706

14,310	548,1	548,3	103,07	101,42	0,173	0,164	237	0,2176053
14,734	548,1	548,3	100,26	98,67	0,173	0,164	238	0,2240398
14,984	548,1	548,4	98,80	97,12	0,173	0,165	239	0,2278573
14,984	548,2	548,4	98,70	97,00	0,173	0,165	240	0,2278572
14,954	548,2	548,4	98,95	97,27	0,173	0,165	241	0,2274125
14,600	548,2	548,5	101,21	99,65	0,173	0,165	242	0,221992
14,986	548,2	548,5	98,71	96,79	0,173	0,164	243	0,227858
14,882	548,3	548,5	99,26	97,80	0,173	0,164	244	0,2262927
14,884	548,3	548,5	99,17	97,75	0,173	0,165	245	0,2262925
14,707	548,4	548,6	100,73	98,90	0,173	0,165	246	0,2235859
14,914	548,4	548,6	99,21	97,45	0,173	0,164	247	0,2267421
14,958	548,4	548,7	99,17	97,30	0,173	0,165	248	0,2274127
15,032	548,5	548,7	98,19	96,77	0,173	0,165	249	0,2285256
14,806	548,5	548,7	99,78	98,54	0,173	0,165	250	0,2251114
14,810	548,5	548,8	99,54	98,10	0,172	0,165	251	0,2251694
14,782	548,6	548,8	100,10	98,21	0,173	0,164	252	0,2247183
14,812	548,6	548,8	100,20	98,15	0,173	0,164	253	0,2251696
14,558	548,6	548,9	101,47	99,91	0,173	0,164	254	0,2213049
14,347	548,7	548,9	103,15	101,75	0,173	0,165	255	0,2180709
14,962	548,7	548,9	98,89	97,41	0,173	0,165	256	0,2274126
14,888	548,7	549,0	99,15	97,67	0,173	0,165	257	0,2262932
15,035	548,8	549,0	97,97	96,93	0,172	0,165	258	0,2285258
14,378	548,8	549,0	102,87	100,90	0,172	0,164	259	0,2185374
14,741	548,8	549,1	100,28	98,70	0,173	0,164	260	0,224039
14,711	548,8	549,1	100,80	98,99	0,173	0,165	261	0,2235866
15,036	548,9	549,1	98,67	97,44	0,173	0,165	262	0,2285259
14,815	548,9	549,2	99,75	98,34	0,173	0,165	263	0,2251698
14,815	549,0	549,2	99,71	98,28	0,173	0,165	264	0,2251696
14,889	548,9	549,2	99,07	97,76	0,172	0,165	265	0,2262934
14,711	549,0	549,2	100,19	98,79	0,172	0,164	266	0,2235866
14,993	549,0	549,3	98,40	97,45	0,172	0,165	267	0,227858
14,963	549,0	549,3	98,80	97,39	0,172	0,165	268	0,2274128
14,891	549,1	549,3	99,40	97,67	0,173	0,165	269	0,2262939
14,918	549,1	549,3	99,12	97,63	0,173	0,165	270	0,226742
14,891	549,1	549,4	99,19	97,75	0,173	0,165	271	0,2262942
14,818	549,1	549,4	99,68	98,54	0,172	0,165	272	0,22517
14,919	549,2	549,4	98,97	97,74	0,172	0,165	273	0,2267431
14,742	549,2	549,4	100,17	98,69	0,172	0,165	274	0,2240408
14,920	549,2	549,5	99,41	97,87	0,173	0,165	275	0,2267426
14,817	549,2	549,5	99,61	98,49	0,173	0,165	276	0,2251703
14,920	549,2	549,5	99,12	97,95	0,173	0,165	277	0,2267426
14,919	549,2	549,5	98,81	97,79	0,172	0,165	278	0,226743
14,962	549,1	549,4	98,77	97,66	0,172	0,165	279	0,2274134
14,815	549,1	549,4	99,66	98,54	0,173	0,165	280	0,225172
14,817	549,1	549,4	99,57	98,49	0,172	0,165	281	0,2251699
14,890	549,1	549,5	99,21	97,82	0,172	0,165	282	0,226294
14,786	549,2	549,5	99,96	98,71	0,173	0,165	283	0,2247193
14,715	549,2	549,5	100,55	99,32	0,173	0,165	284	0,223587
14,743	549,2	549,5	100,04	98,98	0,172	0,165	285	0,2240432
14,892	549,3	549,6	99,31	98,05	0,172	0,165	286	0,2262939
14,789	549,3	549,6	99,70	98,64	0,172	0,165	287	0,2247195
14,893	549,3	549,6	98,93	97,99	0,172	0,165	288	0,2262944
14,740	549,4	549,6	100,32	99,13	0,172	0,165	289	0,2239682
14,923	549,4	549,7	98,99	97,69	0,173	0,165	290	0,2267434
14,924	549,4	549,7	99,20	97,91	0,173	0,165	291	0,226743
14,818	549,4	549,7	99,79	98,62	0,173	0,165	292	0,2251706
14,970	549,4	549,7	98,87	97,57	0,173	0,165	293	0,2274135
14,822	549,5	549,7	99,63	98,38	0,172	0,165	294	0,2251705
14,896	549,5	549,8	99,29	97,85	0,172	0,165	295	0,226294
14,687	549,5	549,8	100,53	99,39	0,172	0,165	296	0,2231337
14,972	549,5	549,8	98,75	97,37	0,172	0,165	297	0,2274137

14,970	549,5	549,8	98,84	97,74	0,173	0,165	298	0,2274137
14,896	549,5	549,8	99,11	98,19	0,172	0,165	299	0,226294
14,971	549,6	549,8	98,43	97,84	0,172	0,165	300	0,2274138
14,908	549,6	549,9	99,17	97,88	0,172	0,165	301	0,2264446
14,928	549,6	549,9	98,96	97,78	0,172	0,165	302	0,2267433
14,925	549,6	549,9	98,93	97,98	0,172	0,165	303	0,2267428
14,794	549,6	549,9	100,28	98,85	0,173	0,165	304	0,2247195
14,821	549,6	549,9	99,58	98,57	0,173	0,165	305	0,2251704
14,537	549,6	549,9	101,73	100,50	0,172	0,165	306	0,2208456
14,897	549,6	549,9	98,99	98,40	0,172	0,165	307	0,2262943
14,897	549,6	549,9	99,23	97,97	0,172	0,165	308	0,2262945
14,794	549,6	549,9	99,82	98,96	0,172	0,165	309	0,2247199
14,897	549,7	549,9	99,01	98,17	0,172	0,165	310	0,2262936
14,569	549,7	550,0	101,38	100,29	0,172	0,165	311	0,2213065
14,750	549,7	550,0	100,22	99,38	0,172	0,165	312	0,2240412
14,896	549,7	550,0	99,27	98,29	0,172	0,165	313	0,2262941
14,928	549,7	550,0	99,37	98,13	0,173	0,165	314	0,2267436
14,719	549,7	550,0	100,27	99,51	0,173	0,165	315	0,2235873
14,928	549,7	550,0	99,07	98,16	0,172	0,165	316	0,2267434
14,989	549,7	550,0	98,36	97,53	0,172	0,165	317	0,2276841
14,795	549,7	550,0	99,91	98,83	0,172	0,165	318	0,2247165
14,924	549,7	550,0	98,90	98,08	0,172	0,165	319	0,2267435
14,792	549,8	550,0	99,69	99,12	0,172	0,166	320	0,22472
14,970	549,8	550,1	98,64	97,85	0,172	0,166	321	0,2274135
14,926	549,8	550,1	99,01	98,09	0,172	0,165	322	0,2267431
14,893	549,8	550,1	99,24	98,19	0,172	0,165	323	0,2262944
14,641	549,8	550,1	100,68	100,06	0,172	0,165	324	0,2224498
14,897	549,8	550,0	99,25	98,31	0,172	0,165	325	0,2262947
14,793	549,7	550,0	99,65	98,97	0,172	0,165	326	0,2247203
14,898	549,8	550,0	98,89	98,23	0,172	0,165	327	0,2262949
14,720	549,8	550,1	100,45	99,57	0,172	0,165	328	0,223587
14,925	549,8	550,1	98,97	98,33	0,172	0,166	329	0,2266911
14,930	549,8	550,1	99,16	98,06	0,172	0,166	330	0,2267432
14,928	549,9	550,1	99,06	98,02	0,173	0,165	331	0,2267433
15,003	549,9	550,1	98,62	97,55	0,173	0,165	332	0,2278593
14,720	549,9	550,2	100,26	99,67	0,172	0,165	333	0,2235872
14,722	549,9	550,2	100,44	99,46	0,172	0,166	334	0,2235873
14,795	550,0	550,2	99,76	99,14	0,172	0,165	335	0,2247199
14,973	550,0	550,3	98,67	97,68	0,172	0,165	336	0,2274141
14,998	550,0	550,3	98,55	97,43	0,172	0,165	337	0,2278589
14,793	550,0	550,3	99,73	98,94	0,172	0,165	338	0,2247202
14,435	549,9	550,3	102,05	101,39	0,172	0,165	339	0,219233
14,927	549,9	550,3	98,97	97,96	0,172	0,165	340	0,2267434
14,121	549,9	550,3	104,47	103,29	0,172	0,165	341	0,2145548
14,966	549,9	550,2	98,57	97,77	0,172	0,165	342	0,2274141
14,897	549,9	550,2	99,53	98,38	0,173	0,165	343	0,226296
14,822	549,9	550,2	99,52	98,92	0,173	0,166	344	0,2251707
14,823	549,9	550,2	99,73	98,93	0,172	0,166	345	0,2251704
14,926	549,9	550,2	98,73	98,05	0,172	0,165	346	0,2267428
14,795	549,9	550,2	99,86	99,09	0,172	0,165	347	0,2247392
14,747	549,9	550,2	100,06	99,29	0,172	0,166	348	0,2240412
14,972	550,0	550,3	98,48	97,96	0,172	0,166	349	0,2274139
14,928	550,0	550,3	98,91	98,52	0,172	0,166	350	0,2267434
14,927	550,1	550,3	98,96	98,33	0,172	0,166	351	0,2267375
14,795	550,1	550,4	99,92	98,99	0,172	0,166	352	0,2247197
15,002	550,1	550,4	98,26	97,63	0,172	0,165	353	0,2278593
14,929	550,2	550,4	99,01	98,29	0,172	0,166	354	0,226743
14,900	550,2	550,5	98,90	98,68	0,172	0,166	355	0,2262947
14,973	550,2	550,5	98,33	97,99	0,172	0,166	356	0,2274139
14,753	550,2	550,5	100,19	99,59	0,172	0,166	357	0,2240427
14,096	550,2	550,5	104,74	104,12	0,172	0,166	358	0,2140813

14,901	550,3	550,5	99,29	98,70	0,172	0,166	359	0,2262951
14,975	550,3	550,5	98,72	98,08	0,172	0,166	360	0,2274138
14,648	550,3	550,6	100,96	100,20	0,172	0,166	361	0,2224504
14,867	550,3	550,6	99,23	98,74	0,172	0,166	362	0,2257815
14,647	550,3	550,6	100,89	100,39	0,172	0,166	363	0,2224497
14,830	550,3	550,6	99,49	99,33	0,172	0,166	364	0,2252306
15,001	550,2	550,6	98,42	97,82	0,172	0,166	365	0,2278645
14,530	550,2	550,5	101,72	101,16	0,172	0,166	366	0,2206832
14,898	550,2	550,5	98,87	98,52	0,172	0,166	367	0,2262947
14,736	550,2	550,5	100,09	99,61	0,172	0,166	368	0,2238152
14,389	550,2	550,6	102,35	102,18	0,172	0,166	369	0,2185384
14,901	550,3	550,6	98,98	98,43	0,172	0,166	370	0,226295
14,826	550,3	550,6	99,71	99,23	0,172	0,166	371	0,2251709
14,931	550,3	550,6	98,92	98,32	0,172	0,166	372	0,226756
14,822	550,3	550,6	99,66	99,22	0,172	0,166	373	0,2251705
14,721	550,3	550,6	100,23	99,70	0,172	0,166	374	0,2235876
14,825	550,3	550,6	99,63	99,03	0,172	0,166	375	0,2251706
14,930	550,2	550,6	98,83	98,36	0,172	0,166	376	0,2267434
14,900	550,2	550,6	98,93	98,87	0,172	0,166	377	0,2262949
14,931	550,2	550,6	99,09	98,58	0,172	0,166	378	0,2267434
14,902	550,2	550,6	99,19	98,81	0,172	0,166	379	0,2262946
14,798	550,2	550,6	100,15	99,48	0,173	0,166	380	0,2247199
14,828	550,3	550,6	99,44	99,08	0,172	0,166	381	0,2251702
15,048	550,3	550,6	98,08	97,65	0,172	0,166	382	0,2285268
14,901	550,3	550,6	98,84	98,58	0,172	0,166	383	0,2262949
14,827	550,3	550,6	99,69	99,23	0,172	0,166	384	0,2251706
14,826	550,3	550,6	99,98	99,19	0,173	0,166	385	0,2251705
14,900	550,3	550,6	99,02	98,82	0,172	0,166	386	0,2262947
14,434	550,3	550,6	102,37	101,78	0,172	0,166	387	0,219233
14,927	550,2	550,6	98,97	98,62	0,172	0,166	388	0,2267419
14,927	550,2	550,6	98,75	98,41	0,172	0,166	389	0,2267431
14,796	550,2	550,5	99,45	99,25	0,172	0,166	390	0,22472
14,825	550,1	550,5	99,67	99,11	0,172	0,166	391	0,2251704
14,247	550,1	550,5	103,61	103,55	0,172	0,166	392	0,2164384
14,822	550,0	550,4	99,92	99,30	0,173	0,166	393	0,2251701
14,747	550,0	550,4	100,49	99,67	0,173	0,166	394	0,2240415
14,717	550,0	550,4	100,31	99,98	0,173	0,166	395	0,2235872
14,924	550,0	550,3	98,88	98,28	0,172	0,166	396	0,2267427
14,712	549,9	550,3	100,10	100,04	0,172	0,166	397	0,2235872
14,505	549,9	550,3	101,51	101,46	0,172	0,166	398	0,2203909
14,967	549,9	550,3	98,45	98,14	0,172	0,166	399	0,2274132
14,790	549,9	550,3	99,85	99,51	0,172	0,166	400	0,2247193
14,789	550,0	550,3	99,94	99,56	0,172	0,166	401	0,2247195
14,922	550,0	550,3	98,99	98,74	0,172	0,166	402	0,2267384
14,818	550,0	550,3	99,53	99,04	0,172	0,166	403	0,2251696
14,788	550,0	550,3	99,73	99,43	0,172	0,166	404	0,2247195
14,789	549,9	550,3	99,74	99,24	0,172	0,166	405	0,2247196
14,789	549,9	550,3	99,75	99,27	0,172	0,166	406	0,2247189
14,993	549,9	550,3	98,79	98,06	0,173	0,166	407	0,2278586
14,889	549,9	550,2	98,99	98,95	0,173	0,166	408	0,2262935
14,992	549,8	550,2	98,51	97,99	0,172	0,166	409	0,2278582
14,888	549,8	550,2	98,89	98,73	0,172	0,166	410	0,226294
14,706	549,7	550,1	100,32	99,75	0,172	0,166	411	0,2235871
14,810	549,7	550,1	99,52	99,31	0,172	0,166	412	0,2251699
14,913	549,6	550,0	98,74	98,54	0,172	0,166	413	0,2267426
14,882	549,6	550,0	99,07	98,81	0,172	0,166	414	0,2262931
14,673	549,6	550,0	100,54	100,31	0,172	0,167	415	0,2231328
14,955	549,5	549,9	98,72	98,65	0,173	0,167	416	0,2274127
14,909	549,5	549,9	98,73	98,60	0,172	0,167	417	0,2267426
14,879	549,5	549,9	99,19	98,64	0,172	0,166	418	0,2262934
14,874	549,4	549,8	98,86	98,58	0,172	0,166	419	0,2262931

14,548	549,4	549,8	101,04	100,63	0,172	0,166	420	0,2212962
14,800	549,4	549,8	99,65	99,33	0,172	0,166	421	0,2251688
14,669	549,3	549,7	100,49	100,34	0,173	0,167	422	0,2231326
14,800	549,3	549,7	99,78	99,38	0,173	0,167	423	0,225169
14,770	549,3	549,7	99,90	99,30	0,173	0,166	424	0,2247181
14,870	549,2	549,6	99,22	98,74	0,173	0,166	425	0,2262926
14,946	549,2	549,6	98,53	98,41	0,173	0,167	426	0,2274122
14,901	549,2	549,6	98,99	98,53	0,173	0,167	427	0,2267413
14,766	549,1	549,5	99,72	99,52	0,173	0,167	428	0,224716
14,691	549,1	549,5	100,32	100,12	0,173	0,167	429	0,223586
14,899	549,1	549,5	99,03	98,61	0,173	0,167	430	0,2267413
14,794	549,0	549,4	99,51	99,20	0,173	0,166	431	0,2251685
14,584	549,0	549,4	100,73	100,49	0,172	0,166	432	0,2219887
14,867	549,0	549,4	99,13	98,62	0,172	0,166	433	0,2262923
14,763	549,0	549,4	99,71	99,34	0,173	0,166	434	0,2247175
14,967	549,0	549,3	98,45	98,20	0,173	0,167	435	0,227857
14,293	548,9	549,3	103,20	102,41	0,173	0,166	436	0,2176036
14,215	548,9	549,3	103,66	103,55	0,173	0,167	437	0,2164369
14,862	548,9	549,3	99,15	98,79	0,173	0,167	438	0,226292
14,684	548,9	549,3	100,24	100,05	0,173	0,167	439	0,2235852
14,892	548,8	549,2	98,95	98,54	0,173	0,167	440	0,2267404
14,610	548,8	549,2	100,78	100,30	0,173	0,166	441	0,2224471
14,861	548,8	549,1	99,15	98,47	0,173	0,166	442	0,2262922
14,934	548,7	549,1	98,38	98,30	0,172	0,166	443	0,2274106
14,859	548,7	549,1	99,01	98,87	0,172	0,167	444	0,2262914
14,754	548,7	549,1	99,70	99,51	0,173	0,167	445	0,2247169
14,933	548,7	549,1	98,62	98,33	0,173	0,167	446	0,2274107
14,351	548,7	549,0	102,57	102,10	0,173	0,167	447	0,2185351
14,319	548,7	549,0	102,79	102,21	0,173	0,166	448	0,2180699
14,887	548,7	549,0	99,29	98,43	0,173	0,166	449	0,2267401
14,961	548,7	549,0	98,32	97,86	0,173	0,166	450	0,2278563
14,888	548,6	549,0	99,01	98,75	0,173	0,167	451	0,2267406
14,783	548,6	549,0	99,39	99,28	0,173	0,167	452	0,2251675
14,857	548,6	548,9	99,15	98,79	0,173	0,167	453	0,2262913
14,751	548,6	548,9	99,73	99,34	0,173	0,167	454	0,224717
14,781	548,6	548,9	99,43	99,05	0,173	0,166	455	0,2251679
14,750	548,5	548,9	99,76	99,47	0,173	0,167	456	0,2247167

Average	Average	Average						Average
14,19	Inlet +	Inlet +						0,213
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,67	100,30	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
14,289	541,8	542,1			0,171	0,164	0	0,2145433
14,382	541,9	542,1	98,25	97,67	0,171	0,165	1	0,2175939
14,595	541,9	542,1	96,72	96,05	0,171	0,165	2	0,2208344
14,422	541,9	542,2	97,63	97,03	0,171	0,165	3	0,2185247
14,498	542,0	542,2	97,29	97,00	0,171	0,165	4	0,2192203
14,333	542,0	542,2	99,93	99,11	0,171	0,165	5	0,2152494
13,744	542,0	542,3	105,11	104,58	0,171	0,165	6	0,20536
14,216	542,0	542,3	102,88	102,06	0,171	0,165	7	0,2112046
14,200	542,0	542,3	104,05	103,48	0,171	0,165	8	0,210001
14,320	542,1	542,3	103,51	103,14	0,171	0,165	9	0,2112046
14,473	542,1	542,3	102,07	102,09	0,171	0,165	10	0,2135937
14,373	542,1	542,3	102,37	101,97	0,171	0,165	11	0,2128799
13,738	542,1	542,2	106,85	106,44	0,171	0,165	12	0,2036238
14,494	542,2	542,2	101,54	101,11	0,171	0,165	13	0,2145418
14,433	542,2	542,3	102,47	101,42	0,171	0,165	14	0,2135831
13,803	542,3	542,3	106,75	106,43	0,171	0,165	15	0,2041217
13,908	542,3	542,4	106,48	105,80	0,171	0,165	16	0,2053598
14,339	542,4	542,4	102,29	102,13	0,171	0,165	17	0,2124019
14,458	542,4	542,4	101,35	100,87	0,171	0,165	18	0,214542
14,416	542,4	542,4	101,39	101,19	0,171	0,165	19	0,2140677
14,452	542,5	542,5	101,08	100,77	0,171	0,165	20	0,2145419
14,457	542,5	542,6	101,25	100,55	0,171	0,165	21	0,2145418
14,275	542,6	542,7	102,75	101,99	0,171	0,165	22	0,2116796
13,846	542,7	542,7	105,95	105,23	0,171	0,165	23	0,2053599
14,337	542,7	542,7	101,80	101,53	0,171	0,165	24	0,2128803
14,430	542,8	542,8	101,14	100,66	0,171	0,165	25	0,2145421
13,501	542,8	542,8	107,89	107,77	0,171	0,165	26	0,2006126
14,178	542,8	542,9	102,61	102,37	0,170	0,165	27	0,2107249
14,373	542,8	542,9	101,61	101,13	0,171	0,165	28	0,213594
14,303	542,9	543,0	102,13	101,60	0,171	0,165	29	0,2124033
13,742	543,0	543,0	106,46	105,92	0,171	0,165	30	0,2041219
14,324	543,0	543,1	101,94	101,43	0,171	0,165	31	0,2128804
14,426	543,0	543,1	101,12	100,64	0,171	0,165	32	0,2145427
13,413	543,0	543,1	108,64	108,42	0,171	0,165	33	0,1993452
13,935	543,0	543,1	104,80	104,30	0,171	0,165	34	0,2070536
13,499	543,1	543,1	107,96	107,22	0,171	0,165	35	0,2006138
14,328	543,1	543,1	101,87	101,04	0,171	0,164	36	0,2128804
14,174	543,1	543,0	102,93	102,23	0,171	0,165	37	0,2107259
14,294	543,1	543,0	101,83	101,36	0,171	0,165	38	0,2124027
14,409	543,1	543,1	101,18	101,13	0,170	0,165	39	0,2140687
14,260	543,1	543,1	102,24	102,19	0,170	0,165	40	0,2116864
14,126	543,1	543,0	103,05	102,83	0,170	0,165	41	0,2100019
13,426	543,0	543,0	108,98	108,61	0,171	0,165	42	0,1993458
14,400	543,1	543,0	101,70	101,16	0,171	0,165	43	0,2135946
14,387	543,1	543,1	101,68	100,97	0,171	0,165	44	0,2135952
14,385	543,1	543,1	101,49	101,43	0,171	0,165	45	0,2135949
14,393	543,2	543,2	101,65	101,18	0,171	0,165	46	0,2135949
14,431	543,2	543,3	101,33	101,14	0,171	0,165	47	0,2140693
14,390	543,3	543,3	101,38	101,39	0,170	0,165	48	0,2135952
14,512	543,3	543,4	101,03	100,49	0,171	0,165	49	0,2152507
14,431	543,4	543,4	101,46	100,99	0,171	0,165	50	0,214069
13,728	543,4	543,5	106,96	105,97	0,171	0,165	51	0,2036246
14,313	543,4	543,5	101,96	101,59	0,171	0,165	52	0,212404
14,282	543,5	543,6	102,34	101,95	0,170	0,165	53	0,2118897

14,311	543,5	543,6	101,84	101,83	0,170	0,165	54	0,2124033
14,317	543,5	543,6	102,25	101,78	0,170	0,165	55	0,2124035
14,379	543,5	543,6	101,85	101,06	0,171	0,165	56	0,2135949
14,443	543,5	543,6	100,92	100,40	0,171	0,165	57	0,2145435
14,418	543,5	543,6	101,36	100,77	0,171	0,165	58	0,2140693
14,469	543,5	543,5	100,59	100,10	0,171	0,165	59	0,2152509
13,653	543,5	543,5	106,61	106,46	0,170	0,165	60	0,2028767
13,423	543,5	543,5	109,14	108,31	0,171	0,165	61	0,1993459
14,175	543,5	543,5	102,70	102,65	0,171	0,165	62	0,2106566
13,583	543,5	543,5	107,37	107,01	0,171	0,165	63	0,2018748
13,891	543,5	543,5	104,53	104,23	0,170	0,165	64	0,206592
14,316	543,5	543,5	101,71	101,14	0,170	0,165	65	0,2128819
14,286	543,6	543,5	101,84	101,28	0,171	0,165	66	0,2124031
13,690	543,6	543,5	106,08	105,95	0,170	0,165	67	0,203625
13,732	543,6	543,5	106,03	105,76	0,170	0,165	68	0,2041229
14,420	543,6	543,6	100,87	100,61	0,171	0,165	69	0,2145433
14,307	543,6	543,6	101,70	101,41	0,171	0,165	70	0,2128812
14,121	543,6	543,7	102,85	102,52	0,170	0,165	71	0,2100022
14,225	543,7	543,7	102,23	101,59	0,170	0,165	72	0,2116865
13,639	543,8	543,8	106,38	106,00	0,170	0,165	73	0,2028765
14,197	543,8	543,8	102,09	101,47	0,170	0,164	74	0,2112056
14,392	543,9	543,9	100,92	100,52	0,170	0,164	75	0,2142572
13,749	543,9	543,9	105,34	105,01	0,170	0,165	76	0,2048674
13,994	543,9	543,9	103,90	103,51	0,171	0,165	77	0,2083208
13,784	543,9	543,9	105,23	104,82	0,171	0,165	78	0,2053614
13,701	543,9	543,9	105,91	105,12	0,171	0,165	79	0,2041237
14,141	543,9	543,9	102,33	101,95	0,170	0,165	80	0,2107258
14,276	543,9	543,9	101,40	100,71	0,170	0,165	81	0,2128815
14,472	544,0	543,9	99,94	99,77	0,170	0,165	82	0,2157223
13,662	543,9	543,9	105,99	105,67	0,170	0,165	83	0,2036254
14,344	544,0	544,0	101,24	100,72	0,171	0,165	84	0,213596
14,357	544,0	544,0	100,65	100,65	0,170	0,165	85	0,2140695
14,171	544,1	544,1	101,85	101,67	0,170	0,165	86	0,2112068
14,332	544,1	544,1	101,03	100,51	0,170	0,165	87	0,2135956
14,379	544,2	544,2	100,37	100,01	0,170	0,165	88	0,214544
13,934	544,2	544,3	103,65	103,08	0,170	0,164	89	0,2078176
14,338	544,3	544,3	100,95	100,29	0,171	0,165	90	0,2140747
14,253	544,3	544,3	100,98	101,14	0,171	0,165	91	0,212882
14,327	544,3	544,3	100,58	100,51	0,170	0,165	92	0,21407
14,099	544,2	544,3	101,84	101,79	0,170	0,165	93	0,2107258
14,394	544,2	544,3	99,89	99,53	0,170	0,165	94	0,215251
14,305	544,3	544,3	100,26	99,81	0,170	0,165	95	0,214076
14,142	544,3	544,4	101,26	101,03	0,170	0,165	96	0,2116871
14,486	544,2	544,4	98,95	98,89	0,170	0,165	97	0,2168953
14,072	544,2	544,4	101,91	101,58	0,170	0,165	98	0,2107217
14,403	544,2	544,4	99,59	99,24	0,170	0,165	99	0,2157238
14,134	544,2	544,4	101,21	100,96	0,170	0,165	100	0,2116877
14,320	544,2	544,4	100,05	99,60	0,170	0,165	101	0,2145926
14,279	544,2	544,5	99,94	99,73	0,170	0,165	102	0,2140703
14,312	544,2	544,5	99,65	99,59	0,170	0,165	103	0,2145448
14,190	544,3	544,5	100,72	100,31	0,170	0,165	104	0,2128828
14,231	544,3	544,4	100,24	99,80	0,170	0,165	105	0,2135962
14,297	544,2	544,5	100,03	99,51	0,170	0,165	106	0,2145447
14,146	544,2	544,4	100,90	100,52	0,171	0,165	107	0,212405
13,578	544,2	544,5	104,89	104,40	0,171	0,165	108	0,204124
14,276	544,2	544,4	99,61	99,47	0,170	0,165	109	0,2145441
14,161	544,3	544,5	100,52	100,02	0,170	0,165	110	0,2128826
14,318	544,3	544,4	99,24	99,17	0,170	0,165	111	0,2152518
13,337	544,3	544,5	106,53	106,11	0,170	0,165	112	0,2006165
13,682	544,4	544,5	103,87	103,51	0,170	0,165	113	0,2058563
14,305	544,3	544,4	98,99	98,79	0,170	0,165	114	0,2152516

14,321	544,3	544,4	98,80	98,67	0,170	0,165	115	0,2157231
13,555	544,3	544,4	104,28	104,10	0,170	0,165	116	0,2041243
13,554	544,3	544,4	104,42	104,23	0,170	0,165	117	0,2041242
14,187	544,3	544,4	100,06	99,28	0,170	0,164	118	0,2135965
14,317	544,4	544,4	98,89	98,57	0,170	0,164	119	0,2157235
14,121	544,4	544,4	100,23	99,78	0,170	0,165	120	0,2128825
14,288	544,4	544,5	99,03	98,67	0,170	0,165	121	0,2152526
14,177	544,4	544,5	99,89	99,39	0,170	0,165	122	0,2135979
13,665	544,4	544,4	103,53	103,15	0,170	0,164	123	0,2058569
13,731	544,4	544,4	102,71	102,40	0,170	0,164	124	0,2070854
14,422	544,4	544,4	98,34	97,66	0,170	0,164	125	0,217279
14,441	544,4	544,4	98,08	97,61	0,170	0,164	126	0,2175971
14,117	544,4	544,4	100,44	99,69	0,171	0,165	127	0,2128835
14,188	544,4	544,4	99,31	99,17	0,170	0,165	128	0,2140708
14,261	544,5	544,4	98,84	98,62	0,170	0,165	129	0,215253
14,255	544,5	544,4	98,60	98,56	0,170	0,165	130	0,2152528
14,263	544,5	544,4	99,01	98,44	0,170	0,165	131	0,215253
14,410	544,5	544,4	98,17	97,61	0,171	0,165	132	0,2175979
14,406	544,5	544,4	97,69	97,46	0,171	0,165	133	0,2175978
14,357	544,5	544,4	98,14	97,81	0,170	0,165	134	0,2168967
14,018	544,5	544,5	100,49	100,00	0,170	0,165	135	0,2117846
13,627	544,5	544,5	103,16	103,09	0,170	0,165	136	0,205857
14,288	544,5	544,5	98,28	98,39	0,170	0,165	137	0,2157244
14,254	544,5	544,5	98,89	98,59	0,170	0,165	138	0,2152541
14,269	544,5	544,5	98,51	98,04	0,170	0,165	139	0,2157255
14,351	544,5	544,5	98,32	97,57	0,171	0,164	140	0,2168972
14,203	544,5	544,4	99,50	98,70	0,171	0,164	141	0,2145461
14,420	544,5	544,4	97,42	97,29	0,171	0,165	142	0,2180637
14,338	544,5	544,3	97,88	97,41	0,170	0,165	143	0,2168971
14,125	544,4	544,3	99,28	99,53	0,170	0,165	144	0,2135985
14,342	544,4	544,3	97,70	97,54	0,170	0,165	145	0,2168988
14,152	544,4	544,3	99,06	98,76	0,170	0,165	146	0,2140724
14,254	544,4	544,2	98,46	98,08	0,170	0,165	147	0,215725
14,245	544,4	544,2	98,50	97,98	0,170	0,165	148	0,2157252
13,981	544,4	544,3	100,33	100,02	0,170	0,165	149	0,2116898
14,251	544,5	544,3	98,33	97,88	0,170	0,165	150	0,2157253
13,802	544,5	544,4	101,57	101,49	0,170	0,165	151	0,2088784
14,376	544,5	544,4	97,49	97,23	0,170	0,165	152	0,2175984
14,174	544,5	544,5	98,86	98,58	0,170	0,165	153	0,2145468
14,330	544,6	544,5	98,24	97,52	0,171	0,165	154	0,2168973
13,877	544,6	544,5	100,97	100,89	0,170	0,165	155	0,2100056
14,219	544,6	544,6	98,68	98,39	0,170	0,165	156	0,2152545
14,108	544,5	544,6	99,12	99,20	0,170	0,165	157	0,2135984
14,245	544,5	544,5	98,37	98,36	0,170	0,165	158	0,2157254
14,220	544,5	544,5	98,53	98,42	0,170	0,165	159	0,2152591
14,164	544,5	544,5	98,69	98,71	0,170	0,165	160	0,2145465
14,312	544,5	544,5	97,71	97,24	0,170	0,165	161	0,2168976
13,526	544,5	544,5	103,58	103,10	0,170	0,164	162	0,2048703
14,168	544,5	544,5	98,99	98,60	0,170	0,165	163	0,2145469
14,158	544,5	544,6	98,71	98,69	0,170	0,165	164	0,2144666
14,207	544,5	544,6	98,60	98,11	0,170	0,165	165	0,2152545
14,101	544,5	544,6	99,08	98,96	0,170	0,165	166	0,2135988
14,388	544,5	544,6	96,92	97,06	0,170	0,165	167	0,2180659
14,310	544,5	544,6	97,79	97,14	0,170	0,165	168	0,2168983
14,391	544,5	544,6	97,20	96,52	0,170	0,164	169	0,2180645
14,354	544,6	544,6	97,66	96,96	0,170	0,164	170	0,2175014
14,209	544,6	544,6	98,62	98,15	0,170	0,164	171	0,2152544
13,749	544,6	544,7	101,93	101,73	0,170	0,165	172	0,2083079
14,395	544,6	544,7	97,16	97,13	0,170	0,165	173	0,2180647
14,319	544,6	544,7	97,85	97,40	0,170	0,165	174	0,2168978
14,363	544,7	544,8	97,35	96,97	0,170	0,164	175	0,2175975

14,394	544,7	544,8	97,24	96,60	0,170	0,164	176	0,2180644
14,209	544,7	544,8	98,61	98,05	0,170	0,164	177	0,2152548
14,113	544,8	544,9	99,08	99,05	0,170	0,165	178	0,2137805
13,719	544,8	544,9	101,70	101,58	0,170	0,165	179	0,2078226
14,127	544,8	544,9	99,07	99,05	0,170	0,165	180	0,2140148
14,210	544,8	544,9	98,39	98,07	0,170	0,165	181	0,2152551
14,364	544,8	545,0	97,44	96,96	0,170	0,164	182	0,2175993
14,426	544,9	545,0	97,13	96,53	0,170	0,164	183	0,2185298
14,362	544,9	545,0	97,43	97,07	0,170	0,164	184	0,2175997
14,318	544,9	545,0	97,77	97,27	0,170	0,164	185	0,2168985
14,315	544,9	545,1	97,64	97,31	0,170	0,164	186	0,2168985
14,394	544,9	545,1	97,21	96,90	0,170	0,165	187	0,218065
14,393	545,0	545,1	97,12	97,22	0,170	0,165	188	0,2180652
14,317	545,0	545,1	97,73	97,31	0,170	0,165	189	0,216898
14,469	545,0	545,2	96,39	96,38	0,170	0,165	190	0,2192259
14,473	545,1	545,2	96,57	96,13	0,170	0,164	191	0,2192257
14,364	545,1	545,2	97,27	97,23	0,170	0,164	192	0,2176001
14,394	545,1	545,3	97,13	96,76	0,170	0,165	193	0,2180652
14,160	545,2	545,3	98,65	98,49	0,170	0,165	194	0,2145477
14,359	545,3	545,4	97,24	97,11	0,170	0,165	195	0,2175999
14,496	545,2	545,4	96,74	96,12	0,170	0,165	196	0,2196866
14,389	545,2	545,4	96,98	96,86	0,170	0,165	197	0,218065
13,906	545,3	545,4	100,57	99,96	0,170	0,164	198	0,2107182
14,424	545,3	545,5	96,69	96,45	0,170	0,164	199	0,2185313
14,236	545,3	545,5	98,16	98,15	0,170	0,165	200	0,2157271
14,360	545,3	545,5	97,22	97,25	0,170	0,165	201	0,2176005
14,236	545,4	545,5	97,95	97,96	0,170	0,165	202	0,2157281
14,156	545,4	545,5	98,62	98,45	0,170	0,165	203	0,2145486
14,126	545,4	545,6	98,91	98,83	0,170	0,165	204	0,214074
14,361	545,4	545,6	97,38	96,80	0,170	0,165	205	0,2176009
13,774	545,5	545,6	101,15	100,97	0,170	0,164	206	0,2087963
14,420	545,5	545,7	96,93	96,55	0,170	0,164	207	0,2185312
13,748	545,5	545,7	101,39	101,32	0,170	0,164	208	0,208309
14,360	545,5	545,7	96,98	97,06	0,170	0,165	209	0,2176009
13,749	545,5	545,7	101,68	101,26	0,170	0,164	210	0,2083092
14,394	545,5	545,7	97,05	96,71	0,170	0,164	211	0,218066
14,236	545,6	545,8	98,27	97,88	0,170	0,164	212	0,2157274
14,354	545,6	545,8	97,39	96,90	0,170	0,164	213	0,2175075
14,390	545,6	545,8	97,16	96,48	0,170	0,164	214	0,218067
14,238	545,6	545,8	98,01	97,57	0,170	0,164	215	0,2157275
14,420	545,6	545,8	96,89	96,62	0,170	0,164	216	0,218532
14,396	545,6	545,8	96,90	96,58	0,170	0,164	217	0,2181687

Average	Average	Average						Average
14,27	Inlet +	Inlet +						0,216
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,29	100,68	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
14,328	540,2	540,6			0,169	0,214	0	0,2180586
14,424	540,5	540,7	99,30	99,57	0,169	0,190	1	0,2185255
14,259	540,5	540,7	99,02	99,05	0,169	0,166	2	0,2180591
14,506	540,5	540,7	97,73	98,27	0,169	0,166	3	0,2208339
14,426	540,5	540,7	99,45	99,83	0,169	0,166	4	0,2185248
13,806	540,5	540,8	104,92	105,53	0,169	0,166	5	0,2078156
14,496	540,5	540,8	100,73	101,06	0,169	0,166	6	0,2175941
13,627	540,6	540,8	107,48	108,03	0,169	0,166	7	0,2041217
14,492	540,6	540,8	100,05	100,54	0,169	0,166	8	0,2180594
14,387	540,6	540,9	100,53	100,91	0,169	0,166	9	0,2168918
14,386	540,7	540,9	100,59	100,99	0,169	0,166	10	0,2168957
13,703	540,7	540,9	105,67	106,17	0,169	0,166	11	0,2065913
14,190	540,8	540,9	101,73	102,23	0,169	0,166	12	0,2139551
14,342	540,8	541,0	101,41	101,63	0,169	0,166	13	0,2157205
14,011	540,8	541,0	103,02	103,43	0,169	0,165	14	0,2112053
14,392	540,9	541,1	100,27	101,07	0,169	0,166	15	0,2168931
13,863	540,9	541,1	104,60	104,74	0,169	0,166	16	0,2087903
14,385	540,9	541,1	100,47	101,00	0,169	0,166	17	0,2168911
14,483	541,0	541,2	99,86	100,07	0,169	0,166	18	0,2185248
14,392	541,0	541,2	100,64	101,17	0,169	0,166	19	0,2168933
14,393	541,0	541,2	100,68	100,78	0,169	0,166	20	0,2168931
14,418	541,1	541,3	100,61	101,33	0,169	0,166	21	0,2168936
14,484	541,1	541,3	100,59	100,78	0,169	0,166	22	0,2175947
14,133	541,1	541,3	102,85	103,20	0,169	0,165	23	0,2124034
13,857	541,1	541,4	105,44	105,90	0,169	0,166	24	0,207816
14,100	541,2	541,4	103,47	103,85	0,169	0,166	25	0,2116854
14,555	541,2	541,4	99,89	101,10	0,169	0,166	26	0,2185249
13,530	541,3	541,5	107,86	108,34	0,169	0,166	27	0,2028768
14,387	541,3	541,5	101,27	101,62	0,169	0,165	28	0,2157211
14,464	541,3	541,6	100,85	100,98	0,169	0,165	29	0,2168937
14,369	541,4	541,6	101,97	102,25	0,169	0,165	30	0,2152501
14,555	541,4	541,6	100,55	101,02	0,169	0,166	31	0,2180522
14,017	541,4	541,6	104,47	104,70	0,169	0,166	32	0,2100016
13,810	541,5	541,7	105,95	106,55	0,169	0,166	33	0,2067974
14,260	541,5	541,7	102,66	103,06	0,169	0,166	34	0,2135944
14,135	541,5	541,7	103,51	103,95	0,169	0,165	35	0,2116478
13,626	541,6	541,8	107,16	107,72	0,169	0,165	36	0,204123
14,069	541,6	541,8	104,19	104,23	0,169	0,165	37	0,2107253
14,546	541,7	541,9	100,91	101,30	0,169	0,165	38	0,2175951
14,415	541,7	541,9	102,01	102,07	0,169	0,165	39	0,2157223
14,422	541,8	541,9	101,53	102,18	0,169	0,165	40	0,2157216
14,275	541,8	542,0	102,10	102,81	0,169	0,166	41	0,2141282
14,117	541,8	542,0	103,56	104,49	0,169	0,166	42	0,2112074
14,418	541,9	542,0	101,75	101,87	0,169	0,165	43	0,2157222
14,118	541,9	542,0	104,25	104,20	0,169	0,165	44	0,2112055
14,545	541,9	542,1	100,70	100,96	0,169	0,165	45	0,2175955
14,419	542,0	542,1	101,73	102,23	0,169	0,165	46	0,2157222
14,503	542,0	542,1	101,20	101,42	0,169	0,165	47	0,2168938
14,312	542,1	542,2	102,28	102,90	0,169	0,165	48	0,214069
14,035	542,1	542,2	104,78	104,84	0,169	0,165	49	0,2100016
13,679	542,1	542,2	106,77	107,30	0,169	0,165	50	0,2048668
14,226	542,1	542,2	103,05	103,38	0,169	0,165	51	0,2128814
14,489	542,1	542,3	100,78	101,23	0,169	0,165	52	0,2168947
14,461	542,2	542,3	100,83	100,96	0,169	0,165	53	0,2168949

13,756	542,2	542,3	106,37	106,64	0,169	0,165	54	0,2058557
13,696	542,2	542,4	106,81	107,57	0,168	0,165	55	0,2048675
14,296	542,3	542,4	102,24	102,79	0,168	0,165	56	0,2140705
14,507	542,3	542,4	100,49	100,86	0,169	0,165	57	0,2175962
13,681	542,3	542,5	106,96	107,46	0,169	0,165	58	0,2048677
13,810	542,3	542,5	105,87	106,46	0,169	0,165	59	0,2065933
14,632	542,4	542,5	99,89	100,27	0,169	0,165	60	0,2192223
14,315	542,4	542,5	101,05	101,82	0,168	0,165	61	0,2152513
14,085	542,4	542,5	102,72	103,45	0,168	0,165	62	0,2116893
14,410	542,4	542,6	100,48	100,99	0,168	0,165	63	0,2168948
14,335	542,4	542,6	100,94	101,43	0,169	0,165	64	0,215726
13,875	542,4	542,6	105,03	105,25	0,169	0,165	65	0,2082759
14,484	542,5	542,6	100,36	100,82	0,169	0,165	66	0,2175969
14,367	542,5	542,7	101,31	101,52	0,169	0,165	67	0,215723
14,210	542,6	542,7	101,97	102,35	0,169	0,165	68	0,2135954
14,471	542,6	542,7	100,22	100,64	0,169	0,165	69	0,2175961
14,297	542,6	542,7	101,03	101,45	0,169	0,165	70	0,2152516
13,876	542,6	542,7	104,31	104,73	0,168	0,165	71	0,2087928
14,520	542,6	542,8	99,74	100,25	0,169	0,165	72	0,2185276
14,017	542,7	542,8	103,32	103,80	0,169	0,165	73	0,2107267
13,681	542,7	542,8	105,45	106,16	0,168	0,165	74	0,2058566
14,097	542,7	542,9	102,38	103,10	0,168	0,165	75	0,2124041
14,306	542,8	542,9	100,62	101,07	0,168	0,165	76	0,2157327
14,228	542,8	542,9	101,18	101,89	0,168	0,165	77	0,2145448
14,463	542,8	542,9	99,57	99,76	0,169	0,165	78	0,2185273
14,374	542,8	543,0	99,96	100,48	0,169	0,165	79	0,2168962
14,466	542,8	543,0	99,73	99,94	0,168	0,165	80	0,2180591
13,754	542,9	543,0	104,80	105,42	0,168	0,165	81	0,2070852
14,317	542,9	543,0	100,78	100,99	0,168	0,165	82	0,2157237
14,470	542,9	543,0	99,58	100,06	0,168	0,165	83	0,2180627
14,306	543,0	543,1	100,48	101,21	0,168	0,165	84	0,2157227
14,299	543,0	543,1	100,58	101,10	0,168	0,165	85	0,2157144
14,211	543,0	543,1	101,12	101,67	0,168	0,165	86	0,214542
13,673	543,0	543,1	104,98	105,35	0,169	0,165	87	0,2065946
14,074	543,0	543,1	101,54	102,05	0,168	0,165	88	0,2128258
14,392	543,0	543,1	99,18	99,61	0,168	0,165	89	0,2180629
13,670	543,0	543,1	104,14	104,90	0,168	0,165	90	0,2070861
14,435	543,0	543,1	98,69	99,56	0,168	0,165	91	0,2185286
14,406	543,0	543,2	99,26	99,78	0,168	0,165	92	0,2180757
14,474	543,0	543,2	98,58	98,94	0,168	0,165	93	0,2192241
13,869	543,1	543,1	103,14	103,24	0,169	0,165	94	0,2100052
13,665	543,1	543,1	104,43	104,83	0,169	0,165	95	0,2070859
14,453	543,1	543,2	98,58	98,80	0,169	0,165	96	0,2192242
13,893	543,1	543,2	102,32	102,64	0,168	0,165	97	0,2107284
14,188	543,1	543,2	100,31	100,42	0,168	0,165	98	0,2152536
13,841	543,2	543,2	102,64	103,08	0,168	0,165	99	0,2100045
14,081	543,2	543,3	100,65	101,05	0,168	0,165	100	0,2139989
14,444	543,2	543,3	98,05	98,23	0,168	0,165	101	0,2196861
14,476	543,2	543,3	97,60	98,13	0,168	0,165	102	0,2200687
14,419	543,2	543,4	98,09	98,54	0,168	0,165	103	0,2192247
14,051	543,2	543,4	100,52	101,23	0,168	0,165	104	0,2135985
14,444	543,2	543,3	97,83	98,19	0,168	0,165	105	0,2196862
14,450	543,2	543,3	98,11	98,46	0,168	0,165	106	0,2196866
14,360	543,3	543,3	98,43	98,81	0,168	0,165	107	0,2185303
14,298	543,2	543,3	98,92	99,26	0,168	0,165	108	0,2175988
14,436	543,3	543,3	97,82	97,88	0,168	0,165	109	0,2196861
14,315	543,3	543,4	98,55	98,68	0,168	0,164	110	0,2180636
14,412	543,3	543,4	97,64	98,03	0,168	0,165	111	0,2196864
13,862	543,3	543,4	101,51	102,07	0,168	0,165	112	0,2112093
14,462	543,3	543,4	97,62	97,79	0,168	0,165	113	0,2203793
14,380	543,3	543,4	97,98	98,62	0,169	0,165	114	0,2192252

14,327	543,3	543,5	98,50	98,48	0,169	0,165	115	0,2185294
14,323	543,3	543,5	97,97	98,47	0,168	0,165	116	0,2185286
14,316	543,3	543,5	98,03	98,54	0,168	0,165	117	0,218529
14,363	543,3	543,5	97,54	98,05	0,168	0,165	118	0,2192245
14,389	543,3	543,5	97,65	97,90	0,168	0,165	119	0,2196866
14,320	543,4	543,5	98,51	98,32	0,169	0,165	120	0,2185298
14,394	543,4	543,5	97,51	98,10	0,169	0,165	121	0,2196866
14,214	543,4	543,5	98,95	99,15	0,168	0,165	122	0,216898
14,397	543,4	543,6	97,67	97,87	0,168	0,165	123	0,2196927
14,470	543,4	543,6	96,92	97,20	0,168	0,165	124	0,2208396
14,498	543,5	543,6	96,49	97,07	0,168	0,165	125	0,2212985
14,207	543,5	543,6	98,84	98,84	0,168	0,164	126	0,2168975
14,541	543,5	543,6	96,52	96,89	0,168	0,165	127	0,2219859
14,503	543,6	543,7	97,17	97,32	0,169	0,165	128	0,2212985
14,252	543,6	543,7	98,80	99,10	0,169	0,165	129	0,217599
14,386	543,6	543,7	97,47	97,57	0,169	0,165	130	0,2196872
14,352	543,6	543,8	97,61	97,80	0,168	0,164	131	0,2192256
14,526	543,6	543,8	96,21	96,48	0,168	0,164	132	0,2219848
14,519	543,6	543,8	96,10	96,64	0,168	0,164	133	0,2219852
14,488	543,6	543,8	96,57	96,82	0,168	0,164	134	0,2212984
14,410	543,6	543,8	97,06	97,51	0,168	0,165	135	0,2203796
14,411	543,7	543,8	97,17	97,49	0,168	0,165	136	0,2203799
14,327	543,7	543,8	97,56	98,00	0,168	0,165	137	0,2192253
13,541	543,7	543,9	103,18	103,61	0,168	0,165	138	0,2071005
14,438	543,7	543,9	96,75	97,16	0,168	0,165	139	0,2208387
14,471	543,7	543,9	96,57	96,85	0,168	0,165	140	0,2212985
14,227	543,7	543,9	98,18	98,58	0,168	0,165	141	0,2176003
14,284	543,7	543,9	98,18	98,25	0,168	0,165	142	0,2185302
14,355	543,7	543,9	97,14	97,98	0,168	0,165	143	0,2196873
14,397	543,7	543,9	97,01	97,30	0,168	0,165	144	0,2203799
14,061	543,7	543,9	99,01	99,56	0,168	0,165	145	0,2152531
14,423	543,7	543,9	96,73	96,89	0,168	0,165	146	0,2208396
14,502	543,7	543,9	96,16	96,35	0,168	0,164	147	0,2219858
14,453	543,7	543,9	96,33	96,74	0,168	0,164	148	0,221299
14,399	543,8	544,0	96,90	97,24	0,168	0,165	149	0,2203802
14,460	543,8	544,0	96,55	96,73	0,168	0,165	150	0,2213201
14,578	543,8	544,0	95,82	96,19	0,168	0,165	151	0,2231262
14,577	543,9	544,1	95,53	96,17	0,168	0,165	152	0,2231256
14,430	543,9	544,1	96,79	97,11	0,168	0,165	153	0,2208397
14,090	544,0	544,1	98,73	99,15	0,168	0,165	154	0,2157275
14,391	544,0	544,1	96,56	97,09	0,168	0,164	155	0,2203803
14,337	544,0	544,2	97,16	97,13	0,168	0,164	156	0,2196871
14,388	544,0	544,2	96,80	96,88	0,168	0,164	157	0,2203801
14,315	543,9	544,2	97,53	97,81	0,168	0,165	158	0,2192259
14,259	543,9	544,2	97,69	97,93	0,168	0,165	159	0,218531
14,386	544,0	544,2	96,95	96,95	0,168	0,164	160	0,2203801
13,870	544,0	544,3	100,38	100,68	0,168	0,164	161	0,2124078
14,412	544,0	544,3	96,64	96,77	0,168	0,164	162	0,2208395
14,492	544,1	544,3	96,02	96,24	0,168	0,164	163	0,2219865
14,392	544,1	544,3	96,84	97,22	0,168	0,164	164	0,2203803
14,450	544,1	544,4	96,52	96,85	0,168	0,165	165	0,2212992
14,388	544,2	544,4	96,69	97,23	0,168	0,165	166	0,2203804

Average	Average	Average						Average
14,08	Inlet +	Inlet +						0,215
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,32	100,55	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
14,640	536,9	537,3			0,173	0,167	0	0,2240206
14,564	537,0	537,3	95,83	95,87	0,172	0,167	1	0,2240205
13,961	537,0	537,3	100,06	99,65	0,172	0,167	2	0,2148558
14,579	537,0	537,3	95,82	95,75	0,172	0,167	3	0,2240211
14,129	537,0	537,4	99,82	99,78	0,172	0,167	4	0,2163347
13,938	537,0	537,4	102,05	101,97	0,172	0,167	5	0,2123945
14,632	537,0	537,4	98,54	98,80	0,172	0,167	6	0,22134
14,117	537,1	537,4	104,09	104,23	0,172	0,168	7	0,2116775
14,271	537,1	537,5	104,59	104,35	0,172	0,167	8	0,2123943
14,084	537,2	537,6	106,14	106,25	0,172	0,167	9	0,2095087
14,790	537,2	537,6	100,45	100,60	0,172	0,168	10	0,2203664
14,730	537,3	537,7	100,93	100,91	0,172	0,167	11	0,2196742
14,711	537,4	537,7	100,48	100,64	0,172	0,167	12	0,2196745
14,162	537,4	537,8	104,09	104,40	0,172	0,167	13	0,2116776
13,996	537,4	537,8	105,40	105,45	0,172	0,167	14	0,2095092
14,482	537,5	537,9	101,66	101,68	0,172	0,167	15	0,2168851
14,666	537,5	537,9	100,45	100,42	0,172	0,167	16	0,219797
13,987	537,5	537,9	105,34	105,23	0,172	0,167	17	0,2095099
13,981	537,5	538,0	105,34	105,01	0,172	0,167	18	0,2095092
14,541	537,6	538,0	100,89	100,87	0,172	0,167	19	0,2180535
14,706	537,6	538,1	100,07	99,85	0,172	0,167	20	0,2203666
14,119	537,6	538,1	104,42	104,52	0,172	0,167	21	0,2112023
14,010	537,7	538,2	105,38	105,39	0,172	0,167	22	0,2095095
13,934	537,8	538,2	106,14	105,96	0,172	0,167	23	0,2082959
14,754	537,8	538,3	99,77	99,81	0,172	0,167	24	0,2208261
14,186	537,9	538,3	103,21	103,04	0,172	0,167	25	0,2126604
14,223	537,9	538,4	102,91	103,04	0,172	0,167	26	0,213589
14,398	538,0	538,4	101,38	101,39	0,172	0,167	27	0,2164178
14,528	538,0	538,4	100,33	100,67	0,172	0,167	28	0,2185176
14,709	538,0	538,5	99,49	99,48	0,172	0,168	29	0,2212855
14,044	538,0	538,5	103,76	104,03	0,172	0,168	30	0,2111979
14,052	538,0	538,5	104,03	104,06	0,172	0,167	31	0,211198
13,939	538,1	538,5	104,54	104,65	0,172	0,167	32	0,2095094
13,975	538,1	538,6	104,58	104,46	0,172	0,167	33	0,2099942
14,712	538,2	538,6	99,03	99,28	0,172	0,167	34	0,2212858
14,052	538,2	538,6	103,73	103,86	0,172	0,167	35	0,2111982
14,405	538,2	538,7	101,40	101,71	0,172	0,167	36	0,2164175
14,398	538,3	538,7	101,42	101,46	0,172	0,167	37	0,2164177
14,593	538,2	538,7	99,83	99,80	0,172	0,167	38	0,2196743
13,948	538,3	538,8	104,12	104,25	0,172	0,167	39	0,2099947
14,013	538,3	538,8	103,68	103,60	0,172	0,167	40	0,2111976
14,038	538,4	538,8	103,07	103,11	0,172	0,167	41	0,2116783
13,887	538,4	538,9	104,01	104,39	0,171	0,167	42	0,20951
14,360	538,4	538,9	100,73	100,86	0,171	0,167	43	0,2168855
14,630	538,4	538,9	98,48	98,64	0,172	0,167	44	0,2212864
14,070	538,4	538,9	102,56	102,57	0,172	0,167	45	0,2128734
13,685	538,5	538,9	105,32	105,49	0,172	0,167	46	0,2070771
14,737	538,5	539,0	97,73	97,70	0,172	0,167	47	0,2231137
14,607	538,5	539,0	98,24	98,40	0,172	0,167	48	0,2212871
13,675	538,5	539,0	105,21	105,10	0,172	0,167	49	0,2070753
14,051	538,6	539,0	102,12	102,68	0,172	0,167	50	0,212873
13,860	538,6	539,1	103,61	103,74	0,172	0,167	51	0,2099958
14,599	538,6	539,1	98,36	98,49	0,172	0,167	52	0,2212874
14,818	538,6	539,1	96,50	96,85	0,172	0,167	53	0,2246988

14,819	538,6	539,1	96,63	96,68	0,171	0,167	54	0,2246994
14,489	538,6	539,1	98,69	99,06	0,171	0,167	55	0,2196722
14,040	538,7	539,2	101,97	102,24	0,171	0,167	56	0,2128733
13,769	538,7	539,2	104,22	104,41	0,172	0,167	57	0,2087835
14,006	538,7	539,2	102,32	102,31	0,172	0,167	58	0,2123959
14,490	538,8	539,2	99,05	99,30	0,172	0,167	59	0,2196498
14,702	538,7	539,2	97,25	97,26	0,172	0,167	60	0,2231124
14,003	538,8	539,2	102,32	102,32	0,172	0,167	61	0,2123961
14,081	538,8	539,3	101,61	101,44	0,172	0,167	62	0,2135875
14,628	538,8	539,3	97,64	97,85	0,171	0,167	63	0,2219736
13,840	538,8	539,3	103,57	103,37	0,172	0,167	64	0,2099946
14,402	538,9	539,3	99,43	99,60	0,172	0,167	65	0,2185178
14,009	538,9	539,3	102,46	102,38	0,172	0,167	66	0,2125967
14,624	538,9	539,3	97,60	97,88	0,172	0,167	67	0,2219737
14,622	538,9	539,4	97,69	97,83	0,171	0,167	68	0,2219738
13,839	538,9	539,4	103,10	103,32	0,171	0,167	69	0,2099944
14,081	539,0	539,4	101,76	101,81	0,171	0,167	70	0,2135871
14,550	539,0	539,4	98,62	98,14	0,172	0,167	71	0,2208782
14,706	539,0	539,5	97,23	97,37	0,172	0,167	72	0,2231142
14,638	539,0	539,5	97,85	97,99	0,172	0,167	73	0,2220707
13,955	539,0	539,5	102,64	102,64	0,172	0,167	74	0,2116791
14,655	539,0	539,5	97,41	97,53	0,171	0,167	75	0,2224296
14,579	539,0	539,5	98,43	97,97	0,172	0,167	76	0,2212837
14,656	539,1	539,5	97,43	97,20	0,172	0,166	77	0,2224295
14,027	539,1	539,5	102,02	101,98	0,171	0,167	78	0,2128733
14,650	539,1	539,6	97,29	97,79	0,171	0,167	79	0,2224294
14,866	539,1	539,6	96,02	96,15	0,171	0,167	80	0,225826
14,695	539,1	539,6	97,13	97,37	0,171	0,167	81	0,2231123
14,179	539,1	539,6	100,59	100,64	0,171	0,167	82	0,2152426
14,647	539,1	539,6	97,44	97,41	0,171	0,167	83	0,2224299
14,550	539,1	539,6	98,27	98,26	0,171	0,167	84	0,2208277
14,026	539,2	539,6	102,00	101,71	0,172	0,167	85	0,2128737
14,650	539,2	539,7	97,30	97,34	0,171	0,166	86	0,2224297
14,135	539,2	539,7	101,19	101,24	0,171	0,167	87	0,2145352
14,176	539,2	539,7	100,50	100,73	0,171	0,167	88	0,2152422
14,646	539,3	539,8	97,16	97,65	0,171	0,167	89	0,22243
14,349	539,3	539,8	99,41	99,41	0,171	0,167	90	0,2180528
14,605	539,3	539,8	97,54	97,44	0,171	0,167	91	0,2219747
14,735	539,3	539,8	96,82	96,35	0,172	0,166	92	0,2240218
14,679	539,3	539,8	97,15	96,68	0,172	0,166	93	0,2231139
14,599	539,3	539,8	97,65	97,56	0,172	0,166	94	0,2219739
13,964	539,3	539,8	101,79	102,19	0,171	0,167	95	0,2123963
14,666	539,3	539,9	97,05	96,88	0,171	0,167	96	0,2231141
14,668	539,4	539,9	96,90	97,15	0,171	0,167	97	0,223116
13,752	539,4	539,9	103,43	103,05	0,171	0,167	98	0,209194
13,993	539,4	539,9	101,74	101,75	0,171	0,167	99	0,2128742
14,043	539,5	540,0	101,20	101,00	0,171	0,167	100	0,2135883
13,960	539,5	540,0	101,57	101,78	0,171	0,166	101	0,2123329
14,038	539,6	540,0	101,26	101,68	0,171	0,167	102	0,2135882
14,472	539,6	540,0	97,99	98,11	0,171	0,167	103	0,2203627
14,704	539,6	540,1	96,33	96,55	0,171	0,167	104	0,2240217
14,318	539,6	540,1	99,44	99,02	0,172	0,167	105	0,2180533
14,350	539,6	540,1	98,74	98,73	0,172	0,166	106	0,2185265
14,598	539,7	540,2	97,14	96,87	0,171	0,166	107	0,2224309
14,734	539,7	540,2	95,77	95,73	0,171	0,166	108	0,2247009
13,883	539,7	540,2	101,94	101,84	0,171	0,166	109	0,2116799
14,147	539,7	540,3	99,93	100,06	0,171	0,167	110	0,2157027
14,537	539,7	540,3	96,86	97,19	0,171	0,167	111	0,2219749
13,637	539,7	540,3	103,33	103,43	0,171	0,167	112	0,2082986
13,860	539,8	540,3	101,76	101,49	0,171	0,166	113	0,2116832
13,476	539,8	540,3	104,72	104,60	0,171	0,166	114	0,2058254

14,335	539,8	540,3	97,92	98,07	0,171	0,167	115	0,2192089
13,654	539,8	540,4	103,10	102,99	0,171	0,167	116	0,2087844
13,619	539,8	540,4	102,98	103,24	0,171	0,167	117	0,208298
13,545	539,9	540,4	103,56	103,83	0,171	0,167	118	0,2070772
13,620	539,9	540,4	103,29	103,11	0,171	0,166	119	0,2082977
14,102	539,9	540,4	99,61	99,76	0,171	0,167	120	0,2157155
13,995	539,9	540,4	100,60	100,31	0,171	0,167	121	0,214062
13,615	539,9	540,5	103,27	103,23	0,171	0,167	122	0,2082976
13,641	539,9	540,4	103,03	102,89	0,171	0,167	123	0,208785
14,137	539,9	540,4	99,18	99,37	0,171	0,167	124	0,2163756
13,577	539,9	540,5	103,44	103,46	0,171	0,167	125	0,2078116
13,684	540,0	540,5	102,40	102,39	0,171	0,167	126	0,2095118
13,684	540,0	540,5	102,50	102,61	0,171	0,167	127	0,2095121
14,087	540,0	540,5	99,62	99,39	0,171	0,167	128	0,2157151
13,897	540,0	540,5	100,57	100,74	0,171	0,166	129	0,2128739
13,680	540,0	540,5	102,33	102,51	0,171	0,167	130	0,2095115
14,232	540,0	540,5	98,13	98,52	0,171	0,167	131	0,2180496
13,791	540,1	540,5	101,50	101,89	0,171	0,167	132	0,2112
13,571	540,1	540,6	103,41	103,32	0,171	0,167	133	0,207811
14,305	540,2	540,6	97,85	97,68	0,171	0,166	134	0,2192153
14,414	540,2	540,6	97,23	97,05	0,171	0,166	135	0,2208286
14,410	540,2	540,6	97,04	96,97	0,171	0,166	136	0,2208291
13,625	540,2	540,7	102,75	102,85	0,171	0,166	137	0,2087857
13,591	540,2	540,7	102,84	103,20	0,171	0,167	138	0,208299
13,704	540,3	540,7	101,92	102,44	0,171	0,167	139	0,2099965
13,563	540,3	540,8	103,36	103,29	0,171	0,167	140	0,2078115
13,594	540,4	540,8	103,00	103,21	0,171	0,167	141	0,2082986
14,300	540,4	540,8	98,08	97,67	0,171	0,167	142	0,2192155
14,330	540,4	540,9	97,37	97,33	0,171	0,166	143	0,2196779
14,300	540,5	540,9	97,68	97,85	0,171	0,166	144	0,2192157
13,699	540,5	540,9	101,75	102,07	0,171	0,166	145	0,2099967
13,508	540,5	541,0	103,55	103,50	0,171	0,166	146	0,207078
13,619	540,6	541,0	103,01	103,07	0,171	0,167	147	0,2087862
14,076	540,6	541,0	99,20	99,39	0,171	0,167	148	0,2157798
13,992	540,6	541,0	99,92	100,03	0,171	0,167	149	0,2145369
13,508	540,6	541,0	103,52	103,62	0,171	0,167	150	0,2070793
13,667	540,6	541,0	102,08	102,41	0,171	0,167	151	0,209513
14,146	540,6	541,0	98,39	98,99	0,171	0,167	152	0,2168889
13,664	540,6	541,1	102,27	102,45	0,171	0,167	153	0,2095128
14,404	540,6	541,1	96,98	97,24	0,171	0,167	154	0,2208298
13,666	540,7	541,1	102,55	102,56	0,171	0,167	155	0,2095132
13,693	540,7	541,1	102,33	102,22	0,172	0,167	156	0,2099972
13,772	540,7	541,1	101,36	101,31	0,171	0,166	157	0,2112012
14,111	540,7	541,1	98,86	99,21	0,171	0,167	158	0,2164216
13,774	540,7	541,2	101,18	101,72	0,171	0,167	159	0,2112013
13,612	540,7	541,2	102,24	102,85	0,171	0,167	160	0,2087864
14,292	540,7	541,2	97,45	97,86	0,171	0,167	161	0,2192167
13,689	540,7	541,2	101,94	102,27	0,171	0,167	162	0,2099947
13,662	540,8	541,2	102,31	102,47	0,171	0,167	163	0,2095132
13,583	540,8	541,2	102,84	102,83	0,171	0,167	164	0,2082995
13,662	540,8	541,3	102,09	102,20	0,171	0,166	165	0,2095137
14,246	540,8	541,3	97,86	98,21	0,171	0,167	166	0,2185214
13,695	540,8	541,3	101,87	102,10	0,171	0,167	167	0,2099976
13,659	540,9	541,3	102,06	102,50	0,171	0,167	168	0,2095134
13,846	540,9	541,3	101,11	100,99	0,171	0,167	169	0,2123994
13,611	540,9	541,4	102,32	102,68	0,171	0,167	170	0,2088138
13,769	541,0	541,4	101,38	101,51	0,171	0,167	171	0,2112017
14,106	541,0	541,4	98,60	99,14	0,171	0,167	172	0,2164221
14,466	541,0	541,5	96,35	96,52	0,171	0,167	173	0,2219777
14,392	541,1	541,5	96,75	97,11	0,171	0,167	174	0,2208311
13,688	541,1	541,5	101,65	102,37	0,171	0,167	175	0,2099989

13,799	541,1	541,6	100,98	101,22	0,171	0,167	176	0,2116831
14,319	541,1	541,6	97,37	97,88	0,171	0,167	177	0,2196794
14,216	541,2	541,6	98,17	98,24	0,171	0,167	178	0,2180564
14,364	541,2	541,6	96,84	97,00	0,171	0,166	179	0,2203718
14,108	541,2	541,6	98,89	99,06	0,171	0,166	180	0,2164227
13,467	541,2	541,6	103,27	103,81	0,171	0,167	181	0,2065886
13,582	541,2	541,6	102,37	102,88	0,170	0,167	182	0,2083002
13,690	541,2	541,7	101,94	102,26	0,171	0,167	183	0,2099562
14,288	541,3	541,7	97,49	97,93	0,171	0,167	184	0,2192167
13,687	541,3	541,7	101,98	102,09	0,171	0,167	185	0,2099983
14,213	541,3	541,7	98,13	98,23	0,171	0,167	186	0,2180575
13,609	541,3	541,7	102,52	102,89	0,171	0,167	187	0,2087876
13,661	541,3	541,7	101,96	102,28	0,171	0,167	188	0,209515
13,663	541,3	541,8	102,15	102,27	0,171	0,166	189	0,2095148
13,548	541,3	541,8	102,79	103,38	0,171	0,167	190	0,2078134
13,690	541,4	541,8	101,81	102,34	0,171	0,167	191	0,2099991
14,065	541,4	541,8	99,23	99,66	0,171	0,167	192	0,2157176
14,395	541,4	541,8	96,69	97,04	0,171	0,167	193	0,2208315
13,496	541,4	541,9	102,88	103,36	0,170	0,166	194	0,2070806
13,925	541,4	541,9	100,10	100,47	0,170	0,167	195	0,2135919
13,681	541,4	541,9	101,62	102,11	0,171	0,167	196	0,2099989
13,786	541,4	541,9	100,90	101,30	0,171	0,167	197	0,2116824
13,756	541,4	541,9	101,25	101,41	0,171	0,167	198	0,2112029
14,350	541,4	541,9	96,92	97,22	0,171	0,167	199	0,2203727
14,352	541,5	541,9	96,92	97,38	0,171	0,167	200	0,2203901
14,381	541,4	541,9	96,62	96,96	0,171	0,167	201	0,2208317
13,754	541,5	541,9	101,12	101,35	0,171	0,167	202	0,2112029
13,966	541,5	541,9	99,43	99,97	0,171	0,167	203	0,2145367
14,226	541,5	542,0	97,69	98,14	0,171	0,167	204	0,2185232
13,590	541,5	542,0	101,93	102,86	0,171	0,167	205	0,2087867
14,119	541,6	542,0	98,28	98,87	0,170	0,167	206	0,2168908
13,906	541,6	542,0	99,81	100,36	0,171	0,167	207	0,2135924
14,275	541,6	542,0	97,30	97,77	0,171	0,167	208	0,2192653
13,778	541,6	542,0	100,71	101,01	0,171	0,167	209	0,2116832
13,969	541,6	542,1	99,40	99,89	0,171	0,167	210	0,2145402
14,269	541,7	542,1	97,67	97,69	0,171	0,167	211	0,2192184
13,779	541,8	542,2	100,63	101,61	0,171	0,167	212	0,2116832
14,300	541,8	542,2	97,16	97,50	0,171	0,167	213	0,2196798
13,637	541,9	542,2	101,55	102,27	0,170	0,167	214	0,2095152
13,639	541,9	542,3	101,81	102,22	0,170	0,167	215	0,2095151
13,901	541,9	542,3	99,75	100,32	0,171	0,167	216	0,2135879
13,746	541,9	542,3	100,77	101,45	0,170	0,167	217	0,2112045
13,824	541,9	542,3	100,35	100,78	0,170	0,167	218	0,2124014
13,588	541,8	542,3	102,16	102,60	0,171	0,167	219	0,2087884
13,633	541,8	542,3	101,85	102,34	0,171	0,167	220	0,2095148
14,262	541,8	542,3	97,05	97,90	0,171	0,167	221	0,2192182
14,369	541,9	542,3	96,61	97,06	0,171	0,167	222	0,2208317
14,112	541,9	542,3	98,06	98,86	0,170	0,167	223	0,2168912
14,209	541,8	542,3	97,31	98,04	0,170	0,167	224	0,2183917
13,661	541,9	542,3	101,56	101,75	0,170	0,167	225	0,2100013
14,256	541,8	542,3	97,22	97,85	0,171	0,167	226	0,2191465
14,109	541,9	542,3	98,44	98,83	0,171	0,167	227	0,2168911
14,032	541,9	542,3	98,89	99,43	0,171	0,167	228	0,2157192
13,474	541,9	542,3	103,07	103,45	0,171	0,167	229	0,2070806
13,960	541,9	542,3	99,26	99,75	0,171	0,167	230	0,2145412
13,629	541,9	542,4	101,78	102,46	0,171	0,167	231	0,2095147
14,364	541,9	542,4	96,40	96,76	0,171	0,167	232	0,2208319
13,550	541,9	542,4	102,31	102,73	0,171	0,167	233	0,2083017
13,769	542,0	542,4	100,75	101,08	0,171	0,167	234	0,2116833
13,661	542,0	542,4	101,23	102,03	0,170	0,167	235	0,2099992
13,582	542,0	542,4	101,94	102,49	0,170	0,167	236	0,2087881

13,660	541,9	542,4	101,19	101,94	0,170	0,167	237	0,2099992
14,108	541,9	542,4	98,11	98,49	0,170	0,167	238	0,2168916
14,044	541,9	542,4	98,81	98,79	0,171	0,166	239	0,2159019
14,030	542,0	542,4	98,77	99,30	0,171	0,166	240	0,2157192
14,333	542,0	542,4	96,75	97,20	0,171	0,167	241	0,220373
13,579	542,0	542,5	101,95	102,70	0,171	0,167	242	0,2087883
13,735	542,0	542,5	100,88	101,43	0,171	0,167	243	0,2112027
14,362	542,1	542,5	96,37	97,02	0,170	0,167	244	0,2208316
13,626	542,1	542,5	101,47	102,12	0,170	0,167	245	0,2095155
14,212	542,1	542,5	97,63	98,10	0,171	0,167	246	0,2185216
14,328	542,1	542,5	96,71	97,11	0,171	0,167	247	0,2203477
14,255	542,1	542,5	97,47	97,65	0,171	0,167	248	0,2192183
13,734	542,1	542,5	100,64	101,54	0,171	0,167	249	0,2112027
14,390	542,1	542,5	96,17	97,01	0,170	0,167	250	0,2212919
14,391	542,1	542,5	95,97	96,79	0,170	0,167	251	0,2212923
13,766	542,1	542,5	100,69	101,12	0,170	0,167	252	0,2116839
14,285	542,1	542,6	97,31	97,49	0,171	0,167	253	0,2196797
14,286	542,1	542,6	96,86	97,59	0,171	0,167	254	0,219681
14,360	542,1	542,6	96,50	97,03	0,171	0,167	255	0,2208322
14,000	542,2	542,6	99,01	99,80	0,171	0,167	256	0,2152476
13,767	542,2	542,6	100,43	101,27	0,170	0,167	257	0,2116829
13,466	542,2	542,6	102,43	103,48	0,170	0,167	258	0,2070803
13,766	542,3	542,7	100,63	101,30	0,170	0,167	259	0,2116832
13,657	542,3	542,7	101,37	101,87	0,170	0,167	260	0,2100024
13,654	542,3	542,7	101,68	101,69	0,171	0,166	261	0,2099994
13,996	542,3	542,7	99,25	99,63	0,171	0,167	262	0,215247
13,655	542,3	542,7	101,35	102,04	0,171	0,167	263	0,2099994
13,842	542,3	542,8	99,93	100,63	0,170	0,167	264	0,2128786
14,330	542,3	542,8	96,39	97,34	0,170	0,167	265	0,2203723
13,764	542,3	542,7	100,27	101,11	0,170	0,167	266	0,2116837
14,285	542,3	542,7	96,71	97,61	0,170	0,167	267	0,2196906
14,283	542,3	542,7	96,91	97,51	0,170	0,167	268	0,2196805
13,767	542,3	542,7	100,71	101,32	0,171	0,167	269	0,2116836
13,733	542,3	542,8	100,85	101,49	0,171	0,167	270	0,2112033
13,624	542,3	542,8	101,52	102,24	0,170	0,167	271	0,2095153
14,284	542,4	542,8	96,81	97,72	0,170	0,167	272	0,2196807

Average	Average	Average						Average
13,99	Inlet +	Inlet +						0,219
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,51	100,13	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
13,659	539,2	539,4			0,174	0,167	0	0,2135869
13,444	539,2	539,5	104,46	104,51	0,174	0,167	1	0,2111965
13,514	539,3	539,5	104,03	103,56	0,173	0,167	2	0,2123945
13,296	539,4	539,6	105,58	105,16	0,173	0,167	3	0,2087842
13,407	539,4	539,6	105,51	104,88	0,173	0,166	4	0,2099931
13,425	539,4	539,6	106,02	105,16	0,173	0,166	5	0,2095091
13,428	539,4	539,7	106,67	106,33	0,173	0,166	6	0,2087824
13,696	539,4	539,7	105,99	105,50	0,173	0,167	7	0,2116774
13,619	539,4	539,7	107,66	106,94	0,173	0,166	8	0,209509
14,396	539,5	539,8	102,92	102,61	0,173	0,167	9	0,2203649
13,872	539,5	539,8	107,17	106,90	0,173	0,167	10	0,211679
13,673	539,5	539,9	109,38	108,68	0,173	0,167	11	0,2082955
13,868	539,6	539,9	107,57	107,16	0,173	0,166	12	0,2111963
13,797	539,7	540,0	108,24	107,91	0,173	0,166	13	0,2099145
13,931	539,7	540,0	107,14	106,74	0,173	0,167	14	0,2123947
13,846	539,8	540,1	107,57	107,24	0,173	0,167	15	0,2111978
14,139	539,8	540,1	105,51	105,15	0,173	0,167	16	0,2157126
13,697	539,9	540,2	109,01	108,50	0,173	0,167	17	0,2087825
13,722	539,9	540,2	109,24	108,72	0,173	0,167	18	0,2087826
13,701	540,0	540,3	108,81	108,38	0,173	0,167	19	0,2087829
14,308	540,1	540,4	103,90	103,20	0,173	0,166	20	0,2185177
13,715	540,1	540,4	108,15	107,42	0,173	0,166	21	0,2095135
13,697	540,2	540,5	108,10	107,40	0,173	0,166	22	0,2095099
13,826	540,3	540,5	107,00	106,40	0,173	0,166	23	0,2116787
13,791	540,3	540,6	106,97	106,70	0,173	0,166	24	0,2111979
13,797	540,4	540,7	106,78	106,70	0,173	0,167	25	0,2111983
13,722	540,4	540,7	107,76	107,01	0,173	0,166	26	0,2099943
13,835	540,5	540,8	106,82	106,56	0,173	0,166	27	0,2116787
13,608	540,5	540,9	108,50	107,91	0,173	0,166	28	0,2082973
14,252	540,6	540,9	103,70	103,01	0,173	0,166	29	0,2185187
13,750	540,6	541,0	106,57	106,49	0,173	0,167	30	0,2111987
14,220	540,7	541,0	102,50	101,72	0,173	0,166	31	0,2192137
13,762	540,7	541,0	105,33	105,05	0,173	0,166	32	0,2123959
13,556	540,7	541,1	106,90	106,47	0,173	0,166	33	0,2095108
14,264	540,8	541,1	101,14	100,59	0,173	0,166	34	0,2208275
14,150	540,8	541,1	101,70	101,12	0,173	0,166	35	0,2192141
14,265	540,8	541,2	100,75	100,36	0,173	0,166	36	0,221287
13,675	540,9	541,2	104,90	104,51	0,173	0,166	37	0,2123966
13,605	540,9	541,3	105,37	105,03	0,173	0,166	38	0,2114447
13,738	540,9	541,3	103,97	103,76	0,173	0,166	39	0,2135881
14,262	541,0	541,3	100,21	99,38	0,173	0,166	40	0,2219739
13,568	541,0	541,3	104,97	104,84	0,173	0,166	41	0,2111988
13,663	541,0	541,4	103,97	103,67	0,172	0,166	42	0,2128745
14,268	541,0	541,4	99,81	99,15	0,173	0,166	43	0,22243
14,362	541,1	541,4	98,94	98,45	0,173	0,166	44	0,2240224
13,535	541,1	541,5	105,12	104,42	0,173	0,166	45	0,2111998
13,635	541,1	541,5	104,14	103,77	0,173	0,166	46	0,2128746
13,632	541,2	541,5	104,15	103,44	0,173	0,166	47	0,2128745
14,341	541,2	541,5	98,70	98,44	0,173	0,166	48	0,2240216
13,590	541,2	541,6	104,23	103,48	0,173	0,166	49	0,212397
13,726	541,3	541,6	103,00	102,44	0,173	0,166	50	0,2145378
13,538	541,3	541,6	104,45	104,24	0,173	0,166	51	0,2116797
13,686	541,3	541,7	103,34	102,77	0,173	0,166	52	0,2140625
13,656	541,4	541,7	103,22	103,17	0,172	0,166	53	0,2135889

14,083	541,4	541,7	100,11	99,77	0,172	0,166	54	0,2203676
13,823	541,5	541,8	101,70	101,67	0,172	0,166	55	0,2164211
14,108	541,6	541,8	99,83	99,10	0,172	0,166	56	0,2208287
13,862	541,6	541,9	101,83	101,17	0,173	0,166	57	0,2169788
13,851	541,7	542,0	101,72	101,13	0,173	0,166	58	0,2168933
13,823	541,8	542,0	102,01	101,75	0,173	0,166	59	0,2164205
13,818	541,8	542,1	101,81	101,53	0,172	0,166	60	0,2164213
13,773	541,9	542,1	102,24	101,85	0,172	0,166	61	0,2157165
13,925	541,9	542,2	101,03	100,68	0,172	0,166	62	0,2180549
13,817	542,0	542,2	101,67	101,11	0,172	0,166	63	0,2164208
14,129	542,0	542,2	99,78	99,14	0,172	0,166	64	0,2212896
14,491	542,0	542,3	97,39	96,98	0,173	0,166	65	0,2267255
14,439	542,1	542,3	98,06	97,14	0,173	0,166	66	0,225829
13,770	542,1	542,4	102,41	102,37	0,173	0,166	67	0,2152458
14,028	542,1	542,4	100,70	100,47	0,172	0,166	68	0,2192159
13,812	542,1	542,4	102,18	101,99	0,172	0,166	69	0,2157165
14,466	542,2	542,5	97,99	97,39	0,172	0,166	70	0,2258284
14,359	542,2	542,5	99,13	98,39	0,173	0,166	71	0,2240239
14,139	542,2	542,5	100,39	100,04	0,173	0,166	72	0,2203759
13,676	542,2	542,6	104,23	103,78	0,172	0,166	73	0,2128758
13,773	542,2	542,6	103,80	103,71	0,172	0,166	74	0,2140638
13,796	542,3	542,6	103,73	103,58	0,172	0,166	75	0,214064
13,923	542,3	542,6	103,72	103,03	0,173	0,166	76	0,2156297
14,433	542,3	542,7	99,92	99,70	0,173	0,166	77	0,2231159
13,956	542,3	542,7	103,98	103,24	0,172	0,166	78	0,2152884
13,682	542,3	542,7	105,59	104,92	0,172	0,165	79	0,2112015
13,853	542,4	542,8	104,32	103,33	0,172	0,165	80	0,2140645
14,131	542,4	542,8	102,01	101,58	0,172	0,165	81	0,2185208
13,724	542,4	542,8	104,75	104,37	0,172	0,166	82	0,2123988
14,088	542,5	542,9	102,16	101,71	0,172	0,166	83	0,2180551
14,502	542,5	542,9	99,10	98,71	0,172	0,166	84	0,2247026
14,397	542,5	543,0	99,85	98,98	0,172	0,166	85	0,223115
13,656	542,6	543,0	104,91	104,90	0,172	0,166	86	0,2116815
13,728	542,6	543,0	104,57	103,94	0,172	0,166	87	0,2128765
14,431	542,5	543,0	99,06	98,70	0,172	0,166	88	0,2238926
14,202	542,6	543,0	100,55	100,45	0,172	0,166	89	0,2203722
13,869	542,5	543,0	103,31	102,80	0,172	0,166	90	0,2152458
13,821	542,6	543,1	103,53	103,02	0,172	0,166	91	0,2145375
14,218	542,6	543,1	100,73	99,95	0,172	0,166	92	0,2208303
14,418	542,6	543,1	99,17	98,54	0,172	0,165	93	0,2240242
14,460	542,6	543,2	98,89	98,10	0,172	0,165	94	0,2247026
13,962	542,6	543,2	102,25	101,73	0,172	0,165	95	0,2168895
13,852	542,6	543,2	103,21	102,48	0,172	0,165	96	0,2152099
14,412	542,6	543,2	98,94	98,75	0,172	0,166	97	0,2240242
14,456	542,6	543,2	98,74	98,51	0,172	0,166	98	0,2247028
13,851	542,6	543,2	103,21	102,42	0,172	0,166	99	0,2152454
14,241	542,6	543,2	100,19	99,80	0,172	0,165	100	0,221289
14,486	542,6	543,2	98,25	98,04	0,172	0,166	101	0,2251524
14,364	542,6	543,2	99,53	98,97	0,172	0,166	102	0,2231149
14,460	542,6	543,2	98,75	98,34	0,172	0,166	103	0,2246376
14,494	542,6	543,2	98,53	98,09	0,172	0,166	104	0,2251528
13,639	542,6	543,3	105,36	104,49	0,172	0,166	105	0,2116817
13,611	542,7	543,3	105,09	104,61	0,172	0,166	106	0,2112005
14,222	542,7	543,3	100,65	99,97	0,172	0,165	107	0,2208285
14,229	542,7	543,3	100,39	100,19	0,172	0,166	108	0,2208289
13,829	542,7	543,3	103,63	102,80	0,172	0,165	109	0,2145378
13,834	542,7	543,3	103,55	103,16	0,172	0,165	110	0,2145378
13,905	542,7	543,4	102,84	102,62	0,172	0,166	111	0,2157164
14,331	542,7	543,4	99,83	99,58	0,172	0,166	112	0,2224319
14,052	542,7	543,4	101,92	101,63	0,172	0,166	113	0,2180554
13,827	542,7	543,4	103,67	103,13	0,172	0,166	114	0,2145375

13,761	542,7	543,4	103,80	103,61	0,172	0,166	115	0,2135902
14,426	542,7	543,4	99,18	98,52	0,172	0,166	116	0,2240241
13,678	542,7	543,4	104,29	103,94	0,172	0,165	117	0,2123987
13,958	542,7	543,4	102,00	101,79	0,172	0,166	118	0,2168893
13,698	542,8	543,5	104,28	103,59	0,172	0,165	119	0,2128761
13,875	542,8	543,5	102,76	102,63	0,172	0,166	120	0,2157162
13,613	542,8	543,5	104,93	103,97	0,172	0,166	121	0,2116811
13,914	542,8	543,5	102,51	101,86	0,172	0,165	122	0,2164214
13,729	542,8	543,5	103,87	103,11	0,172	0,165	123	0,2135901
14,288	542,8	543,5	99,45	98,87	0,172	0,165	124	0,2224324
14,281	542,8	543,5	99,57	98,79	0,172	0,165	125	0,2224319
14,372	542,8	543,5	98,61	98,33	0,172	0,165	126	0,2240523
13,577	542,8	543,5	104,47	103,96	0,172	0,166	127	0,2116817
14,253	542,8	543,5	99,40	98,65	0,172	0,165	128	0,2224354
13,743	542,8	543,5	102,69	102,45	0,172	0,165	129	0,2145378
13,684	542,8	543,5	103,29	102,72	0,172	0,165	130	0,21359
13,813	542,8	543,5	102,05	101,66	0,172	0,165	131	0,2157165
14,416	542,8	543,5	97,91	97,45	0,172	0,165	132	0,2251524
13,774	542,8	543,5	102,61	102,05	0,172	0,166	133	0,2152451
13,702	542,8	543,5	103,06	102,93	0,172	0,166	134	0,2140985
13,977	542,8	543,5	100,99	100,40	0,172	0,166	135	0,2185207
13,687	542,8	543,5	102,89	102,30	0,172	0,165	136	0,2140638
13,756	542,8	543,5	102,39	101,68	0,172	0,165	137	0,2152459
14,357	542,8	543,4	97,93	97,34	0,172	0,165	138	0,2247023
14,380	542,8	543,4	97,61	97,25	0,172	0,165	139	0,2251529
13,752	542,8	543,4	102,51	101,91	0,172	0,166	140	0,2152455
13,782	542,8	543,4	102,17	101,56	0,172	0,166	141	0,2157168
13,633	542,8	543,4	103,37	102,69	0,173	0,166	142	0,2135902
13,772	542,8	543,4	101,85	101,47	0,172	0,166	143	0,2157168
13,690	542,8	543,4	102,48	102,01	0,172	0,165	144	0,214538
13,505	542,8	543,4	103,63	103,10	0,172	0,165	145	0,2116813
13,813	542,8	543,4	101,76	101,11	0,172	0,165	146	0,2164212
13,658	542,8	543,4	103,15	101,89	0,173	0,165	147	0,2140645
13,763	542,8	543,4	101,88	101,60	0,172	0,165	148	0,2157165
13,810	542,8	543,4	101,72	101,38	0,172	0,166	149	0,2164213
13,759	542,8	543,4	101,99	101,64	0,172	0,166	150	0,2157174
13,841	542,8	543,4	101,27	100,76	0,172	0,166	151	0,2168913
14,366	542,8	543,4	97,32	96,93	0,172	0,165	152	0,2251525
14,324	542,9	543,5	97,83	97,28	0,172	0,165	153	0,2247026
13,658	542,9	543,5	102,73	102,24	0,172	0,166	154	0,2140641
13,987	542,9	543,5	100,63	100,00	0,172	0,166	155	0,219216
14,190	542,9	543,5	99,21	98,47	0,173	0,166	156	0,2224337
13,909	542,9	543,5	100,80	100,36	0,172	0,166	157	0,2180557
13,797	542,9	543,5	101,46	101,00	0,172	0,166	158	0,216422
13,728	543,0	543,5	101,91	101,49	0,172	0,165	159	0,2152458
14,320	543,0	543,5	97,47	97,14	0,172	0,165	160	0,2247026
14,456	543,0	543,6	96,51	96,07	0,172	0,165	161	0,2269921
13,748	543,0	543,6	101,84	101,39	0,172	0,165	162	0,2157174
14,275	543,0	543,6	98,14	97,58	0,172	0,166	163	0,2240279
14,142	543,0	543,6	98,97	98,56	0,172	0,166	164	0,2219776
13,715	543,1	543,6	101,93	101,75	0,172	0,166	165	0,2152455
13,643	543,1	543,6	102,51	102,10	0,172	0,166	166	0,2140648
13,893	543,1	543,6	100,60	99,74	0,172	0,165	167	0,2180559
14,142	543,1	543,7	98,81	98,22	0,172	0,165	168	0,2219759
13,819	543,1	543,7	101,59	100,64	0,172	0,165	169	0,2168812
13,786	543,2	543,7	101,27	100,95	0,172	0,165	170	0,2164214
14,316	543,2	543,7	97,76	97,41	0,172	0,166	171	0,224702
13,964	543,2	543,7	99,86	99,78	0,172	0,166	172	0,2192166
13,993	543,3	543,7	99,89	99,38	0,172	0,166	173	0,2196781
13,785	543,3	543,8	101,28	100,89	0,172	0,165	174	0,2164219
13,665	543,3	543,8	102,06	101,45	0,172	0,165	175	0,2145382

14,167	543,4	543,8	98,57	98,12	0,172	0,165	176	0,2224341
13,842	543,3	543,8	100,98	100,49	0,172	0,165	177	0,2173093
14,436	543,4	543,9	96,80	96,36	0,172	0,166	178	0,2267265
14,060	543,3	543,8	99,11	98,89	0,172	0,166	179	0,2208308
14,409	543,3	543,8	96,99	96,72	0,172	0,166	180	0,2262778
14,478	543,4	543,9	96,20	95,79	0,172	0,165	181	0,2273971
14,304	543,4	543,9	97,27	96,75	0,172	0,165	182	0,2246996
13,663	543,4	543,9	102,23	101,43	0,172	0,165	183	0,2146105
14,404	543,4	543,9	96,84	96,58	0,172	0,165	184	0,2262773
13,784	543,4	543,9	101,52	100,77	0,172	0,165	185	0,2164225
13,658	543,4	543,9	102,28	101,81	0,172	0,165	186	0,2145393
13,732	543,4	543,9	101,74	101,00	0,172	0,165	187	0,2157184
14,305	543,5	543,9	97,45	96,97	0,172	0,165	188	0,2247037
13,659	543,5	544,0	102,24	101,90	0,172	0,165	189	0,2145394
13,734	543,5	544,0	101,52	100,97	0,172	0,165	190	0,2157176
13,953	543,5	544,0	99,96	99,39	0,172	0,165	191	0,2192171
14,056	543,6	544,0	99,35	98,68	0,172	0,165	192	0,2208184
14,157	543,6	544,1	98,40	98,13	0,172	0,165	193	0,2224335
14,430	543,6	544,1	96,33	96,18	0,172	0,165	194	0,2267268
14,376	543,6	544,1	97,04	96,58	0,172	0,165	195	0,2258302
13,907	543,6	544,1	100,15	99,72	0,172	0,165	196	0,2185223
13,804	543,6	544,1	101,04	100,12	0,172	0,165	197	0,2168907
13,850	543,6	544,1	100,91	100,41	0,172	0,165	198	0,2174998
14,336	543,6	544,1	97,38	97,04	0,172	0,166	199	0,2251544
14,331	543,7	544,2	97,35	96,81	0,172	0,165	200	0,2251545
14,374	543,7	544,2	96,95	96,50	0,172	0,165	201	0,2258304
14,277	543,7	544,2	97,66	97,02	0,172	0,165	202	0,2243382
13,652	543,7	544,2	102,02	101,50	0,172	0,165	203	0,2145399
13,906	543,7	544,2	100,25	99,59	0,172	0,165	204	0,2185229
14,155	543,7	544,2	98,21	97,88	0,172	0,165	205	0,222434
14,056	543,7	544,2	99,10	98,60	0,172	0,165	206	0,2208313
13,729	543,8	544,2	101,43	101,00	0,172	0,165	207	0,215719
14,130	543,8	544,2	98,66	98,26	0,172	0,165	208	0,2219781
13,808	543,8	544,3	100,93	100,34	0,172	0,165	209	0,2168915
14,029	543,8	544,3	99,33	98,88	0,172	0,165	210	0,2203723
13,878	543,8	544,3	100,81	99,96	0,172	0,165	211	0,218057
14,201	543,8	544,3	98,04	97,70	0,172	0,165	212	0,2231182
13,807	543,9	544,3	101,07	100,62	0,172	0,165	213	0,216886
13,472	543,9	544,3	103,21	102,83	0,172	0,165	214	0,2116838
14,376	543,9	544,3	97,01	96,66	0,172	0,165	215	0,2258303
14,300	543,9	544,3	97,36	97,07	0,172	0,165	216	0,2247044
13,803	543,9	544,4	100,77	100,25	0,172	0,165	217	0,216891
13,879	543,9	544,3	100,39	99,93	0,172	0,165	218	0,2180578
14,085	543,9	544,4	98,98	98,21	0,172	0,165	219	0,2212914
13,652	543,9	544,4	102,18	101,28	0,172	0,165	220	0,2144937
13,729	543,9	544,4	101,30	100,76	0,172	0,165	221	0,2157191
13,981	544,0	544,5	99,74	99,32	0,172	0,165	222	0,2196796
13,804	544,0	544,5	100,70	100,34	0,172	0,165	223	0,2168916
13,805	544,0	544,5	100,64	100,41	0,171	0,165	224	0,2168908
13,732	544,0	544,5	101,56	100,89	0,172	0,165	225	0,2157192
13,732	544,1	544,5	101,46	101,09	0,172	0,165	226	0,2157193
14,156	544,1	544,5	98,58	97,69	0,172	0,165	227	0,2224354
13,624	544,1	544,5	102,35	101,61	0,172	0,165	228	0,2140659
13,803	544,1	544,6	101,04	100,44	0,172	0,165	229	0,2168914
13,784	544,1	544,6	100,96	100,59	0,172	0,165	230	0,2165829
14,300	544,1	544,6	97,47	96,85	0,172	0,165	231	0,2247048
14,472	544,1	544,6	96,16	95,67	0,172	0,165	232	0,2273993
13,806	544,2	544,6	100,93	100,16	0,172	0,165	233	0,2168911
14,201	544,2	544,6	98,18	97,32	0,172	0,165	234	0,2231189
14,157	544,2	544,7	98,15	97,68	0,172	0,165	235	0,2224356
13,909	544,2	544,7	100,03	99,45	0,171	0,165	236	0,218523

14,331	544,2	544,7	96,93	96,68	0,171	0,165	237	0,2251557
13,733	544,2	544,7	101,33	101,02	0,171	0,165	238	0,2157201
13,775	544,3	544,7	101,23	100,81	0,172	0,165	239	0,216424
14,130	544,3	544,7	98,60	97,91	0,172	0,165	240	0,2219786
13,955	544,3	544,7	99,92	99,25	0,172	0,165	241	0,219219
14,331	544,3	544,7	97,11	96,55	0,172	0,165	242	0,2251553
13,732	544,3	544,8	101,47	100,90	0,172	0,165	243	0,2157324
13,656	544,3	544,8	101,90	101,56	0,172	0,165	244	0,2145412
13,807	544,4	544,8	100,70	100,50	0,171	0,165	245	0,2168921
14,475	544,4	544,8	96,38	95,78	0,172	0,165	246	0,2273994
14,476	544,4	544,8	96,29	95,38	0,172	0,165	247	0,2273994
14,332	544,4	544,8	97,50	96,32	0,172	0,164	248	0,2251563
14,476	544,4	544,9	96,03	95,74	0,172	0,165	249	0,2274142
13,778	544,5	544,9	101,03	100,63	0,171	0,165	250	0,2164245
14,434	544,5	544,9	96,24	96,09	0,171	0,165	251	0,226729
13,779	544,5	544,9	101,19	100,50	0,171	0,165	252	0,2164246
14,379	544,5	544,9	97,27	96,36	0,172	0,165	253	0,2258322
14,334	544,6	545,0	97,08	96,66	0,172	0,165	254	0,225157
13,780	544,6	545,0	101,17	100,40	0,172	0,165	255	0,2164292
14,379	544,6	545,0	96,94	96,09	0,172	0,165	256	0,2258323
13,778	544,6	545,0	100,91	100,64	0,172	0,165	257	0,2164255
13,779	544,6	545,0	100,70	100,58	0,171	0,165	258	0,2164251
14,307	544,6	545,0	97,41	97,17	0,171	0,165	259	0,2247059
13,956	544,5	545,0	99,79	99,60	0,172	0,166	260	0,2192215
13,633	544,6	545,0	102,51	101,75	0,172	0,165	261	0,214109
13,911	544,6	545,0	100,46	99,58	0,172	0,165	262	0,2185246
13,808	544,6	545,0	100,83	100,19	0,172	0,165	263	0,2168922
14,306	544,6	545,1	97,29	96,81	0,172	0,165	264	0,2247048
13,702	544,7	545,1	101,40	100,78	0,171	0,165	265	0,2152487
13,881	544,7	545,1	100,02	99,70	0,171	0,165	266	0,218059
14,504	544,7	545,1	95,80	95,61	0,171	0,165	267	0,227845
14,377	544,7	545,1	96,87	96,23	0,171	0,165	268	0,2258325
13,809	544,7	545,1	100,98	100,58	0,172	0,165	269	0,2168926
13,704	544,7	545,1	101,68	101,11	0,172	0,165	270	0,2152485
13,659	544,8	545,2	101,86	101,27	0,172	0,165	271	0,2145409
13,883	544,7	545,2	100,22	99,51	0,171	0,165	272	0,2180586
13,778	544,8	545,2	100,97	100,37	0,171	0,165	273	0,2164242
14,378	544,8	545,2	96,77	96,49	0,171	0,165	274	0,2258319
13,958	544,8	545,3	100,13	99,30	0,172	0,165	275	0,2192197
13,810	544,9	545,3	100,69	100,25	0,172	0,165	276	0,2168923
13,630	544,9	545,3	102,22	101,57	0,171	0,165	277	0,2140672
14,436	544,9	545,4	96,21	95,76	0,171	0,165	278	0,2267294
13,884	545,0	545,4	100,28	99,83	0,171	0,165	279	0,2180631
14,091	545,0	545,4	98,72	98,38	0,171	0,165	280	0,221293
13,661	544,9	545,4	101,73	101,38	0,171	0,165	281	0,2145419
13,810	544,9	545,4	100,76	100,31	0,171	0,165	282	0,2168924
13,810	545,0	545,4	100,83	100,51	0,171	0,165	283	0,2168926
14,306	545,0	545,4	97,38	96,81	0,172	0,165	284	0,2247051
14,436	545,0	545,4	96,24	95,79	0,171	0,165	285	0,2267291
14,061	545,0	545,4	99,08	98,55	0,171	0,165	286	0,2208333
14,508	545,0	545,4	95,73	95,51	0,171	0,165	287	0,2278449
14,408	545,0	545,4	96,32	96,17	0,171	0,165	288	0,2262812
13,914	545,0	545,5	100,11	99,60	0,171	0,165	289	0,2185244
13,736	545,0	545,4	101,31	100,91	0,171	0,165	290	0,2157199
14,336	545,0	545,5	97,26	96,65	0,172	0,165	291	0,2251567
14,266	545,0	545,5	97,68	97,26	0,172	0,165	292	0,2240281
13,813	545,1	545,5	100,93	100,02	0,172	0,165	293	0,2168926
13,812	545,1	545,5	100,69	100,46	0,171	0,165	294	0,2168925
13,962	545,1	545,5	99,80	99,14	0,171	0,165	295	0,2192202
13,738	545,1	545,6	101,25	101,04	0,171	0,165	296	0,2157205
14,410	545,2	545,6	96,60	96,64	0,171	0,165	297	0,2262808

14,316	545,2	545,6	97,35	96,73	0,172	0,165	298	0,2247916
14,209	545,2	545,6	97,86	97,26	0,171	0,165	299	0,2231194
13,738	545,2	545,6	101,02	100,72	0,171	0,165	300	0,2157219
14,382	545,2	545,7	96,80	96,21	0,171	0,165	301	0,2258329
13,917	545,2	545,7	99,96	99,52	0,171	0,165	302	0,2185249
13,783	545,2	545,7	100,92	100,65	0,171	0,165	303	0,2164253
13,813	545,2	545,7	101,16	100,72	0,172	0,165	304	0,2168928
13,993	545,2	545,7	99,36	99,01	0,172	0,165	305	0,2197227
14,137	545,2	545,7	98,54	97,94	0,171	0,165	306	0,2219801
14,267	545,2	545,7	97,34	97,06	0,171	0,165	307	0,2240274
13,738	545,2	545,7	101,35	100,78	0,171	0,165	308	0,2157209
14,311	545,2	545,7	97,20	96,97	0,171	0,165	309	0,2247062
14,481	545,2	545,7	95,94	95,72	0,171	0,165	310	0,2274011
13,917	545,2	545,7	99,99	99,87	0,171	0,165	311	0,2185241
13,813	545,2	545,7	100,81	100,46	0,171	0,165	312	0,2168931
14,094	545,2	545,7	98,87	98,25	0,172	0,165	313	0,2212932
14,554	545,2	545,7	96,02	95,11	0,172	0,165	314	0,2285131
13,739	545,2	545,7	101,21	100,78	0,172	0,165	315	0,215721
13,739	545,3	545,7	101,40	100,97	0,171	0,165	316	0,2157283
13,784	545,3	545,7	100,76	100,50	0,171	0,165	317	0,2164245
13,887	545,3	545,7	100,24	99,82	0,171	0,165	318	0,2180588
14,412	545,3	545,8	96,50	96,47	0,171	0,165	319	0,2262809
14,340	545,4	545,8	96,88	96,76	0,171	0,165	320	0,2251571
14,413	545,3	545,8	96,54	95,82	0,171	0,165	321	0,2262812
13,740	545,4	545,8	101,33	100,83	0,171	0,165	322	0,2157209
14,138	545,4	545,9	98,52	98,17	0,171	0,165	323	0,221982
14,412	545,4	545,9	96,38	96,05	0,171	0,165	324	0,2262809
13,813	545,4	545,9	100,82	100,33	0,171	0,165	325	0,2168836
13,814	545,4	545,9	100,51	100,43	0,171	0,165	326	0,2168935
13,917	545,5	545,9	99,68	99,42	0,171	0,165	327	0,2185211
13,888	545,4	545,9	100,27	100,01	0,171	0,165	328	0,2180593
13,784	545,4	545,9	100,92	100,32	0,171	0,165	329	0,2164253
13,784	545,5	545,9	101,13	100,53	0,171	0,165	330	0,2164252
13,785	545,5	546,0	101,04	100,44	0,172	0,165	331	0,2164254
13,888	545,5	546,0	100,32	99,75	0,171	0,165	332	0,2180598
14,212	545,5	546,0	97,82	97,64	0,171	0,165	333	0,2231208
14,512	545,5	546,0	95,95	95,34	0,171	0,165	334	0,2278456
14,484	545,6	546,0	95,99	95,74	0,171	0,165	335	0,2274008
14,037	545,6	546,1	99,14	98,83	0,171	0,165	336	0,220375
14,414	545,6	546,1	96,66	96,03	0,171	0,165	337	0,2262818
13,740	545,6	546,1	101,16	100,91	0,171	0,165	338	0,2157214
13,815	545,6	546,1	100,41	100,70	0,171	0,165	339	0,2168927
14,269	545,6	546,1	97,53	97,24	0,171	0,165	340	0,2240284
13,816	545,6	546,1	100,66	100,32	0,171	0,165	341	0,2168936
13,816	545,6	546,1	100,66	100,41	0,171	0,165	342	0,2168932
14,442	545,6	546,1	96,72	96,12	0,172	0,165	343	0,2267305
13,787	545,6	546,1	100,83	100,61	0,171	0,165	344	0,2164257
13,741	545,6	546,1	101,35	101,05	0,171	0,165	345	0,2157212
13,759	545,6	546,1	100,90	100,89	0,171	0,165	346	0,2160047
13,786	545,6	546,1	100,96	100,65	0,171	0,165	347	0,2164257
14,147	545,7	546,2	98,28	98,18	0,171	0,165	348	0,2220864
13,561	545,7	546,2	102,43	102,62	0,171	0,165	349	0,2128809
14,313	545,7	546,2	97,16	96,74	0,171	0,165	350	0,2247048
14,386	545,7	546,2	96,75	96,33	0,171	0,165	351	0,2258334
13,561	545,7	546,2	102,70	102,29	0,171	0,165	352	0,2128813
14,416	545,7	546,2	96,35	96,23	0,171	0,165	353	0,2262817
14,068	545,7	546,3	98,99	98,47	0,171	0,165	354	0,2208353
14,315	545,7	546,2	96,99	97,12	0,171	0,165	355	0,2247029
14,315	545,8	546,3	96,91	96,90	0,171	0,165	356	0,2247072
14,415	545,8	546,3	96,59	96,19	0,171	0,165	357	0,2262819
14,164	545,8	546,3	98,20	98,17	0,171	0,165	358	0,2223447

13,891	545,8	546,3	100,35	99,69	0,171	0,165	359	0,2180596
13,891	545,8	546,3	100,25	99,74	0,171	0,165	360	0,2180601
14,315	545,8	546,3	97,33	96,74	0,171	0,165	361	0,224707
14,414	545,8	546,3	96,41	96,20	0,171	0,165	362	0,2262813
13,818	545,8	546,3	100,77	100,42	0,171	0,165	363	0,2168935
13,740	545,8	546,4	101,13	101,16	0,171	0,165	364	0,2157208
13,788	545,9	546,4	100,91	100,81	0,171	0,165	365	0,2164264
13,787	545,9	546,4	100,99	100,45	0,171	0,165	366	0,2164252
13,788	545,9	546,4	100,66	100,62	0,171	0,165	367	0,216426
13,922	545,9	546,4	99,81	99,84	0,171	0,165	368	0,2185252
13,893	545,9	546,4	99,87	99,86	0,171	0,165	369	0,2180601
13,899	545,9	546,4	99,97	100,17	0,171	0,165	370	0,2181589
13,789	546,0	546,4	101,01	100,55	0,171	0,165	371	0,2164266
13,789	546,0	546,5	100,91	100,87	0,171	0,165	372	0,216426
13,967	546,0	546,5	99,70	99,52	0,171	0,165	373	0,2192211
13,907	546,0	546,5	99,95	99,79	0,171	0,165	374	0,218289
14,274	546,0	546,5	97,50	97,06	0,171	0,165	375	0,224029
14,142	546,0	546,6	98,27	97,97	0,171	0,165	376	0,2219808
13,789	546,0	546,6	100,70	100,54	0,171	0,165	377	0,2164259
13,921	546,0	546,6	100,07	99,74	0,171	0,165	378	0,2185256
13,714	546,0	546,5	101,50	101,24	0,171	0,165	379	0,215253
14,389	546,0	546,5	97,01	96,56	0,171	0,165	380	0,2258337
13,744	546,0	546,5	101,04	101,19	0,171	0,165	381	0,2157213
13,820	546,0	546,5	100,60	100,35	0,171	0,165	382	0,2168949
13,790	546,0	546,6	100,62	100,86	0,171	0,165	383	0,2164264
13,741	546,1	546,6	101,35	100,80	0,171	0,165	384	0,2156452
14,419	546,1	546,6	96,88	96,41	0,172	0,165	385	0,2262816
13,923	546,1	546,5	99,83	99,98	0,171	0,165	386	0,2185256
14,041	546,1	546,6	99,16	98,81	0,171	0,165	387	0,2203751
13,821	546,1	546,6	100,74	100,16	0,171	0,165	388	0,2168936
14,318	546,1	546,6	97,02	97,11	0,171	0,165	389	0,2247069
14,390	546,1	546,6	96,33	96,44	0,171	0,165	390	0,2258333
14,417	546,1	546,6	96,53	96,55	0,171	0,165	391	0,2262752
14,348	546,1	546,6	96,97	96,95	0,171	0,165	392	0,2251582
14,390	546,1	546,6	96,98	96,61	0,171	0,165	393	0,2258329
13,671	546,1	546,6	102,14	101,55	0,172	0,165	394	0,2145427
14,319	546,1	546,6	97,15	97,03	0,171	0,165	395	0,2247086
14,101	546,1	546,7	98,60	98,38	0,171	0,165	396	0,2212942
14,144	546,1	546,6	98,14	98,16	0,171	0,165	397	0,2219845
14,216	546,2	546,7	97,57	97,59	0,171	0,165	398	0,2231202
14,419	546,2	546,7	96,30	96,46	0,171	0,165	399	0,2262819
14,351	546,2	546,7	96,96	96,85	0,171	0,165	400	0,2252126
13,747	546,2	546,7	101,34	101,08	0,171	0,165	401	0,2157236
14,218	546,2	546,7	97,92	97,67	0,171	0,165	402	0,2231209
13,716	546,2	546,7	101,35	101,14	0,171	0,165	403	0,2152499
14,448	546,2	546,7	96,22	96,13	0,171	0,165	404	0,2267302
14,391	546,2	546,7	96,60	96,66	0,171	0,165	405	0,2258337
14,492	546,2	546,7	95,94	95,94	0,171	0,165	406	0,2274009
13,792	546,3	546,8	101,24	100,84	0,171	0,165	407	0,216427
13,490	546,3	546,8	103,00	103,02	0,171	0,165	408	0,2116865
13,793	546,3	546,7	100,95	100,59	0,171	0,165	409	0,2164259
14,074	546,2	546,7	98,64	98,55	0,171	0,165	410	0,2208341
14,420	546,2	546,8	96,50	96,47	0,171	0,165	411	0,226282
14,493	546,2	546,7	95,93	95,98	0,171	0,165	412	0,2274012
13,794	546,2	546,8	100,70	100,82	0,171	0,165	413	0,2164257
13,749	546,3	546,8	101,17	101,27	0,171	0,165	414	0,2157216
13,720	546,3	546,8	101,46	101,46	0,171	0,165	415	0,2152499
14,220	546,3	546,8	97,93	97,62	0,171	0,165	416	0,2231208
14,565	546,4	546,9	95,34	95,44	0,171	0,165	417	0,2285141
13,644	546,4	546,9	102,05	101,68	0,171	0,165	418	0,2140681
13,794	546,4	546,9	100,63	101,02	0,171	0,165	419	0,2164202

13,806	546,4	546,9	100,46	100,80	0,171	0,165	420	0,2166126
14,424	546,4	546,9	96,52	96,42	0,171	0,165	421	0,22631
14,322	546,4	546,9	97,10	97,38	0,171	0,165	422	0,2247075
13,899	546,4	546,9	100,28	100,00	0,171	0,165	423	0,2180673
13,824	546,4	546,9	100,73	100,74	0,171	0,165	424	0,216894
13,822	546,4	546,9	100,76	100,59	0,171	0,165	425	0,2168932
14,278	546,3	546,9	97,34	97,13	0,171	0,165	426	0,2240284
13,674	546,4	546,9	101,81	101,73	0,171	0,165	427	0,2145424
13,898	546,3	546,9	100,02	100,07	0,171	0,165	428	0,2180598
13,823	546,3	546,9	100,65	100,60	0,171	0,165	429	0,216894
13,793	546,4	546,9	100,97	101,02	0,171	0,165	430	0,216426
13,897	546,3	546,9	100,00	99,84	0,171	0,165	431	0,2180596
13,750	546,4	546,9	100,89	101,12	0,171	0,165	432	0,2157211
13,716	546,4	546,9	101,41	101,45	0,171	0,165	433	0,2152505
14,493	546,4	546,9	95,90	96,01	0,171	0,165	434	0,2274011
13,719	546,4	546,9	101,43	101,11	0,171	0,165	435	0,2152497
13,748	546,4	546,9	101,32	101,34	0,171	0,165	436	0,2157219
13,971	546,4	546,9	99,61	99,89	0,171	0,166	437	0,2192206
13,821	546,3	546,9	100,68	100,75	0,171	0,166	438	0,216893
13,716	546,3	546,9	101,34	101,61	0,171	0,166	439	0,2152469
13,792	546,3	546,9	100,88	100,81	0,171	0,165	440	0,2164256
13,791	546,3	546,9	100,80	100,74	0,171	0,165	441	0,2164255
13,818	546,3	546,9	100,64	100,41	0,171	0,165	442	0,2168935
14,274	546,3	546,8	97,17	97,47	0,171	0,165	443	0,2240286
14,040	546,3	546,8	98,92	99,04	0,171	0,165	444	0,2203754
13,817	546,3	546,8	100,51	100,63	0,171	0,165	445	0,2168933
14,315	546,2	546,8	97,10	96,92	0,171	0,165	446	0,2247072
14,314	546,3	546,8	97,04	96,88	0,171	0,165	447	0,2247074
14,359	546,3	546,8	96,75	96,71	0,171	0,165	448	0,2254062
14,213	546,2	546,8	98,17	97,85	0,171	0,165	449	0,2231204
13,919	546,2	546,8	99,73	99,81	0,171	0,165	450	0,218525
13,963	546,2	546,8	99,62	99,50	0,171	0,165	451	0,21922
14,210	546,2	546,8	97,57	97,87	0,171	0,165	452	0,2231201
14,268	546,2	546,8	97,42	97,54	0,171	0,166	453	0,2240292
13,917	546,2	546,8	99,77	99,87	0,171	0,165	454	0,2185244
14,410	546,2	546,8	96,24	96,28	0,171	0,165	455	0,2262813
14,439	546,2	546,7	96,19	96,01	0,171	0,165	456	0,22673

Average	Average	Average						Average
14,14	Inlet +	Inlet +						0,219
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	86,54	100,10	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.		Delta-P
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
13,787	540,0	540,4			0,170	0,166	0	0,2135858
13,903	540,0	540,5	86,90	100,35	0,170	0,166	1	0,2168845
14,416	540,0	540,5	83,53	96,80	0,170	0,166	2	0,2251475
14,378	540,1	540,5	83,82	96,87	0,170	0,166	3	0,2246973
14,312	540,1	540,5	84,20	97,51	0,171	0,166	4	0,2235708
14,564	540,1	540,5	83,35	96,66	0,171	0,166	5	0,2267208
14,288	540,1	540,5	85,99	99,71	0,170	0,166	6	0,2208259
13,789	540,2	540,6	90,46	104,55	0,170	0,166	7	0,2116766
14,049	540,2	540,6	89,58	103,34	0,170	0,166	8	0,2145327
13,991	540,2	540,6	90,70	104,53	0,170	0,165	9	0,2128718
13,811	540,3	540,6	91,12	105,41	0,170	0,166	10	0,2111162
14,199	540,3	540,6	87,25	101,09	0,170	0,166	11	0,2185141
14,392	540,3	540,7	85,17	99,03	0,170	0,166	12	0,2224273
13,872	540,3	540,7	88,53	102,55	0,170	0,166	13	0,2145332
13,711	540,3	540,7	89,19	103,47	0,170	0,166	14	0,2123937
13,950	540,4	540,8	87,40	101,33	0,170	0,166	15	0,2164156
14,080	540,4	540,8	86,91	100,09	0,171	0,166	16	0,2185157
14,327	540,4	540,8	84,93	98,45	0,170	0,166	17	0,2224269
14,355	540,4	540,8	84,74	98,00	0,170	0,166	18	0,2231111
14,557	540,4	540,9	83,29	96,88	0,170	0,166	19	0,2262724
14,526	540,4	540,9	83,65	96,93	0,170	0,166	20	0,2258237
14,586	540,4	540,9	83,25	96,40	0,170	0,166	21	0,2267201
14,412	540,4	540,9	84,16	97,66	0,170	0,166	22	0,2240186
13,619	540,5	540,9	89,20	103,08	0,170	0,166	23	0,2116776
13,621	540,4	540,9	89,28	103,33	0,170	0,166	24	0,211678
14,216	540,5	540,9	85,66	99,02	0,170	0,166	25	0,2208248
14,465	540,5	540,9	83,95	97,70	0,170	0,166	26	0,224699
14,039	540,5	540,9	86,75	100,57	0,170	0,166	27	0,2180507
14,123	540,5	540,9	86,07	100,18	0,170	0,166	28	0,2192133
13,833	540,5	541,0	88,13	102,32	0,170	0,166	29	0,2143269
13,903	540,6	541,0	88,15	101,79	0,170	0,166	30	0,2152413
13,820	540,6	541,0	88,90	102,72	0,170	0,166	31	0,2135853
13,944	540,6	541,0	88,51	102,24	0,170	0,166	32	0,2152406
14,424	540,6	541,0	85,66	99,20	0,170	0,166	33	0,2224277
14,487	540,6	541,1	85,53	99,18	0,170	0,166	34	0,2231118
13,872	540,6	541,1	89,16	103,24	0,170	0,166	35	0,2135856
13,827	540,6	541,1	89,62	103,60	0,170	0,166	36	0,2128717
13,827	540,7	541,1	89,48	103,53	0,170	0,166	37	0,2128717
13,797	540,7	541,2	89,76	103,89	0,170	0,166	38	0,212394
13,877	540,7	541,2	89,35	103,41	0,170	0,166	39	0,2135861
13,759	540,7	541,2	89,90	104,33	0,170	0,166	40	0,2116772
13,947	540,7	541,2	88,82	103,24	0,170	0,166	41	0,214534
14,332	540,7	541,2	86,37	100,44	0,170	0,166	42	0,2203655
14,070	540,7	541,3	88,03	102,00	0,170	0,166	43	0,2164206
13,934	540,8	541,3	89,33	103,32	0,170	0,166	44	0,2140628
14,515	540,8	541,3	85,57	98,78	0,170	0,166	45	0,2231114
14,389	540,8	541,3	86,29	99,57	0,170	0,165	46	0,2212841
13,896	540,8	541,4	89,30	103,51	0,170	0,166	47	0,2135858
14,514	540,9	541,4	85,57	99,11	0,170	0,166	48	0,2231122
14,368	540,9	541,4	86,36	100,15	0,170	0,166	49	0,2208267
14,444	540,9	541,4	85,85	99,55	0,170	0,166	50	0,2219721
13,780	540,9	541,4	90,37	104,40	0,170	0,166	51	0,2116772
14,447	540,9	541,4	86,07	99,46	0,170	0,166	52	0,2219729
14,231	541,0	541,5	87,72	101,13	0,170	0,166	53	0,2185162

14,629	541,0	541,5	84,84	98,21	0,170	0,166	54	0,2246974
13,869	541,0	541,5	89,71	104,08	0,170	0,166	55	0,2128722
13,793	541,0	541,6	90,04	104,81	0,170	0,166	56	0,2116709
13,688	541,1	541,6	90,99	105,22	0,170	0,166	57	0,2101369
14,107	541,1	541,6	88,68	102,14	0,170	0,166	58	0,2164151
13,918	541,1	541,6	89,39	103,38	0,170	0,166	59	0,2135861
13,921	541,1	541,7	89,56	103,71	0,170	0,166	60	0,213586
13,986	541,2	541,7	89,16	103,20	0,170	0,166	61	0,2145339
14,392	541,2	541,7	86,40	100,04	0,170	0,166	62	0,2208254
14,721	541,2	541,7	84,95	98,12	0,170	0,166	63	0,2258247
14,431	541,2	541,8	86,32	99,96	0,170	0,166	64	0,2212617
13,668	541,2	541,8	91,36	105,80	0,170	0,166	65	0,2095096
13,969	541,2	541,8	89,17	103,48	0,170	0,166	66	0,2140599
14,483	541,2	541,8	86,16	99,37	0,170	0,165	67	0,2220217
13,707	541,3	541,8	91,05	105,50	0,170	0,165	68	0,2099933
14,616	541,2	541,8	85,23	98,89	0,170	0,166	69	0,22402
14,120	541,2	541,8	88,34	102,56	0,170	0,166	70	0,216419
13,937	541,3	541,9	89,59	103,85	0,170	0,166	71	0,2135859
14,660	541,3	541,9	85,20	98,40	0,170	0,166	72	0,2246984
13,869	541,3	541,9	89,88	104,39	0,170	0,166	73	0,2124808
13,780	541,3	541,9	90,64	104,71	0,170	0,166	74	0,2111975
13,998	541,3	541,9	88,95	102,86	0,170	0,165	75	0,2145335
14,676	541,3	541,9	84,61	98,22	0,170	0,165	76	0,2251487
13,848	541,3	541,9	90,04	104,33	0,170	0,166	77	0,2123951
13,799	541,4	541,9	90,23	104,51	0,170	0,166	78	0,2116797
14,489	541,4	541,9	85,99	99,28	0,170	0,166	79	0,2224285
13,839	541,4	542,0	89,99	104,13	0,170	0,166	80	0,2123949
14,268	541,5	542,0	87,13	100,78	0,170	0,166	81	0,219212
14,121	541,4	542,0	87,89	101,76	0,170	0,166	82	0,2168847
14,440	541,5	542,0	85,94	99,28	0,170	0,165	83	0,2219727
14,273	541,5	542,1	86,96	100,67	0,170	0,165	84	0,219212
14,583	541,5	542,1	85,16	98,80	0,170	0,166	85	0,2240203
14,395	541,5	542,1	86,25	99,86	0,170	0,166	86	0,2212854
14,522	541,5	542,1	85,40	98,84	0,170	0,166	87	0,2231123
13,957	541,5	542,1	88,59	102,74	0,170	0,165	88	0,2145341
13,903	541,5	542,1	89,32	103,20	0,170	0,165	89	0,2135861
14,512	541,5	542,1	85,37	98,86	0,170	0,166	90	0,2231134
13,524	541,5	542,1	91,71	106,58	0,170	0,166	91	0,2078097
13,749	541,5	542,1	90,67	104,63	0,170	0,166	92	0,2111967
13,588	541,5	542,1	91,24	105,92	0,170	0,166	93	0,2087831
14,606	541,4	542,1	84,85	98,27	0,170	0,166	94	0,2246981
14,444	541,4	542,1	85,37	98,92	0,170	0,166	95	0,2224283
13,908	541,5	542,1	88,97	102,67	0,170	0,165	96	0,2140599
13,837	541,5	542,1	89,41	103,28	0,170	0,165	97	0,2128725
14,552	541,5	542,1	84,81	98,17	0,170	0,165	98	0,2240203
14,376	541,5	542,2	85,99	99,65	0,170	0,166	99	0,2212853
14,659	541,6	542,2	84,25	97,48	0,170	0,166	100	0,2258247
14,544	541,6	542,2	84,99	98,36	0,170	0,166	101	0,2240198
14,608	541,6	542,2	84,27	97,88	0,170	0,166	102	0,2251493
13,893	541,6	542,2	88,91	102,61	0,170	0,166	103	0,2140605
13,739	541,6	542,2	89,63	103,66	0,170	0,165	104	0,211678
13,969	541,6	542,2	88,10	102,33	0,169	0,165	105	0,2152112
13,812	541,6	542,3	89,36	103,21	0,170	0,166	106	0,2128723
14,292	541,6	542,3	86,22	99,94	0,170	0,166	107	0,2203376
14,284	541,6	542,3	86,34	99,83	0,170	0,166	108	0,2203643
14,057	541,6	542,2	87,63	101,32	0,170	0,166	109	0,2168847
13,761	541,7	542,3	89,48	103,52	0,170	0,166	110	0,2123951
13,871	541,6	542,2	88,59	102,50	0,170	0,166	111	0,2140598
13,949	541,7	542,3	88,27	101,84	0,170	0,165	112	0,2152415
14,627	541,7	542,3	83,94	97,10	0,170	0,165	113	0,225825
14,146	541,7	542,3	86,79	100,40	0,170	0,165	114	0,2185173

14,010	541,7	542,3	87,70	101,50	0,170	0,166	115	0,2164175
14,435	541,7	542,4	84,76	98,19	0,170	0,166	116	0,2230846
14,624	541,7	542,3	83,57	96,73	0,170	0,165	117	0,2262735
13,735	541,7	542,4	88,94	103,20	0,170	0,165	118	0,2123953
13,766	541,7	542,4	88,87	102,97	0,169	0,166	119	0,2128724
13,813	541,7	542,4	88,79	102,33	0,170	0,165	120	0,2135866
14,518	541,7	542,4	84,24	97,58	0,170	0,165	121	0,2246984
14,506	541,7	542,4	84,23	97,44	0,170	0,166	122	0,2246988
13,822	541,7	542,4	88,29	102,32	0,170	0,166	123	0,2140604
13,894	541,7	542,4	87,88	101,68	0,170	0,166	124	0,2152417
14,183	541,7	542,4	86,01	99,68	0,170	0,166	125	0,2196742
14,433	541,7	542,4	84,26	97,46	0,170	0,165	126	0,2237872
13,888	541,7	542,4	87,96	101,47	0,170	0,165	127	0,2152417
14,324	541,7	542,4	85,21	98,55	0,170	0,165	128	0,2219727
14,391	541,7	542,4	84,97	98,10	0,170	0,166	129	0,2231119
13,609	541,7	542,4	89,21	103,35	0,170	0,166	130	0,2111974
14,379	541,7	542,4	84,56	97,99	0,170	0,166	131	0,2231125
13,874	541,7	542,4	87,48	101,29	0,170	0,165	132	0,2152416
14,058	541,7	542,3	86,69	99,90	0,170	0,165	133	0,2180516
14,251	541,7	542,4	85,59	98,33	0,170	0,165	134	0,2212866
13,801	541,7	542,4	88,16	101,99	0,170	0,165	135	0,214061
13,794	541,7	542,3	88,26	102,31	0,170	0,166	136	0,2140602
14,341	541,7	542,3	84,97	98,29	0,170	0,166	137	0,2224285
14,510	541,7	542,3	83,72	97,15	0,170	0,166	138	0,2251523
14,495	541,6	542,3	83,46	96,68	0,169	0,165	139	0,2251502
14,075	541,6	542,3	86,39	99,54	0,170	0,165	140	0,2185186
13,792	541,6	542,3	88,17	101,64	0,170	0,165	141	0,2140608
13,708	541,7	542,3	88,89	102,64	0,170	0,165	142	0,212873
14,495	541,7	542,3	84,07	97,09	0,170	0,166	143	0,2251497
14,369	541,7	542,3	84,54	97,84	0,170	0,166	144	0,2231128
14,464	541,7	542,3	83,87	97,17	0,170	0,166	145	0,2246986
13,667	541,7	542,3	88,66	102,48	0,170	0,165	146	0,2122726
13,810	541,7	542,4	87,65	101,51	0,169	0,165	147	0,2145344
13,859	541,7	542,4	87,46	101,29	0,169	0,165	148	0,215242
14,365	541,7	542,4	84,54	97,52	0,170	0,165	149	0,2231161
13,779	541,7	542,4	88,20	101,92	0,170	0,165	150	0,214061
14,572	541,7	542,4	83,42	96,34	0,170	0,165	151	0,2262716
13,810	541,7	542,4	87,83	101,62	0,170	0,165	152	0,2145344
14,321	541,7	542,4	84,73	98,08	0,170	0,165	153	0,2224286
14,464	541,7	542,4	83,85	97,12	0,170	0,166	154	0,2246985
14,361	541,7	542,4	84,45	97,50	0,170	0,165	155	0,2231128
14,557	541,7	542,4	83,59	96,01	0,170	0,165	156	0,2262861
14,031	541,7	542,4	86,33	99,73	0,170	0,165	157	0,2180509
14,627	541,7	542,4	82,93	95,75	0,170	0,165	158	0,2273927
14,578	541,7	542,4	83,01	96,33	0,170	0,165	159	0,2265418
14,411	541,8	542,4	84,12	97,22	0,170	0,165	160	0,2240207
14,034	541,8	542,5	86,38	99,93	0,170	0,165	161	0,2180514
14,593	541,8	542,5	82,99	95,92	0,170	0,165	162	0,2267226
13,741	541,8	542,5	88,17	101,88	0,170	0,165	163	0,2135869
14,486	541,8	542,5	83,72	96,65	0,170	0,165	164	0,2251497
14,527	541,8	542,5	83,51	96,17	0,170	0,165	165	0,2258252
14,127	541,8	542,5	85,57	99,21	0,170	0,165	166	0,2196746
14,527	541,8	542,5	83,49	96,57	0,170	0,166	167	0,2258256
14,450	541,8	542,4	83,63	96,96	0,170	0,166	168	0,224699
14,407	541,8	542,4	83,82	96,95	0,169	0,165	169	0,2240208
14,509	541,8	542,4	83,46	96,20	0,170	0,165	170	0,2257192
13,744	541,8	542,4	88,21	102,01	0,170	0,165	171	0,2135868
13,798	541,8	542,4	87,96	101,44	0,170	0,165	172	0,2145348
13,763	541,8	542,4	88,05	101,59	0,170	0,165	173	0,2140607
13,793	541,7	542,4	87,89	101,54	0,170	0,165	174	0,2145349
13,724	541,7	542,4	88,03	101,87	0,170	0,165	175	0,2135867

14,400	541,8	542,4	84,10	97,12	0,170	0,165	176	0,2240207
14,124	541,8	542,4	85,65	99,04	0,170	0,165	177	0,2196744
13,762	541,8	542,4	87,97	101,49	0,170	0,165	178	0,2140609
13,779	541,8	542,4	87,79	101,31	0,170	0,165	179	0,2145346
13,644	541,8	542,4	88,49	102,42	0,170	0,165	180	0,2123959
13,788	541,8	542,4	87,48	101,51	0,169	0,165	181	0,2145352
13,775	541,7	542,4	87,69	101,55	0,170	0,166	182	0,2145348
14,073	541,7	542,3	85,70	99,32	0,170	0,166	183	0,2192121
14,463	541,6	542,3	83,60	96,41	0,170	0,165	184	0,2251495
14,530	541,7	542,3	83,25	96,11	0,170	0,165	185	0,2262734
14,580	541,7	542,3	82,64	95,43	0,170	0,165	186	0,2273921
13,738	541,7	542,3	87,87	101,53	0,170	0,165	187	0,2140602
14,456	541,7	542,4	83,48	96,49	0,170	0,165	188	0,2251496
14,450	541,7	542,4	83,52	96,59	0,170	0,165	189	0,2251497
13,740	541,7	542,4	87,79	101,47	0,170	0,165	190	0,2140608
14,279	541,7	542,4	84,57	97,61	0,170	0,165	191	0,2224284
14,524	541,7	542,3	82,89	96,07	0,170	0,165	192	0,2262739
13,766	541,6	542,3	87,54	101,00	0,170	0,165	193	0,2145362
13,746	541,6	542,3	87,80	101,10	0,170	0,165	194	0,2140605
13,631	541,6	542,3	88,51	102,00	0,170	0,165	195	0,2123948
13,793	541,5	542,2	87,37	101,02	0,170	0,165	196	0,2149972
14,373	541,5	542,2	83,86	97,00	0,170	0,165	197	0,2240205
14,235	541,5	542,2	84,97	97,67	0,170	0,165	198	0,2219722
13,759	541,5	542,2	87,49	101,10	0,170	0,165	199	0,2145344
14,515	541,5	542,2	83,14	95,79	0,170	0,165	200	0,2262737
14,449	541,5	542,2	83,33	96,39	0,170	0,165	201	0,2251491
14,419	541,5	542,2	83,71	96,49	0,170	0,165	202	0,2246991
13,879	541,5	542,2	86,77	100,65	0,170	0,165	203	0,2164179
14,160	541,4	542,1	84,94	98,30	0,170	0,166	204	0,2208262
13,806	541,4	542,1	86,91	100,32	0,170	0,165	205	0,215713
13,784	541,4	542,1	87,23	100,48	0,170	0,165	206	0,215242
14,538	541,3	542,1	82,98	95,54	0,170	0,165	207	0,2267218
13,823	541,3	542,0	86,91	100,53	0,170	0,165	208	0,2157113
13,822	541,3	542,0	87,14	100,49	0,170	0,165	209	0,2157133
14,121	541,3	542,0	85,04	98,43	0,170	0,165	210	0,2203667
14,361	541,3	542,0	83,63	96,87	0,170	0,165	211	0,2240205
14,266	541,3	542,0	84,46	97,38	0,170	0,165	212	0,2225903
14,357	541,3	542,0	83,83	96,69	0,170	0,165	213	0,2240204
14,472	541,3	542,0	83,33	95,78	0,170	0,165	214	0,225825
14,422	541,4	542,1	83,47	95,99	0,170	0,165	215	0,2251488
14,532	541,4	542,1	82,97	95,57	0,170	0,165	216	0,2267215
13,639	541,4	542,1	88,13	101,68	0,170	0,165	217	0,2128726
14,398	541,4	542,1	83,64	96,50	0,170	0,165	218	0,2246982
14,496	541,4	542,0	82,91	95,76	0,170	0,165	219	0,2262735
13,888	541,4	542,0	86,54	99,97	0,170	0,165	220	0,2168866
14,487	541,4	542,0	83,01	95,72	0,170	0,165	221	0,2262729
14,584	541,4	542,1	82,14	94,73	0,170	0,165	222	0,2278369
14,398	541,4	542,0	83,15	96,36	0,170	0,165	223	0,2251489
14,504	541,4	542,0	82,47	95,24	0,170	0,165	224	0,2267215
13,774	541,4	542,0	87,02	100,74	0,170	0,165	225	0,2152414
13,858	541,5	542,1	86,81	100,18	0,170	0,165	226	0,2164176
13,978	541,5	542,1	-86,01	-99,14	0,170	0,165	225	0,2182465

APPENDIX 3: Calibration data



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-001 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2.0°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Fluke	Type de sortie:	Digitale
No. Model:	52-II	Type de mesure:	Température
No. Série:	90630037	Gamme:	Divers
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	No. du certificat d'étalonnage:	AC15061429-7798010
No. Série:	7798010	Dernière date d'étalonnage:	22-Jun-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	22-Jun-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0 °C	0.0 °C	0.0 °C	0.0 °C	0.00 °C	1.0 °C	T1 typeJ
125.0 °C	125.0 °C	125.0 °C	0.0 °C	125.0 °C	1.0 °C	T1 typeJ
250.0 °C	250.0 °C	250.0 °C	0.0 °C	250.0 °C	1.0 °C	T1 typeJ
375.0 °C	375.0 °C	375.0 °C	0.0 °C	375.0 °C	1.0 °C	T1 typeJ
500.0 °C	500.0 °C	500.0 °C	0.0 °C	500.0 °C	1.0 °C	T1 typeJ
0.0 °C	0.0 °C	0.0 °C	0.0 °C	0.0 °C	1.0 °C	T2 typeJ
125.0 °C	125.0 °C	125.0 °C	0.0 °C	125.0 °C	1.0 °C	T2 typeJ
250.0 °C	250.0 °C	250.0 °C	0.0 °C	250.0 °C	1.0 °C	T2 typeJ
375.0 °C	375.0 °C	375.0 °C	0.0 °C	375.0 °C	1.0 °C	T2 typeJ
500.0 °C	500.0 °C	500.0 °C	0.0 °C	500.0 °C	1.0 °C	T2 typeJ
0.0 °C	0.0 °C	0.1 °C	0.1 °C	0.1 °C	1.0 °C	T1 typeK
125.0 °C	125.0 °C	125.2 °C	0.2 °C	125.2 °C	1.0 °C	T1 typeK
250.0 °C	250.0 °C	250.2 °C	0.2 °C	250.2 °C	1.0 °C	T1 typeK
375.0 °C	375.0 °C	375.2 °C	0.2 °C	375.2 °C	1.0 °C	T1 typeK
500.0 °C	500.0 °C	500.2 °C	0.2 °C	500.2 °C	1.0 °C	T1 typeK
0.0 °C	0.0 °C	0.2 °C	0.2 °C	0.2 °C	1.0 °C	T2 typeK
125.0 °C	125.0 °C	125.3 °C	0.3 °C	125.3 °C	1.0 °C	T2 typeK
250.0 °C	250.0 °C	250.2 °C	0.2 °C	250.2 °C	1.0 °C	T2 typeK
375.0 °C	375.0 °C	375.2 °C	0.2 °C	375.2 °C	1.0 °C	T2 typeK
500.0 °C	500.0 °C	500.2 °C	0.2 °C	500.2 °C	1.0 °C	T2 typeK

Conditions Environnementales: Température: 23 °C Humidité: 24 %RH

Type d'Étalonnage:

[Signature]
2016-03-01

5F09101



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-001 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette
	St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2.0°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Fluke	Type de sortie:	Digitale
No. Model:	52-II	Type de mesure:	Température
No. Série:	90630037	Gamme:	Divers
Emplacement:	N.A.	Conditions Enviro:	Normale

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-006 24/02/16

CLIENT		SPÉCIFICATION DE CALIBRATION	
Compagnie:	Services Polytests Inc	Procédure de service:	4IN9106
Adresse:	695 B rue Gaudette	Précision requise:	+/-0.25"H2O
	St-Jean-sur-Richelieu, Québec, J3B 7S7	Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Indicateur	Type d'entrée:	Pression
Manufacturier:	Dwyer	Type de sortie:	Digitale
No. Model:	MS-321-LCD	Type de mesure:	Pression
No. Série:	E47U020014	Gamme:	0-0.5"H2O
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Setra	No. du certificat d'étalonnage:	AC16021060-2784759
No. Série:	2784759	Dernière date d'étalonnage:	3-Feb-16
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	3-Feb-17
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0000 "H2O	0.000 "H2O	0.000 "H2O	0.000 "H2O	0.000 "H2O	0.25 "H2O	
0.1500 "H2O	0.150 "H2O	0.151 "H2O	0.001 "H2O	0.151 "H2O	0.25 "H2O	
0.2500 "H2O	0.250 "H2O	0.251 "H2O	0.001 "H2O	0.251 "H2O	0.25 "H2O	
0.3500 "H2O	0.350 "H2O	0.349 "H2O	-0.001 "H2O	0.349 "H2O	0.25 "H2O	
0.5000 "H2O	0.500 "H2O	0.493 "H2O	-0.007 "H2O	0.493 "H2O	0.25 "H2O	
Conditions Environnementales: Température: 23 °C Humidité: 24 %RH						
Type d'Étalonnage:						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

2016-03-01



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-007 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+/- 0.25"H2O
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Indicateur	Type d'entrée:	Pression
Manufacturier:	Dwyer	Type de sortie:	Digitale
No. Model:	MS-321-LCD	Type de mesure:	Pression
No. Série:	E23S020111/12	Gamme:	0-0.5"H2O
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Setra	No. du certificat d'étalonnage:	AC16021060-2784759
No. Série:	2784759	Dernière date d'étalonnage:	3-Feb-16
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	3-Feb-17
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0000 "H2O	0.0000 "H2O	0.0000 "H2O	0.0000 "H2O	0.0000 "H2O	0.25 "H2O	
0.1500 "H2O	0.1500 "H2O	0.1521 "H2O	0.0021 "H2O	0.1521 "H2O	0.25 "H2O	
0.2500 "H2O	0.2500 "H2O	0.2520 "H2O	0.0020 "H2O	0.2520 "H2O	0.25 "H2O	
0.3500 "H2O	0.3500 "H2O	0.3528 "H2O	0.0028 "H2O	0.3528 "H2O	0.25 "H2O	
0.5000 "H2O	0.5000 "H2O	0.5063 "H2O	0.0063 "H2O	0.5063 "H2O	0.25 "H2O	
Conditions Environnementales: Température: 23 °C Humidité: 24 %RH						
Type d'Étalonnage:						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exacritude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

5F09106



**Instrumentation
Saint-Laurent** inc.
Accrédité ISO 17025



80 rue de la montagne
St-Joseph du lac
(Québec), J0N 1M0
Tél: (450) 473-6169
Fax: (450) 473-5207
Email: inst.st-laurent@videotron.ca

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-015 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Keithley	Type de sortie:	Digitale
No. Model:	7700	Type de mesure:	Température
No. Série:	1213648	Gamme:	Divers
Emplacement:	EM-047	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	No. du certificat d'étalonnage:	AC15061429-7798010
No. Série:	7798010	Dernière date d'étalonnage:	22-Jun-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	22-Jun-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
-190.0 °C	-190.0 °C	-190.6 °C	-0.6 °C	-190.6 °C	1.0 °C	Input#1TypeK
0.0 °C	0.0 °C	-0.3 °C	-0.3 °C	-0.3 °C	1.0 °C	Input#1TypeK
750.0 °C	750.0 °C	749.7 °C	-0.3 °C	749.7 °C	1.0 °C	Input#1TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#2 TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#3 TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#4 TypeK
100.0 °C	100.0 °C	99.5 °C	-0.5 °C	99.5 °C	1.0 °C	Input#5TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#6TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#7TypeK
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#8TypeK
100.0 °C	100.0 °C	99.5 °C	-0.5 °C	99.5 °C	1.0 °C	Input#9TypeK
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#10TypeJ
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#11TypeJ
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#12TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#13 TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#14TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#15 TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#16TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#17TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#18TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#19TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#20TypeJ
12.000 mA	12.000 mA	12.001 mA	0.001 mA	12.001 mA	1.00 mA	Input#21
12.000 mA	12.000 mA	12.002 mA	0.002 mA	12.002 mA	1.00 mA	Input#22
Conditions Environnementales:			Température: 21 °C	Humidité: 21 %RH		

5F09101



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-015 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette
	St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Keithley	Type de sortie:	Digitale
No. Model:	7700	Type de mesure:	Température
No. Série:	1213648	Gamme:	Divers
Emplacement:	EM-047	Conditions Enviro:	Normale
Type d'Étalonnage:		Test avec EM-047	

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

[Signature]
2016-03-01



**Instrumentation
Saint-Laurent** inc.
Accrédité ISO 17025



80 rue de la montagne
St-Joseph du lac
(Québec), J0N 1M0
Tél: (450) 473-6169
Fax: (450) 473-5207
Email: inst.st-laurent@videotron.ca

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-047 05/02/15

CLIENT		SPÉCIFICATION DE CALIBRATION	
Compagnie:	Services Polytests Inc	Procédure de service:	4IN9101
Adresse:	695 B rue Gaudette	Précision requise:	+/-2°C
	St-Jean-sur-Richelieu, Québec, J3B 7S7	Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Keithley	Type de sortie:	Digitale
No. Model:	2700	Type de mesure:	Température
No. Série:	1217093	Gamme:	Divers
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	No. du certificat d'étalonnage:	AC15011147-8180008
No. Série:	8180008	Dernière date d'étalonnage:	15-Jan-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	15-Apr-15

Commentaire:

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
Voir Commentaire						
Conditions Environnementales:			Température: 20 °C	Humidité: 24 %RH		
Type d'Étalonnage: Data Acquisition system Conforme						
Carte1: EM-154						
Carte2: EM-015						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabriquant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	5 Février 2015
Date du prochain Étalonnage:	5 Février 2016
Date d'émission du certificat:	5 Février 2015

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

2015-02-15

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	122-3A7009-161-1649
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Date d'étalonnage :	22-09-2016

Technicien:
Auclair, François



David Llorens, Responsable Qualité

DESCRIPTION DU SERVICE:

Modèle de Balance :	AR2140	Méthode :	ISO 17025
Manufacturier :	Ohaus	Date d'approbation :	22-09-2016
Numéro de Série :	M3658329010091	Date prochain étalonnage :	22-09-2017
Numéro d'identification :	EM-051	accréditation CCN n. :	668
Capacité :	210g	Certification CLAS n. :	2010-01
Résolution:	0.0001g		

Condition d'essai :	Temp °C:	25.1	Pression kPa:	101.9	Humidité %:	45.5
----------------------------	----------	------	---------------	-------	-------------	------

Note: Les conditions environnementales ne sont pas utilisées dans le calcul de l'incertitude.

CETTE BALANCE RENCONTRE LES SPÉCIFICATIONS SUIVANTES:

Type de test :	Manufacturier
Excentricité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Linéarité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Sensibilité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Répétabilité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non

NOTES:

Cette balance a été certifiée selon la procédure de travail PDL-09-MG-010 (certification de balance analytique et à plateau) et la et la procédure PDL-09-MG-012 (détermination des incertitudes de pesées). Nos étalons sont certifiés à chaque année. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.



2016.09.28

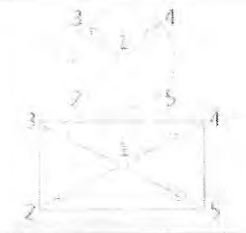
CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	122-3A7009-161-1649
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
Méthode :	ISO 17025	Certification CLAS n. :	2010-01
		Modèle de Balance :	AR2140
		Date d'étalonnage :	22-09-2016
		Date du prochain étalonnage :	22-09-2017

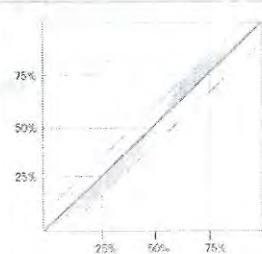
TEST D'EXCENTRICITÉ:

Poids Test: 100 g Tolérance 0.0004 g
(Note: Le Poids Test est taré au centre du plateau de pesée)

Position	Avant Ajustement	Après Ajustement	
1: Centre:	0.0000 g	---	
2: Avant Gauche:	0.0000 g	---	
3: Arrière Gauche:	0.0000 g	---	
4: Arrière Droit:	0.0000 g	---	
5: Avant Droit:	0.0000 g	---	
Résultats	0.0000 g	---	
STATUT	CONFORME	N/A	

TEST DE LINÉARITÉ:

Méthode: Substitution Plage: 210 g Poids Test: 50 g Tolérance: 0.0002 g

Pré-Charge	Avant Ajustement	Après Ajustement	
0.0000 g	50.0002 g	---	
50.0000 g	49.9998 g	---	
100.0000 g	49.9998 g	---	
150.0000 g	50.0002 g	---	
---	---	---	
---	---	---	
Résultats	0.00020 g	---	
STATUT	CONFORME	N/A	

TEST DE SENSIBILITÉ:

Valeur de masse conventionnelle: 200.0000 g Tolérance: 0.0004 g

	Avant Ajustement	Après Ajustement	
Lecture:	199.9998 g	---	$S = \frac{\Delta W}{\Delta m}$
Résultats:	0.0002 g	---	
STATUT	CONFORME	N/A	

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	122-3A7009-161-1649
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
Méthode :	ISO 17025	Certification CLAS n. :	2010-01
		Modèle de Balance :	AR2140
		Date d'étalonnage :	22-09-2016
		Date du prochain étalonnage :	22-09-2017

TEST DE RÉPÉTABILITÉ:

AVANT AJUSTEMENT:

Charge Utilisée:
100.0000 gTolérance:
0.00010 gRésolution d'affichage:
0.0001 gMoyenne:
99.99979 gÉcart-type:
0.00006 g

#	Vide	Chargé	Différence
1	0.0000 g	99.9997 g	99.9997 g
2	0.0000 g	99.9998 g	99.9998 g
3	0.0000 g	99.9998 g	99.9998 g
4	0.0000 g	99.9997 g	99.9997 g
5	0.0000 g	99.9998 g	99.9998 g
6	0.0000 g	99.9998 g	99.9998 g
7	0.0000 g	99.9998 g	99.9998 g
8	0.0000 g	99.9999 g	99.9999 g
9	0.0000 g	99.9998 g	99.9998 g
10	0.0000 g	99.9998 g	99.9998 g

Statut : **CONFORME**

APRÈS AJUSTEMENT:

Charge Utilisée:
---Tolérance:
0.00010 gRésolution d'affichage:
0.0001 gMoyenne:
---Écart-type:

#	Vide	Chargé	Différence
1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---
6	---	---	---
7	---	---	---
8	---	---	---
9	---	---	---
10	---	---	---

Statut : **N/A**

2016-09-28

CERTIFICAT D'ÉTALONNAGE

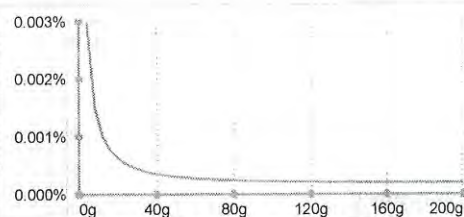
108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

INCERTITUDE AVANT AJUSTEMENT :

$$Uc = \sqrt{(u_{(cr)})^2 + s_p^2 + u_{(l)}^2 + u_{(dr)}^2 + u_{(s)}^2}$$

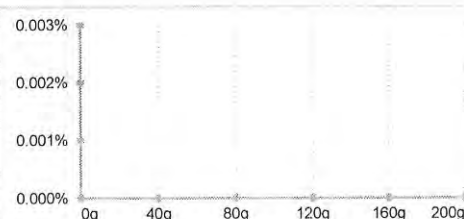
- u(cr)** = Incertitude reliée à l'étalon utilisé
- Sp** = Incertitude de l'écart-type
- u(l)** = Incertitude associée à la linéarité
- u(dr)** = Incertitude associée à résolution si Sp = 0
- u(s)** = Incertitude liée à la sensibilité (span)

Valeur	Incertitude	Incertitude (%)
12.5000 g	0.00016 g	0.001300 %
25.0000 g	0.00017 g	0.000673 %
50.0000 g	0.00019 g	0.000378 %
100.0000 g	0.00026 g	0.000256 %
200.0000 g	0.00059 g	0.000294 %



INCERTITUDE APRÈS AJUSTEMENT :

Valeur	Incertitude	Incertitude (%)
---	---	---
---	---	---
---	---	---
---	---	---



NOTES :

De ces valeurs d'incertitudes, seule la valeur surlignée est calculée selon ISO17025:2005, les autres étant estimées jusqu'au résultat de l'incertitude minimale. Dans le calcul de cette l'incertitude, l'écart-type utilisé est de 0,577d (où d est la précision d'affichage de la balance) lorsque cet écart-type est plus inférieur à 0,577d.

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

RÉFÉRENCE

ENSEMBLE DE RÉFÉRENCE:

Référence	No de série	Fabricant	Date d'étalonnage
1mg - 5kg	DK000A161	Dispersion Laboratoire	29-08-2016

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

3. *L'incertitude associée à l'étalon utilisé.*
2. *L'incertitude associée à l'écart-type.*
1. *L'incertitude associée à l'opération de pesage.*
4. *L'incertitude associée à la résolution de l'appareil.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de $k = 2$. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

REMARQUES:



2016-09-28

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	123-259410-142
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Date d'étalonnage :	30-10-2014

Technicien :
Simard, Catherine

Technicienne Métrologie



Pierre Trépanier, Directeur laboratoire

DESCRIPTION DU SERVICE:

Description des masses :	ASTM E617	Date d'approbation :	03-11-2014
Classe de précision :	ASTM 6	Date prochain étalonnage :	03-11-2015
Densité :	7.95g/cm ³	Accréditation CCN n. :	668
Identification (si unique) :	EM-090	Certification CLAS n. :	2010-01

Condition d'essai :	Temp °C: 20.605	Pression kPa: 101.2	Humidité: 46.785
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NOTES:

Pour l'étalonnage des masses, nous utilisons la procédure "Comparaison individuelle" PDL-09-MG-001 et la procédure "Détermination des incertitudes" PDL-09-MG-002. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.

REMARQUES:

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client : Polytests	No. du Certificat : 123-259410-142
Adresse : 695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. : 668
Masse : 2 kg	Certification CLAS n. : 2010-01
	Classe d'exactitude : ASTM 6
	Date d'étalonnage : 30-10-2014
	Date du prochain étalonnage : 03-11-2015

RÉSULTAT DE L'ÉTALONNAGE, MASSE CONVENTIONNELLE:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle	Masse conventionnelle après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
2 kg		EM-090	2.0001350 kg		200 mg	2.0 mg

S'applique seulement pour les masses qui ont été ajustées

Hors-tolérance pour la classe spécifiée



CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	123-259410-142
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
		Certification CLAS n. :	2010-01
		Classe d'exactitude :	ASTM 6
Masse :	2 kg	Date d'étalonnage :	30-10-2014
		Date du prochain étalonnage :	03-11-2015

RÉSULTAT DE L'ÉTALONNAGE DES POIDS, CORRECTIONS:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle Correction	Masse conventionnelle Correction après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
2 kg		EM-090	135.0 mg		200 mg	2.0 mg

S'applique seulement pour les masses qui ont été ajustées **Hors-tolérance pour la classe spécifiée**



CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

BALANCES UTILISÉES

Pour l'étalonnage manuel :

> 5 kg à 25 kg :	Mettler Toledo XP32003L, SNR 1123271214, max. 32100 g, d = 0.005 g
> 1 kg à 5 kg :	Mettler Toledo PR5003, SNR 1115311634, max. 5100 g, d = 0.001 g
> 300 g à 2 kg :	Mettler Toledo XP2004S, SNR B131185222, max. 2100 g, d = 0.1 mg
> 100 g à 200 g :	Mettler Toledo AT201 SNR BA1115230146, max. 205 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1127063924, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1121103055, max. 5.1 g, d = 0.1 µg

Pour l'étalonnage automatisé :

> 200 g à 1 kg :	Mettler Toledo AX1005 SNR 1127063210, max. 1109 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1120143015, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1125140561, max. 5.1 g, d = 0.1 µg

Les balances sont vérifiées selon notre procédure de contrôle périodique PDL-11-MG-001.

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

1. *L'incertitude associée à l'opération de pesage.*
2. *L'incertitude associée à la densité de l'air.*
3. *L'incertitude associée à l'étalon utilisé.*
4. *L'incertitude associée à la densité de la masse à être étalonnée.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de $k = 2$. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

RÉFÉRENCES UTILISÉES

Poids	No de série	Fabricant	Date d'étalonnage
20kg	69976	Troemner	18-03-2014
1kg - 1mg	MT-01	Mettler Toledo	04-09-2014
300g	96-0888-50-2	Denver Instrument Company	04-09-2014
2kg	96-0888-50-3	Denver Instrument Company	04-09-2014
2kg	129098	Mettler Toledo	04-09-2014
5kg	96-0888-50-3	Denver Instrument Company	04-09-2014
5kg	129099	Mettler Toledo	04-09-2014
10kg	129100	Mettler Toledo	14-08-2014

ÉTALONS CERTIFIÉS PAR LE CNRC:

Poids	No de série	Fabricant	Date d'étalonnage
100g	95170	Mettler Toledo	19-08-2014
1kg	95171	Mettler Toledo	02-05-2014

RÉFÉRENCES DE LA STATION ROBOTISÉE:

Poids	No de série	Fabricant	Date d'étalonnage
1kg - 1mg	DK000A133	Laboratoire Dispersion	04-09-2014
1kg - 1mg	DK000A132	Laboratoire Dispersion	01-02-2013



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-126 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+/- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	Type d'entrée:	Pression
Manufacturier:	Dwyer	Type de sortie:	Digitale
No. Model:	DPG200	Type de mesure:	Pression
No. Série:	N.A.	Gamme:	0-28"Hg
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Crystal XP2i 300	No. du certificat d'étalonnage:	AC15061148-864490
No. Série:	864490	Dernière date d'étalonnage:	10-Jun-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	10-Jun-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	1 "Hg	
-7.50 "Hg	-7.50 "Hg	-7.60 "Hg	-0.10 "Hg	-7.60 "Hg	1 "Hg	
-15.00 "Hg	-15.00 "Hg	-15.20 "Hg	-0.20 "Hg	-15.20 "Hg	1 "Hg	
-22.50 "Hg	-22.50 "Hg	-22.80 "Hg	-0.30 "Hg	-22.80 "Hg	1 "Hg	
-28.00 "Hg	-28.00 "Hg	-28.37 "Hg	-0.37 "Hg	-28.37 "Hg	1 "Hg	
Conditions Environnementales: Température: 23 °C Humidité: 24 %RH						
Type d'Étalonnage:						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabriquant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-127 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+/- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	Type d'entrée:	Pression
Manufacturier:	Dwyer	Type de sortie:	Digitale
No. Model:	DPG200	Type de mesure:	Pression
No. Série:	N.A.	Gamme:	0-28"Hg
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Crystal XP2i 300	No. du certificat d'étalonnage:	AC15061148-864490
No. Série:	864490	Dernière date d'étalonnage:	10-Jun-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	10-Jun-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	1 "Hg	
-7.50 "Hg	-7.50 "Hg	-7.51 "Hg	-0.01 "Hg	-7.51 "Hg	1 "Hg	
-15.00 "Hg	-15.00 "Hg	-15.01 "Hg	-0.01 "Hg	-15.01 "Hg	1 "Hg	
-22.50 "Hg	-22.50 "Hg	-22.54 "Hg	-0.04 "Hg	-22.54 "Hg	1 "Hg	
-28.00 "Hg	-28.00 "Hg	-28.08 "Hg	-0.08 "Hg	-28.08 "Hg	1 "Hg	
Conditions Environnementales: Température: 23 °C Humidité: 24 %RH						
Type d'Étalonnage:						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

2016-03-01

5F09106

CERTIFICAT D'ÉTALONNAGE


108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	900-259410-141
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Date d'étalonnage :	03-11-2014

Technicien :

CB001,

Station d'étalonnage automatisée



Pierre Trépanier, Directeur laboratoire

DESCRIPTION DU SERVICE:

Description des masses :	ASTM E617	Date d'approbation :	03-11-2014
Classe de précision :	ASTM 1	Date prochain étalonnage :	03-11-2015
Densité :	7.95g/cm ³	Accréditation CCN n. :	668
Identification (si unique) :	(items multiples)	Certification CLAS n. :	2010-01

Condition d'essai :	Temp °C: 20.51	Pression kPa: 101.195	Humidité: 48.615
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NOTES:

Pour l'étalonnage des masses, nous utilisons la procédure "Comparaison individuelle" PDL-09-MG-001 et la procédure "Détermination des incertitudes" PDL-09-MG-002. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.

REMARQUES:

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	900-259410-141
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
Masse :	100 mg - 200 g	Certification CLAS n. :	2010-01
		Classe d'exactitude :	ASTM 1
		Date d'étalonnage :	03-11-2014
		Date du prochain étalonnage :	03-11-2015

RÉSULTAT DE L'ÉTALONNAGE DES POIDS, CORRECTIONS:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle Correction	Masse conventionnelle Correction après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
100 mg	1000014200	EM-128	-0.0004 mg		0.010 mg	0.002 mg
200 g	1000026013	EM-129	0.23 mg		0.50 mg	0.11 mg

S'applique seulement pour les masses qui ont été ajustées

Hors-tolérance pour la classe spécifiée

BALANCES UTILISÉES

Pour l'étalonnage manuel :

> 5 kg à 25 kg :	Mettler Toledo XP32003L, SNR 1123271214, max. 32100 g, d = 0.005 g
> 1 kg à 5 kg	Mettler Toledo PR5003, SNR 1115311634, max. 5100 g, d = 0.001 g
> 300 g à 2 kg :	Mettler Toledo XP2004S, SNR B131185222, max. 2100 g, d = 0.1 mg
> 100 g à 200 g :	Mettler Toledo AT201 SNR BA1115230146, max. 205 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1127063924, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1121103055, max. 5.1 g, d = 0.1 µg

Pour l'étalonnage automatisé :

> 200 g à 1 kg :	Mettler Toledo AX1005 SNR 1127063210, max. 1109 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1120143015, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1125140561, max. 5.1 g, d = 0.1 µg

Les balances sont vérifiées selon notre procédure de contrôle périodique PDL-11-MG-001.

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

1. *L'incertitude associée à l'opération de pesage.*
2. *L'incertitude associée à la densité de l'air.*
3. *L'incertitude associée à l'étalon utilisé.*
4. *L'incertitude associée à la densité de la masse à être étalonnée.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de $k = 2$. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

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CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

RÉFÉRENCES UTILISÉES

Poids	No de série	Fabricant	Date d'étalonnage
20kg	69976	Troemner	18-03-2014
1kg - 1mg	MT-01	Mettler Toledo	04-09-2014
300g	96-0888-50-2	Denver Instrument Company	04-09-2014
2kg	96-0888-50-3	Denver Instrument Company	04-09-2014
2kg	129098	Mettler Toledo	04-09-2014
5kg	96-0888-50-3	Denver Instrument Company	04-09-2014
5kg	129099	Mettler Toledo	04-09-2014
10kg	129100	Mettler Toledo	14-08-2014

ÉTALONS CERTIFIÉS PAR LE CNRC:

Poids	No de série	Fabricant	Date d'étalonnage
100g	95170	Mettler Toledo	19-08-2014
1kg	95171	Mettler Toledo	02-05-2014

RÉFÉRENCES DE LA STATION ROBOTISÉE:

Poids	No de série	Fabricant	Date d'étalonnage
1kg - 1mg	DK000A133	Laboratoire Dispersion	04-09-2014
1kg - 1mg	DK000A132	Laboratoire Dispersion	01-02-2013



2014-11-05

CERTIFICAT D'ÉTALONNAGE # 5138

Date d'étalonnage : 2015/09/18

Date d'émission du certificat : 2015/09/18

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Débitmètre volumétrique American Meter Company DTM-200A S/N : 99A274209

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols et sont conformes à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2008 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de $\pm 0.2\%$ de la lecture pour les mesures entre 5 SCCM à 10 SLPM, $\pm 0.3\%$ de la lecture pour les mesures entre 10 SLPM à 30 SLPM, $\pm 0.2\%$ de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, $\pm 0.3\%$ de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et $\pm 0.5\%$ pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
Résultats	Lectures finales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois


Métrologiste


Responsable du laboratoire

Certificat d'étalonnage # 5138

Numéro de série:	99A274209	Station de mesure:	3
Date d'étalonnage:	2015/09/18	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-130		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500173210	2015/11/12
DHI molbloc (120 slpm)	2E2-S	237	1500173211	2015/11/12
DHI molbox1	Molbox1	881	1500181338	2016/05/13
RTD Mist	M22	1871501	AC15021633-1871501	2016/03/27
Module 44.5 PSI avec Baro 163671	Module 30	160659	AC15041466-160659	2016/05/06

Spécifications finales de l'appareil

Condition d'étalonnage

Spécifications finales de l'appareil		Condition d'étalonnage	
Gaz	Air	Gaz	Air
Température d'opération		Température ambiante	23 °C
Pression à l'entrée		Pression ambiante	1010 mbar
Pression à la sortie		Orientation	Verticale
Température de référence		Élastomère	Viton
Pression de référence		Valve	Viton
Étendue d'échelle	0-200 ACFH		
Signaux Entrée/Sortie	-		
Alimentation			
Tolérance	±1 %O.R.		

Lectures finales

Débit du test ACFH	Instrument en test ft3	Valeurs mesurées			Référence calculée ft3	Erreur calculée ft3	Tolérance acceptable ft3	TUR
		Pression PSIA	Température °C	Référence ft3				
40.5223	13.535	14.687	23.73	13.367	13.494	0.041	0.135	2.98
70.6538	11.800	14.712	23.67	11.674	11.763	0.037	0.118	3.98
161.3162	26.875	14.818	23.61	26.851	26.856	0.019	0.269	>4

Correction factor
0,9968

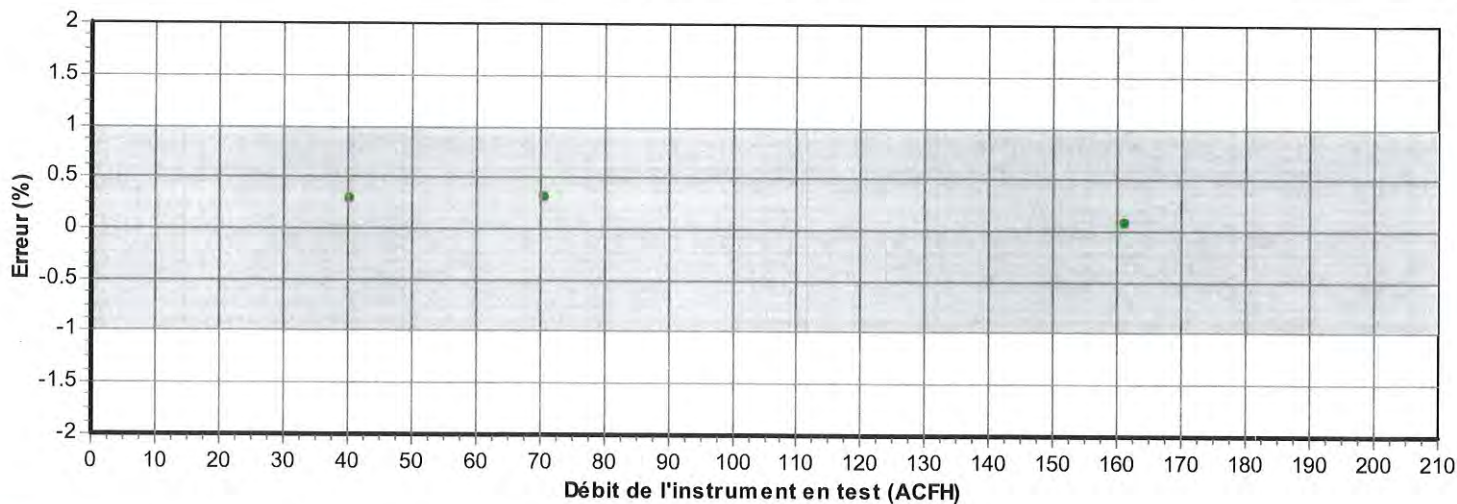
Bernard Poirier
Métrologue

Certificat d'étalonnage # 5138

Numéro de série: 99A274209
Date d'étalonnage: 2015/09/18
Identification de l'instrument: EM-130

Station de mesure: 3
Procédure: POS-CAL-005

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC


2015-09-25

Bernard Poirier
Métrologue


Signature

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-136 07/03/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette
	St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	ISL-004
Précision requise:	+/-2°C +/-3%RH
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Hygromètre	Type d'entrée:	Temp/%RH
Manufacturier:	Fluke	Type de sortie:	Digitale
No. Model:	971	Type de mesure:	Temp/humidité
No. Série:	10610850	Gamme:	5-95%RH -20a60°C
Emplacement:	N.A.	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Vaisala Portable 1	No. du certificat d'étalonnage:	AC15071230-U4840010
No. Série:	U4840010/U4920031	Dernière date d'étalonnage:	17-Jul-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	17-Jul-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
25.0 °C	25.0 °C	25.2 °C	0.2 °C	25.2 °C	1.0 °C	
40.0 °C	40.0 °C	40.0 °C	0.0 °C	40.0 °C	1.0 °C	
33.0 %RH	33.0 %RH	33.2 %RH	+0.2 %RH	33.2 %RH	3.0 %RH	
50.0 %RH	50.0 %RH	50.9 %RH	+0.9 %RH	50.9 %RH	3.0 %RH	
80.0 %RH	80.0 %RH	79.6 %RH	-0.4 %RH	79.6 %RH	3.0 %RH	
Conditions Environnementales: Température: N.A. Humidité: N.A.						
Type d'Étalonnage:						

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraceable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	7 Mars 2016
Date du prochain Étalonnage:	7 Mars 2017
Date d'émission du certificat:	7 Mars 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.



Martin Langlais - Technicien



CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client : Polytests	No. du Certificat : 122-3A7009-161-1648
Adresse : 695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Date d'étalonnage : 22-09-2016

Technicien:
Auclair, François


David Llorens, Responsable Qualité

DESCRIPTION DU SERVICE:

Modèle de la Base : 4X4HP-10K	Capacité : 400kg
Numéro de Série Base: C18395	Méthode: ISO 17025 / Class III
Modèle de Terminal: IQ355	Résolution: 0.05kg
Numéro de Série Terminal: 164851	Date d'approbation : 22-09-2016
Numéro d'identification : EM-137 <i>et EM-114</i> <i>D.P. 2016-09-22</i>	Date prochain étalonnage : 22-09-2017

Condition d'essai :	Temp °C: 21.1	Pression kPa: 101.9	Humidité %: 60.9
----------------------------	----------------------	----------------------------	-------------------------

Note: Les conditions environnementales ne sont pas utilisées dans le calcul de l'incertitude.

CETTE BALANCE RENCONTRE LES SPÉCIFICATIONS SUIVANTES:

Type de test :	Manufacturier	
Excentricité:	Pré: <input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non	Post: <input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Linéarité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Sensibilité:	<input type="checkbox"/> Oui <input checked="" type="checkbox"/> Non	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non
Répétabilité:	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non	<input checked="" type="checkbox"/> Oui <input type="checkbox"/> Non

NOTES:

Cette balance a été certifiée selon la procédure de travail PDL-09-MG-010 (certification de balance analytique et à plateau) et la et la procédure PDL-09-MG-012 (détermination des incertitudes de pesées). Nos étalons sont certifiés à chaque année. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.


2016.09.28

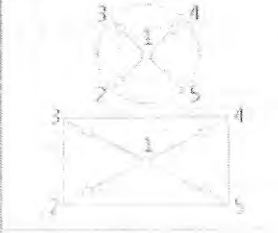
CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	122-3A7009-161-1648
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
Méthode :	ISO 17025	Certification CLAS n. :	2010-01
		Modèle de la Base :	4X4HP-10K
		Date d'étalonnage :	22-09-2016
		Date du prochain étalonnage :	22-09-2017

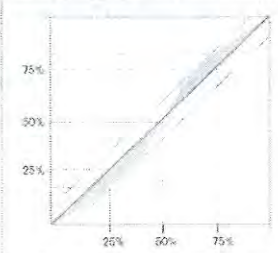
TEST D'EXCENTRICITÉ:

Poids Test: 200 kg Tolérance 0.15 kg
(Note: Le Poids Test est taré au centre du plateau de pesée)

Position	Avant Ajustement	Après Ajustement	
1: Centre:	0.00 kg	0.00 kg	
2: Avant Gauche:	0.00 kg	0.00 kg	
3: Arrière Gauche:	0.05 kg	0.05 kg	
4: Arrière Droit:	0.00 kg	0.00 kg	
5: Avant Droit:	0.15 kg	0.15 kg	
Résultats	0.15 kg	0.15 kg	
STATUT	CONFORME	CONFORME	

TEST DE LINÉARITÉ:

Méthode: Accumulation Plage: 400 kg Poids Test: 100 kg Tolérance: 0.10 kg

Pré-Charge	Avant Ajustement	Après Ajustement	
0.00 kg	99.90 kg	100.00 kg	
0.00 kg	199.80 kg	199.95 kg	
0.00 kg	299.75 kg	299.95 kg	
0.00 kg	399.70 kg	400.00 kg	
---	---	---	
Résultats	0.050 kg	0.050 kg	
STATUT	CONFORME	CONFORME	

TEST DE SENSIBILITÉ:

Valeur de masse conventionnelle: 400.00 kg Tolérance: 0.25 kg

	Avant Ajustement	Après Ajustement	
Lecture:	399.70 kg	400.00 kg	$S = \frac{\Delta W}{\Delta m}$
Résultats:	0.30 kg	0.00 kg	
STATUT	NON-CONFORME	CONFORME	

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

Client :	Polytests	No. du Certificat :	122-3A7009-161-1648
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	Accréditation CCN n. :	668
Méthode :	ISO 17025	Certification CLAS n. :	2010-01
		Modèle de la Base :	4X4HP-10K
		Date d'étalonnage :	22-09-2016
		Date du prochain étalonnage :	22-09-2017

TEST DE RÉPÉTABILITÉ:

AVANT AJUSTEMENT:

Charge Utilisée:
100.00 kgTolérance:
0.100 kgRésolution d'affichage:
0.05 kgMoyenne:
99.900 kgÉcart-type:
0.000 kg

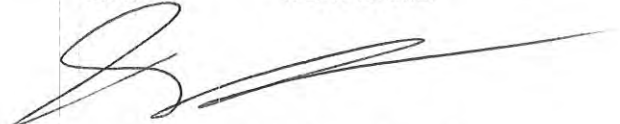
#	Vide	Chargé	Différence
1	0.00 kg	99.90 kg	99.90 kg
2	0.00 kg	99.90 kg	99.90 kg
3	0.00 kg	99.90 kg	99.90 kg
4	0.00 kg	99.90 kg	99.90 kg
5	0.00 kg	99.90 kg	99.90 kg
6	0.00 kg	99.90 kg	99.90 kg
7	0.00 kg	99.90 kg	99.90 kg
8	0.00 kg	99.90 kg	99.90 kg
9	0.00 kg	99.90 kg	99.90 kg
10	0.00 kg	99.90 kg	99.90 kg

Statut : CONFORME

APRÈS AJUSTEMENT:

Charge Utilisée:
100.00 kgTolérance:
0.100 kgRésolution d'affichage:
0.05 kgMoyenne:
99.920 kgÉcart-type:
0.026 kg

#	Vide	Chargé	Différence
1	0.00 kg	99.95 kg	99.95 kg
2	0.00 kg	99.90 kg	99.90 kg
3	0.00 kg	99.95 kg	99.95 kg
4	0.00 kg	99.90 kg	99.90 kg
5	0.00 kg	99.95 kg	99.95 kg
6	0.00 kg	99.90 kg	99.90 kg
7	0.00 kg	99.95 kg	99.95 kg
8	0.00 kg	99.90 kg	99.90 kg
9	0.00 kg	99.90 kg	99.90 kg
10	0.00 kg	99.90 kg	99.90 kg

Statut : CONFORME

2016-09-28

CERTIFICAT D'ÉTALONNAGE

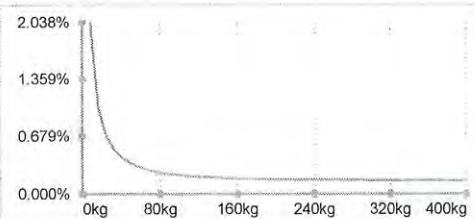
108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

INCERTITUDE AVANT AJUSTEMENT :

$$Uc = \sqrt{(u_{(cr)})^2 + s_p^2 + u_{(l)}^2 + u_{(dr)}^2 + u_{(s)}^2}$$

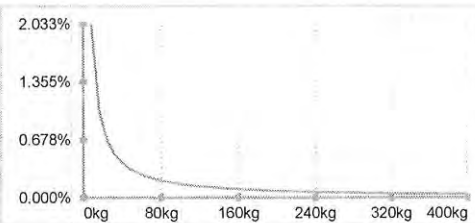
- u(cr)** = Incertitude reliée à l'étalon utilisé
- Sp** = Incertitude de l'écart-type
- u(l)** = Incertitude associée à la linéarité
- u(dr)** = Incertitude associée à résolution si Sp = 0
- u(s)** = Incertitude liée à la sensibilité (span)

Valeur	Incertitude	Incertitude (%)
25.00 kg	0.0731641 kg	0.292656 %
50.00 kg	0.0978352 kg	0.195670 %
100.00 kg	0.1626245 kg	0.162625 %
200.00 kg	0.3065073 kg	0.153254 %
400.00 kg	0.612 kg	0.152924 %



INCERTITUDE APRÈS AJUSTEMENT :

Valeur	Incertitude	Incertitude (%)
25.00 kg	0.0628230 kg	0.251292 %
50.00 kg	0.0628230 kg	0.125646 %
100.00 kg	0.0628230 kg	0.062823 %
200.00 kg	0.0628230 kg	0.031412 %
400.00 kg	0.1190526 kg	0.029763 %



NOTES :

De ces valeurs d'incertitudes, seule la valeur surlignée est calculée selon ISO17025:2005, les autres étant estimées jusqu'au résultat de l'incertitude minimale. Dans le calcul de cette l'incertitude, l'écart-type utilisé est de 0,577d (où d est la précision d'affichage de la balance) lorsque cet écart-type est plus inférieur à 0,577d.

CERTIFICAT D'ÉTALONNAGE

108-86 Boulevard Des Entreprises, Boisbriand, Québec J7G 2T3
www.dispersion.ca 1.866.390.5066

RÉFÉRENCE

ENSEMBLE DE RÉFÉRENCE:

Référence	No de série	Fabricant	Date d'étalonnage
20kg	LT-PHM01	Poids & Mesure Canada	09-09-2015

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

3. *L'incertitude associée à l'étalon utilisé.*
2. *L'incertitude associée à l'écart-type.*
1. *L'incertitude associée à l'opération de pesage.*
4. *L'incertitude associée à la résolution de l'appareil.*

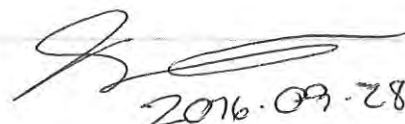
L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de $k = 2$. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

REMARQUES:



2016.09.28

CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 56849

Customer Information

Customer: Services Polytests, Inc.
Address : 695-B Gaudette
St-Jean-sur-richelieu
J3B 7S7
Customer PO #: 100396



LABORATORY ACCREDITATION BUREAU a division of A5-B
ACCREDITED ISO/IEC 17025
Certificate # L2115-1 Calibration

Calibration Procedure Information

Procedure ID: GTP AIRVEL

Revision #: 6

Revision Date: 1/6/2013

Calibration Standards Information

<u>Graffel ID</u>	<u>Manufacturer</u>	<u>Model #</u>	<u>Description</u>	<u>CAL Due</u>
10017	Hart Scientific/Burn:	1502A/3925	Thermometer	9/7/2016
10086	Furness Controls	FC0332	DP Transmitter	6/6/2017
10100	Graffel	n/a	Temperature	10/29/2016
10155	HOBO	UX100-011	RH/Temp logger	11/17/2016
10171	Furness	FC0332-2W	0 - .4" H2O	11/10/2016
10187	Vaisala	PTB210	Barometric Pressure Gauge	12/6/2017

Sensor Information

Manufacturer: Omega

Description: Anemometer

Method Used: Pitot Tube

Model #: HHF143

Rated Accuracy: ± See Attachment

Accuracy Specified By: Omega

Instrument ID#: EM153

Range: 40 to 7800 fpm

Condition: Failed

Serial #: 1015949

Comments: Calibration Date: 08/12/2016
Failed Calibration

Pass below 5200 FPM
[Signature]
August 22nd 2016

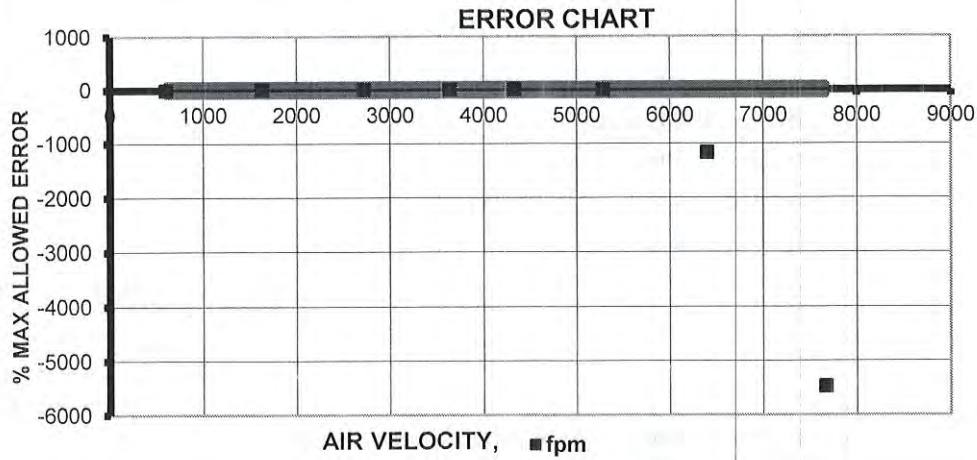
The instruments(s) listed on this certificate have been calibrated against standards traceable to the National Institute of Standards & Technology (NIST) or compared to nationally or internationally recognized consensus standards. The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graffel, LLC. Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2005, ANSI/NCCL Z540-1-1994 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 Graffel, 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: J. Cortez
J. Cortez
Calibration Technician

Date: 8/12/2016

**ATTACHMENT TO CALIBRATION CERTIFICATE 56849
AS FOUND/AS LEFT DATA
Page 2 of 2**

Reading From Standard,	Lower Limit of Meter Reading,	Measured Reading From Meter,	Upper Limit of Meter Reading,	Error,	Measurement Uncertainty,	STATUS
Actual Air Velocity						
fpm	fpm	fpm	fpm	fpm	fpm	
609	602	608	616	-1	3.05	Pass
1634	1617	1634	1651	0	8.17	Pass
2720	2692	2722	2748	2	13.60	Pass
3639	3602	3638	3676	-1	18.20	Pass
4333	4289	4334	4377	1	21.67	Pass
5285	5231	5282	5339	-3	26.43	Pass
6402	6337	5640	6467	-762	32.01	Fail
7669	7591	3416	7747	-4253	38.35	Fail



INSTRUMENT SPECIFICATIONS		
Test Fluid	Air	
Lower Range	40	fpm
Upper Range	7800	fpm
Rated Accuracy	+/- 1% reading +/-1 digit	
LABORATORY AMBIENT CONDITIONS		
Pressure	14.30	psia
Humidity	48.40	% RH
Temperature	78.83	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



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-154 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Keithley	Type de sortie:	Digitale
No. Model:	7700	Type de mesure:	Température
No. Série:	1306774	Gamme:	Divers
Emplacement:	EM-047	Conditions Enviro:	Normale

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	No. du certificat d'étalonnage:	AC15061429-7798010
No. Série:	7798010	Dernière date d'étalonnage:	22-Jun-15
Certificat fait par:	Alpha Controls	Prochaine date d'étalonnage:	22-Jun-16
Commentaire:			

RÉSULTAT D'ÉTALONNAGE						
Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
-17.000 mV	-17.000 mV	-17.000 mV	-0.000 mV	-17.000 mV	0.1 mV	Input#1
0.000 mV	0.000 mV	-0.001 mV	-0.001 mV	-0.001 mV	0.1 mV	Input#1
20.000 mV	20.000 mV	19.999 mV	-0.001 mV	19.999 mV	0.1 mV	Input#1
30.000 mV	30.000 mV	30.001 mV	0.001 mV	30.001 mV	0.1 mV	Input#2
Input#3 Non-Conforme						
100.0 °C	100.0 °C	99.4 °C	-0.6 °C	99.4 °C	1.0 °C	Input#4 TypeJ
30.000 mV	30.000 mV	30.000 mV	0.000 mV	30.000 mV	0.1 mV	Input#5
30.000 mV	30.000 mV	29.993 mV	-0.007 mV	29.993 mV	0.1 mV	Input#6
100.0 Ohms	100.0 Ohms	100.0 Ohms	0.0 Ohms	100.0 Ohms	1.0 Ohms	Input#7
100.0 Ohms	100.0 Ohms	100.0 Ohms	0.0 Ohms	100.0 Ohms	1.0 Ohms	Input#8
100.0 Ohms	100.0 Ohms	99.9 Ohms	-0.1 Ohms	99.9 Ohms	1.0 Ohms	Input#9
100.0 Ohms	100.0 Ohms	99.9 Ohms	-0.1 Ohms	99.9 Ohms	1.0 Ohms	Input#10
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#11 TypeT
100.0 °C	100.0 °C	100.0 °C	0.0 °C	100.0 °C	1.0 °C	Input#12 TypeT
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#13 TypeJ
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#14 TypeJ
100.0 °C	100.0 °C	99.6 °C	-0.4 °C	99.6 °C	1.0 °C	Input#15 TypeJ
100.0 °C	100.0 °C	99.5 °C	-0.5 °C	99.5 °C	1.0 °C	Input#16 TypeJ
100.0 Ohms	100.0 Ohms	99.9 Ohms	-0.1 Ohms	99.9 Ohms	1.0 Ohms	Input#17
100.0 Ohms	100.0 Ohms	99.9 Ohms	-0.1 Ohms	99.9 Ohms	1.0 Ohms	Input#18
100.0 Ohms	100.0 Ohms	100.0 Ohms	0.0 Ohms	100.0 Ohms	1.0 Ohms	Input#19
100.0 Ohms	100.0 Ohms	99.9 Ohms	-0.1 Ohms	99.9 Ohms	1.0 Ohms	Input#20
12.000 mA	12.000 mA	12.001 mA	0.001 mA	12.001 mA	1.00 mA	Input#21
12.000 mA	12.000 mA	12.001 mA	0.001 mA	12.001 mA	1.00 mA	Input#22
Conditions Environnementales: Température: 21 °C Humidité: 21 %RH						



CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-154 24/02/16

CLIENT	
Compagnie:	Services Polytests Inc
Adresse:	695 B rue Gaudette
	St-Jean-sur-Richelieu, Québec, J3B 7S7

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9101
Précision requise:	+/- 2°C
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	Type d'entrée:	Temp
Manufacturier:	Keithley	Type de sortie:	Digitale
No. Model:	7700	Type de mesure:	Température
No. Série:	1306774	Gamme:	Divers
Emplacement:	EM-047	Conditions Enviro:	Normale
Type d'Étalonnage:		Test avec EM-047	

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabricant. Le système qualité de l'entreprise est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST. Le degré d'incertitude est basé sur un niveau de confiance=95%, K=2.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	24 Février 2016
Date du prochain Étalonnage:	24 Février 2017
Date d'émission du certificat:	24 Février 2016

CONFORMITÉ D'ÉTALONNAGE		
	Avant	Après
Conforme:	X	X
Non Conforme:		

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN), Numéro d'accréditation du CCN: # 669. Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

Martin Langlais - Technicien

Certificat d'Étalonnage / Certificate of Calibration

CLIENT :
SERVICES POLYTESTS INC.
695-B GAUDETTE
ST-JEAN-SUR-RICHELIEU, QUEBEC

Description: CHRONOMÈTRE / STOPWATCH TIMER
Fabriquant/ Manufacturer: EXTECH
Modèle/ Model : 365510
No série / Serial no : 131636
Inventaire / Asset # : EM-175

CERTIFICAT No / Certificate No: 179909

PROCÉDURE / Procedure :
PRIMO_CHRONOMÈTRE_DIGIT_REV.3

Certificat émis/ Certificate issued : 2015-12-21
yyyy-mm-dd

Echéance/ Due Date : 2016-12-21

Type de résultat / Results type : **Tel que trouvé / As Found**

Conditions de mesure / Measurement conditions

Résultats d'essais / Test results : **Ok Pass**

TEMPÉRATURE / Temp. : **22°C**

Usage restreint/ Restricted use :

HUMIDITÉ / Humidity : **27%RH**

Réparation effectuée / Repair performed :

Ajustement effectué / Adjustment performed :

ÉTALONS UTILISÉS/ Standards Used:

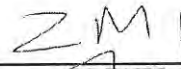
Identification	Fabricant / Manufacturer	Modèle / Model	Description	Ser. #	Echéance/ Due Date
PR0283	H-P	53131 A	FREQUENCY COUNTER	3736A24271	2016-04-27
PR0377	AGILENT	33250A	ARBITRARY FUNCTION WAVEFORM GEN.	MY40003210	2016-06-29

Les spécifications mentionnées comme limites de tolérances d'essai sont celles établies par le fabricant, sauf indication contraire.

Test tolerance limits are based on manufacturers specifications unless stated otherwise.

NOTES :

Technicien :
Technician


M. ZAIDI

Le système qualité de la société est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour le processus d'étalonnage sont retraceables au CNRC et/ou au NIST.
Our quality system complies with the requirements of ISO 17025 and the standards used for the calibration are traceable to NRC and/or NIST.

LE DROIT D'AUTEUR DE CE CERTIFICAT APPARTIEN À PRIMO INSTRUMENT INC. CE CERTIFICAT NE PEUT ÊTRE REPRODUIT AUTREMENT QU'EN ENTIER ET AVEC LE CONSENTEMENT PRÉALABLE ÉCRIT DE PRIMO INSTRUMENT INC.
PRIMO INSTRUMENT INC. OWNS COPYRIGHT OF THIS CERTIFICATE. THE CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN CONSENT OF PRIMO INSTRUMENT INC.


2016-01-11

INSTRUMENT

CERTIFICAT No / Certificate No :

179909

CLIENT / Customer :

SERVICES POLYTESTS INC.

DESCRIPTION / Description :

CHRONOMÈTRE / STOPWATCH TIMER

MANUFACTURIER / Manufacturer :

EXTECH

MODÈLE / Model :

365510

DESCRIPTION
 Description

LIMITES
 Limits

LECTURES
 Readings

LIMITES
 Limits

Temps écoulé / elapsed time

Minutes	Seconds	1/100 sec
33	45	19

Total au compteur: 202517,3 comptes/counts

Comptes / Counts
 Chronomètre/timer
 202519

(Δt) Deviation (1/100sec): 2

Deviation Par jour/ Per day (%): 0.0008 %

*** Secondes**

Deviation 24hrs

*** Secondes**

Deviation Par jour/ Per day (sec): 1 sec

-3.00

0.73

3.00

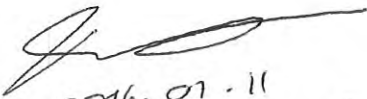
* Tolérances basées sur une déviation maximale de 3 sec/jour

* Tolerances based on a 3 sec/day maximum deviation

Incertitude/ Uncertainty: ± 37 ms

Lorsque fournies dans le rapport, les incertitudes de mesure sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95% , obtenu en multipliant l'incertitude-type composée par un facteur de couverture de k=2.

When supplied in the report, the measurement uncertainties are expanded uncertainties representing a confidence level of approximately 95% , obtain by multiplying the combined standard uncertainty by a coverage factor of k=2.


 2016-01-11

CERTIFICAT D'ÉTALONNAGE # 5753

Date d'étalonnage : 2016/04/05

Date d'émission du certificat : 2016/04/05

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDA-2c S/N : 23544

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols et sont conformes à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2008 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.


Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC


Les références utilisées pour l'étalonnage de débit ont une incertitude de $\pm 0.2\%$ de la lecture pour les mesures entre 5 SCCM à 10 SLPM, $\pm 0.3\%$ de la lecture pour les mesures entre 10 SLPM à 30 SLPM, $\pm 0.2\%$ de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, $\pm 0.3\%$ de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et $\pm 0.5\%$ pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
Résultats	Aucun ajustement requis
	Lectures finales dans les tolérances
Remarques	Tolérance placée à 2% OR à la demande du client


Métrologue


Responsable du laboratoire


2016.04.18

Certificat d'étalonnage # 5753

Numéro de série:	23544	Station de mesure:	3
Date d'étalonnage:	2016/04/05	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500192068	2016/12/12
DHI molbox1	Molbox1	881	1500181338	2016/05/13
RTD Mist	M22	1871501	AC15021633-1871501	2016/12/02
Module 44.5 PSI avec Baro 163671	Module 30	160659	AC15041466-160659	2016/05/06

Spécifications finales de l'appareil

Condition d'étalonnage

Spécifications finales de l'appareil		Condition d'étalonnage	
Gaz	Air	Gaz	Air
Température d'opération		Température ambiante	21 °C
Pression à l'entrée		Pression ambiante	1027 mbar
Pression à la sortie		Orientation	Horizontale
Température de référence		Élastomère	Viton
Pression de référence		Valve	
Étendue d'échelle	10-2000 ALH		
Signaux Entrée/Sortie	-		
Alimentation			
Tolérance	±2 %O.R.		

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées			Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
		Pression PSIA	Température °C	Référence L				
357.7138	59.9700	14.9094	20.73	60.4941	59.5506	0.4194	1.1910	>4
595.5628	100.1050	14.9094	20.68	100.7247	99.1352	0.9698	1.9827	>4
1602.1776	268.9300	14.9337	20.59	272.0405	267.2323	1.6977	5.3446	>4

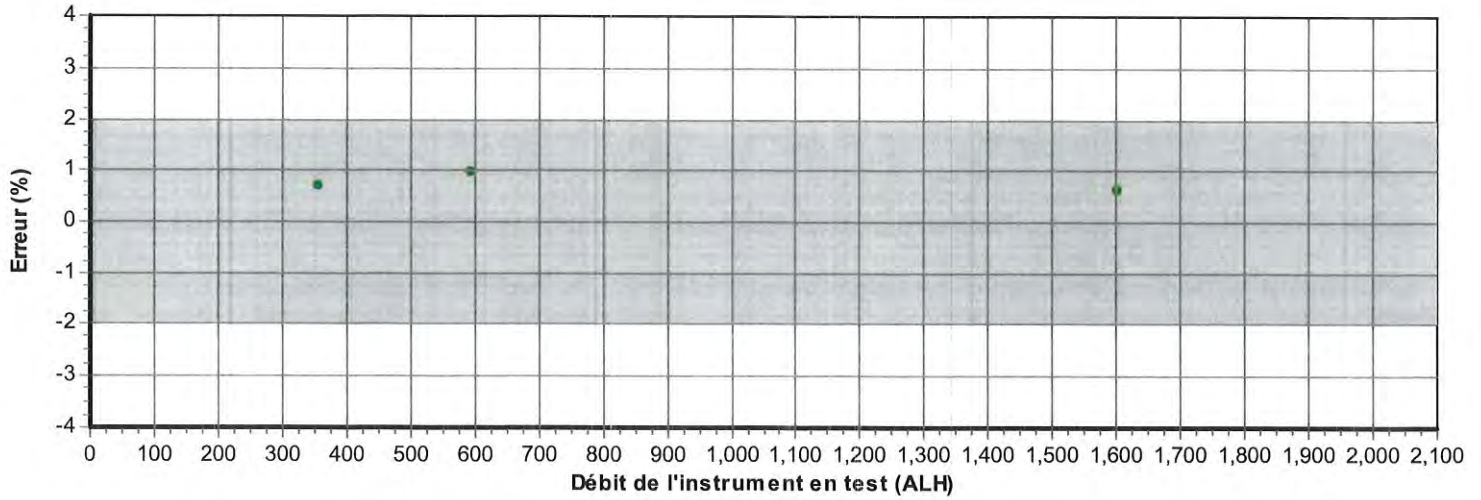
Bernard Poirier
Métrologue


Signature

Certificat d'étalonnage # 5753

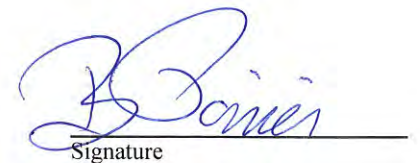
Numéro de série:	23544	Station de mesure:	3
Date d'étalonnage:	2016/04/05	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Bernard Poirier
Métrologue



Signature



CERTIFICAT D'ÉTALONNAGE # 5750

Date d'étalonnage : 2016/04/05

Date d'émission du certificat : 2016/04/05

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDA-2c S/N : 23543

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols et sont conformes à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2008 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de $\pm 0.2\%$ de la lecture pour les mesures entre 5 SCCM à 10 SLPM, $\pm 0.3\%$ de la lecture pour les mesures entre 10 SLPM à 30 SLPM, $\pm 0.2\%$ de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, $\pm 0.3\%$ de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et $\pm 0.5\%$ pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
Résultats	Aucun ajustement requis Lectures finales dans les tolérances
Remarques	Tolérance placée à 2% OR à la demande du client


Métrologiste


Responsable du laboratoire



Certificat d'étalonnage # 5750

Numéro de série: 23543	Station de mesure: 3
Date d'étalonnage: 2016/04/05	Procédure: POS-CAL-005
Identification de l'instrument: EM-179	

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500192068	2016/12/12
DHI molbox1	Molbox1	881	1500181338	2016/05/13
RTD Mist	M22	1871501	AC15021633-1871501	2016/12/02
Module 44.5 PSI avec Baro 163671	Module 30	160659	AC15041466-160659	2016/05/06

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	10-2000 ALH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %O.R.

Condition d'étalonnage

Gaz	Air
Température ambiante	20 °C
Pression ambiante	1028 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées			Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
		Pression PSIA	Température °C	Référence L				
356.9425	59.9000	14.9107	20.62	60.3925	59.4228	0.4772	1.1885	>4
599.9584	100.8750	14.9323	20.65	101.6412	99.8738	1.0012	1.9975	>4
1585.9473	265.6850	14.9417	20.56	268.3634	263.4557	2.2293	5.2691	>4

Bernard Poirier
Métrologue

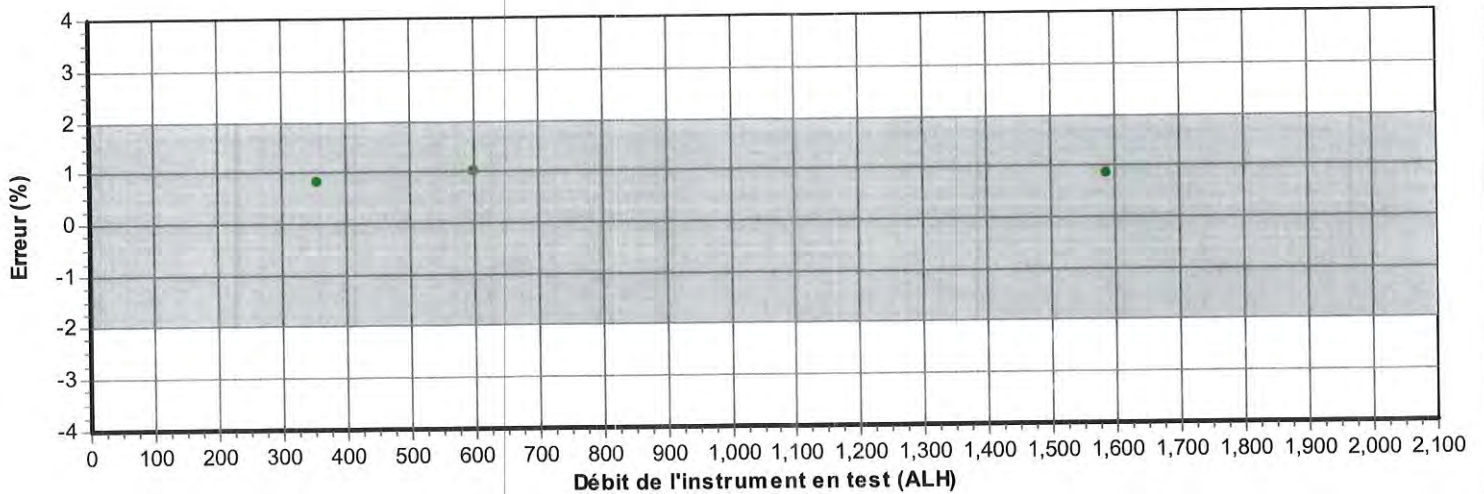

Signature

Certificat d'étalonnage # 5750

Numéro de série: 23543
Date d'étalonnage: 2016/04/05
Identification de l'instrument: EM-179


Station de mesure: 3
Procédure: POS-CAL-005

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Bernard Poirier
Métrologue


Signature



EM-183

Airgas USA, LLC
325 McCausland Court
Cheshire, CT 06410
(203) 250-6820
(203) 272-1584 (FAX)

CERTIFICATE OF ANALYSIS

Grade of Product: **CERTIFIED STANDARD-SPEC**

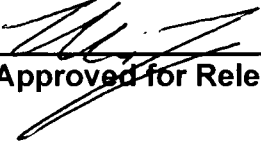
Part Number:	X04NI79C15A2VF3	Reference Number:	37-400238139-1
Cylinder Number:	SG9140147	Cylinder Volume:	151.0 CF
Laboratory:	ANE - Cheshire (SAP) - CT	Cylinder Pressure:	2015 PSIG
Analysis Date:	Aug 16, 2013	Valve Outlet:	590
Lot Number:	37-400238139-1		

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration (Mole %)	Analytical Uncertainty
CARBON MONOXIDE	1.000 %	1.031 %	+/- 2%
CARBON DIOXIDE	10.00 %	9.968 %	+/- 2%
OXYGEN	10.00 %	9.995 %	+/- 2%
NITROGEN	Balance		

Notes:



Approved for Release

Certificat d'Étalonnage / Certificate of Calibration

CLIENT :
SERVICES POLYTESTS INC.
695-B GAUDETTE
ST-JEAN-SUR-RICHELIEU, QUEBEC

Description: STANDARD D'HUMIDITÉ /MOISTURE STANDARD
Fabriquant/ Manufacturer: DELMHORST
Modèle/ Model : MCS-1 REFERENCE STANDARD
No série / Serial no : N/A
Inventaire / Asset # : EM-191

CERTIFICAT No / Certificate No: 179908

PROCÉDURE / Procedure :
PRIMO - DELMHORST_MCS-1 REFERENCE STANDARD

Certificat émis/ Certificate issued : 2015-12-23

yyyy-mm-dd

Echéance/ Due Date : 2016-12-23

Type de résultat / Results type : **Tel que trouvé / As Found**

Conditions de mesure / Measurement conditions

Résultats d'essais / Test results : **Ok Pass**

TEMPÉRATURE / Temp. : 22°C

Usage restreint/ Restricted use :

HUMIDITÉ / Humidity : 28%RH

Réparation effectuée / Repair performed :

Ajustement effectué / Adjustment performed :

ÉTALONS UTILISÉS/ Standards Used:

Identification	Fabricant / Manufacturer	Modèle / Model	Description	Ser. #	Echéance/ Due Date
PR0520	FLUKE	8846A	MULTIMETER	1141021	2016-10-02

Les spécifications mentionnées comme limites de tolérances d'essai sont celles établies par le manufacturier, sauf indication contraire.

Test tolerance limits are based on manufacturers specifications unless stated otherwise.

NOTES :

Technicien :
Technician


H. AMRI

Le système qualité de la société est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour le processus d'étalonnage sont retracables au CNRC et/ou au NIST.

Our quality system complies with the requirements of ISO 17025 and the standards used for the calibration are traceable to NRC and/or NIST.

LE DROIT D'AUTEUR DE CE CERTIFICAT APPARTIEN À PRIMO INSTRUMENT INC. LE CERTIFICAT NE PEUT ÊTRE REPRODUIT AUTREMENT QU'EN ENTIER ET AVEC LE CONSENTEMENT PRÉALABLE ÉCRIT DE PRIMO INSTRUMENT INC.
PRIMO INSTRUMENT INC. OWNS COPYRIGHT OF THIS CERTIFICATE. THE CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN CONSENT OF PRIMO INSTRUMENT INC.

INSTRUMENT

CERTIFICAT No / Certificate No :

179908

CLIENT / Customer :

SERVICES POLYTESTS INC.

DESCRIPTION / Description :

STANDARD D'HUMIDITÉ / MOISTURE STANDARD


MANUFACTURIER / Manufacturer :

DELMHORST

MODÈLE / Model :

MCS-1 REFERENCE STANDARD

DESCRIPTION Description		LIMITES Limits	LECTURES Readings	LIMITES Limits
DOUGLAS-FIR @ 80°F				Déviaton MΩ
	Nominal			
12 %	120 MΩ		120.9	-0.9
22 %	1.10 MΩ		1.096	0.004


 2016-01-11



Airgas USA, LLC
325 McCausland Court
Cheshire, CT 06410
(203) 250-6820
(203) 272-1584 (FAX)

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X04NI77C15A0004	Reference Number:	37-400429255-1
Cylinder Number:	CC46789	Cylinder Volume:	144.0 CF
Laboratory:	ANE - Cheshire (SAP) - CT	Cylinder Pressure:	1862 PSIG
Analysis Date:	Sep 29, 2014	Valve Outlet:	350
Lot Number:	37-400429255-1		

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration (Mole %)	Analytical Uncertainty
OXYGEN	2.000 %	1.989 %	+/- 2%
CARBON MONOXIDE	3.000 %	2.971 %	+/- 2%
CARBON DIOXIDE	18.00 %	17.87 %	+/- 2%
NITROGEN	Balance		



Approved for Release



CalSource, Inc.
 1005 West Fayette St
 Suite 4D
 Syracuse, NY 13204
 866-895-8648
 calsource.com

CERTIFICATE OF CALIBRATION

ISSUED TO	EQUIPMENT INFORMATION										
POLYTEST SERVICES INC 411 ST-JACQUES NAPIERVILLE JEBEJOJ 1 L0 CUSTOMER PO NUMBER: 100325	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">ASSET NUMBER</td> <td style="width: 50%;">EM-224</td> </tr> <tr> <td>MANUFACTURER</td> <td>STANLEY</td> </tr> <tr> <td>MODEL NUMBER</td> <td>STHT30810</td> </tr> <tr> <td>DESCRIPTION</td> <td>TAPE MEASURE, 0-12 FT</td> </tr> <tr> <td>SERIAL NUMBER</td> <td>N/A</td> </tr> </table>	ASSET NUMBER	EM-224	MANUFACTURER	STANLEY	MODEL NUMBER	STHT30810	DESCRIPTION	TAPE MEASURE, 0-12 FT	SERIAL NUMBER	N/A
ASSET NUMBER	EM-224										
MANUFACTURER	STANLEY										
MODEL NUMBER	STHT30810										
DESCRIPTION	TAPE MEASURE, 0-12 FT										
SERIAL NUMBER	N/A										

TEST RESULTS			
CERTIFICATE NUMBER	467997	PROCEDURE	CS TAPE MEASURE REV-3
AS RECEIVED	IN TOLERANCE	INTERVAL	12 MONTHS
AS RETURNED	PASS	CALIBRATION DATE	12/22/2015
LAB TEMPERATURE	68.0 F	CALIBRATION DUE DATE	12/22/2016
LAB HUMIDITY	44.0 %	TECHNICIAN	JOHN W SAGER

COMMENTS
See data

CALIBRATION STANDARDS

ASSET NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DESCRIPTION	CAL DATE	CAL DUE
CAL-00232	STANLEY	33-425	NA	TAPE MEASURE	4/8/2015	4/8/2016
CAL-00259	WEBBER	SCS81A	111076.4	GAGE BLOCK SET	7/16/2015	7/16/2016
CAL-00490	NEWPORT	ITHX-M	MEC	TEMP/HUMIDITY METER	10/7/2015	10/7/2016

CalSource certifies this instrument to have been calibrated using standards with accuracies traceable to the National Institute of Standards and Technology, derived from natural physical constants, derived from ratio measurements, or compared to consensus standards. CalSource's calibration system complies to the requirements of ISO-9001, ISO/IEC 17025, ISO/TS 16949 and MIL-STD-45662A Unless otherwise indicated, the confidence level each calibrated parameter is 95%, utilizing expanded measurement uncertainty k=2. The results contained are valid only for the unit listed above. Any calibration due date/ interval has been chosen by the customer and any number of factors may cause the item listed above to drift out of calibration before the interval has expired.



CERTIFIED BY 12/22/2015
 JOHN W SAGER

2016-01-22



Tape Measure

ID Number EM-224
 Certificate Number 467997
 Technician John W. Sager
 Date December 22, 2015

Tape Measure

Length, English Scale 1/16"

Range: 0-12' Accuracy: ± 1 div

Nominal (in)	Minimum	As Found	As Left	Maximum	M/U
1	31/32	1		1 1/32	0.048
36	35 15/16	36		36 1/16	0.12
72	71 15/16	72		72 1/16	0.12
108	107 15/16	108		108 1/16	0.12
144	143 15/16	144		144 1/16	0.12

Length, English Scale 1/16"

Range: 0-12' Accuracy: ± 1 div

Nominal (in)	Minimum	As Found	As Left	Maximum	M/U
1	15/16	1		1 1/16	0.096
36	35 15/16	36		36 1/16	0.12
72	71 15/16	72		72 1/16	0.12
108	107 15/16	108		108 1/16	0.12
144	143 15/16	144		144 1/16	0.12

Notes: Out of Tolerance Readings Highlighted
 All Transferred Values Reviewed for Accuracy
 Unless otherwise stated, As Left = As Found
 Measurement Uncertainty calculated at 95%, k=2
 English Scale 1/32" for First Foot

[Handwritten Signature]
 2016-01-22



Posttest dry gas meter calibration data

Date : 2016-09-15		Barometric pressure: 102.6		Tech/Eng. Maxime Martin	
Manufacturer. : Foyers Supreme inc. Model : NV 200		Calibration factor : 0.993 DGM 1 : EM-178		Calibration factor 0.992 DGM 2 : EM-179	
		Calibration factor : 0.9928 DGM 3 : EM-070		Calibration factor 0.9968 Standardized DGM : EM-130	

Standard meter							Dry gas meter #1					
Trail #	Press drop	Final ft3	Initial ft3	Change ft3	Temp F	STD ft3	Final Liter	Initial Liter	Change ft3	Temp F	STD ft3	Cal Factor
1	0	579	578	1,000	68	0,997	432290,640	432261,840	1,017	72,68	1,0081	1,0114
2	0	580	579	1,000	67,9	0,997	432319,410	432290,640	1,016	72,32	1,0078	1,0108
3	0	581	580	1,000	68,1	0,997	432348,330	432319,410	1,021	71,78	1,0140	1,0175
Average calibration factor : 1.0132												

Previous cal factor	minus	Average cal factor	Divided by	Previous cal. factor	Multiplied * 100	Equals	Deviation percent Max5%
0.993	-	1.0132	/	0.993	*100	=	2.05 %

Standard meter							Dry gas meter #2					
Trail #	Press drop	Final ft3	Initial ft3	Change ft3	Temp F	STD ft3	Final Liter	Initial Liter	Change ft3	Temp F	STD ft3	Cal Factor
1	0	579	578	1,000	68	0,997	374246,08	374217,11	1,023	73,22	1,013	1,0163
2	0	580	579	1,000	67,9	0,997	374274,96	374246,08	1,020	72,86	1,011	1,0136
3	0	581	580	1,000	68,1	0,997	374303,96	374274,96	1,024	72,32	1,016	1,0193
Average calibration factor : 1.0164												

Previous cal factor	minus	Average cal factor	Divided by	Previous cal. factor	Multiplied * 100	Equals	Deviation percent Max5%
0.992	-	1.0164	/	0.992	*100	=	2.4 %



Posttest dry gas meter calibration data

Date : 2016-09-15		Barometric pressure: 102.6		Tech/Eng. Maxime Martin	
Manufacturer. : Foyers Supreme inc. Model : NV 200		Calibration factor : 0.993 DGM 1 : EM-178		Calibration factor 0.992 DGM 2 : EM-179	
		Calibration factor : 0.9928 DGM 3 : EM-070		Calibration factor 0.9968 Standardized DGM : EM-130	

Standard meter							Dry gas meter #3					
Trail #	Press drop	Final ft3	Initial ft3	Change ft3	Temp F	STD ft3	Final ft3	Initial ft3	Change ft3	Temp F	STD ft3	Cal Factor
1	0	579	578	1,000	68	0,997	481,12	480,13	0,990	68	0,990	0,9932
2	0	580	579	1,000	67,9	0,997	482,07	481,12	0,950	67,9	0,950	0,9530
3	0	581	580	1,000	68,1	0,997	483,15	482,07	1,080	68,1	1,080	1,0835
Average calibration factor : 1.0099												

Previous cal factor	minus	Average cal factor	Divided by	Previous cal. factor	Multiplied * 100	Equals	Deviation percent Max5%
0.9928	-	1.0099	/	0.9928	*100	=	1.7 %

APPENDIX 4: Unit pre burn

Manufacturer: Foyers Suprême Inc.

Model: LASER-E

Date: 9th Aug 2016

RUN #:

Test Duration: 236

Burn rate: 1.373 dry kg/hr

Pollu rate: 2.405 gr/hr

Polluants: 5 mg

Delta Temp FB: -6 degF

Pollution rate 1.399 gr/hr

non adjusted:

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	DGM#1 Out T	Filter#1 Temp	DGM#2 In T	DGM#2 Out T	Filter#2 Temp	TunnelFlue gas Temp	Room Temp	CO2	CO	O ²	Bimetal Temp	Weight Remaining	Burn Rate	FB Temp	
0	263	258	228	356	323	87	86	n/a	87	85	n/a	102	212	86	2.89	1.29	16.13	198	14.69		286
2	242	242	223	351	319	86	87	n/a	84	84	n/a	112	232	82	1.10	0.44	19.08	192	14.68	0.00	275
4	303	233	217	345	317	86	86	n/a	85	84	n/a	125	353	85	7.91	0.40	12.56	192	14.32	0.36	283
6	475	244	220	343	315	86	85	n/a	85	84	n/a	147	521	89	11.05	0.35	9.29	225	13.88	0.44	319
8	563	252	229	341	314	85	84	n/a	86	85	n/a	153	558	93	10.25	0.97	9.71	270	13.42	0.46	340
10	608	263	237	340	316	85	83	n/a	87	85	n/a	153	585	93	11.75	1.10	8.19	300	12.98	0.44	353
12	587	282	242	342	317	85	84	n/a	86	85	n/a	150	583	94	11.90	1.22	8.08	308	12.60	0.38	354
14	595	297	248	346	318	85	83	n/a	86	85	n/a	150	594	96	14.48	1.08	5.80	317	12.20	0.40	361
16	621	290	254	349	323	84	82	n/a	88	85	n/a	145	558	94	12.68	0.78	7.39	336	11.80	0.40	367
18	604	283	260	355	325	84	82	n/a	86	85	n/a	142	539	93	12.31	0.92	7.83	338	11.50	0.30	365
20	599	305	263	360	328	84	83	n/a	86	84	n/a	141	532	92	11.99	0.94	8.18	337	11.14	0.36	371
22	593	281	266	362	330	84	83	n/a	88	86	n/a	140	528	87	12.89	0.86	7.43	337	10.84	0.30	366
24	604	309	269	367	332	85	83	n/a	88	86	n/a	141	542	94	13.79	0.66	6.81	339	10.50	0.34	376
26	634	299	272	373	335	84	82	n/a	88	86	n/a	143	559	95	14.54	0.55	6.16	348	10.19	0.31	382
28	661	297	276	377	336	84	82	n/a	89	88	n/a	143	565	89	13.98	0.42	6.70	363	9.80	0.39	389
30	652	294	277	384	340	84	83	n/a	86	85	n/a	143	556	95	13.32	0.51	7.34	366	9.51	0.30	390
32	658	307	278	387	342	84	83	n/a	88	86	n/a	145	572	98	14.84	0.45	5.98	368	9.19	0.32	394
34	689	292	283	391	348	84	82	n/a	89	87	n/a	147	584	95	15.55	0.31	5.29	380	8.87	0.32	401
36	695	294	288	398	353	84	83	n/a	89	88	n/a	147	592	90	15.43	0.32	5.39	389	8.53	0.34	406
38	701	301	294	403	359	85	84	n/a	90	88	n/a	148	601	89	16.02	0.46	4.69	394	8.19	0.34	412
40	714	306	300	409	363	85	83	n/a	89	87	n/a	149	608	94	16.41	0.55	4.23	401	7.82	0.37	418
42	722	310	306	418	368	85	84	n/a	87	85	n/a	151	616	93	16.38	0.57	4.24	404	7.53	0.29	425
44	725	300	313	422	374	85	85	n/a	90	88	n/a	150	618	90	16.07	0.46	4.58	409	7.18	0.35	427
46	721	302	320	430	378	85	84	n/a	89	87	n/a	150	611	93	15.73	0.37	4.94	411	6.88	0.30	430
48	722	309	326	437	383	85	84	n/a	90	87	n/a	150	603	96	15.79	0.39	4.89	409	6.57	0.31	435
50	718	309	331	444	390	85	82	n/a	92	88	n/a	151	598	96	15.53	0.33	5.09	409	6.27	0.30	438
52	707	310	336	450	394	85	83	n/a	91	89	n/a	150	587	97	14.90	0.27	5.62	407	6.01	0.26	439
54	697	303	341	457	401	85	85	n/a	91	89	n/a	148	575	91	14.66	0.23	5.92	404	5.71	0.30	440
56	688	294	345	462	404	85	83	n/a	91	88	n/a	148	566	96	14.42	0.18	6.14	400	5.47	0.25	439
58	679	322	350	468	412	86	85	n/a	90	89	n/a	147	555	96	14.07	0.13	6.42	398	5.26	0.20	446
60	665	319	352	475	417	86	85	n/a	91	88	n/a	145	541	96	13.57	0.09	6.89	393	4.99	0.27	445
62	652	324	353	480	422	86	86	85	89	87	n/a	145	532	99	13.26	0.07	7.19	383	4.80	0.19	446
64	638	333	356	485	425	86	84	87	89	87	n/a	144	526	97	12.93	0.06	7.49	377	4.60	0.20	447
66	626	341	359	490	427	86	84	88	90	89	n/a	143	515	97	12.51	0.07	7.86	373	4.46	0.14	448
68	619	331	361	493	434	86	85	89	91	89	n/a	142	504	97	12.33	0.07	8.08	370	4.26	0.20	447
70	614	343	361	498	439	87	86	90	90	88	n/a	140	498	98	12.22	0.09	8.19	364	4.08	0.18	451
72	607	343	361	499	443	86	85	90	89	87	n/a	140	494	99	12.09	0.10	8.31	361	3.92	0.16	450
74	599	335	361	500	443	86	84	91	92	90	n/a	139	492	96	11.95	0.10	8.42	359	3.78	0.14	448
76	591	342	363	503	445	86	84	92	91	89	n/a	138	484	95	11.71	0.10	8.57	357	3.62	0.16	449
78	580	341	364	505	449	86	85	93	91	89	n/a	136	478	92	11.40	0.13	8.86	353	3.42	0.20	448
80	572	331	364	507	452	87	86	93	91	89	n/a	135	468	93	11.31	0.13	8.98	349	3.32	0.10	445
82	563	346	363	509	455	87	86	93	90	87	n/a	135	465	98	11.31	0.12	8.99	343	3.17	0.14	447
84	554	339	364	510	456	86	85	94	93	89	n/a	135	460	96	11.13	0.15	9.15	338	3.01	0.16	444
86	549	349	363	512	458	86	87	95	89	87	n/a	135	457	98	11.14	0.13	9.16	334	2.91	0.10	446
88	551	350	364	516	460	86	87	96	88	86	n/a	134	452	96	11.29	0.09	9.03	331	2.77	0.14	448
90	563	343	364	519	463	86	86	97	88	86	n/a	134	453	97	10.96	0.15	9.21	333	2.61	0.16	450
92	559	346	362	517	464	86	85	98	89	87	n/a	134	450	99	9.87	0.30	10.15	335	2.47	0.14	450
94	552	328	360	520	466	86	86	98	89	87	n/a	132	444	99	9.29	0.51	10.46	333	2.37	0.10	445
96	546	343	357	520	468	86	85	98	88	87	n/a	132	434	98	9.14	0.61	10.52	333	2.26	0.11	447
98	537	322	357	520	469	86	86	98	91	89	n/a	130	426	91	9.15	0.68	10.34	334	2.21	0.05	441
100	524	344	353	515	466	86	85	98	91	89	n/a	129	416	92	8.52	0.88	10.88	330	2.11	0.10	441
102	515	354	349	515	468	86	86	98	89	87	n/a	128	406	99	8.76	0.90	10.67	323	2.07	0.04	440
104	505	372	347	512	466	86	85	98	89	87	n/a	128	398	99	8.78	0.95	10.61	317	1.97	0.10	440
106	496	362	345	511	465	86	85	99	91	89	n/a	127	392	91	8.61	1.04	10.70	314	1.91	0.06	436
108	488	367	344	508	464	86	85	99	90	88	n/a	125	383	96	8.34	1.22	10.83	311	1.87	0.04	434

110	473	379	341	507	467	86	86	99	88	86	n/a	124	376	96	7.73	1.41	11.33	306	1.81	0.00	433
112	458	385	336	504	465	86	87	98	89	87	n/a	123	367	97	7.62	1.48	11.44	297	1.81	0.04	430
114	443	377	336	500	461	86	85	99	92	89	n/a	122	360	95	7.42	1.60	11.57	293	1.77	0.06	423
116	434	393	334	499	462	86	85	99	91	89	n/a	121	351	91	7.22	1.74	11.70	287	1.71	0.04	424
118	425	376	330	496	457	86	85	99	90	88	n/a	120	342	97	7.24	1.74	11.65	283	1.66	0.07	417
120	419	383	328	492	454	86	85	99	90	88	n/a	120	335	96	7.16	1.76	11.73	279	1.59	0.04	415
122	412	388	326	489	453	86	84	99	90	88	n/a	119	329	94	7.09	1.77	11.78	277	1.55	0.06	414
124	409	391	324	488	451	86	85	98	88	87	n/a	118	326	98	6.95	1.84	11.89	273	1.49	0.04	413
126	403	383	323	484	453	86	86	98	90	89	n/a	117	323	97	6.80	1.92	11.99	272	1.45	0.05	409
128	400	380	320	483	449	86	85	98	90	88	n/a	117	315	94	6.45	1.98	12.32	269	1.40	0.00	406
130	393	383	318	478	444	86	85	98	90	88	n/a	117	312	95	6.22	2.05	12.50	266	1.39	0.04	403
132	390	375	314	476	444	86	86	98	87	85	n/a	116	308	98	6.14	2.10	12.53	263	1.36	0.06	400
134	385	374	313	472	443	86	86	98	89	87	n/a	116	304	95	6.05	2.22	12.53	261	1.29	0.00	397
136	379	368	312	467	439	86	85	98	91	89	n/a	115	297	95	6.07	2.17	12.56	260	1.30	0.04	393
138	375	364	311	466	437	86	85	98	92	90	n/a	113	292	94	6.01	2.18	12.62	259	1.25	0.06	391
140	372	367	308	461	437	86	86	98	88	86	n/a	113	291	97	5.93	2.21	12.69	256	1.20	0.00	389
142	367	366	305	459	434	86	86	98	88	86	n/a	113	287	97	5.88	2.24	12.68	254	1.20	0.04	386
144	363	365	302	456	429	86	87	97	87	86	n/a	113	285	97	5.83	2.25	12.73	251	1.16	0.06	383
146	359	359	301	452	426	86	85	98	93	91	n/a	112	280	90	5.75	2.28	12.80	251	1.10	0.00	379
148	358	351	300	449	423	86	86	97	90	89	n/a	112	276	93	5.69	2.30	12.85	250	1.10	0.01	376
150	356	360	296	446	418	86	86	97	89	87	n/a	111	273	97	5.58	2.31	12.96	248	1.09	0.03	375
152	351	342	292	442	415	86	87	97	88	87	n/a	111	272	96	5.55	2.33	12.95	245	1.06	0.06	368
154	347	344	291	439	414	86	86	97	87	86	n/a	111	268	96	5.39	2.33	13.10	243	1.00	0.04	367
156	345	329	289	437	411	86	85	97	88	86	n/a	111	266	96	5.44	2.36	13.03	241	0.96	0.00	362
158	342	334	286	433	405	86	85	97	90	88	n/a	110	262	96	5.32	2.40	13.14	240	0.96	0.06	360
160	338	338	284	429	402	86	85	96	88	87	n/a	110	259	97	5.19	2.47	13.20	238	0.90	0.00	358
162	334	322	282	424	401	85	84	97	92	88	n/a	110	256	94	5.30	2.38	13.15	237	0.90	0.04	353
164	331	332	282	423	398	86	84	97	90	88	n/a	109	253	96	5.32	2.32	13.22	236	0.86	0.01	353
166	328	335	280	420	396	86	85	97	92	91	n/a	109	251	95	5.19	2.34	13.30	235	0.86	0.06	352
168	325	329	277	418	394	86	85	97	93	91	n/a	108	249	93	5.04	2.38	13.45	234	0.79	0.04	349
170	322	321	275	413	388	86	85	97	92	90	n/a	108	247	95	4.94	2.37	13.53	232	0.75	-0.01	344
172	319	328	269	409	386	87	86	97	93	91	n/a	108	244	92	4.83	2.39	13.65	231	0.76	0.01	342
174	317	322	264	406	384	87	86	97	91	88	n/a	108	242	93	4.78	2.44	13.63	229	0.76	0.07	339
176	315	315	261	403	382	87	86	97	91	89	n/a	107	239	93	4.75	2.44	13.67	228	0.69	0.04	335
178	312	304	259	400	378	87	87	97	92	90	n/a	107	238	93	4.70	2.41	13.73	227	0.65	0.00	331
180	311	306	258	397	375	88	88	97	92	91	n/a	106	235	92	4.67	2.42	13.80	226	0.64	0.06	330
182	311	303	256	396	374	88	88	97	92	90	n/a	106	233	94	4.61	2.42	13.81	224	0.58	-0.01	328
184	308	310	255	393	371	88	87	97	92	91	n/a	106	231	91	4.61	2.43	13.82	223	0.59	0.04	327
186	306	296	253	390	367	88	87	97	89	87	n/a	106	229	96	4.57	2.42	13.88	222	0.55	0.00	323
188	304	299	251	386	365	88	87	97	89	88	n/a	106	226	96	4.52	2.38	13.95	220	0.54	0.06	321
190	301	304	250	382	362	87	87	97	90	89	n/a	106	226	95	4.40	2.39	14.05	219	0.48	0.00	320
192	300	299	249	379	360	87	86	97	90	89	n/a	106	224	96	4.40	2.41	14.03	218	0.49	0.04	317
194	299	301	248	378	357	87	86	97	91	90	n/a	106	222	95	4.44	2.42	14.02	218	0.45	0.05	316
196	297	292	247	374	353	88	87	97	93	91	n/a	106	220	93	4.21	2.62	14.12	217	0.39	-0.01	313
198	298	287	244	372	351	88	88	97	89	87	n/a	106	219	96	4.20	2.63	14.14	216	0.40	0.00	310
200	294	286	242	369	349	88	87	97	91	90	n/a	106	218	96	4.25	2.59	14.16	215	0.40	0.00	308
202	293	286	241	366	346	88	87	97	93	90	n/a	105	216	94	4.23	2.62	14.16	214	0.39	0.04	306
204	293	279	241	363	345	88	87	97	92	91	n/a	104	215	92	4.40	2.48	14.04	215	0.36	0.00	304
206	291	270	239	361	343	88	88	97	90	89	n/a	104	213	96	4.46	2.41	14.06	213	0.36	0.09	301
208	291	277	236	359	340	88	88	96	89	87	n/a	105	212	96	4.22	2.33	14.26	212	0.27	-0.02	301

210	290	275	235	357	337	88	87	96	89	87	n/a	105	210	96	4.37	2.33	14.25	212	0.29	0.04	299
212	289	280	234	355	335	88	87	97	89	88	n/a	105	210	96	4.38	2.35	14.20	211	0.25	0.00	299
214	289	280	232	352	333	88	87	96	89	88	n/a	105	209	97	4.40	2.53	14.06	210	0.25	0.06	297
216	288	285	231	349	331	88	87	96	91	89	n/a	105	208	95	4.39	2.55	14.04	210	0.18	0.04	297
218	284	286	230	347	330	88	87	96	93	91	n/a	104	207	94	4.44	2.49	14.07	210	0.15	0.00	295
220	284	284	227	346	327	88	87	96	92	88	n/a	104	206	94	4.48	2.47	14.07	209	0.15	0.00	293
222	282	289	226	344	325	88	88	96	93	91	n/a	103	206	94	4.38	2.54	14.12	208	0.15	0.06	293
224	282	287	226	341	324	88	87	96	93	92	n/a	103	204	93	4.30	2.66	14.10	208	0.09	-0.01	292
226	280	288	225	339	323	89	88	96	93	91	n/a	103	204	94	4.14	2.66	14.22	207	0.09	0.05	291
228	278	284	224	338	319	89	88	96	93	90	n/a	103	203	95	3.74	2.82	14.47	206	0.05	0.00	288
230	275	285	222	336	319	89	88	96	91	89	n/a	103	202	96	3.74	2.92	14.47	204	0.05	0.00	287
232	272	271	222	334	315	89	88	96	94	91	n/a	103	202	96	3.67	2.89	14.56	203	0.05	0.06	283
234	269	278	222	332	314	89	89	n/a	94	92	n/a	103	201	93	3.64	2.89	14.57	202	-0.02	0.00	283
236	267	268	221	331	313	89	89	n/a	95	92	n/a	103	199	93	3.62	2.88	14.60	201	-0.02	0.04	280

Manufacturer: Foyers Suprême Inc.

Burn rate: 0.921 dry kg/hr

Model: LASER-E

Pollu rate: 2.317 gr/hr

Pollution rate 1.338 gr/hr

Date: 12th Aug 2016

Polluants: 7 mg

non adjusted:

RUN #:

Delta Temp FB: -53 degF

Test Duration: 356

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filter#2	Tunnel	Flue gas	Room	CO ₂	CO	O ₂	Bimetal	Weight	Burn	FB		
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp		Temp	Remaining	Rate	Temp		
0	277	252	231	372	321	88	87	87	87	88	88	90.98	111	245	2.21	1.77	16	206	14.95	291	
2	251	234	227	367	317	87	87	87	87	88	88	89.72	128	248	1.15	0.51	19	198	14.99	-0.03	279
4	275	241	222	361	313	87	87	87	86	87	87	90.01	138	314	5.71	0.45	14	193	14.79	0.20	282
6	356	214	222	355	308	87	86	87	86	88	88	90.39	157	412	8.19	0.37	12	203	14.46	0.33	291
8	527	258	226	351	306	87	86	86	87	89	89	91.19	178	532	9.49	0.40	10	239	13.99	0.46	334
10	539	273	230	347	305	87	86	86	87	88	88	90.83	169	526	7.81	0.60	12	267	13.69	0.31	339
<u>12</u>	<u>609</u>	<u>286</u>	<u>234</u>	<u>346</u>	<u>305</u>	87	86	<u>86</u>	87	88	<u>88</u>	<u>91.68</u>	<u>181</u>	<u>605</u>	<u>12.80</u>	<u>0.87</u>	7	<u>287</u>	<u>13.25</u>	<u>0.44</u>	<u>356</u>
14	624	299	239	346	305	87	86	86	87	88	88	92.19	172	588	10.20	0.83	10	308	12.85	0.40	363
16	610	314	243	348	306	87	85	86	86	88	88	92.87	169	584	11.02	1.02	9	318	12.50	0.35	364
18	616	299	247	350	307	86	85	85	87	88	88	92.28	166	582	11.74	0.96	8	326	12.16	0.34	364
20	606	312	251	352	311	86	85	85	87	88	88	93.85	159	562	12.22	0.87	8	332	11.80	0.36	366
22	601	309	254	353	313	86	86	85	88	89	89	94.70	156	551	11.61	0.89	8	334	11.51	0.30	366
<u>24</u>	<u>585</u>	<u>293</u>	<u>257</u>	<u>356</u>	<u>314</u>	87	86	<u>86</u>	87	89	<u>89</u>	<u>93.62</u>	<u>154</u>	<u>535</u>	<u>10.63</u>	<u>1.01</u>	9	<u>331</u>	<u>11.20</u>	<u>0.30</u>	<u>361</u>
26	580	286	259	358	315	87	86	86	87	88	88	92.62	153	528	11.32	0.92	9	326	10.96	0.24	359
28	592	303	260	360	318	86	86	86	87	89	89	93.51	153	533	12.52	0.86	8	325	10.60	0.36	366
30	631	311	262	362	318	87	86	86	88	89	89	94.10	155	550	13.56	0.62	7	335	10.29	0.31	377
32	671	313	265	366	322	87	86	86	86	88	88	92.63	154	557	13.45	0.29	7	353	9.99	0.30	387
34	655	311	268	369	326	87	86	86	87	88	88	93.36	151	541	12.24	0.69	8	362	9.75	0.24	386
<u>36</u>	<u>626</u>	<u>279</u>	<u>270</u>	<u>372</u>	<u>327</u>	86	86	<u>86</u>	86	88	<u>88</u>	<u>93.88</u>	<u>150</u>	<u>533</u>	<u>12.93</u>	<u>0.82</u>	7	<u>356</u>	<u>9.49</u>	<u>0.26</u>	<u>375</u>
38	637	280	272	375	329	86	86	86	86	88	88	93.85	150	536	13.82	0.64	7	354	9.19	0.30	379
40	650	310	275	378	332	86	86	86	87	88	88	93.80	150	539	13.92	0.66	6	360	8.95	0.24	389
42	649	274	279	381	334	86	85	86	86	88	88	94.03	150	541	14.00	0.67	6	361	8.64	0.31	383
44	646	297	282	385	336	86	85	85	86	88	88	93.93	150	544	14.26	0.59	6	362	8.39	0.25	389
46	666	254	287	389	341	86	85	85	86	88	88	92.29	150	549	14.82	0.64	6	366	8.10	0.29	387
<u>48</u>	<u>658</u>	<u>315</u>	<u>289</u>	<u>393</u>	<u>344</u>	86	85	<u>85</u>	88	89	<u>89</u>	<u>95.10</u>	<u>151</u>	<u>551</u>	<u>14.41</u>	<u>0.35</u>	6	<u>369</u>	<u>7.79</u>	<u>0.31</u>	<u>400</u>
50	650	311	292	398	349	86	85	85	88	89	89	95.70	150	547	13.48	0.48	7	369	7.55	0.24	400
52	638	307	294	402	350	86	85	85	87	88	88	94.66	148	537	13.08	0.54	7	367	7.36	0.20	398
54	628	294	295	406	354	86	85	85	87	88	88	94.56	148	530	13.20	0.50	7	362	7.10	0.26	395
56	622	283	297	411	355	86	85	85	87	88	88	94.49	148	529	14.11	0.55	6	359	6.85	<u>0.25</u>	394
58	625	307	299	412	359	85	85	85	87	88	88	94.17	149	534	14.93	0.57	6	356	6.59	0.26	400
<u>60</u>	<u>642</u>	<u>282</u>	<u>303</u>	<u>420</u>	<u>362</u>	85	85	<u>85</u>	87	88	<u>88</u>	<u>94.84</u>	<u>149</u>	<u>542</u>	<u>15.01</u>	<u>0.67</u>	5	<u>361</u>	<u>6.35</u>	0.24	<u>402</u>
62	648	304	307	424	367	85	85	85	87	88	88	95.25	149	545	14.98	0.53	5	365	6.04	0.31	410
64	651	276	312	431	371	85	85	85	86	88	88	93.64	149	545	14.87	0.54	5	368	5.78	<u>0.26</u>	408
66	651	285	315	435	376	85	85	85	86	88	88	94.28	148	542	14.56	0.54	6	369	5.57	0.21	412
68	641	328	318	438	378	85	85	85	88	89	89	95.54	148	538	14.33	0.42	6	368	5.34	0.24	420
70	637	314	323	443	382	85	85	85	87	88	88	94.16	147	531	14.21	0.37	6	367	5.13	0.21	420
<u>72</u>	<u>629</u>	<u>298</u>	<u>326</u>	<u>447</u>	<u>386</u>	85	85	<u>85</u>	87	88	<u>88</u>	<u>93.59</u>	<u>146</u>	<u>524</u>	<u>13.85</u>	<u>0.31</u>	6	<u>363</u>	<u>4.93</u>	<u>0.20</u>	<u>417</u>
74	622	311	329	449	389	85	85	85	87	88	88	96.30	146	517	13.52	0.33	7	360	4.73	0.20	420
76	615	305	331	453	392	85	85	85	87	89	89	96.34	145	511	13.31	0.29	7	358	4.53	0.20	419
78	611	335	333	455	396	85	85	85	87	88	88	94.97	144	506	13.35	0.29	7	356	4.37	0.16	426
80	600	339	335	455	397	85	85	85	87	88	88	95.34	143	501	13.16	0.26	7	353	4.22	0.14	425
82	602	305	338	460	401	85	85	85	87	88	88	93.64	142	495	13.26	0.27	7	352	4.04	0.19	421
84	600	307	339	463	404	85	85	85	87	88	88	93.77	142	490	13.02	0.25	7	350	3.87	0.16	423
86	593	304	341	466	407	85	85	85	87	88	88	95.62	141	485	13.02	0.24	7	348	3.74	0.14	422
88	589	319	343	468	409	85	85	85	87	89	89	94.93	140	481	12.98	0.23	7	346	3.57	0.16	426
90	590	331	344	471	411	85	85	85	87	89	89	94.35	140	478	13.12	0.20	7	345	3.45	0.12	429
92	592	338	345	472	414	86	85	85	88	89	89	95.24	140	477	13.08	0.18	7	346	3.29	0.16	432
94	589	316	347	475	416	86	85	85	87	89	89	94.59	139	474	12.58	0.21	7	347	3.19	0.10	429
96	582	320	349	479	418	86	86	85	87	89	89	94.06	137	467	12.13	0.19	8	345	3.04	0.15	430
98	575	332	349	478	421	86	85	86	88	89	89	94.55	137	462	12.18	0.19	8	343	2.94	0.10	431
100	565	344	349	478	422	86	86	85	89	90	90	95.22	137	457	11.91	0.19	8	339	2.78	0.16	432
102	562	325	350	481	424	86	86	86	88	89	89	94.40	136	452	11.77	0.17	8	336	2.68	0.10	429
104	556	350	349	480	426	86	86	86	88	89	89	94.51	135	447	11.67	0.16	8	333	2.58	0.10	432
106	557	319	350	485	427	86	85	86	87	89	89	94.80	134	443	11.39	0.25	8	332	2.48	0.10	428
108	554	335	349	487	428	86	85	85	87	88	88	94.79	133	436	10.57	0.52	9	331	2.44	0.04	431

110	544	308	348	487	432	86	85	85	87	89	89	94.80	132	427	9.89	0.72	9	328	2.33	0.00	424
112	522	297	345	487	433	85	85	85	87	88	88	93.85	130	416	8.93	1.00	10	322	2.33	0.06	417
114	496	317	344	487	432	85	85	85	87	88	88	95.18	129	405	8.68	1.02	10	312	2.28	0.04	415
116	479	329	342	487	429	85	85	85	87	88	88	94.11	128	395	8.74	0.97	10	303	2.23	0.05	413
118	467	316	340	486	428	85	85	85	87	88	88	93.82	127	386	8.75	0.99	10	296	2.18	0.04	408
120	457	312	339	483	427	85	85	85	87	88	88	94.36	126	377	8.56	1.07	10	291	2.13	0.06	404
122	446	324	337	483	424	85	85	85	87	88	88	94.56	125	369	8.49	1.16	10	286	2.08	0.04	403
124	434	328	335	481	424	85	85	85	87	89	89	94.97	124	360	8.28	1.26	11	282	2.03	0.06	401
126	428	335	333	480	423	85	85	85	87	89	89	93.39	123	352	8.13	1.34	11	279	1.97	0.05	400
128	420	341	330	474	419	85	85	85	88	89	89	94.95	122	345	7.98	1.48	11	275	1.92	-0.01	397
130	414	348	328	473	417	85	85	85	87	88	88	94.66	121	338	7.85	1.55	11	273	1.93	0.06	396
132	407	324	327	471	415	85	85	85	87	89	89	94.46	120	331	7.79	1.62	11	271	1.87	0.04	389
134	403	338	324	470	416	85	86	85	87	89	89	94.92	119	325	7.71	1.70	11	268	1.83	0.05	390
136	401	322	323	467	415	86	86	86	88	89	89	95.00	119	319	7.56	1.79	11	267	1.78	0.00	386
138	393	340	322	465	415	86	86	86	87	89	89	93.54	118	314	7.17	2.10	11	264	1.78	0.03	387
140	386	337	320	463	412	86	86	86	87	89	89	92.99	117	308	6.84	2.07	12	261	1.74	0.00	383
142	382	344	317	460	409	86	86	86	88	89	89	93.36	116	302	6.69	2.12	12	259	1.74	0.06	383
144	376	345	313	456	406	86	86	86	87	89	89	93.49	116	297	6.65	2.17	12	256	1.69	0.04	379
146	372	329	310	453	404	86	86	86	88	89	89	94.01	115	291	6.62	2.24	12	254	1.65	-0.04	374
148	370	328	308	450	402	86	86	86	88	89	89	93.33	114	286	6.56	2.28	12	253	1.69	0.04	372
150	366	350	305	448	399	86	86	86	87	89	89	92.98	114	281	6.55	2.28	12	251	1.65	0.06	374
152	363	357	302	443	395	86	86	86	88	89	89	93.08	113	277	6.56	2.28	12	250	1.59	0.00	372
154	358	346	299	441	393	86	86	86	88	89	89	93.26	112	273	6.48	2.34	12	249	1.59	0.00	367
156	357	361	296	436	390	86	86	86	87	89	89	93.31	112	270	6.44	2.26	12	247	1.59	0.05	368
158	357	360	294	434	387	86	86	86	88	89	89	94.54	112	266	6.25	2.29	12	246	1.54	-0.01	366
160	355	348	291	430	385	86	86	86	88	89	89	93.72	111	263	6.21	2.32	12	245	1.55	0.07	362
162	352	326	288	427	382	86	86	86	88	89	89	93.02	111	260	6.17	2.32	12	244	1.48	0.00	355
164	349	345	282	424	380	86	86	86	88	89	89	93.59	110	256	6.19	2.31	12	242	1.48	-0.01	356
166	347	346	268	420	376	86	86	86	88	89	89	93.49	110	252	6.12	2.34	12	240	1.48	0.09	351
168	343	335	260	415	373	86	86	86	88	89	89	93.90	109	249	6.05	2.33	12	239	1.39	-0.03	345
170	341	316	256	413	372	86	86	86	88	89	89	92.60	109	246	5.58	2.48	12	237	1.42	0.05	340
172	335	329	254	409	368	86	86	86	88	89	89	92.75	109	243	5.34	2.53	13	235	1.37	0.01	339
174	332	329	251	405	365	86	86	86	88	89	89	93.58	108	240	5.30	2.50	13	234	1.37	0.00	337
176	330	314	249	402	361	86	86	86	87	89	89	92.32	108	236	5.20	2.48	13	232	1.36	0.05	331
178	327	309	248	399	359	86	86	86	87	89	89	93.16	107	233	5.11	2.48	13	230	1.31	-0.02	328
180	323	323	245	396	355	86	86	86	87	88	88	91.22	107	229	5.06	2.47	13	228	1.33	0.01	328
182	318	327	243	391	352	86	86	86	87	88	88	92.50	106	226	4.96	2.53	13	226	1.32	-0.02	326
184	314	313	240	386	349	86	86	86	87	88	88	92.75	106	223	4.86	2.51	13	224	1.34	0.07	321
186	311	291	238	385	348	86	86	86	87	88	88	91.92	106	220	4.71	2.59	13	223	1.28	0.01	314
188	308	314	236	381	345	86	86	86	87	88	88	91.22	105	218	4.53	2.65	13	221	1.27	-0.01	317
190	305	294	234	378	341	86	86	86	87	88	88	91.68	105	215	4.49	2.63	13	219	1.28	0.02	310
192	302	276	232	375	338	86	85	86	87	88	88	91.97	105	213	4.40	2.52	13	217	1.26	-0.01	305
194	299	269	230	372	335	85	85	85	86	88	88	91.38	105	210	4.32	2.66	14	216	1.27	0.01	301
196	297	297	229	369	332	85	85	85	86	88	88	91.51	104	207	4.26	2.62	14	214	1.25	-0.02	305
198	293	267	227	365	330	85	85	85	87	88	88	91.85	104	205	4.20	2.58	14	213	1.27	0.06	297
200	292	266	227	364	327	85	85	85	86	88	88	92.44	104	203	4.16	2.56	14	212	1.21	0.00	295
202	291	270	226	359	324	85	85	85	86	88	88	91.31	103	201	4.19	2.62	14	211	1.21	0.00	294
204	288	264	224	357	321	85	85	85	86	88	88	90.70	103	199	4.10	2.57	14	209	1.21	0.00	291
206	286	270	223	353	319	85	85	85	86	87	87	90.51	103	197	4.07	2.54	14	208	1.21	0.00	290
208	283	245	221	351	316	85	84	85	86	87	87	90.20	102	195	4.03	2.50	14	207	1.21	0.00	283

210	282	243	219	347	313	85	84	84	86	87	87	91.71	102	194	4.05	2.49	14	206	1.21	0.04	281
212	280	271	217	344	311	85	84	84	86	88	88	91.40	102	192	4.03	2.48	14	205	1.17	0.00	285
214	278	259	215	340	309	85	84	84	87	88	88	91.48	102	190	4.03	2.48	14	203	1.17	0.00	280
216	277	254	215	338	307	85	84	84	86	87	87	90.81	102	189	4.08	2.52	14	203	1.17	0.00	278
218	275	245	213	335	303	85	85	84	86	88	88	90.49	102	188	4.02	2.55	14	201	1.17	0.06	274
220	272	251	211	331	302	85	85	85	87	88	88	91.36	101	187	3.90	2.55	14	200	1.10	0.00	273
222	268	276	210	328	299	85	85	85	87	88	88	91.43	101	185	3.91	2.55	14	199	1.11	0.01	276
224	265	263	208	325	296	85	85	85	87	88	88	91.43	101	184	3.92	2.49	14	197	1.10	0.00	272
226	264	265	207	323	295	85	85	85	86	88	88	91.37	101	183	3.95	2.45	14	196	1.10	0.04	271
228	263	253	206	320	293	85	85	85	87	88	88	91.18	101	182	4.00	2.44	14	195	1.06	0.00	267
230	261	269	205	317	291	85	85	85	86	88	88	91.07	101	181	3.99	2.46	14	194	1.07	0.00	269
232	261	245	204	315	289	85	85	85	86	87	87	91.08	101	179	4.07	2.44	14	193	1.07	0.00	263
234	261	260	202	312	288	85	85	85	87	88	88	90.96	100	178	4.13	2.44	14	193	1.07	0.00	265
236	260	249	201	310	286	85	85	85	86	87	87	91.03	100	178	4.13	2.41	14	192	1.07	0.06	261
238	259	253	200	308	284	85	84	85	86	87	87	91.13	100	176	4.40	2.22	14	192	1.01	0.01	261
240	258	238	199	306	282	85	85	84	86	87	87	90.84	100	176	4.37	2.19	14	191	1.00	0.00	257
242	258	254	197	303	281	85	85	85	86	87	87	91.16	100	175	4.30	2.25	14	191	1.00	0.00	259
244	257	256	196	300	278	85	85	85	86	87	87	91.38	100	174	4.22	2.32	14	190	1.01	0.04	257
246	256	249	195	298	277	85	85	85	86	87	87	90.69	100	174	4.11	2.35	14	190	0.96	0.00	255
248	256	241	194	295	276	85	85	85	87	88	88	90.09	99	173	4.00	2.41	14	189	0.96	0.00	252
250	256	250	193	293	276	85	85	85	87	88	88	90.00	100	173	3.93	2.44	14	189	0.96	0.07	254
252	255	250	193	290	274	86	86	85	88	89	89	90.65	99	173	3.95	2.49	14	189	0.89	-0.02	253
254	254	258	192	288	272	86	86	86	87	88	88	91.01	99	172	3.99	2.73	14	189	0.91	0.00	253
256	250	253	191	285	271	87	86	86	87	89	89	90.24	99	171	3.91	2.80	14	187	0.91	0.00	250
258	249	247	190	284	269	87	86	86	87	88	88	89.31	99	170	4.07	2.59	14	186	0.91	0.04	248
260	247	240	188	282	268	87	87	86	87	88	88	89.22	99	169	4.02	2.56	14	185	0.87	0.00	245
262	246	235	188	281	266	87	87	87	87	88	88	89.86	99	168	4.02	2.54	14	184	0.87	0.00	243
264	245	245	187	279	265	87	87	87	87	87	87	89.60	99	167	4.09	2.55	14	184	0.87	0.06	244
266	244	243	186	277	265	88	87	87	87	88	88	89.94	99	167	4.04	2.48	14	183	0.81	0.00	243
268	243	250	185	275	263	88	87	87	87	88	88	90.60	99	166	4.00	2.39	14	182	0.82	0.01	243
270	242	244	185	273	262	88	87	87	87	88	88	89.97	98	166	3.93	2.39	14	182	0.81	0.00	241
272	241	238	183	272	261	88	87	87	86	87	87	89.22	98	165	3.93	2.40	14	181	0.81	0.01	239
274	241	241	183	271	259	88	87	87	87	88	88	89.17	98	164	3.96	2.38	14	181	0.80	0.04	239
276	240	240	182	269	258	88	87	87	87	88	88	89.08	98	163	3.83	2.39	14	180	0.77	0.00	238
278	239	231	181	267	257	88	87	87	87	88	88	89.42	98	163	3.80	2.43	14	180	0.76	0.00	235
280	239	238	180	266	256	88	87	87	87	88	88	90.14	98	163	3.77	2.49	14	179	0.77	0.06	236
282	238	238	179	264	254	88	87	87	87	88	88	90.08	98	162	4.00	2.50	14	179	0.71	0.00	235
284	236	237	179	263	253	88	87	87	87	88	88	89.30	98	161	3.55	2.49	15	178	0.71	0.00	234
286	234	236	178	262	252	88	87	87	87	88	88	89.65	98	160	3.39	2.61	15	177	0.72	0.00	232
288	231	232	177	260	251	88	87	87	87	88	88	89.57	98	160	3.36	2.58	15	176	0.72	0.04	230
290	229	224	176	258	250	88	88	87	86	87	87	88.90	98	159	3.28	2.52	15	175	0.67	0.00	228
292	226	229	176	257	248	88	87	88	87	88	88	89.36	98	158	3.24	2.50	15	174	0.67	0.00	227
294	224	226	175	255	247	88	87	87	87	88	88	89.85	98	157	3.15	2.44	15	173	0.67	0.00	226
296	223	213	174	254	245	88	87	87	86	87	87	88.66	97	156	3.19	2.45	15	172	0.68	0.00	222
298	221	217	173	253	244	88	88	87	87	88	88	89.86	97	155	3.17	2.42	15	171	0.68	0.00	222
300	221	227	172	251	243	88	87	88	87	87	87	88.77	97	155	3.15	2.42	15	170	0.68	0.01	223
302	215	214	172	250	241	88	87	87	87	88	88	89.41	101	163	1.51	1.27	18	169	0.67	0.06	218
304	215	220	172	247	240	88	88	87	87	88	88	89.15	98	160	3.79	3.09	15	169	0.61	0.00	219
306	217	223	171	246	239	88	88	88	86	87	87	88.31	97	158	4.05	3.81	14	170	0.61	0.04	219
308	219	198	171	245	238	88	88	88	86	87	87	88.49	97	157	4.70	3.86	14	171	0.57	0.06	214

310	223	217	170	242	237	88	87	88	86	87	87	88.76	97	155	8.08	1.54	13	172	0.52	0.00	218
312	228	221	170	241	236	88	87	87	87	87	87	88.87	97	155	8.03	1.42	12	175	0.51	0.04	219
314	232	233	170	239	236	88	87	87	87	88	88	87.70	97	155	7.95	1.39	12	177	0.48	0.07	222
316	237	238	171	238	234	88	87	87	86	87	87	88.66	97	156	7.66	1.40	12	179	0.41	0.00	223
318	239	241	171	237	235	88	87	87	86	87	87	88.65	97	157	7.42	1.44	12	181	0.41	0.04	225
320	243	241	172	236	235	88	87	87	86	87	87	88.91	97	158	7.27	1.44	12	182	0.37	0.00	225
322	245	242	172	235	235	88	87	87	86	87	87	88.90	97	159	7.20	1.44	12	183	0.37	0.00	226
324	247	247	173	235	235	88	87	87	86	87	87	88.97	97	160	7.29	1.34	12	184	0.38	0.06	227
326	248	258	173	235	235	88	87	87	88	88	88	89.51	97	160	7.32	1.36	12	185	0.31	0.04	230
328	249	255	174	234	235	88	87	87	87	87	87	89.24	97	160	7.23	1.35	12	185	0.27	0.00	230
330	249	258	175	234	235	88	87	87	87	88	88	89.37	97	160	7.18	1.37	12	185	0.27	0.00	230
332	250	269	175	234	235	88	87	87	87	88	88	88.90	97	161	7.12	1.39	12	185	0.27	0.06	232
334	249	260	175	234	235	88	87	87	87	88	88	88.93	97	161	7.00	1.48	12	184	0.21	0.01	231
336	248	262	176	234	235	88	88	87	86	87	87	89.02	97	161	6.95	1.52	12	184	0.21	0.04	231
338	249	254	176	234	235	88	88	88	86	87	87	88.73	97	161	6.88	1.57	12	184	0.17	0.00	230
340	248	267	177	235	235	88	87	88	87	87	87	88.56	97	161	6.90	1.62	12	184	0.17	0.06	232
342	249	275	177	234	235	88	87	87	87	88	88	89.59	97	161	7.19	1.42	12	184	0.11	0.00	234
344	252	277	177	235	236	88	87	87	87	88	88	89.30	97	162	7.22	1.33	12	186	0.11	-0.01	235
346	255	281	178	234	235	88	87	87	86	87	87	88.58	97	163	7.25	1.34	12	187	0.12	0.00	237
348	256	251	178	235	236	88	87	87	87	88	88	89.17	97	164	7.26	1.30	12	188	0.11	0.04	231
350	257	284	179	235	236	88	87	87	86	87	87	88.05	97	164	7.21	1.34	12	189	0.07	0.00	238
352	258	254	179	235	236	88	87	87	86	87	87	87.89	97	165	7.13	1.36	12	189	0.07	0.00	232
354	258	286	179	235	236	87	87	87	86	87	87	88.36	97	165	7.00	1.42	12	190	0.07	0.00	239
356	259	280	179	235	236	87	n/a	87	86	87	87	87.96	97	166	6.92	1.46	12	190	0.07	0.06	238

Manufacturer: Foyers Suprême Inc.

Burn rate: 2.233 dry kg/hr

Model: LASER-E

Pollu rate: 3.065 gr/hr

Pollution rate 1.874 gr/hr

Date: 15th Aug 2016

Polluants: 4 mg

non adjusted:

RUN #:

Delta Temp FB: 79 degF

Test Duration: 150

Time	Unit	Unit	Unit	Unit	Unit	DGM#1		Filter#1	DGM#2		Filt#2	Tunnel Flue gas		Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp				Temp	Remaining	Rate	Temp
0	377	390	272	446	407	86	85	83	84	86	n/a	135	369	93.20	3.09	1.02	16	245	16.13		378
2	332	374	268	440	400	86	85	84	83	85	n/a	140	324	92.81	1.19	0.47	19	233	16.09	0.04	363
4	336	381	263	431	393	85	85	86	85	87	n/a	140	346	91.76	5.78	0.45	14	224	15.83	0.26	361
6	371	379	261	422	385	85	85	87	83	85	n/a	144	381	92.45	7.92	0.35	12	226	15.53	0.30	363
8	501	368	263	415	378	85	85	88	83	86	n/a	155	465	92.75	11.01	0.66	9	250	15.09	0.44	385
10	590	373	267	410	373	85	84	90	84	86	n/a	154	477	94.00	8.19	0.81	12	291	14.72	0.36	403
12	<u>556</u>	<u>370</u>	<u>270</u>	<u>408</u>	<u>369</u>	<u>84</u>	<u>84</u>	<u>91</u>	<u>83</u>	<u>84</u>	n/a	<u>154</u>	<u>471</u>	<u>93.19</u>	<u>8.26</u>	<u>0.75</u>	<u>12</u>	<u>296</u>	<u>14.32</u>	<u>0.40</u>	<u>395</u>
14	622	385	274	402	366	84	84	92	84	86	n/a	160	516	90.88	11.06	0.63	9	310	13.92	0.40	410
16	669	383	276	398	364	84	83	92	83	85	n/a	166	561	94.23	11.40	0.58	9	328	13.48	0.44	418
18	714	389	279	398	361	84	83	92	84	86	n/a	172	605	94.73	12.31	0.50	8	348	12.98	0.50	428
20	745	387	283	397	361	83	82	93	85	86	n/a	176	640	94.96	12.85	0.41	8	365	12.50	0.48	435
22	762	397	286	399	362	83	82	92	84	85	n/a	180	664	96.11	13.00	0.38	8	377	12.04	0.46	441
24	<u>776</u>	<u>405</u>	<u>291</u>	<u>401</u>	<u>363</u>	<u>83</u>	<u>82</u>	<u>93</u>	<u>85</u>	<u>86</u>	n/a	<u>185</u>	<u>686</u>	<u>96.81</u>	<u>13.49</u>	<u>0.35</u>	<u>7</u>	<u>386</u>	<u>11.53</u>	<u>0.50</u>	<u>447</u>
26	789	369	295	407	366	83	83	93	83	84	n/a	187	701	95.75	13.59	0.29	7	393	11.03	0.50	445
28	799	417	300	410	368	83	82	93	84	86	n/a	190	717	97.90	14.04	0.25	7	401	10.59	0.44	459
30	805	406	305	415	372	83	82	94	83	85	n/a	192	710	97.43	14.06	0.20	7	406	10.09	0.50	461
32	801	412	312	418	375	83	81	95	87	91	n/a	193	721	93.70	13.68	0.20	7	412	9.62	0.46	464
34	779	419	318	424	378	83	82	95	88	91	n/a	192	709	96.91	13.36	0.23	7	411	9.18	0.44	464
36	<u>771</u>	<u>409</u>	<u>324</u>	<u>429</u>	<u>381</u>	<u>83</u>	<u>81</u>	<u>96</u>	<u>86</u>	<u>90</u>	n/a	<u>192</u>	<u>699</u>	<u>96.92</u>	<u>13.40</u>	<u>0.33</u>	<u>7</u>	<u>408</u>	<u>8.78</u>	<u>0.40</u>	<u>463</u>
38	767	428	330	436	384	84	83	97	87	92	n/a	192	699	94.65	13.72	0.30	7	407	8.34	0.44	469
40	771	417	336	442	390	85	83	97	87	91	n/a	191	697	96.67	13.33	0.25	7	408	7.93	0.40	471
42	759	451	341	447	394	85	85	97	85	86	n/a	190	689	99.08	12.98	0.22	8	407	7.49	0.44	478
44	746	449	347	452	398	85	84	98	86	89	n/a	188	674	99.52	12.44	0.15	8	405	7.09	0.40	478
46	732	438	352	458	401	85	84	98	87	93	n/a	187	663	97.05	12.37	0.14	8	402	6.79	0.30	476
48	<u>721</u>	<u>448</u>	<u>359</u>	<u>464</u>	<u>404</u>	<u>86</u>	<u>84</u>	<u>98</u>	<u>89</u>	<u>92</u>	n/a	<u>184</u>	<u>651</u>	<u>97.88</u>	<u>12.23</u>	<u>0.12</u>	<u>8</u>	<u>401</u>	<u>6.43</u>	<u>0.36</u>	<u>479</u>
50	722	432	361	469	413	86	86	98	86	88	n/a	183	643	99.59	11.96	0.11	9	397	6.12	0.30	479
52	711	439	366	474	415	86	85	99	89	90	n/a	181	636	99.73	11.63	0.12	9	394	5.78	0.34	481
54	696	459	370	478	419	86	84	98	87	90	n/a	180	627	100.46	11.58	0.09	9	389	5.48	0.30	484
56	687	459	375	481	423	86	85	99	88	92	n/a	179	618	97.56	11.35	0.08	9	386	5.22	0.26	485
58	675	465	379	486	425	86	85	99	90	92	n/a	176	607	97.43	11.21	0.07	9	383	4.91	0.30	486
60	<u>668</u>	<u>482</u>	<u>384</u>	<u>492</u>	<u>432</u>	<u>87</u>	<u>86</u>	<u>99</u>	<u>88</u>	<u>92</u>	n/a	<u>175</u>	<u>600</u>	<u>96.66</u>	<u>11.08</u>	<u>0.06</u>	<u>9</u>	<u>378</u>	<u>4.67</u>	<u>0.24</u>	<u>491</u>
62	662	476	385	499	434	87	87	n/a	86	89	n/a	173	484	100.47	10.88	0.06	9	373	4.37	0.30	491
64	650	494	387	503	439	87	87	n/a	86	89	n/a	173	466	99.48	10.61	0.05	10	366	4.20	0.18	494
66	639	480	389	508	442	87	87	n/a	86	89	n/a	170	442	100.33	10.49	0.05	10	361	3.93	0.27	492
68	627	496	391	514	446	87	87	n/a	85	87	n/a	170	439	98.04	10.24	0.04	10	356	3.73	0.20	495
70	620	458	394	520	453	86	86	n/a	85	87	n/a	168	428	98.55	9.79	0.05	10	352	3.53	0.20	489
72	<u>609</u>	<u>482</u>	<u>394</u>	<u>525</u>	<u>457</u>	<u>86</u>	<u>86</u>	n/a	<u>86</u>	<u>88</u>	n/a	<u>167</u>	<u>430</u>	<u>99.67</u>	<u>9.49</u>	<u>0.06</u>	<u>11</u>	<u>348</u>	<u>3.33</u>	<u>0.20</u>	<u>493</u>
74	598	494	395	528	461	86	85	n/a	85	88	n/a	165	417	99.60	9.42	0.07	11	344	3.18	0.14	495
76	590	482	397	530	467	86	84	n/a	87	89	n/a	165	403	99.79	9.31	0.09	11	341	2.99	0.20	493
78	589	495	398	535	470	85	84	n/a	86	88	n/a	164	397	100.23	9.26	0.09	11	339	2.82	0.16	497
80	589	484	399	538	474	86	85	n/a	91	94	n/a	163	434	97.01	9.35	0.10	11	340	2.68	0.14	497
82	596	489	400	542	476	87	87	n/a	90	93	n/a	162	503	96.93	9.59	0.07	11	342	2.48	0.20	501
84	600	506	401	543	480	87	86	n/a	91	95	n/a	161	503	98.79	9.67	0.09	11	344	2.32	0.16	506
86	587	510	402	549	484	87	86	n/a	92	96	n/a	160	495	95.35	9.10	0.09	11	345	2.12	0.20	506
88	576	537	403	556	488	88	88	n/a	89	92	n/a	158	488	97.02	8.73	0.15	11	342	2.02	0.10	512
90	566	555	400	559	492	88	89	n/a	87	90	n/a	157	482	98.89	8.78	0.17	11	336	1.88	0.14	514
92	561	569	401	557	496	88	88	n/a	89	91	n/a	156	483	97.42	8.11	0.18	12	335	1.72	0.16	517
94	561	599	398	561	502	88	88	n/a	88	91	n/a	156	480	99.48	7.96	0.22	12	332	1.68	0.04	524
96	554	607	396	561	505	88	88	n/a	91	95	n/a	153	476	94.30	7.43	0.30	12	332	1.54	0.13	525
98	537	604	394	562	507	88	87	n/a	90	94	n/a	150	462	95.98	6.69	0.47	13	328	1.48	0.07	521
100	523	631	391	560	511	88	88	n/a	92	94	n/a	147	450	96.29	6.88	0.44	13	323	1.42	0.06	523
102	512	638	389	557	510	88	88	n/a	91	94	n/a	146	444	95.99	6.85	0.48	13	318	1.32	0.10	521
104	500	633	387	556	513	88	89	n/a	93	96	n/a	145	434	96.68	6.40	0.49	13	312	1.28	0.04	518
106	490	668	384	553	513	89	89	n/a	89	93	n/a	144	425	94.39	6.30	0.47	13	305	1.22	0.06	522
108	480	658	382	550	514	89	89	n/a	88	93	n/a	143	417	97.17	6.32	0.51	13	301	1.12	0.10	517

110	473	666	383	548	514	89	89	n/a	87	89	n/a	142	409	98.91	6.23	0.59	14	296	1.08	0.00	517
112	464	668	409	544	513	89	88	n/a	89	93	n/a	141	404	94.29	6.19	0.63	14	293	1.08	0.10	519
114	455	672	403	542	512	89	89	n/a	90	94	n/a	139	399	93.21	5.63	0.71	14	291	0.98	0.06	517
116	444	669	388	539	509	89	88	n/a	91	94	n/a	138	392	92.04	5.60	0.77	14	286	0.92	0.04	510
118	438	664	381	537	509	89	88	n/a	91	94	n/a	137	386	94.45	5.31	0.80	14	283	0.88	0.06	506
120	433	659	376	534	502	89	89	n/a	89	92	n/a	134	381	92.49	5.28	0.81	14	281	0.82	0.00	501
122	429	663	371	530	500	88	89	n/a	88	91	n/a	134	376	96.04	5.32	0.82	14	278	0.82	0.10	499
124	427	656	368	525	496	88	88	n/a	90	93	n/a	133	371	91.96	5.42	0.83	14	277	0.72	0.04	494
126	423	655	364	522	492	88	88	n/a	90	94	n/a	132	365	96.31	5.40	0.84	14	276	0.68	0.06	491
128	421	677	361	518	488	88	88	n/a	91	94	n/a	131	358	94.97	5.43	0.85	14	275	0.62	0.04	493
130	418	665	357	513	483	88	88	n/a	92	94	n/a	131	354	95.54	5.45	0.85	14	273	0.58	0.06	488
132	419	658	355	508	481	88	89	n/a	91	94	n/a	131	355	92.88	5.50	0.82	14	272	0.52	0.04	485
134	419	642	353	507	477	89	88	n/a	91	94	n/a	130	353	93.72	5.50	0.83	14	272	0.48	0.06	480
136	418	635	351	506	475	89	88	n/a	89	93	n/a	130	352	93.03	5.63	0.81	14	270	0.41	0.09	477
138	417	632	348	503	472	88	88	n/a	89	93	n/a	130	349	97.40	5.70	0.80	14	270	0.32	0.05	474
140	413	632	347	499	469	89	89	n/a	91	94	n/a	130	348	95.18	5.36	0.87	14	269	0.27	0.06	472
142	408	620	346	497	467	89	89	n/a	91	94	n/a	129	349	93.56	5.21	0.90	15	268	0.21	0.04	468
144	406	616	343	494	467	89	88	n/a	90	93	n/a	127	345	91.18	5.19	0.92	15	267	0.17	0.06	465
146	403	611	340	490	467	88	88	n/a	90	94	n/a	127	344	96.04	5.13	0.94	15	266	0.11	0.04	462
148	401	618	334	488	463	88	88	n/a	89	91	n/a	128	341	97.46	5.19	0.96	15	263	0.07	0.06	461
150	398	605	334	485	462	88	88	n/a	91	93	n/a	127	334	92.17	5.02	1.00	15	263	0.01	0.04	457

Manufacturer: Foyers Suprême Inc.

Model: LASER-E

Date: 16th Aug 2016

RUN #:

Test Duration: 280

Burn rate: 1.183 dry kg/hr

Pollu rate: 1.451 gr/hr

Polluants: 3 mg

Delta Temp FB: -67 degF

Pollution rate 0.761 gr/hr

non adjusted:

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filt#2	Tunnel	Flue gas	Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB		
[min]	top	bottom	back	LH	RH	In T	Out T	In T	Out T	Temp	Temp	Temp	Temp	Temp		Temp	Remaining	Rate	Temp		
0	264	254	228	364	318	85	85	82	83	84	n/a	86	213	84.88	2.28	1.32	17	196	15.00	285	
2	243	242	225	359	313	84	85	82	83	83	n/a	86	211	82.90	1.11	0.41	19	190	14.94	0.06	276
4	304	227	220	352	310	84	85	83	83	83	n/a	86	286	82.69	6.81	0.26	14	191	14.64	0.30	283
6	495	236	224	348	308	84	84	84	84	84	n/a	89	413	85.19	10.70	0.37	10	220	14.14	0.50	322
8	589	242	229	348	304	84	83	86	85	86	n/a	92	462	88.41	9.66	0.69	11	261	13.64	0.50	342
10	641	260	236	348	304	84	82	87	84	86	n/a	93	488	88.40	10.47	0.96	10	294	13.20	0.44	358
12	<u>661</u>	<u>264</u>	<u>240</u>	<u>350</u>	<u>304</u>	<u>84</u>	<u>82</u>	<u>87</u>	<u>86</u>	<u>88</u>	n/a	<u>93</u>	<u>506</u>	<u>89.14</u>	<u>11.36</u>	<u>0.96</u>	<u>9</u>	<u>314</u>	<u>12.76</u>	<u>0.44</u>	<u>364</u>
14	682	264	245	353	308	84	83	87	84	87	n/a	94	526	88.18	12.40	0.78	8	332	12.35	0.40	370
16	673	278	251	356	311	84	84	88	85	87	n/a	94	528	89.08	12.97	0.84	7	344	11.91	0.44	374
18	653	284	256	359	315	84	84	88	85	86	n/a	94	524	88.41	13.02	0.59	7	348	11.55	0.36	373
20	650	272	261	365	318	85	82	89	86	87	n/a	95	519	91.71	12.96	0.43	8	347	11.15	0.40	373
22	658	290	267	372	321	85	83	89	87	89	n/a	96	522	90.83	13.46	0.38	7	350	10.81	0.34	382
24	<u>678</u>	<u>294</u>	<u>273</u>	<u>375</u>	<u>325</u>	<u>85</u>	<u>84</u>	<u>89</u>	<u>87</u>	<u>90</u>	n/a	<u>97</u>	<u>520</u>	<u>90.72</u>	<u>13.34</u>	<u>0.46</u>	<u>7</u>	<u>356</u>	<u>10.45</u>	<u>0.36</u>	<u>389</u>
26	702	291	278	380	330	86	85	89	87	89	n/a	96	521	90.56	13.66	0.58	7	367	10.10	0.34	396
28	715	287	283	383	336	86	85	90	87	89	n/a	97	522	91.07	13.92	0.54	7	376	9.74	0.36	401
30	694	272	287	387	340	86	85	90	88	90	n/a	96	522	91.94	13.86	0.40	7	378	9.44	0.30	396
32	682	293	292	392	343	86	85	90	87	90	n/a	97	526	89.33	14.49	0.41	6	376	9.10	0.34	400
34	701	297	297	398	349	86	85	91	88	91	n/a	96	536	91.89	14.91	0.51	6	379	8.79	0.30	408
36	<u>714</u>	<u>301</u>	<u>302</u>	<u>404</u>	<u>353</u>	<u>87</u>	<u>85</u>	<u>91</u>	<u>88</u>	<u>90</u>	n/a	<u>99</u>	<u>540</u>	<u>92.11</u>	<u>14.98</u>	<u>0.50</u>	<u>6</u>	<u>385</u>	<u>8.41</u>	<u>0.38</u>	<u>415</u>
38	726	287	308	409	358	87	86	91	88	90	n/a	97	545	91.75	14.86	0.51	6	391	8.11	0.30	418
40	730	293	313	414	364	87	85	92	87	88	n/a	98	544	94.05	14.54	0.32	6	395	7.81	0.30	423
42	727	291	317	421	367	87	85	92	86	87	n/a	98	545	94.48	14.37	0.29	6	397	7.51	0.30	425
44	725	299	322	426	374	87	86	93	88	91	n/a	99	543	93.72	15.04	0.32	6	396	7.21	0.30	429
46	737	288	327	431	379	88	88	93	88	90	n/a	96	546	90.55	15.33	0.40	5	401	6.85	0.36	432
48	<u>747</u>	<u>292</u>	<u>332</u>	<u>435</u>	<u>383</u>	<u>88</u>	<u>87</u>	<u>93</u>	<u>88</u>	<u>90</u>	n/a	<u>97</u>	<u>547</u>	<u>91.26</u>	<u>15.10</u>	<u>0.29</u>	<u>6</u>	<u>408</u>	<u>6.54</u>	<u>0.30</u>	<u>438</u>
50	749	292	336	442	390	88	87	93	89	91	n/a	98	544	94.01	14.98	0.23	6	408	6.24	0.30	442
52	744	290	340	449	395	88	87	94	89	91	n/a	98	540	92.86	14.84	0.20	6	408	5.94	0.30	444
54	738	290	344	455	400	88	88	94	88	90	n/a	97	535	91.70	14.69	0.19	6	408	5.70	0.24	445
56	730	288	348	461	406	88	88	93	88	90	n/a	96	531	93.00	14.42	0.16	6	407	5.44	<u>0.26</u>	447
58	722	293	351	465	410	88	87	94	89	92	n/a	97	524	93.46	14.21	0.15	6	403	5.13	0.30	448
60	<u>714</u>	<u>286</u>	<u>355</u>	<u>473</u>	<u>417</u>	<u>88</u>	<u>87</u>	<u>94</u>	<u>90</u>	<u>92</u>	n/a	<u>98</u>	<u>517</u>	<u>93.94</u>	<u>13.76</u>	<u>0.12</u>	<u>7</u>	<u>399</u>	<u>4.93</u>	<u>0.20</u>	<u>449</u>
62	706	289	358	478	423	88	87	n/a	91	93	n/a	98	510	94.10	13.58	0.09	7	394	4.69	0.24	451
64	695	298	361	484	428	89	88	n/a	90	92	n/a	99	501	93.66	13.12	0.08	7	390	4.49	<u>0.20</u>	453
66	671	301	364	487	431	89	88	n/a	89	91	n/a	98	491	92.22	12.37	0.07	8	385	4.29	0.20	451
68	646	290	367	491	435	89	88	n/a	91	93	n/a	97	479	94.16	11.74	0.06	9	375	4.15	0.14	446
70	625	308	368	497	441	89	87	n/a	88	91	n/a	98	468	94.40	11.30	0.05	9	364	3.95	0.20	448
72	<u>601</u>	<u>304</u>	<u>370</u>	<u>498</u>	<u>441</u>	<u>89</u>	<u>88</u>	n/a	<u>89</u>	<u>92</u>	n/a	<u>98</u>	<u>458</u>	<u>92.68</u>	<u>10.88</u>	<u>0.09</u>	<u>9</u>	<u>355</u>	<u>3.81</u>	<u>0.14</u>	<u>443</u>
74	593	313	370	501	446	89	87	n/a	87	87	n/a	98	447	94.70	10.70	0.14	10	347	3.65	0.16	445
76	580	291	371	503	448	89	88	n/a	90	92	n/a	97	439	93.56	10.60	0.16	10	342	3.51	0.14	439
78	575	295	375	506	449	89	88	n/a	87	87	n/a	98	432	94.49	10.39	0.20	10	336	3.41	0.10	440
80	563	297	385	503	449	89	90	n/a	88	89	n/a	96	425	94.33	10.25	0.22	10	335	3.25	0.16	439
82	556	305	388	504	450	89	90	n/a	89	91	n/a	95	420	92.93	10.28	0.25	10	332	3.14	0.10	441
84	549	294	387	505	449	89	89	n/a	88	89	n/a	94	416	90.66	10.33	0.23	10	331	3.00	0.14	437
86	550	302	385	505	450	88	89	n/a	88	89	n/a	94	415	91.47	10.86	0.17	9	329	2.84	0.16	438
88	553	302	384	509	451	88	88	n/a	89	91	n/a	94	414	93.35	10.83	0.15	9	328	2.70	0.14	440
90	556	289	383	509	453	88	88	n/a	88	91	n/a	95	410	92.63	10.24	0.25	10	329	2.60	0.10	438
92	546	294	382	509	454	88	88	n/a	88	91	n/a	95	405	93.05	10.02	0.32	10	328	2.44	0.16	437
94	533	296	381	511	453	88	88	n/a	89	91	n/a	96	401	93.18	9.52	0.39	10	323	2.40	0.04	435
96	524	315	380	514	456	88	87	n/a	89	91	n/a	96	392	93.11	8.85	0.62	11	317	2.30	0.10	438
98	515	305	378	514	454	88	88	n/a	88	90	n/a	94	382	91.82	8.28	0.84	11	316	2.20	0.10	433
100	499	318	375	514	453	88	89	n/a	88	90	n/a	93	374	91.42	7.84	1.04	11	312	2.14	0.06	432
102	486	318	371	512	454	88	88	n/a	88	90	n/a	93	365	89.25	7.48	1.26	12	306	2.04	0.10	428
104	475	318	367	511	455	88	87	n/a	89	91	n/a	93	356	92.91	7.50	1.25	12	300	2.00	0.04	425
106	468	324	364	509	454	88	87	n/a	89	91	n/a	94	348	92.88	7.34	1.30	12	295	1.94	0.06	424
108	455	343	359	506	450	87	87	n/a	88	90	n/a	94	339	91.11	6.94	1.44	12	291	1.90	0.04	423

110	446	339	355	503	452	87	87	n/a	87	88	n/a	94	331	93.53	6.80	1.53	12	285	1.84	0.00	419
112	433	331	352	502	448	87	87	n/a	85	86	n/a	94	324	93.73	5.98	1.67	13	279	1.84	0.04	413
114	420	348	347	498	443	88	87	n/a	89	91	n/a	94	316	91.85	5.90	1.69	13	275	1.80	0.06	411
116	412	341	342	496	440	88	87	n/a	87	88	n/a	94	309	93.81	5.96	1.71	13	271	1.74	0.04	406
118	403	349	339	493	437	88	87	n/a	89	90	n/a	94	302	92.71	5.99	1.71	13	267	1.70	0.06	404
120	395	330	336	486	433	88	88	n/a	88	90	n/a	94	296	92.02	6.00	1.73	13	266	1.64	0.00	396
122	389	345	332	481	429	88	89	n/a	88	89	n/a	92	291	91.26	6.01	1.75	13	264	1.64	0.04	395
124	383	345	328	478	424	88	88	n/a	88	90	n/a	92	285	90.40	5.95	1.77	13	262	1.60	0.06	392
126	377	344	325	474	422	87	87	n/a	88	91	n/a	92	280	91.24	5.97	1.77	13	258	1.54	0.00	388
128	373	349	323	470	419	87	88	n/a	88	90	n/a	92	276	90.57	5.85	1.79	13	257	1.54	0.04	387
130	369	323	318	468	416	87	87	n/a	89	89	n/a	93	271	91.59	5.86	1.83	13	254	1.50	0.06	379
132	364	338	315	465	411	87	87	n/a	88	90	n/a	92	267	90.86	5.80	1.87	13	252	1.44	0.00	379
134	359	334	312	460	408	87	87	n/a	86	88	n/a	90	263	88.96	5.71	1.92	13	251	1.44	0.00	375
136	355	354	309	458	405	86	86	n/a	87	89	n/a	90	259	89.84	5.70	1.97	13	249	1.44	0.04	376
138	350	345	307	454	403	86	87	n/a	88	90	n/a	91	256	89.64	5.71	2.01	13	247	1.40	0.06	372
140	350	327	304	452	400	86	86	n/a	86	87	n/a	91	253	91.51	5.48	2.06	13	244	1.34	0.04	367
142	349	334	301	449	396	86	86	n/a	87	88	n/a	92	251	88.56	5.46	2.10	13	242	1.30	0.00	366
144	347	336	298	448	394	86	85	n/a	86	87	n/a	92	248	91.21	5.39	2.14	13	240	1.30	0.06	365
146	343	327	295	444	390	86	86	n/a	87	88	n/a	92	247	91.30	5.22	2.21	13	239	1.24	0.04	360
148	337	328	293	442	388	86	86	n/a	88	88	n/a	92	244	92.07	4.98	2.29	14	237	1.20	0.00	358
150	334	331	291	440	388	86	85	n/a	86	86	n/a	92	241	91.98	4.81	2.25	14	235	1.20	0.06	357
152	330	323	288	437	384	86	86	n/a	85	86	n/a	92	239	91.57	4.73	2.25	14	233	1.14	0.00	352
154	325	327	286	431	379	86	86	n/a	88	89	n/a	92	236	89.30	4.55	2.30	14	232	1.14	0.04	350
156	321	313	284	427	374	86	86	n/a	87	89	n/a	91	234	88.76	4.42	2.39	14	231	1.10	0.00	344
158	317	297	281	424	373	86	87	n/a	87	89	n/a	90	231	89.54	4.23	2.46	14	229	1.10	0.00	338
160	315	313	280	419	371	86	87	n/a	87	88	n/a	90	228	89.06	4.11	2.54	14	228	1.10	0.02	339
162	311	295	277	416	368	86	86	n/a	87	88	n/a	90	225	88.82	3.88	2.68	14	226	1.09	0.04	333
164	307	295	275	413	364	86	86	n/a	87	88	n/a	89	222	88.50	4.30	2.32	14	224	1.04	0.00	331
166	303	300	272	409	361	86	86	n/a	86	87	n/a	88	220	86.98	4.06	2.37	14	222	1.05	0.04	329
168	302	294	270	405	359	86	86	n/a	87	88	n/a	89	217	89.54	3.99	2.37	15	221	1.00	0.00	326
170	299	293	268	401	355	86	86	n/a	87	88	n/a	89	214	89.72	3.96	2.34	15	219	1.01	0.06	323
172	295	294	265	398	352	86	85	n/a	86	87	n/a	88	212	88.02	3.90	2.32	15	218	0.94	0.00	321
174	292	286	263	395	349	85	85	n/a	86	87	n/a	89	209	87.19	3.72	2.40	15	217	0.95	0.00	317
176	289	282	260	391	347	85	85	n/a	86	88	n/a	88	207	87.15	3.70	2.37	15	215	0.94	0.04	314
178	287	284	257	389	342	85	84	n/a	87	88	n/a	88	205	87.32	3.52	2.40	15	213	0.90	0.00	312
180	285	277	254	386	339	85	84	n/a	87	88	n/a	88	203	88.93	3.45	2.42	15	211	0.90	0.06	308
182	282	268	251	382	337	85	85	n/a	86	87	n/a	88	201	87.24	3.43	2.39	15	210	0.84	0.00	304
184	280	267	249	379	336	84	84	n/a	85	86	n/a	87	199	86.02	3.39	2.37	15	209	0.84	0.04	302
186	277	265	247	376	332	84	84	n/a	86	87	n/a	87	197	86.13	3.36	2.38	15	207	0.80	0.00	299
188	274	264	245	372	330	84	83	n/a	86	87	n/a	88	195	87.75	3.26	2.27	15	205	0.80	0.00	297
190	271	254	243	369	327	84	84	n/a	86	88	n/a	88	193	88.25	3.24	2.25	15	204	0.80	0.00	293
192	270	260	241	367	324	84	84	n/a	87	88	n/a	89	192	88.77	3.25	2.24	15	202	0.80	0.06	292
194	268	247	239	364	322	84	84	n/a	85	86	n/a	88	191	84.69	3.26	2.22	15	201	0.74	0.04	288
196	266	246	236	360	319	84	83	n/a	85	86	n/a	87	190	85.59	3.24	2.19	15	200	0.70	-0.04	285
198	264	242	233	358	316	84	83	n/a	84	85	n/a	86	188	84.41	3.35	2.26	15	198	0.74	0.04	283
200	262	243	231	355	312	83	83	n/a	85	86	n/a	87	187	86.19	3.49	2.31	15	197	0.70	0.06	281
202	261	245	230	352	311	83	82	n/a	85	86	n/a	87	186	86.07	3.72	2.09	15	196	0.64	0.00	280
204	260	247	228	350	308	83	82	n/a	84	85	n/a	86	186	83.91	3.67	2.02	15	196	0.64	0.00	279
206	259	246	227	347	306	83	82	n/a	85	86	n/a	86	184	85.66	3.33	2.06	15	195	0.64	0.04	277
208	257	249	225	345	303	83	83	n/a	85	85	n/a	87	183	85.76	3.31	2.11	15	194	0.60	0.00	276

210	255	244	223	342	301	82	82	n/a	83	84	n/a	86	182	85.87	3.23	2.26	16	192	0.60	0.00	273
212	253	246	222	340	299	82	81	n/a	85	86	n/a	86	180	86.50	3.23	2.26	16	191	0.60	0.00	272
214	252	246	221	338	296	82	82	n/a	86	87	n/a	87	179	86.18	3.15	2.23	16	190	0.60	0.06	271
216	250	233	219	335	294	82	82	n/a	85	87	n/a	87	178	85.72	3.15	2.24	16	190	0.54	0.00	266
218	249	228	217	333	293	82	81	n/a	84	85	n/a	86	177	84.66	3.18	2.29	16	189	0.54	0.04	264
220	248	227	214	329	290	82	82	n/a	85	85	n/a	86	176	83.93	3.19	2.31	16	188	0.50	0.00	262
222	247	226	214	326	287	82	82	n/a	85	87	n/a	86	175	86.38	3.19	2.32	16	186	0.50	0.06	260
224	246	218	214	324	285	82	82	n/a	85	85	n/a	86	174	84.80	3.40	2.26	15	186	0.44	0.00	257
226	244	217	212	323	282	82	82	n/a	84	86	n/a	87	174	85.45	3.59	2.10	15	185	0.44	0.04	256
228	243	209	210	321	280	82	81	n/a	82	83	n/a	84	173	81.47	3.17	2.11	16	184	0.40	0.00	253
230	242	215	208	318	278	81	81	n/a	83	84	n/a	84	172	83.92	3.00	2.19	16	182	0.40	0.00	252
232	241	210	209	316	275	81	80	n/a	83	84	n/a	84	170	81.93	3.03	2.22	16	182	0.40	0.00	250
234	240	204	207	313	273	80	79	n/a	83	83	n/a	84	169	82.27	2.97	2.18	16	181	0.40	0.06	247
236	239	210	206	310	272	80	79	n/a	83	84	n/a	84	168	84.67	2.96	2.17	16	180	0.34	0.00	248
238	238	205	205	309	270	80	80	n/a	82	83	n/a	84	167	82.80	2.97	2.06	16	179	0.34	0.00	246
240	236	202	204	307	267	80	79	n/a	82	83	n/a	83	166	81.96	2.94	2.06	16	178	0.34	0.04	243
242	234	201	204	305	265	80	79	n/a	82	83	n/a	84	165	82.38	2.94	2.14	16	177	0.30	0.00	242
244	232	199	203	303	264	80	80	n/a	83	84	n/a	84	165	85.52	2.84	2.08	16	177	0.30	0.00	240
246	231	197	203	301	262	81	80	n/a	83	84	n/a	84	164	82.93	2.83	2.07	16	176	0.30	0.06	239
248	229	195	202	299	262	81	81	n/a	84	84	n/a	85	164	85.37	2.83	2.07	16	175	0.25	0.00	237
250	228	201	201	298	260	82	81	n/a	84	85	n/a	85	163	85.78	2.83	2.09	16	174	0.25	0.04	238
252	227	197	201	296	258	82	82	n/a	84	84	n/a	85	163	82.75	2.77	2.05	16	174	0.21	0.00	236
254	225	191	199	295	257	83	82	n/a	83	83	n/a	85	162	82.52	2.72	2.02	16	173	0.21	0.06	233
256	224	196	198	293	255	83	82	n/a	83	84	n/a	85	161	83.22	2.68	2.00	16	172	0.15	-0.06	233
258	223	195	198	291	252	83	82	n/a	84	85	n/a	85	160	84.68	2.76	2.07	16	172	0.21	0.06	232
260	221	191	197	289	251	83	82	n/a	84	85	n/a	86	160	85.48	2.73	2.07	16	171	0.15	0.00	230
262	220	193	196	287	250	83	82	n/a	84	85	n/a	86	159	84.84	2.70	2.06	16	171	0.15	0.00	229
264	219	186	195	286	249	83	83	n/a	83	84	n/a	85	158	83.11	2.81	2.19	16	170	0.15	0.04	227
266	218	188	193	283	247	83	83	n/a	82	83	n/a	85	157	81.47	2.80	2.22	16	169	0.11	0.00	226
268	217	186	192	282	246	84	83	n/a	83	84	n/a	85	157	84.34	2.77	2.21	16	168	0.11	0.00	224
270	216	186	191	280	244	84	83	n/a	82	83	n/a	84	156	81.61	2.71	2.15	16	167	0.11	0.06	223
272	216	186	190	278	242	84	83	n/a	82	83	n/a	85	156	83.56	2.72	2.15	16	167	0.05	0.00	222
274	215	190	189	277	241	84	83	n/a	84	85	n/a	86	155	85.35	2.72	2.13	16	166	0.05	0.00	222
276	215	184	188	275	240	84	83	n/a	83	83	n/a	85	155	80.96	2.76	2.12	16	166	0.05	0.04	220
278	213	181	186	273	238	84	83	n/a	82	83	n/a	84	154	80.44	2.76	2.10	16	165	0.01	-0.04	218
280	212	182	186	272	236	84	83	n/a	83	84	n/a	84	153	81.98	2.73	2.08	16	164	0.05	0.04	218

Manufacturer: Foyers Suprême Inc.

Model: LASER-E

Date: 17th Aug 2016

RUN #:

Test Duration: 376

Burn rate: 0.920 dry kg/hr

Pollu rate: 1.628 gr/hr

Polluants: 4 mg

Delta Temp FB: -73 degF

Pollution rate 0.874 gr/hr

non adjusted:

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filt#2	Tunnel	Flue ga	Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB		
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp		Temp	Remaining	Rate	Temp		
0	263	225	219	342	293	83	83	n/a	79	80	n/a	89	191	84.77	2.24	1.47	17	197	15.81	268	
2	234	229	214	337	290	82	82	n/a	81	82	n/a	95	192	85.09	0.66	0.36	20	189	15.81	0.00	261
4	241	221	208	329	287	82	81	n/a	81	82	n/a	96	225	83.33	4.96	0.43	16	179	15.55	0.26	257
6	327	220	207	324	285	82	81	n/a	80	81	n/a	96	307	84.65	7.67	0.32	13	185	15.15	0.40	273
8	524	210	213	321	282	82	81	n/a	80	82	n/a	103	421	85.09	10.65	0.34	10	219	14.51	0.64	310
10	655	245	219	322	282	81	80	n/a	80	81	n/a	102	496	86.78	10.72	0.91	10	269	13.94	0.56	345
12	<u>679</u>	<u>226</u>	<u>227</u>	<u>325</u>	<u>282</u>	<u>81</u>	<u>80</u>	n/a	<u>80</u>	<u>81</u>	n/a	<u>106</u>	<u>511</u>	<u>85.69</u>	<u>10.56</u>	<u>1.15</u>	<u>10</u>	<u>300</u>	<u>13.44</u>	<u>0.50</u>	<u>348</u>
14	710	252	233	326	285	81	80	n/a	79	80	n/a	107	557	86.06	11.75	1.22	9	322	12.90	0.54	361
16	718	273	240	329	288	80	79	n/a	80	81	n/a	110	573	88.78	12.55	0.93	8	337	12.42	0.48	370
18	725	294	248	333	290	80	78	n/a	81	82	n/a	109	581	90.68	13.94	0.80	7	349	11.92	0.50	378
20	731	283	256	338	295	80	77	n/a	82	84	n/a	110	589	90.90	14.54	0.67	6	361	11.45	0.46	380
22	743	284	265	345	300	80	79	n/a	80	81	n/a	109	576	89.60	15.10	0.96	6	374	11.01	0.44	387
24	<u>696</u>	<u>264</u>	<u>271</u>	<u>352</u>	<u>304</u>	<u>80</u>	<u>79</u>	n/a	<u>80</u>	<u>81</u>	n/a	<u>105</u>	<u>525</u>	<u>87.48</u>	<u>10.86</u>	<u>0.93</u>	<u>9</u>	<u>377</u>	<u>10.75</u>	<u>0.26</u>	<u>377</u>
26	624	289	273	355	306	80	79	n/a	80	81	n/a	105	489	89.21	10.93	1.18	9	358	10.51	0.24	369
28	591	275	275	359	306	80	79	n/a	80	81	n/a	103	469	90.05	12.05	1.23	8	337	10.25	0.26	361
30	598	286	276	362	306	80	78	n/a	81	82	n/a	105	461	90.71	13.19	1.16	7	331	9.95	0.30	365
32	613	277	278	366	307	80	78	n/a	82	83	n/a	104	457	89.72	13.53	1.13	7	335	9.68	0.27	368
34	613	267	282	373	308	80	78	n/a	80	81	n/a	106	457	90.57	13.87	1.41	6	338	9.40	0.27	369
36	<u>616</u>	<u>278</u>	<u>285</u>	<u>379</u>	<u>310</u>	<u>80</u>	<u>78</u>	n/a	<u>81</u>	<u>83</u>	n/a	<u>104</u>	<u>457</u>	<u>91.02</u>	<u>14.07</u>	<u>1.51</u>	<u>6</u>	<u>341</u>	<u>9.04</u>	<u>0.36</u>	<u>374</u>
38	618	274	289	386	312	80	78	n/a	81	82	n/a	109	455	91.41	14.09	1.43	6	345	8.74	0.30	376
40	628	272	293	393	316	80	78	n/a	80	81	n/a	105	457	90.49	14.41	1.15	6	349	8.52	0.22	381
42	648	282	296	398	319	80	78	n/a	82	84	n/a	108	460	91.18	14.90	0.89	6	354	8.22	0.30	389
44	676	276	301	402	323	79	78	n/a	82	84	n/a	108	467	91.21	15.65	0.73	5	363	7.91	0.30	396
46	693	263	305	409	328	80	79	n/a	81	82	n/a	106	472	90.67	15.64	0.61	5	371	7.61	0.30	399
48	<u>703</u>	<u>279</u>	<u>308</u>	<u>415</u>	<u>332</u>	<u>79</u>	<u>78</u>	n/a	<u>81</u>	<u>82</u>	n/a	<u>110</u>	<u>475</u>	<u>91.77</u>	<u>15.43</u>	<u>0.52</u>	<u>5</u>	<u>379</u>	<u>7.31</u>	<u>0.30</u>	<u>408</u>
50	704	260	310	419	336	79	77	n/a	82	84	n/a	109	477	92.56	15.35	0.49	6	383	7.05	0.26	406
52	709	271	313	423	341	79	77	n/a	83	85	n/a	111	477	91.50	15.42	0.43	6	386	6.81	0.24	411
54	711	270	315	428	345	79	77	n/a	83	85	n/a	109	476	93.69	15.36	0.41	6	388	6.51	0.30	414
56	712	268	319	433	350	79	76	n/a	84	86	n/a	111	475	91.42	15.24	0.40	6	389	6.25	0.26	416
58	711	252	322	440	354	80	79	n/a	81	82	n/a	112	471	90.92	15.07	0.43	6	389	6.01	0.24	416
60	<u>710</u>	<u>267</u>	<u>323</u>	<u>447</u>	<u>357</u>	<u>80</u>	<u>79</u>	n/a	<u>82</u>	<u>83</u>	n/a	<u>112</u>	<u>468</u>	<u>93.13</u>	<u>15.01</u>	<u>0.39</u>	<u>6</u>	<u>389</u>	<u>5.74</u>	0.26	<u>421</u>
62	707	259	326	451	363	80	79	81	81	82	n/a	108	464	91.20	14.57	0.37	6	388	5.50	0.24	421
64	695	263	329	452	365	80	79	82	83	85	n/a	109	459	90.91	13.84	0.39	7	387	5.30	0.20	421
66	690	263	331	455	369	80	78	83	83	85	n/a	110	454	93.78	13.61	0.37	7	385	5.10	0.20	421
68	685	241	333	459	372	80	80	84	81	82	n/a	110	446	89.83	13.19	0.39	7	382	4.89	0.20	418
70	672	273	335	457	374	80	78	85	83	86	n/a	113	440	91.03	13.04	0.30	7	380	4.69	0.20	422
72	<u>666</u>	<u>266</u>	<u>337</u>	<u>459</u>	<u>378</u>	<u>80</u>	<u>79</u>	<u>86</u>	<u>82</u>	<u>84</u>	n/a	<u>112</u>	<u>433</u>	<u>92.87</u>	<u>13.00</u>	<u>0.29</u>	<u>7</u>	<u>378</u>	<u>4.53</u>	0.16	<u>421</u>
74	650	278	338	461	381	80	79	86	82	83	n/a	113	427	92.60	12.77	0.17	8	374	4.39	0.14	422
76	638	267	338	464	385	80	79	87	82	83	n/a	110	420	93.15	12.28	0.21	8	368	4.21	0.18	418
78	623	273	339	466	389	80	79	87	82	84	n/a	110	412	92.22	12.23	0.18	8	362	4.11	0.10	418
80	612	264	348	467	389	80	79	87	82	84	n/a	111	406	93.11	12.17	0.19	8	356	3.91	0.20	416
82	603	275	353	467	390	80	79	88	83	85	n/a	111	401	92.60	12.18	0.17	8	352	3.75	0.16	417
84	595	279	354	467	391	80	79	89	83	85	n/a	108	396	92.87	12.18	0.17	8	350	3.65	0.10	417
86	595	282	352	469	394	80	79	90	84	86	n/a	109	392	91.42	12.22	0.16	8	346	3.51	0.14	418
88	591	279	351	473	396	80	80	90	82	84	n/a	110	388	92.86	12.13	0.24	8	343	3.34	0.16	418
90	588	285	350	472	395	80	80	91	83	86	n/a	108	386	89.20	12.10	0.28	8	340	3.25	0.10	418
92	590	274	349	476	398	80	80	91	83	84	n/a	109	383	93.43	12.14	0.28	8	337	3.10	0.14	417
94	591	273	347	478	402	80	80	92	82	84	n/a	112	385	92.70	12.57	0.26	8	336	2.90	0.20	418
96	593	277	349	482	404	81	81	91	81	83	n/a	111	390	90.94	12.33	0.20	8	337	2.74	0.16	421
98	597	275	348	486	405	81	81	92	81	82	n/a	109	388	90.48	11.00	0.21	9	338	2.64	0.10	422
100	599	261	348	489	405	81	81	91	81	82	n/a	112	386	89.05	10.04	0.40	10	338	2.54	0.10	420
102	600	274	345	487	406	81	80	91	82	83	n/a	106	381	92.65	9.97	0.47	10	339	2.40	0.14	423
104	606	284	343	484	408	80	79	92	83	85	n/a	109	376	92.40	10.25	0.38	10	344	2.30	0.10	425
106	599	286	340	482	408	80	79	92	84	84	n/a	110	369	93.53	9.40	0.42	10	349	2.20	0.10	423
108	571	298	337	481	409	80	79	92	84	86	n/a	107	360	92.71	8.45	0.62	11	342	2.20	0.00	419

110	529	288	335	479	409	81	80	92	84	86	n/a	106	347	93.23	7.49	0.94	12	328	2.14	0.00	408
112	493	276	332	478	410	81	80	91	82	83	n/a	105	334	90.89	7.16	1.08	12	311	2.14	0.04	398
114	466	286	328	472	408	81	79	92	84	86	n/a	106	322	92.09	7.17	1.11	12	298	2.10	0.00	392
116	451	305	325	471	406	81	79	92	82	83	n/a	106	311	92.61	7.23	1.09	12	289	2.10	0.06	392
118	435	306	322	467	403	81	80	92	82	83	n/a	105	301	92.09	7.21	1.17	12	281	2.04	0.04	387
120	423	303	318	465	402	81	81	91	81	83	n/a	103	291	90.77	7.14	1.30	12	275	2.00	0.00	382
122	409	276	314	463	400	81	81	91	81	83	n/a	102	282	91.03	7.09	1.40	12	269	2.00	0.06	372
124	396	307	311	458	397	81	81	91	82	84	n/a	102	274	91.05	6.95	1.51	12	265	1.94	0.00	374
126	384	292	309	453	394	81	80	91	83	86	n/a	99	267	90.22	6.91	1.62	12	261	1.94	0.04	366
128	376	296	305	449	391	81	80	91	83	85	n/a	100	259	91.13	6.90	1.67	12	257	1.90	0.06	363
130	367	299	302	446	388	80	79	91	84	85	n/a	100	253	91.35	6.96	1.67	12	253	1.84	0.00	361
132	363	311	301	443	385	81	80	91	84	85	n/a	98	247	89.09	6.92	1.70	12	253	1.84	0.00	361
134	360	297	297	441	386	81	81	91	82	83	n/a	99	242	90.39	6.74	1.83	12	249	1.84	0.04	356
136	353	312	295	438	384	81	81	91	82	83	n/a	99	237	90.95	6.59	1.92	12	246	1.80	0.00	356
138	346	307	292	436	381	81	80	91	82	85	n/a	98	232	90.68	6.56	1.96	12	243	1.80	0.06	352
140	340	306	290	430	379	81	80	91	84	86	n/a	97	228	90.67	6.55	1.95	12	242	1.74	0.00	349
142	337	304	288	425	376	81	81	91	85	87	n/a	97	224	89.74	6.53	1.94	12	241	1.74	0.00	346
144	335	295	285	422	373	81	81	91	84	87	n/a	98	220	90.78	6.53	1.94	12	239	1.74	0.04	342
146	333	295	283	420	371	81	81	91	82	83	n/a	99	217	90.29	6.39	2.02	12	236	1.70	0.00	340
148	328	300	280	417	369	81	81	91	84	86	n/a	98	214	90.39	6.27	2.02	12	234	1.70	0.06	339
150	324	288	278	413	365	82	81	91	85	87	n/a	94	211	88.50	6.01	2.02	13	234	1.64	0.00	334
152	321	286	274	409	364	82	82	91	85	85	n/a	97	208	89.98	5.91	2.06	13	232	1.64	0.00	331
154	318	280	268	408	363	82	82	91	82	84	n/a	97	204	90.52	5.75	2.12	13	229	1.64	0.04	327
156	313	284	265	404	360	82	82	91	82	84	n/a	96	201	90.46	5.73	2.13	13	227	1.60	0.00	325
158	308	282	264	401	355	82	81	91	84	86	n/a	95	198	88.83	5.48	2.13	13	226	1.60	0.00	322
160	307	277	262	397	355	82	82	91	82	83	n/a	96	194	90.39	5.31	2.10	13	224	1.60	0.00	320
162	304	274	260	393	352	82	82	90	85	87	n/a	96	191	89.33	5.25	2.10	13	223	1.60	0.00	317
164	300	263	258	392	350	82	82	90	83	86	n/a	96	188	89.98	5.10	2.08	13	222	1.60	0.06	313
166	297	261	255	387	348	82	81	90	83	85	n/a	96	185	90.61	4.90	2.12	14	220	1.54	0.04	310
168	294	251	253	384	347	82	82	90	83	84	n/a	96	183	90.39	4.95	2.10	14	218	1.50	0.00	306
170	295	265	253	380	343	82	82	90	85	87	n/a	93	179	87.81	6.35	1.95	13	218	1.50	0.00	307
172	296	256	249	377	342	82	82	90	83	83	n/a	95	177	89.59	6.48	1.81	13	217	1.50	0.06	304
174	295	268	247	374	339	82	82	90	83	85	n/a	95	175	89.88	6.33	1.92	13	217	1.45	0.00	305
176	294	266	245	372	336	82	82	90	82	84	n/a	94	173	89.46	6.13	2.00	13	216	1.45	0.04	303
178	292	269	245	369	334	82	81	90	86	87	n/a	93	171	89.05	6.03	2.01	13	217	1.41	-0.03	302
180	291	230	244	367	332	82	82	90	84	85	n/a	94	168	89.31	6.00	2.06	13	217	1.44	0.03	293
182	289	268	241	365	330	82	82	90	83	85	n/a	94	167	89.34	5.95	2.11	13	215	1.41	0.00	299
184	287	271	238	362	329	82	82	90	83	84	n/a	95	165	90.73	6.23	1.95	13	214	1.41	0.06	298
186	286	272	237	359	326	82	81	90	84	86	n/a	94	165	87.44	6.21	1.96	13	214	1.35	0.04	296
188	285	270	237	356	323	82	81	90	85	87	n/a	95	164	89.00	6.12	1.98	13	214	1.31	0.00	294
190	284	271	236	354	322	82	81	90	87	87	n/a	94	163	88.79	6.12	2.01	13	214	1.31	0.00	293
192	283	267	235	353	321	83	82	90	86	88	n/a	92	162	88.25	6.00	2.01	13	213	1.31	0.00	292
194	281	275	233	350	319	83	82	90	85	87	n/a	94	160	89.64	5.97	2.04	13	212	1.31	0.00	292
196	280	257	230	349	317	83	82	90	83	84	n/a	95	159	90.21	5.90	2.07	13	210	1.31	0.06	286
198	277	257	228	347	315	83	82	90	83	84	n/a	94	158	90.26	5.66	2.28	13	208	1.25	0.00	285
200	274	271	227	344	313	83	82	90	86	88	n/a	93	157	89.67	5.56	2.24	13	208	1.25	0.04	286
202	272	266	227	342	312	83	82	90	87	88	n/a	93	157	87.65	5.55	2.25	13	207	1.21	0.00	283
204	270	269	224	340	311	83	82	90	86	88	n/a	91	156	88.77	5.41	2.30	13	207	1.21	0.00	283
206	267	267	217	337	309	83	83	90	84	86	n/a	94	155	90.48	5.30	2.29	13	205	1.21	0.00	280
208	265	275	215	335	308	83	83	90	85	87	n/a	93	153	89.53	5.21	2.28	13	204	1.21	0.06	279

210	263	270	214	331	307	83	83	90	86	89	n/a	94	152	89.26	5.16	2.27	13	203	1.15	0.00	277
212	261	266	214	329	304	83	82	90	87	89	n/a	91	151	89.32	5.08	2.26	13	202	1.15	0.00	275
214	259	268	213	327	304	83	83	90	87	88	n/a	92	150	88.61	4.98	2.26	13	201	1.15	0.00	274
216	257	249	211	326	302	84	83	90	85	88	n/a	93	149	89.81	4.96	2.31	13	200	1.15	0.04	269
218	255	267	210	322	299	84	83	90	85	86	n/a	93	149	89.91	4.86	2.27	14	199	1.11	0.00	271
220	254	267	210	321	298	84	83	90	86	88	n/a	92	148	87.19	4.78	2.26	14	198	1.11	0.00	270
222	252	258	207	319	296	84	83	90	85	86	n/a	92	147	89.43	4.83	2.26	14	196	1.11	0.04	266
224	250	267	206	316	294	83	83	90	85	87	n/a	93	146	90.41	4.95	2.13	14	195	1.07	0.02	267
226	249	256	205	314	292	83	83	90	85	87	n/a	94	146	89.64	4.85	2.11	14	194	1.05	0.04	263
228	247	261	203	312	289	83	83	90	84	86	n/a	93	145	89.36	4.80	2.08	14	193	1.01	0.00	263
230	245	253	204	310	289	83	82	90	87	88	n/a	92	144	88.47	4.78	2.08	14	193	1.01	0.00	260
232	244	245	203	307	286	84	83	90	85	87	n/a	93	143	89.60	4.83	2.08	14	192	1.01	0.00	257
234	243	244	200	306	284	84	84	90	83	84	n/a	93	142	89.50	4.76	2.16	14	190	1.01	0.06	256
236	241	251	199	304	283	83	83	90	85	87	n/a	93	142	89.13	4.69	2.14	14	190	0.94	0.00	256
238	241	227	199	302	283	83	82	90	86	88	n/a	90	141	85.89	4.44	2.26	14	189	0.95	0.04	250
240	239	239	198	300	281	83	82	89	86	88	n/a	90	140	87.23	4.25	2.43	14	189	0.91	0.00	251
242	238	255	197	298	279	83	83	90	85	86	n/a	91	138	89.02	4.27	2.45	14	188	0.90	0.00	253
244	236	240	197	295	276	83	83	90	87	89	n/a	92	137	89.29	4.18	2.38	14	188	0.90	0.00	249
246	235	239	196	294	275	83	83	90	86	88	n/a	92	136	89.28	4.13	2.35	14	187	0.90	0.00	248
248	234	248	194	291	274	83	83	90	85	88	n/a	92	135	89.09	4.11	2.33	14	186	0.90	0.06	248
250	233	249	194	290	272	83	82	89	86	88	n/a	90	135	86.21	4.03	2.27	14	185	0.84	-0.06	247
252	231	240	192	288	269	83	82	89	86	89	n/a	90	133	86.49	4.04	2.29	14	185	0.90	0.06	244
254	231	238	191	286	268	83	83	89	85	87	n/a	90	132	86.98	4.13	2.47	14	184	0.84	-0.06	243
256	231	242	190	283	266	83	83	89	86	88	n/a	90	131	86.95	4.58	2.90	14	183	0.90	0.06	243
258	231	245	189	281	264	83	83	89	85	87	n/a	90	130	88.11	4.60	2.93	14	183	0.84	0.00	242
260	232	234	187	279	262	83	83	89	84	86	n/a	91	129	88.94	4.55	2.91	14	183	0.84	0.04	239
262	233	216	185	277	261	83	83	89	83	85	n/a	91	130	89.12	4.51	2.90	14	182	0.80	0.06	234
264	232	252	185	275	259	83	83	89	85	88	n/a	91	130	88.00	4.57	2.93	14	182	0.74	0.00	241
266	233	254	185	272	258	83	82	89	87	89	n/a	91	130	87.45	4.59	2.94	14	183	0.74	0.00	241
268	234	251	185	270	257	83	82	89	87	89	n/a	91	130	86.81	4.60	2.94	14	184	0.74	0.04	240
270	234	239	184	269	256	83	82	89	86	88	n/a	90	130	86.08	4.51	2.89	14	184	0.70	0.00	236
272	235	247	183	266	254	83	82	89	86	88	n/a	90	130	87.55	4.54	2.96	14	184	0.70	0.00	237
274	236	245	183	264	253	83	82	89	87	89	n/a	91	129	89.30	4.46	2.88	14	184	0.70	0.06	236
276	236	236	182	263	252	83	83	89	86	89	n/a	90	129	86.36	4.41	2.82	14	184	0.64	0.00	234
278	236	249	181	262	251	83	82	89	86	89	n/a	90	128	86.75	4.34	2.81	14	183	0.64	0.00	236
280	235	228	180	260	249	83	82	89	86	88	n/a	90	128	86.08	4.33	2.78	14	183	0.64	0.00	231
282	235	239	180	259	249	83	83	88	85	88	n/a	89	127	87.88	4.29	2.71	14	182	0.64	0.00	232
284	233	236	179	257	247	83	82	89	87	89	n/a	90	126	87.40	4.31	2.66	14	182	0.64	0.00	231
286	232	234	178	255	246	83	83	89	85	88	n/a	91	126	89.42	4.29	2.62	14	181	0.64	0.04	229
288	232	220	178	254	245	83	83	89	86	89	n/a	90	126	86.00	4.34	2.67	14	181	0.60	0.00	226
290	231	227	177	252	245	83	82	89	86	89	n/a	89	126	86.67	4.43	2.74	14	181	0.60	0.06	227
292	231	222	177	251	243	83	82	89	86	89	n/a	91	125	88.24	4.39	2.71	14	181	0.54	0.00	225
294	230	235	177	250	242	83	82	89	86	89	n/a	91	125	90.25	4.30	2.66	14	180	0.54	0.04	227
296	229	240	175	249	240	83	83	89	86	89	n/a	92	125	89.99	4.27	2.64	14	179	0.50	0.00	227
298	229	223	175	247	239	83	83	89	87	90	n/a	92	126	88.17	4.20	2.60	14	179	0.49	0.00	223
300	228	228	175	245	238	83	83	89	87	89	n/a	91	126	87.91	4.19	2.60	14	179	0.50	0.06	223
302	228	228	174	244	237	83	83	89	87	90	n/a	91	125	86.94	4.16	2.59	14	178	0.44	0.00	222
304	228	214	173	242	237	83	83	90	87	90	n/a	92	125	89.33	4.17	2.59	14	178	0.44	0.00	219
306	226	226	173	242	235	83	83	90	87	91	n/a	92	125	89.64	4.27	2.65	14	177	0.44	0.00	220
308	227	223	173	241	235	83	83	90	87	91	n/a	92	126	88.69	4.31	2.68	14	177	0.44	0.04	220

310	228	227	172	239	234	83	83	90	87	90	n/a	92	125	90.20	4.37	2.76	14	177	0.40	0.00	220
312	229	217	171	238	233	83	83	90	87	93	n/a	91	126	87.11	4.48	2.84	14	177	0.40	0.00	218
314	229	212	171	237	233	83	83	90	87	93	n/a	92	126	88.03	4.48	2.83	14	177	0.40	0.00	216
316	227	227	170	236	232	83	83	90	87	93	n/a	92	126	88.32	4.42	2.82	14	177	0.40	0.06	218
318	226	222	170	234	231	83	82	90	87	91	n/a	91	126	87.66	4.35	2.78	14	176	0.34	0.00	216
320	224	219	169	233	230	83	83	89	87	90	n/a	90	126	86.71	4.24	2.70	14	176	0.34	0.00	215
322	224	219	168	231	229	83	83	89	87	93	n/a	91	125	86.98	4.16	2.65	14	175	0.33	0.00	214
324	223	226	168	231	228	83	83	89	86	92	n/a	91	125	88.18	4.11	2.62	14	174	0.33	0.00	215
326	223	209	167	229	226	84	83	n/a	85	90	n/a	91	125	89.37	4.25	2.69	14	174	0.33	0.04	211
328	217	205	166	228	225	84	84	n/a	86	91	n/a	91	125	89.38	3.79	2.42	15	172	0.29	0.00	208
330	210	211	166	228	224	84	84	n/a	87	93	n/a	91	125	89.19	3.96	2.67	15	170	0.29	0.00	208
332	206	218	166	227	223	85	84	n/a	87	94	n/a	92	125	89.80	4.00	2.69	15	168	0.29	0.06	208
334	204	215	165	227	222	85	84	n/a	87	94	n/a	92	125	88.61	3.98	2.70	15	166	0.23	0.00	207
336	203	204	164	227	221	85	84	n/a	86	92	n/a	91	125	87.04	3.90	2.65	15	165	0.23	0.00	204
338	201	216	164	225	220	85	84	n/a	87	92	n/a	92	124	88.03	3.92	2.67	15	164	0.23	0.04	205
340	200	208	163	225	219	85	85	n/a	87	90	n/a	91	124	88.30	3.96	2.68	15	163	0.19	0.00	203
342	199	213	163	223	218	85	85	n/a	86	89	n/a	90	124	87.32	3.91	2.61	15	162	0.19	0.00	203
344	198	211	162	222	217	85	85	n/a	86	88	n/a	91	123	89.04	3.97	2.63	15	162	0.19	0.00	202
346	198	207	162	222	216	85	85	n/a	86	89	n/a	90	123	86.05	3.96	2.61	15	161	0.19	0.00	201
348	197	208	161	221	216	85	85	91	86	89	n/a	91	122	88.67	3.93	2.57	15	161	0.19	0.06	201
350	197	206	161	220	215	85	85	n/a	86	89	n/a	90	121	87.00	3.87	2.51	15	161	0.13	0.00	200
352	198	191	160	219	214	85	85	n/a	86	88	n/a	90	120	86.47	4.01	2.65	15	161	0.13	0.00	196
354	198	206	160	218	213	85	85	n/a	86	89	n/a	91	119	87.61	4.01	2.70	15	160	0.13	0.00	199
356	198	207	159	217	212	85	85	n/a	87	89	n/a	90	119	89.02	4.09	2.78	14	160	0.13	0.00	199
358	197	209	159	217	212	85	85	n/a	86	88	n/a	91	119	87.35	3.92	2.66	15	160	0.13	0.04	199
360	197	209	159	216	211	85	85	n/a	87	89	n/a	91	119	88.25	3.80	2.58	15	160	0.09	0.00	198
362	197	204	159	216	211	85	85	n/a	86	88	n/a	90	119	87.21	3.66	2.46	15	160	0.09	0.00	197
364	197	201	159	215	211	85	85	n/a	87	89	n/a	90	119	86.87	3.55	2.41	15	160	0.10	0.06	196
366	197	201	158	213	210	85	85	n/a	86	88	n/a	90	118	87.01	3.54	2.41	15	160	0.03	-0.06	196
368	198	205	158	212	209	85	85	n/a	86	89	n/a	91	117	88.30	3.57	2.43	15	160	0.10	0.00	197
370	199	192	157	211	208	85	85	n/a	87	89	n/a	91	116	87.73	3.64	2.48	15	160	0.10	0.06	194
372	202	194	157	210	208	85	85	n/a	86	88	n/a	91	116	88.78	3.71	2.56	15	161	0.04	0.00	194
374	204	200	156	208	207	85	85	n/a	86	88	n/a	91	117	87.70	3.69	2.57	15	162	0.04	0.00	195
376	208	195	157	208	207	85	85	n/a	86	88	n/a	91	117	87.99	3.87	2.71	15	162	0.04	0.04	195

Manufacturer: Foyers Suprême Inc.

Burn rate: 0.864 dry kg/hr

Model: LASER-E

Pollu rate: 1.913 gr/hr Pollution rate 1.062 gr/hr

Date: 19th Aug 2016

Polluants: 5 mg non adjusted:

RUN #:

Delta Temp FB: -73 degF

Test Duration: 380

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	Filter#1 Out T	Temp	DGM#2 In T	Out T	Temp	TunnelFlue gas Temp	Room Temp	CO2 Temp	CO Temp	O ² Temp	Bimetal Temp	Weight Remaining	Burn Rate	FB Temp	
0	246	228	217	327	299	85	85	82	85	84	n/a	87	167	84.60	2.36	2.05	16	192	14.85		263
2	231	212	214	323	298	84	85	82	83	84	n/a	86	184	85.41	2.18	0.44	19	186	14.81	0.04	256
4	291	216	211	319	296	84	84	83	85	84	n/a	87	254	85.67	6.49	0.36	14	185	14.45	0.36	267
6	453	222	213	316	296	84	83	85	85	85	n/a	89	348	87.01	8.77	0.44	12	210	14.01	0.44	300
8	618	231	218	316	297	84	83	86	86	86	n/a	91	443	87.98	9.36	0.44	11	259	13.55	0.46	336
10	645	250	224	317	296	84	82	87	86	86	n/a	91	463	87.24	9.50	0.81	11	294	13.11	0.44	346
12	<u>647</u>	<u>268</u>	<u>229</u>	<u>320</u>	<u>298</u>	<u>84</u>	<u>82</u>	<u>88</u>	<u>86</u>	<u>86</u>	n/a	<u>92</u>	<u>484</u>	<u>91.27</u>	<u>9.97</u>	<u>1.01</u>	<u>10</u>	<u>315</u>	<u>12.66</u>	<u>0.44</u>	<u>353</u>
14	652	288	233	323	302	84	82	89	85	85	n/a	93	494	92.25	11.53	0.94	9	330	12.26	0.40	360
16	644	275	238	328	305	83	82	89	84	84	n/a	94	499	92.05	11.89	0.75	8	337	11.86	0.40	358
18	632	297	242	334	309	83	82	90	84	84	n/a	94	486	92.90	10.69	0.82	9	342	11.56	0.30	363
20	603	287	246	337	311	83	81	91	84	84	n/a	94	461	91.97	9.08	1.15	11	338	11.26	0.30	357
22	563	309	248	340	313	83	82	92	84	85	n/a	94	443	92.81	9.08	1.19	11	324	10.96	0.30	354
24	<u>535</u>	<u>290</u>	<u>251</u>	<u>342</u>	<u>314</u>	<u>83</u>	<u>81</u>	<u>92</u>	<u>85</u>	<u>84</u>	n/a	<u>94</u>	<u>432</u>	<u>93.21</u>	<u>9.09</u>	<u>1.32</u>	<u>11</u>	<u>310</u>	<u>10.71</u>	<u>0.24</u>	<u>346</u>
26	537	295	252	346	315	83	81	93	84	84	n/a	94	432	92.18	10.62	1.07	10	302	10.41	0.30	349
28	580	292	255	348	316	83	81	93	85	85	n/a	95	445	93.53	12.64	0.80	8	311	10.11	0.30	358
30	662	304	259	353	321	83	81	93	84	85	n/a	95	465	93.13	13.38	0.62	7	339	9.75	0.36	380
32	699	282	264	359	327	83	81	93	83	84	n/a	95	469	93.12	13.51	0.60	7	366	9.41	0.34	386
34	685	310	268	363	331	82	81	94	85	86	n/a	95	456	93.81	12.56	0.86	8	379	9.14	0.26	391
36	<u>660</u>	<u>302</u>	<u>271</u>	<u>367</u>	<u>334</u>	<u>82</u>	<u>80</u>	<u>94</u>	<u>87</u>	<u>87</u>	n/a	<u>95</u>	<u>452</u>	<u>92.10</u>	<u>13.51</u>	<u>0.80</u>	<u>7</u>	<u>373</u>	<u>8.84</u>	<u>0.30</u>	<u>387</u>
38	673	303	275	373	338	82	80	94	86	86	n/a	95	454	94.31	13.67	0.52	7	373	8.60	0.24	392
40	669	282	279	380	341	83	81	94	84	84	n/a	96	452	93.09	12.94	0.54	8	375	8.36	0.24	390
42	654	264	281	386	345	83	82	94	84	84	n/a	95	448	91.59	12.49	0.53	8	372	8.12	0.24	386
44	643	260	284	390	347	82	81	94	84	84	n/a	95	443	92.37	12.60	0.51	8	366	7.86	0.26	385
46	634	297	285	391	348	83	81	95	83	84	n/a	95	440	92.63	12.59	0.52	8	362	7.62	0.24	391
48	<u>642</u>	<u>285</u>	<u>289</u>	<u>396</u>	<u>353</u>	<u>82</u>	<u>81</u>	<u>95</u>	<u>85</u>	<u>86</u>	n/a	<u>95</u>	<u>435</u>	<u>93.03</u>	<u>13.23</u>	<u>0.55</u>	<u>7</u>	<u>364</u>	<u>7.42</u>	<u>0.20</u>	<u>393</u>
50	655	292	291	401	358	82	80	95	85	85	n/a	95	436	94.49	13.34	0.53	7	367	7.16	0.26	400
52	660	278	294	406	363	82	81	96	84	84	n/a	96	435	94.07	12.86	0.53	8	370	6.91	0.24	400
54	651	295	296	408	366	82	80	96	86	86	n/a	96	432	94.64	12.70	0.50	8	371	6.65	0.26	403
56	644	286	299	412	368	83	81	96	88	88	n/a	95	430	93.86	12.75	0.53	8	371	6.45	0.20	402
58	639	282	301	414	372	83	81	96	88	88	n/a	95	428	93.53	12.93	0.56	8	369	6.21	0.24	402
60	<u>647</u>	<u>299</u>	<u>304</u>	<u>418</u>	<u>377</u>	<u>83</u>	<u>81</u>	<u>96</u>	<u>87</u>	<u>87</u>	n/a	<u>96</u>	<u>426</u>	<u>95.98</u>	<u>12.86</u>	<u>0.67</u>	<u>8</u>	<u>369</u>	<u>6.01</u>	<u>0.20</u>	<u>409</u>
62	651	286	307	421	377	83	82	83	89	89	n/a	96	424	90.49	12.93	0.54	8	372	5.80	0.20	409
64	654	287	309	423	380	84	83	85	90	88	n/a	95	422	93.37	12.53	0.50	8	375	5.61	0.20	411
66	658	295	312	429	387	84	83	86	89	87	n/a	96	417	93.69	13.01	0.36	8	374	5.41	0.20	416
68	657	299	314	433	392	84	83	87	86	85	n/a	96	415	94.47	13.06	0.25	7	374	5.14	0.26	419
70	655	277	315	438	396	84	84	88	85	85	n/a	96	413	94.95	13.04	0.23	7	373	4.94	0.20	416
72	<u>656</u>	<u>286</u>	<u>317</u>	<u>443</u>	<u>398</u>	<u>84</u>	<u>83</u>	<u>88</u>	<u>86</u>	<u>86</u>	n/a	<u>96</u>	<u>412</u>	<u>95.16</u>	<u>12.83</u>	<u>0.16</u>	<u>8</u>	<u>373</u>	<u>4.80</u>	<u>0.14</u>	<u>420</u>
74	653	298	319	446	402	84	82	89	88	87	n/a	96	412	95.87	12.67	0.13	8	372	4.60	0.20	424
76	649	287	322	449	406	84	83	90	88	88	n/a	96	410	95.31	12.42	0.13	8	370	4.44	0.16	423
78	644	279	322	452	409	84	83	90	87	87	n/a	96	408	94.98	12.09	0.12	8	369	4.26	0.18	421
80	634	285	322	455	411	84	83	91	87	88	n/a	97	405	94.62	11.58	0.14	9	363	4.12	0.14	421
82	626	276	323	457	415	84	83	92	87	86	n/a	96	400	95.12	11.16	0.15	9	359	3.96	0.16	420
84	611	285	323	460	414	85	84	92	89	89	n/a	96	394	93.72	10.74	0.21	10	356	3.85	0.10	418
86	602	283	322	460	417	84	83	93	88	88	n/a	96	388	95.90	10.57	0.23	10	352	3.71	0.14	417
88	588	281	322	461	419	85	83	94	87	87	n/a	97	383	96.53	10.42	0.25	10	346	3.61	0.10	414
90	572	290	322	463	419	84	83	94	88	89	n/a	97	378	95.19	10.63	0.21	10	341	3.45	0.16	413
92	572	275	323	464	422	85	83	94	86	85	n/a	97	373	95.55	10.57	0.45	10	338	3.31	0.14	411
94	576	272	325	465	421	85	84	94	86	85	n/a	97	370	94.78	10.71	0.47	9	338	3.21	0.10	412
96	577	280	325	465	422	84	84	95	87	87	n/a	97	366	95.68	10.84	0.34	9	339	3.11	0.10	414
98	577	283	327	467	424	84	83	95	87	87	n/a	97	365	96.10	10.95	0.36	9	340	2.95	0.16	415
100	577	289	328	468	429	85	84	95	86	86	n/a	97	364	96.49	10.87	0.43	9	340	2.85	0.10	418
102	576	287	329	469	430	85	84	95	87	87	n/a	97	363	96.29	10.98	0.37	9	341	2.71	0.14	418
104	573	282	330	470	433	85	83	95	87	86	n/a	97	360	95.67	10.26	0.49	9	342	2.65	0.06	418
106	547	298	331	470	432	85	83	95	89	89	n/a	97	351	94.92	8.64	0.95	11	337	2.55	0.10	415
108	521	287	330	471	431	85	84	95	86	86	n/a	97	341	94.84	8.26	0.95	11	326	2.51	0.04	408

110	499	288	329	471	433	85	84	95	88	88	n/a	97	332	96.02	8.11	0.95	11	315	2.45	0.00	404
112	482	285	335	471	432	85	84	95	86	86	n/a	97	324	95.30	7.96	0.98	11	305	2.45	0.04	401
114	468	295	339	470	429	85	84	95	87	86	n/a	97	316	95.05	7.83	1.01	11	299	2.41	0.10	400
116	455	305	340	469	427	85	84	94	85	85	n/a	96	309	93.89	7.69	1.04	12	293	2.30	0.00	399
118	443	287	338	469	426	84	83	94	86	86	n/a	96	301	94.97	7.47	1.14	12	286	2.31	0.06	392
120	433	307	335	467	425	84	83	94	86	86	n/a	96	295	95.03	7.24	1.25	12	282	2.25	0.04	393
122	422	319	332	466	423	84	83	94	86	86	n/a	96	288	95.81	7.10	1.39	12	278	2.20	0.06	392
124	414	297	329	467	421	84	84	94	85	85	n/a	96	281	93.89	7.00	1.51	12	274	2.15	0.04	386
126	405	311	326	464	419	84	83	94	86	86	n/a	96	275	94.74	6.86	1.64	12	270	2.11	0.00	385
128	397	314	323	461	415	84	83	94	87	87	n/a	96	269	94.36	6.77	1.72	12	267	2.11	0.06	382
130	389	321	320	459	413	84	82	94	87	86	n/a	96	263	95.64	6.63	1.83	12	264	2.05	0.04	380
132	380	323	318	455	411	84	82	94	88	87	n/a	95	258	94.88	6.49	1.96	12	260	2.01	0.00	377
134	375	302	315	455	410	84	83	94	85	85	n/a	95	253	94.30	6.25	2.13	12	257	2.01	0.06	372
136	370	328	311	454	407	84	83	94	86	85	n/a	95	247	94.52	5.97	2.29	12	254	1.95	0.04	374
138	364	317	309	449	405	84	82	94	87	87	n/a	95	242	94.63	5.82	2.35	13	252	1.91	0.00	369
140	361	298	306	447	403	84	83	94	86	86	n/a	95	238	94.79	5.68	2.39	13	250	1.91	0.06	363
142	356	304	303	445	399	84	83	94	86	85	n/a	95	234	94.62	5.58	2.46	13	248	1.85	0.00	361
144	352	291	300	441	397	84	83	94	87	86	n/a	95	229	94.61	5.57	2.48	13	246	1.85	0.04	356
146	347	313	297	438	394	84	83	94	87	87	n/a	95	225	94.77	5.55	2.50	13	244	1.81	0.00	358
148	343	318	295	434	390	84	83	94	89	91	n/a	95	222	93.26	5.47	2.53	13	244	1.81	0.00	356
150	340	305	293	431	388	85	84	94	89	89	n/a	95	218	94.91	5.60	2.46	13	242	1.81	0.06	351
152	335	302	291	428	386	85	84	94	91	90	n/a	94	213	93.88	5.52	2.47	13	242	1.75	0.00	348
154	333	303	289	425	381	85	85	94	91	91	n/a	93	209	92.11	5.53	2.48	13	241	1.74	0.00	346
156	332	301	286	424	380	86	85	94	91	92	n/a	93	205	92.87	6.02	2.25	13	239	1.75	0.04	345
158	331	297	283	421	376	86	85	94	90	91	n/a	93	202	89.76	5.78	2.26	13	238	1.71	0.00	342
160	328	302	280	418	375	86	86	94	91	92	n/a	93	199	93.90	5.67	2.31	13	238	1.71	0.06	341
162	327	297	274	415	375	86	86	94	90	89	n/a	93	196	94.46	5.53	2.32	13	236	1.65	0.00	337
164	324	304	271	412	371	86	86	94	91	91	n/a	92	194	92.41	5.44	2.34	13	236	1.65	0.00	336
166	322	300	269	409	369	87	86	94	91	91	n/a	92	192	90.00	5.33	2.39	13	235	1.65	0.04	334
168	318	284	267	407	367	87	86	94	91	90	n/a	92	190	93.50	5.05	2.60	13	233	1.61	0.00	328
170	317	275	264	405	367	87	86	94	86	86	n/a	93	188	94.32	4.98	2.68	13	231	1.61	0.06	326
172	314	279	261	401	363	87	86	94	90	90	n/a	93	187	94.90	4.88	2.66	13	230	1.55	0.00	324
174	310	288	259	399	362	87	85	94	90	88	n/a	94	185	94.43	4.86	2.65	13	228	1.55	0.04	324
176	306	289	259	396	358	87	86	94	91	92	n/a	94	183	94.34	4.79	2.58	13	227	1.51	0.00	321
178	302	288	257	391	355	87	87	94	91	92	n/a	93	181	93.13	4.71	2.58	13	227	1.51	0.00	319
180	300	279	255	389	356	87	86	94	91	91	n/a	93	179	93.26	4.73	2.56	13	226	1.51	0.00	316
182	298	282	253	388	352	87	87	94	91	92	n/a	94	176	94.28	4.72	2.55	13	224	1.51	0.06	314
184	296	285	251	384	350	87	87	94	91	92	n/a	93	175	91.92	4.69	2.54	13	224	1.45	0.00	313
186	292	275	250	379	347	88	87	94	91	91	n/a	92	173	92.46	4.69	2.56	13	224	1.45	0.00	309
188	290	268	249	377	344	87	87	94	90	91	n/a	92	171	93.05	4.62	2.50	14	223	1.45	0.00	306
190	288	281	247	375	342	88	87	94	91	92	n/a	91	169	93.16	4.55	2.63	14	222	1.45	0.00	306
192	286	283	245	372	339	88	87	94	92	93	n/a	92	167	93.04	4.47	2.63	14	220	1.45	0.04	305
194	284	265	243	369	336	88	87	93	89	91	n/a	91	164	88.95	4.36	2.53	14	219	1.41	0.06	299
196	283	270	241	366	334	88	87	93	89	91	n/a	90	161	90.48	4.56	2.64	14	218	1.35	0.00	299
198	283	276	239	362	332	87	87	93	91	93	n/a	92	159	92.66	4.92	2.82	13	218	1.35	0.00	299
200	283	277	238	359	328	88	87	93	91	92	n/a	92	158	93.64	5.01	2.82	13	217	1.35	0.04	297
202	283	270	236	356	327	88	87	93	91	92	n/a	92	158	92.11	5.04	2.77	13	216	1.31	0.00	294
204	283	274	235	353	324	88	87	93	91	92	n/a	92	156	91.78	4.92	2.78	13	216	1.31	0.00	294
206	284	270	233	351	323	88	87	94	92	93	n/a	92	156	93.65	4.92	2.75	13	216	1.31	0.06	292
208	283	264	232	348	321	88	87	93	91	93	n/a	92	154	93.23	4.86	2.75	13	215	1.25	0.00	290

210	281	259	230	346	318	88	87	93	90	92	n/a	91	154	93.05	4.86	2.76	13	215	1.25	0.04	287
212	280	250	229	343	316	88	87	93	91	90	n/a	92	153	93.53	4.81	2.74	13	214	1.20	0.00	284
214	280	242	227	341	315	88	87	94	92	93	n/a	92	152	93.67	4.80	2.78	13	213	1.21	0.00	281
216	277	256	226	339	313	88	86	94	92	93	n/a	92	152	92.16	4.72	2.73	13	212	1.21	0.00	282
218	274	246	225	338	312	88	87	94	92	93	n/a	93	151	93.52	4.66	2.74	13	211	1.20	0.06	279
220	272	252	223	335	310	88	87	94	92	93	n/a	93	151	93.79	4.61	2.76	13	209	1.14	0.00	278
222	270	240	221	333	307	88	87	94	90	90	n/a	93	150	94.90	4.55	2.82	13	208	1.15	0.04	274
224	267	245	220	332	306	88	88	94	88	88	n/a	93	150	93.97	4.57	2.79	13	206	1.11	0.00	274
226	265	246	218	330	304	88	87	94	91	93	n/a	94	150	92.62	4.47	2.76	14	205	1.10	0.00	273
228	263	239	217	328	300	88	87	94	90	91	n/a	94	149	94.24	4.77	2.57	13	204	1.11	0.06	269
230	263	239	216	325	299	88	87	94	88	89	n/a	94	148	94.98	4.65	2.59	14	203	1.05	0.00	268
232	261	239	215	323	297	88	86	94	92	93	n/a	94	148	94.20	4.54	2.62	14	203	1.05	0.00	267
234	258	231	213	320	295	88	87	95	90	90	n/a	94	147	93.91	4.40	2.66	14	201	1.05	0.00	263
236	255	233	212	319	293	88	87	95	89	89	n/a	94	146	94.09	4.34	2.74	14	199	1.05	0.04	262
238	253	218	211	318	292	88	87	95	87	88	n/a	94	146	93.80	4.28	2.75	14	198	1.00	0.00	259
240	251	232	209	316	289	88	88	95	87	88	n/a	94	146	94.14	4.23	2.82	14	196	1.00	0.06	259
242	248	222	208	313	287	87	87	95	86	88	n/a	94	145	92.18	4.31	2.87	14	195	0.94	0.00	256
244	246	236	207	311	286	87	86	95	89	90	n/a	94	145	93.84	4.34	2.89	14	194	0.95	0.00	257
246	245	237	204	310	284	87	86	95	92	93	n/a	94	144	93.79	4.37	2.89	14	193	0.95	0.04	256
248	245	230	202	308	283	87	86	94	92	93	n/a	93	144	93.63	4.29	2.81	14	193	0.91	0.00	253
250	244	225	200	306	281	87	87	94	89	90	n/a	93	143	93.74	4.32	2.80	14	193	0.90	0.00	251
252	242	226	199	304	280	87	86	94	88	90	n/a	93	143	94.21	4.23	2.74	14	191	0.90	0.00	250
254	240	232	198	302	278	87	87	95	91	91	n/a	93	142	93.94	4.20	2.75	14	191	0.90	0.05	250
256	238	237	198	300	276	87	86	94	91	93	n/a	93	141	92.76	4.14	2.72	14	190	0.85	0.00	250
258	236	220	198	298	275	87	86	94	92	93	n/a	93	140	93.36	4.13	2.75	14	189	0.85	0.00	245
260	234	228	196	297	273	87	86	95	91	91	n/a	93	140	94.35	4.13	2.73	14	188	0.85	0.05	246
262	232	227	196	295	272	87	87	95	92	94	n/a	93	140	93.25	4.17	2.74	14	187	0.80	0.00	244
264	231	229	194	293	270	87	87	95	91	91	n/a	93	139	94.42	4.18	2.74	14	186	0.80	0.00	243
266	231	228	193	292	269	87	87	95	89	90	n/a	93	139	94.83	4.26	2.83	14	184	0.80	0.05	243
268	230	229	192	290	267	87	87	95	91	91	n/a	93	140	93.64	4.44	2.94	14	183	0.75	0.00	242
270	228	227	191	289	266	87	87	95	88	90	n/a	94	140	94.77	4.36	2.92	14	182	0.75	0.00	240
272	227	230	190	288	264	87	87	95	88	90	n/a	94	140	94.66	4.33	2.92	14	181	0.75	0.05	239
274	226	228	191	287	262	87	86	94	91	94	n/a	93	140	91.88	4.29	2.92	14	182	0.70	0.00	239
276	226	235	191	285	261	87	86	94	91	95	n/a	92	140	91.62	4.22	2.88	14	182	0.70	0.00	240
278	226	228	191	284	260	87	86	94	91	96	n/a	92	139	92.73	4.12	2.81	14	182	0.70	0.06	238
280	224	228	190	282	259	87	87	n/a	91	96	n/a	92	139	92.36	4.01	2.75	14	181	0.64	0.00	237
282	223	228	189	282	258	88	87	n/a	92	97	n/a	92	138	93.18	4.07	2.80	14	181	0.64	0.00	236
284	223	232	189	280	257	88	87	n/a	92	97	n/a	92	137	94.06	4.02	2.76	14	180	0.64	0.04	236
286	221	229	188	280	255	88	88	n/a	93	98	n/a	93	137	94.79	4.12	2.81	14	180	0.60	0.00	235
288	220	224	186	278	253	89	88	n/a	93	98	n/a	93	136	95.20	4.03	2.73	14	178	0.60	0.00	232
290	219	219	184	277	251	89	88	n/a	92	97	n/a	93	135	94.82	3.96	2.68	14	177	0.60	0.06	230
292	217	223	183	275	250	89	89	n/a	92	97	n/a	94	135	95.13	3.96	2.68	14	176	0.54	0.00	230
294	217	211	184	274	247	90	89	n/a	93	98	n/a	94	134	94.57	3.93	2.68	14	176	0.54	0.00	227
296	216	209	183	272	247	90	89	n/a	92	97	n/a	94	134	94.45	4.08	2.83	14	176	0.54	0.00	226
298	214	218	182	272	246	90	90	n/a	92	97	n/a	93	133	93.66	3.96	2.70	14	176	0.54	0.04	227
300	214	213	181	270	245	90	90	n/a	91	97	n/a	94	132	93.68	3.89	2.63	14	175	0.50	0.00	224
302	212	211	180	268	244	90	90	n/a	90	96	n/a	92	131	89.33	3.79	2.57	14	174	0.50	0.00	223
304	211	211	179	267	242	90	90	n/a	91	96	n/a	92	130	91.88	3.76	2.57	14	174	0.50	0.00	222
306	210	210	179	265	242	90	90	n/a	91	96	n/a	92	128	92.27	3.75	2.56	14	173	0.50	0.00	221
308	209	208	178	264	240	90	90	n/a	91	96	n/a	92	128	91.92	3.77	2.59	14	173	0.50	0.06	220

310	208	209	178	262	239	90	90	n/a	91	98	n/a	92	127	90.13	3.71	2.54	14	172	0.44	0.00	219
312	208	204	177	261	237	90	90	n/a	92	98	n/a	92	126	92.27	3.67	2.54	14	171	0.44	0.00	217
314	207	197	175	260	236	90	90	n/a	92	98	n/a	92	125	93.37	3.65	2.54	15	170	0.44	0.00	215
316	205	205	174	258	234	90	90	n/a	88	94	n/a	93	125	95.34	3.60	2.51	15	169	0.44	0.00	215
318	203	198	172	257	233	90	89	n/a	87	90	n/a	94	125	93.11	3.56	2.49	15	167	0.44	0.04	213
320	202	186	173	256	232	89	89	n/a	89	91	n/a	93	125	93.39	3.51	2.48	15	167	0.40	0.00	210
322	201	187	171	254	230	89	89	n/a	87	89	n/a	94	125	94.43	3.55	2.50	15	166	0.40	0.00	209
324	200	196	171	253	230	89	89	n/a	91	93	n/a	93	125	92.72	3.53	2.46	15	167	0.40	0.06	210
326	199	195	171	251	230	89	89	n/a	90	92	n/a	92	124	91.14	3.48	2.41	15	166	0.34	0.00	209
328	199	195	170	250	228	89	89	n/a	89	91	n/a	92	124	93.47	3.42	2.35	15	166	0.33	0.00	208
330	197	198	169	249	226	89	88	n/a	89	92	n/a	93	123	91.44	3.42	2.33	15	165	0.33	0.00	208
332	197	176	168	248	225	89	88	n/a	88	90	n/a	93	123	93.33	3.32	2.25	15	165	0.33	0.00	203
334	196	193	167	246	223	88	88	n/a	89	90	n/a	93	122	92.07	3.35	2.24	15	164	0.33	0.00	205
336	195	185	167	245	222	88	88	n/a	89	89	n/a	93	122	92.77	3.26	2.17	15	163	0.33	0.04	203
338	194	193	166	243	222	89	88	n/a	90	90	n/a	93	121	92.54	3.21	2.13	15	163	0.29	0.06	204
340	194	185	166	242	221	89	89	n/a	90	91	n/a	92	121	90.80	3.21	2.11	15	163	0.23	0.00	201
342	192	177	164	241	219	89	89	n/a	87	88	n/a	92	120	92.45	3.19	2.09	15	161	0.23	0.00	199
344	191	189	163	240	217	89	88	n/a	88	89	n/a	93	120	94.87	3.21	2.07	15	160	0.22	0.00	200
346	190	180	162	238	215	88	88	n/a	88	89	n/a	93	119	94.03	3.16	2.03	15	159	0.22	0.04	197
348	189	176	162	237	214	88	88	n/a	90	91	n/a	93	119	91.71	3.20	2.05	15	159	0.18	0.00	196
350	190	176	162	236	213	89	89	n/a	90	91	n/a	92	119	89.07	3.20	2.05	15	158	0.18	0.05	195
352	190	178	161	235	212	89	89	n/a	89	90	n/a	91	118	90.91	3.26	2.09	15	158	0.13	0.01	195
354	190	186	160	234	211	89	89	n/a	87	89	n/a	92	118	93.15	3.33	2.15	15	157	0.12	0.00	196
356	190	180	160	233	210	89	89	n/a	89	90	n/a	91	118	88.90	3.39	2.18	15	157	0.12	0.00	194
358	190	178	159	232	208	89	89	n/a	89	90	n/a	90	117	89.87	3.27	2.12	15	157	0.12	0.00	194
360	190	181	159	232	207	89	89	n/a	90	91	n/a	91	117	90.61	3.33	2.17	15	156	0.12	0.04	194
362	191	183	160	231	206	89	89	n/a	90	92	n/a	91	117	91.85	3.60	2.39	15	156	0.08	-0.04	194
364	191	179	160	231	205	89	88	n/a	90	91	n/a	91	118	90.80	3.68	2.49	15	156	0.12	0.04	193
366	192	169	159	231	203	89	89	n/a	90	91	n/a	91	118	90.30	3.71	2.54	15	156	0.08	0.06	191
368	193	178	159	230	202	89	89	n/a	89	91	n/a	91	118	90.33	3.67	2.54	15	156	0.02	-0.06	192
370	193	175	158	230	201	89	89	n/a	90	91	n/a	91	119	90.12	3.66	2.53	15	156	0.08	0.06	192
372	193	178	158	230	201	89	89	n/a	90	91	n/a	91	119	90.29	3.29	2.25	15	156	0.02	0.00	192
374	192	176	157	229	200	89	89	n/a	89	90	n/a	90	119	90.71	3.10	2.16	16	156	0.02	0.00	191
376	191	176	157	228	198	89	89	n/a	89	90	n/a	90	119	88.43	3.19	2.26	15	155	0.02	0.00	190
378	190	179	156	227	197	89	89	n/a	90	91	n/a	90	119	90.09	3.32	2.37	15	155	0.02	0.00	190
380	189	181	156	227	197	89	89	n/a	89	90	n/a	90	119	90.40	3.36	2.43	15	154	0.02	0.04	190

Manufacturer Foyers Suprême Inc.

Burn rate: 1.395 dry kg/hr

Model: LASER-E

Pollu rate: 7.494 gr/hr

Pollution rate 5.502 gr/hr

Date: 24th Aug 2016

Polluants: 22 mg

non adjusted:

RUN #:

Delta Temp FB: 22 degF

Test Duration: 236

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	DGM#1 Out T	Filter#1 Temp	DGM#2 In T	DGM#2 Out T	Filt#2 Temp	Tunnel Temp	Flue gas Temp	Room Temp	CO2	CO	O ²	Bimetal Temp	Weight Remaining	Burn Rate	FB Temp
0	369	453	426	408	421	83	83	81	84	83	n/a	89	255	85.79	1.64	0.63	18	292	15.25		415
2	331	449	422	404	417	84	83	82	85	83	n/a	90	239	85.67	0.56	0.20	20	285	15.25	0.00	405
4	332	453	416	398	412	84	83	83	84	83	n/a	89	244	84.35	1.97	0.25	18	273	15.15	0.10	402
6	334	450	409	391	405	84	83	84	84	83	n/a	89	244	84.22	2.44	0.28	18	267	15.05	0.10	398
8	331	449	402	384	396	83	82	84	84	83	n/a	89	245	84.47	3.15	0.39	17	262	14.91	0.14	392
10	354	447	396	377	389	83	82	85	84	83	n/a	89	257	84.64	5.85	0.43	14	261	14.71	0.20	392
<u>12</u>	<u>397</u>	<u>446</u>	<u>390</u>	<u>370</u>	<u>381</u>	<u>83</u>	<u>82</u>	<u>86</u>	<u>84</u>	<u>83</u>	n/a	<u>90</u>	<u>275</u>	<u>84.36</u>	<u>5.76</u>	<u>0.36</u>	<u>14</u>	<u>270</u>	<u>14.45</u>	<u>0.26</u>	<u>397</u>
14	485	445	387	366	376	83	82	88	84	84	n/a	91	312	84.94	6.64	0.61	14	290	14.15	0.30	412
16	480	450	386	363	371	83	81	87	84	83	n/a	91	318	85.03	4.61	0.50	16	310	13.95	0.20	410
18	463	454	385	360	367	82	81	88	84	83	n/a	91	319	85.93	5.19	0.64	15	313	13.71	0.24	406
20	453	454	385	357	363	82	81	88	84	83	n/a	91	319	85.90	5.59	0.83	14	312	13.45	0.26	402
22	452	455	386	356	360	82	80	89	85	84	n/a	89	320	85.95	5.33	0.79	15	312	13.21	0.24	402
<u>24</u>	<u>471</u>	<u>455</u>	<u>386</u>	<u>354</u>	<u>358</u>	<u>82</u>	<u>80</u>	<u>89</u>	<u>85</u>	<u>83</u>	n/a	<u>91</u>	<u>328</u>	<u>85.72</u>	<u>6.34</u>	<u>0.84</u>	<u>14</u>	<u>313</u>	<u>12.91</u>	<u>0.30</u>	<u>405</u>
26	577	455	387	354	356	82	80	90	85	83	n/a	92	378	86.52	11.85	0.73	9	341	12.52	0.38	426
28	686	455	390	354	357	82	80	90	85	84	n/a	92	409	86.46	9.86	0.30	11	400	12.22	0.30	449
30	680	453	394	356	359	82	80	91	84	83	n/a	94	411	87.44	7.68	0.54	13	437	11.96	0.26	448
32	674	452	397	357	359	82	80	91	85	84	n/a	94	423	87.52	9.87	0.63	10	446	11.66	0.30	448
34	724	453	400	356	361	82	80	92	86	85	n/a	95	452	87.65	12.08	0.47	9	465	11.32	0.34	459
<u>36</u>	<u>758</u>	<u>449</u>	<u>405</u>	<u>359</u>	<u>363</u>	<u>82</u>	<u>80</u>	<u>93</u>	<u>85</u>	<u>83</u>	n/a	<u>93</u>	<u>469</u>	<u>89.67</u>	<u>11.71</u>	<u>0.30</u>	<u>9</u>	<u>488</u>	<u>11.02</u>	<u>0.30</u>	<u>467</u>
38	771	451	410	361	366	82	81	94	85	86	n/a	95	484	89.56	11.94	0.22	9	503	10.65	0.36	472
40	778	452	415	365	369	82	81	95	85	85	n/a	95	491	89.93	11.70	0.17	9	516	10.35	0.30	476
42	772	456	420	368	371	82	81	95	85	85	n/a	97	495	89.59	11.88	0.23	9	523	10.01	0.34	477
44	761	455	424	372	374	82	81	96	84	85	n/a	97	500	90.24	12.41	0.31	8	524	9.71	0.30	477
46	767	458	430	376	376	82	81	97	84	84	n/a	97	506	90.27	12.64	0.27	8	526	9.41	0.30	482
<u>48</u>	<u>767</u>	<u>460</u>	<u>435</u>	<u>379</u>	<u>380</u>	<u>83</u>	<u>82</u>	<u>98</u>	<u>86</u>	<u>86</u>	n/a	<u>99</u>	<u>510</u>	<u>90.83</u>	<u>12.62</u>	<u>0.29</u>	<u>8</u>	<u>529</u>	<u>9.11</u>	<u>0.30</u>	<u>484</u>
50	765	463	441	383	382	83	82	99	85	86	n/a	99	510	91.22	12.44	0.34	8	530	8.81	0.30	487
52	770	464	447	388	386	83	82	99	85	86	n/a	98	510	90.98	12.62	0.34	8	531	8.52	0.28	491
54	780	464	453	392	390	83	82	100	86	86	n/a	100	512	91.14	12.72	0.33	8	534	8.22	0.30	496
56	780	464	461	396	394	83	82	100	85	85	n/a	99	513	92.32	12.83	0.38	8	537	7.92	<u>0.30</u>	499
58	788	465	467	400	400	83	82	101	86	86	n/a	98	517	92.57	13.48	0.31	7	541	7.56	0.36	504
<u>60</u>	<u>810</u>	<u>462</u>	<u>475</u>	<u>406</u>	<u>403</u>	<u>83</u>	<u>82</u>	<u>101</u>	<u>83</u>	<u>83</u>	n/a	<u>99</u>	<u>525</u>	<u>93.01</u>	<u>13.78</u>	<u>0.30</u>	<u>7</u>	<u>549</u>	<u>7.22</u>	<u>0.34</u>	<u>511</u>
62	822	463	484	413	410	83	82	101	83	83	n/a	99	530	92.01	13.66	0.29	7	559	6.91	0.30	518
64	818	466	494	418	415	83	82	101	85	85	n/a	100	532	93.77	13.22	0.27	7	566	6.61	<u>0.30</u>	522
66	810	459	502	424	420	84	82	102	85	85	n/a	102	530	92.50	12.78	0.29	8	567	6.35	0.26	523
68	798	463	510	429	426	84	82	102	85	86	n/a	99	525	92.44	12.32	0.31	8	562	6.05	0.30	525
70	780	464	518	433	432	84	83	103	84	84	n/a	100	518	92.59	11.79	0.35	9	557	5.81	0.24	525
<u>72</u>	<u>763</u>	<u>462</u>	<u>525</u>	<u>438</u>	<u>438</u>	<u>84</u>	<u>83</u>	<u>82</u>	<u>86</u>	<u>87</u>	n/a	<u>100</u>	<u>510</u>	<u>93.70</u>	<u>11.45</u>	<u>0.37</u>	<u>9</u>	<u>549</u>	<u>5.55</u>	<u>0.26</u>	<u>525</u>
74	743	470	533	441	444	84	83	85	85	85	n/a	99	500	91.99	11.06	0.34	9	539	5.34	0.20	526
76	724	465	538	447	448	84	83	86	84	84	n/a	100	491	93.08	10.94	0.27	9	527	5.14	0.20	525
78	709	470	545	451	454	84	83	87	85	85	n/a	102	483	93.50	10.74	0.23	10	516	4.94	0.20	526
80	695	468	550	456	460	84	83	88	86	86	n/a	100	476	92.46	10.28	0.27	10	505	4.74	0.20	526
82	677	472	553	461	464	84	83	89	85	84	n/a	100	465	93.29	9.65	0.38	10	496	4.60	0.14	525
84	656	470	555	467	468	84	83	90	85	83	n/a	100	455	93.93	8.87	0.58	11	485	4.44	0.16	523
86	636	473	556	472	473	84	83	91	86	87	n/a	99	446	93.40	8.63	0.61	11	472	4.30	0.14	522
88	621	475	557	474	478	84	84	91	87	85	n/a	100	437	92.38	8.49	0.60	12	460	4.22	0.08	521
90	611	473	558	479	479	84	83	92	85	84	n/a	99	430	92.86	8.63	0.54	11	450	4.04	0.18	520
92	607	478	559	482	480	84	84	92	86	86	n/a	101	425	92.53	8.72	0.54	11	444	3.92	0.12	521
94	612	480	559	485	482	84	84	93	87	88	n/a	99	423	92.63	9.01	0.48	11	439	3.76	0.16	524
96	619	480	560	488	483	84	84	93	86	85	n/a	98	421	92.77	8.52	0.49	12	439	3.66	0.10	526
98	622	480	559	491	485	84	84	93	87	86	n/a	100	416	91.91	7.55	0.64	12	440	3.52	0.14	527
100	627	481	559	492	487	84	83	94	87	86	n/a	102	407	93.10	7.59	0.76	12	442	3.41	0.10	529
102	623	472	559	493	488	84	84	94	85	86	n/a	102	400	92.46	7.81	0.68	12	443	3.25	0.16	527
104	613	479	558	494	491	85	84	94	87	86	n/a	99	393	92.88	7.59	0.81	12	441	3.15	0.10	527
106	597	472	557	495	491	85	84	94	87	87	n/a	101	388	92.35	7.75	0.81	12	436	3.05	0.10	522
108	594	475	555	497	493	85	84	94	86	85	n/a	102	386	93.05	8.22	0.60	12	431	2.91	0.14	523

110	591	478	554	499	494	85	84	94	85	85	n/a	100	384	93.26	8.14	0.55	12	428	2.81	0.00	523
112	578	468	554	500	496	85	83	94	85	84	n/a	101	382	93.48	7.60	0.72	12	424	2.81	0.10	519
114	560	470	554	502	497	85	83	94	84	84	n/a	100	376	93.33	6.61	1.03	13	417	2.71	0.10	517
116	545	477	553	503	498	85	83	94	84	84	n/a	98	366	93.13	6.21	1.11	13	409	2.61	0.06	515
118	540	479	553	504	499	85	83	94	86	85	n/a	99	359	92.47	6.18	1.16	13	402	2.55	0.10	515
120	536	485	551	504	499	85	84	94	85	85	n/a	100	352	91.87	6.26	1.20	13	398	2.45	0.04	515
122	530	487	550	504	498	85	85	94	86	85	n/a	100	345	91.83	6.16	1.24	13	394	2.41	0.10	514
124	526	480	548	503	500	85	84	94	85	85	n/a	99	340	92.41	6.03	1.30	13	391	2.31	0.06	511
126	520	482	547	502	500	85	84	94	86	85	n/a	100	336	91.54	5.74	1.39	13	387	2.25	0.04	510
128	509	491	544	502	500	85	84	94	87	85	n/a	99	330	91.63	5.54	1.44	14	383	2.21	0.06	509
130	501	491	542	500	500	85	84	94	86	85	n/a	98	325	91.53	5.45	1.50	14	379	2.15	0.04	507
132	493	497	540	499	498	85	84	94	84	85	n/a	96	320	93.17	5.41	1.47	14	374	2.11	0.06	506
134	487	493	538	498	496	85	84	94	86	85	n/a	99	316	92.59	5.43	1.50	14	369	2.05	0.04	502
136	481	496	535	497	495	85	84	94	86	85	n/a	99	312	91.46	5.28	1.57	14	365	2.01	0.06	501
138	474	499	533	495	494	85	84	94	86	86	n/a	97	308	92.52	5.17	1.63	14	361	1.95	0.00	499
140	470	499	529	493	493	85	84	94	87	87	n/a	98	305	92.69	5.28	1.58	14	357	1.95	0.04	497
142	467	499	527	492	491	85	84	94	88	87	n/a	98	302	92.19	5.38	1.56	14	354	1.91	0.06	495
144	464	506	525	491	489	85	84	94	87	87	n/a	98	300	92.41	5.32	1.60	14	352	1.85	0.04	495
146	463	507	523	489	488	85	83	94	87	87	n/a	97	298	92.39	5.19	1.70	14	350	1.81	0.06	494
148	460	509	521	488	486	85	84	94	86	86	n/a	97	295	92.45	5.25	1.68	14	348	1.75	0.04	493
150	459	509	518	487	484	85	85	94	88	87	n/a	96	294	91.51	5.24	1.73	14	347	1.71	0.06	492
152	458	509	516	485	484	85	85	94	88	86	n/a	97	292	92.29	5.31	1.72	14	346	1.65	0.04	491
154	455	518	515	484	483	85	84	94	85	85	n/a	97	290	92.30	5.24	1.71	14	345	1.61	0.00	491
156	453	521	513	483	482	85	85	94	87	86	n/a	97	288	92.26	5.30	1.59	14	343	1.61	0.06	490
158	450	511	511	482	481	85	84	94	88	86	n/a	97	286	92.94	5.22	1.58	14	341	1.54	0.04	487
160	448	521	510	480	481	85	84	94	89	86	n/a	97	284	92.43	5.22	1.58	14	341	1.50	0.06	488
162	445	522	509	477	479	85	85	94	87	88	n/a	95	282	92.34	5.19	1.62	14	339	1.45	0.04	487
164	444	522	509	476	477	86	85	94	86	86	n/a	97	280	91.42	5.11	1.57	14	337	1.41	0.00	486
166	442	519	508	475	476	86	85	94	85	85	n/a	96	279	92.11	5.05	1.56	14	336	1.41	0.10	484
168	439	525	508	474	475	85	85	94	88	87	n/a	96	277	91.75	4.74	1.67	14	335	1.31	0.00	484
170	433	525	508	471	474	85	84	94	88	86	n/a	96	276	92.33	4.80	1.57	14	333	1.31	0.06	482
172	429	523	508	469	472	86	85	94	87	86	n/a	97	275	91.45	4.51	1.85	15	331	1.25	0.04	480
174	425	528	507	468	470	86	85	94	87	86	n/a	96	274	91.61	4.60	1.80	14	329	1.21	0.00	480
176	423	525	506	467	468	86	85	94	87	86	n/a	96	273	92.31	4.57	1.85	14	327	1.21	0.06	478
178	420	521	505	465	467	86	85	94	86	86	n/a	97	271	92.66	4.47	1.90	15	325	1.15	0.04	476
180	417	525	503	463	465	86	85	94	86	86	n/a	96	270	91.93	4.45	1.93	15	323	1.11	0.00	475
182	414	528	501	461	462	86	85	94	88	86	n/a	97	269	93.62	4.29	2.06	15	321	1.11	0.10	473
184	410	523	501	460	461	86	85	94	87	86	n/a	96	267	92.87	4.26	2.03	15	318	1.01	0.00	471
186	409	522	500	459	459	86	85	94	88	86	n/a	96	266	92.79	4.20	1.99	15	317	1.00	0.00	470
188	410	523	498	457	459	86	85	94	89	86	n/a	96	265	92.97	4.63	1.77	15	317	1.01	0.10	469
190	411	519	496	455	456	86	85	94	87	87	n/a	96	264	92.46	4.64	1.76	14	316	0.90	0.00	467
192	412	522	495	454	454	86	85	95	89	87	n/a	96	263	93.65	4.66	1.75	14	316	0.91	0.06	467
194	413	522	494	453	451	86	86	95	90	87	n/a	96	263	92.14	4.65	1.76	14	316	0.84	0.04	467
196	414	519	493	452	451	86	85	95	87	86	n/a	96	262	93.68	4.64	1.76	14	316	0.80	0.06	466
198	414	524	491	451	450	86	86	95	87	86	n/a	96	262	91.86	4.56	1.77	15	317	0.74	0.04	466
200	413	522	489	449	447	86	86	95	86	86	n/a	96	262	92.26	4.54	1.79	15	316	0.70	0.00	464
202	412	520	488	448	446	86	86	95	87	86	n/a	97	261	92.91	4.46	1.80	15	315	0.70	0.06	463
204	411	524	487	447	445	86	86	95	87	86	n/a	97	261	92.94	4.36	1.87	15	314	0.64	0.04	463
206	409	518	485	447	444	86	86	95	86	86	n/a	96	260	92.59	4.32	1.90	15	314	0.60	0.06	461
208	404	522	484	445	442	86	86	95	86	86	n/a	96	259	92.40	4.22	1.87	15	313	0.54	0.00	459

210	402	519	483	444	440	86	86	95	86	87	n/a	97	258	93.02	4.19	1.90	15	312	0.54	0.04	458
212	401	518	482	442	440	86	86	96	88	86	n/a	97	257	93.82	3.98	1.98	15	311	0.50	0.06	456
214	398	517	481	441	439	86	86	96	88	87	n/a	95	256	93.61	3.94	1.96	15	310	0.44	0.00	455
216	397	507	480	440	437	86	86	96	89	87	n/a	96	255	93.60	4.08	1.85	15	309	0.44	0.04	452
218	394	512	479	439	436	86	86	96	89	89	n/a	96	253	92.72	4.18	1.86	15	307	0.40	0.06	452
220	392	509	478	438	434	86	87	96	87	87	n/a	97	251	93.26	3.91	2.06	15	306	0.34	0.04	450
222	389	509	476	436	432	86	87	96	87	87	n/a	97	250	92.99	3.59	2.15	15	304	0.30	0.06	449
224	385	510	476	435	429	86	86	96	87	86	n/a	96	248	93.86	3.54	2.17	15	302	0.24	0.00	447
226	383	506	476	433	429	86	86	96	87	87	n/a	97	247	94.14	3.56	2.16	15	301	0.24	0.04	445
228	380	504	475	431	427	87	87	96	87	87	n/a	97	245	94.06	3.56	2.16	15	299	0.20	0.00	443
230	378	503	475	429	425	87	87	96	88	88	n/a	97	244	94.77	3.56	2.13	15	297	0.19	0.10	442
232	376	497	474	427	424	87	87	96	88	88	n/a	97	243	93.18	3.57	2.13	15	297	0.09	0.00	440
234	374	497	473	426	422	87	87	96	88	87	n/a	97	241	94.22	3.65	2.12	15	296	0.09	0.06	439
236	372	495	473	424	419	87	87	96	87	87	n/a	97	240	92.44	3.65	2.14	15	295	0.03	0.04	437

Manufacturer: Foyers Suprême Inc.

Burn rate: 1.291 dry kg/hr

Model: LASER-E

Pollu rate: 1.354 gr/hr

Pollution rate 0.700 gr/hr

Date: 25-Jul-2016

Polluants: 3 mg

non adjusted:

RUN #:

Delta Temp FB: 0 degF

Test Duration: 254

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filter#2	Tunnel	Flue gas	Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB			
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp		Temp	Remaining	Rate	Temp			
0	239	194	229	397	321	84	84	82	84	82	n/a	107	288	86	1.87	1.47	17.14	192	14.87	n/a	276	
2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14	n/a	n/a	n/a	n/a
6	320	204	228	376	307	84	83	87	83	81	n/a	134	340	87	7.87	0.30	12.50	199	14.20	0.00	287	
8	409	213	234	372	305	84	83	87	83	82	n/a	143	401	85	10.64	0.70	9.79	228	13.80	0.40	307	
10	504	213	239	374	306	84	82	88	83	82	n/a	146	455	88	10.08	1.11	9.86	271	13.36	0.44	327	
12	<u>512</u>	<u>228</u>	<u>245</u>	<u>375</u>	<u>308</u>	<u>83</u>	<u>82</u>	<u>88</u>	<u>83</u>	<u>82</u>	n/a	<u>146</u>	<u>480</u>	<u>87</u>	<u>9.58</u>	<u>0.87</u>	<u>10.52</u>	<u>286</u>	<u>13.00</u>	<u>0.36</u>	<u>334</u>	
14	517	224	249	379	309	83	82	89	83	82	n/a	146	497	88	9.99	0.54	10.25	287	12.68	0.32	336	
16	515	235	252	385	310	83	81	90	84	82	n/a	148	511	87	9.95	0.53	10.37	288	12.28	0.40	339	
18	554	233	255	391	314	83	81	90	84	82	n/a	149	532	87	11.36	0.75	8.92	305	11.92	0.36	349	
20	543	229	259	394	314	83	81	90	85	83	n/a	147	530	87	8.08	0.77	11.96	319	11.62	0.30	348	
22	515	232	262	396	315	82	81	90	84	83	n/a	144	525	86	9.95	0.65	10.36	310	11.28	0.34	344	
24	<u>500</u>	<u>236</u>	<u>263</u>	<u>398</u>	<u>316</u>	<u>82</u>	<u>81</u>	<u>90</u>	<u>84</u>	<u>83</u>	n/a	<u>143</u>	<u>525</u>	<u>85</u>	<u>10.52</u>	<u>0.60</u>	<u>9.88</u>	<u>302</u>	<u>10.98</u>	<u>0.30</u>	<u>343</u>	
26	499	241	267	405	317	82	81	91	84	82	n/a	144	528	88	11.05	0.74	9.35	299	10.68	0.30	346	
28	499	242	269	411	318	82	80	92	85	84	n/a	145	535	88	11.42	1.05	8.87	300	10.37	0.31	348	
30	513	244	272	419	319	82	80	93	84	82	n/a	146	542	88	11.91	1.05	8.47	304	10.01	0.36	353	
32	529	235	275	427	322	82	81	93	86	83	n/a	147	551	89	12.41	0.88	8.04	312	9.71	0.30	358	
34	562	230	279	434	326	82	80	94	83	81	n/a	148	565	89	13.04	0.57	7.60	327	9.37	0.34	366	
36	<u>580</u>	<u>245</u>	<u>282</u>	<u>440</u>	<u>329</u>	<u>82</u>	<u>80</u>	<u>94</u>	<u>83</u>	<u>81</u>	n/a	<u>147</u>	<u>570</u>	<u>89</u>	<u>12.18</u>	<u>0.57</u>	<u>8.32</u>	<u>342</u>	<u>9.07</u>	<u>0.30</u>	<u>375</u>	
38	571	240	285	447	332	82	81	93	83	81	n/a	147	571	88	11.94	0.61	8.57	342	8.81	0.26	375	
40	560	244	288	452	335	81	80	93	82	81	n/a	148	572	89	12.08	0.85	8.30	338	8.53	0.28	376	
42	559	247	291	459	337	81	79	94	83	82	n/a	148	574	91	12.28	0.82	8.12	338	8.19	0.34	379	
44	561	255	293	465	340	81	79	93	83	81	n/a	149	576	90	12.37	0.78	8.07	339	7.93	0.26	383	
46	563	259	296	470	343	81	79	94	83	82	n/a	149	579	91	12.47	0.62	8.03	341	7.63	0.30	386	
48	<u>567</u>	<u>258</u>	<u>298</u>	<u>475</u>	<u>346</u>	<u>81</u>	<u>80</u>	<u>93</u>	<u>84</u>	<u>82</u>	n/a	<u>149</u>	<u>581</u>	<u>90</u>	<u>12.51</u>	<u>0.52</u>	<u>8.04</u>	<u>345</u>	<u>7.39</u>	<u>0.24</u>	<u>389</u>	
50	577	265	300	481	350	82	80	94	84	82	n/a	150	584	91	12.66	0.49	7.91	349	7.09	0.30	394	
52	579	259	303	487	353	82	80	94	84	82	n/a	150	586	91	12.69	0.48	7.89	352	6.83	0.26	396	
54	586	267	305	492	358	82	80	94	83	81	n/a	151	587	92	12.60	0.41	7.99	356	6.53	0.30	402	
56	592	253	309	496	361	82	80	94	83	82	n/a	150	587	92	12.46	0.36	8.15	360	6.32	<u>0.20</u>	402	
58	595	270	311	499	364	82	80	94	84	83	n/a	150	586	92	12.19	0.32	8.42	363	6.02	0.30	408	
60	<u>597</u>	<u>268</u>	<u>313</u>	<u>503</u>	<u>367</u>	<u>82</u>	<u>79</u>	<u>94</u>	<u>84</u>	<u>82</u>	n/a	<u>150</u>	<u>584</u>	<u>91</u>	<u>11.88</u>	<u>0.28</u>	<u>8.72</u>	<u>365</u>	<u>5.82</u>	0.20	<u>410</u>	
62	593	256	315	508	369	82	80	n/a	84	82	n/a	149	579	92	11.37	0.27	9.16	364	5.62	0.20	408	
64	588	264	316	509	374	82	81	92	84	82	n/a	148	572	92	11.05	0.23	9.47	362	5.41	<u>0.20</u>	410	
66	585	264	318	509	378	83	81	93	84	82	n/a	148	566	92	10.94	0.21	9.58	361	5.22	0.20	411	
68	588	260	319	510	382	83	81	94	83	82	n/a	147	561	92	10.90	0.26	9.59	363	5.01	0.20	412	
70	590	258	320	511	387	82	81	95	85	82	n/a	146	557	91	10.80	0.26	9.68	365	4.88	0.14	413	
72	<u>584</u>	<u>260</u>	<u>321</u>	<u>506</u>	<u>389</u>	<u>83</u>	<u>82</u>	<u>95</u>	<u>86</u>	<u>84</u>	n/a	<u>145</u>	<u>552</u>	<u>92</u>	<u>10.56</u>	<u>0.32</u>	<u>9.87</u>	<u>367</u>	<u>4.67</u>	<u>0.20</u>	<u>412</u>	
74	586	258	320	509	394	83	82	96	83	82	n/a	145	549	92	10.48	0.30	9.96	366	4.51	0.16	413	
76	584	257	320	509	395	83	82	95	83	81	n/a	144	545	91	10.52	0.31	9.92	365	4.31	0.20	413	
78	578	258	321	508	397	83	82	96	85	83	n/a	144	541	90	10.40	0.31	10.02	363	4.19	0.12	412	
80	576	251	321	508	402	83	82	96	85	83	n/a	143	538	91	10.40	0.29	10.03	361	4.03	0.16	412	
82	575	270	321	509	404	83	81	96	84	82	n/a	143	535	93	10.35	0.30	10.05	361	3.83	0.20	416	
84	574	268	320	509	408	83	81	96	84	83	n/a	142	533	92	10.40	0.25	10.04	360	3.69	0.14	416	
86	564	267	321	511	408	83	81	96	84	82	n/a	142	531	92	10.40	0.17	10.03	357	3.53	0.16	414	
88	551	258	321	510	412	83	82	96	84	82	n/a	142	528	92	10.40	0.14	9.98	350	3.39	0.14	411	
90	547	268	321	513	412	83	81	96	84	83	n/a	141	526	93	10.62	0.14	9.77	345	3.23	0.16	412	
92	539	254	320	515	413	83	82	97	87	83	n/a	141	523	90	10.26	0.14	10.05	340	3.09	0.15	408	
94	530	265	321	516	414	83	82	97	85	83	n/a	140	519	92	9.94	0.12	10.33	335	2.93	0.16	409	
96	517	269	320	517	416	83	82	97	86	83	n/a	139	515	92	9.21	0.17	10.95	332	2.83	0.10	408	
98	510	275	320	518	416	83	83	96	88	85	n/a	138	507	90	8.56	0.33	11.51	329	2.72	0.10	408	
100	509	274	319	518	420	83	83	96	84	83	n/a	137	499	92	8.54	0.36	11.49	326	2.62	0.10	408	
102	503	283	318	517	418	83	82	96	88	86	n/a	136	491	89	8.40	0.41	11.58	324	2.52	0.10	408	
104	497	271	318	513	417	83	83	96	88	85	n/a	135	485	91	8.36	0.44	11.60	323	2.42	0.10	403	
106	492	277	317	511	419	84	83	96	88	86	n/a	134	479	88	8.38	0.44	11.58	320	2.32	0.10	403	
108	486	281	316	506	420	83	83	96	88	86	n/a	133	474	88	8.37	0.42	11.58	318	2.28	0.04	402	

110	481	282	316	504	422	83	83	96	87	87	n/a	132	469	88	8.43	0.42	11.50	316	2.18	0.00	401
112	481	293	315	503	422	83	84	96	86	85	n/a	131	465	91	8.46	0.43	11.48	314	2.18	0.06	403
114	482	280	315	503	425	84	84	96	87	85	n/a	131	462	90	8.42	0.44	11.47	315	2.12	0.10	401
116	480	289	315	500	426	83	83	96	88	86	n/a	130	459	89	8.14	0.45	11.68	314	2.02	0.10	402
118	476	291	314	498	426	83	83	96	87	86	n/a	129	453	85	7.52	0.67	12.17	312	1.92	0.04	401
120	462	292	314	495	427	83	84	96	88	87	n/a	128	447	88	7.03	0.82	12.56	308	1.88	0.06	398
122	447	290	313	495	428	83	82	95	88	85	n/a	127	439	91	6.67	0.95	12.82	301	1.82	0.04	395
124	426	297	312	493	427	83	83	95	87	85	n/a	126	430	89	6.52	1.00	12.92	293	1.78	0.06	391
126	410	295	311	490	426	83	83	95	87	86	n/a	125	422	89	6.46	1.00	12.99	286	1.72	0.04	386
128	400	300	310	488	424	83	83	95	87	85	n/a	124	414	90	6.44	1.02	13.00	281	1.68	0.06	384
130	390	291	308	485	422	83	83	95	87	86	n/a	123	406	87	6.36	1.06	13.08	276	1.62	0.04	379
132	384	304	306	485	421	83	83	95	86	85	n/a	122	398	92	6.26	1.13	13.11	272	1.58	0.06	380
134	377	289	304	483	420	83	84	95	86	84	n/a	122	391	90	6.28	1.14	13.11	268	1.52	0.04	375
136	370	291	302	479	416	83	83	95	86	85	n/a	120	383	90	5.73	1.26	13.59	265	1.49	0.00	372
138	362	295	301	476	415	83	83	94	86	86	n/a	119	376	84	5.56	1.38	13.66	263	1.48	0.06	370
140	356	301	299	473	412	83	83	94	86	85	n/a	118	369	89	5.44	1.44	13.72	260	1.43	0.04	368
142	351	292	296	470	411	83	84	94	85	84	n/a	118	362	91	5.43	1.49	13.74	256	1.39	0.00	364
144	348	298	294	470	409	83	82	94	84	83	n/a	117	356	90	5.41	1.58	13.71	253	1.39	0.06	364
146	340	297	292	465	405	83	83	94	86	84	n/a	116	350	89	5.30	1.61	13.81	251	1.33	0.00	360
148	335	300	291	461	403	83	83	94	86	84	n/a	116	344	89	5.34	1.67	13.74	250	1.33	0.04	358
150	333	296	288	459	400	83	83	94	85	84	n/a	115	339	89	5.24	1.68	13.78	247	1.29	0.06	355
152	329	296	286	455	398	83	83	94	85	84	n/a	114	334	89	5.26	1.72	13.78	246	1.23	0.00	353
154	328	306	284	451	395	83	83	93	86	85	n/a	114	329	88	4.93	1.70	14.10	245	1.23	0.04	353
156	324	300	282	447	392	83	83	93	85	84	n/a	113	324	89	4.84	1.68	14.18	244	1.19	0.06	349
158	323	283	280	443	390	83	83	93	86	84	n/a	112	320	87	4.96	1.68	14.09	243	1.13	0.00	344
160	321	300	278	438	387	83	83	93	85	84	n/a	112	315	88	4.99	1.68	14.13	243	1.13	0.04	345
162	319	284	276	434	385	83	82	93	85	84	n/a	111	311	85	5.08	1.69	13.97	242	1.09	0.00	339
164	316	283	273	430	383	82	82	93	85	84	n/a	110	308	86	5.26	1.72	13.82	241	1.09	0.06	337
166	315	287	272	427	380	82	81	92	86	85	n/a	110	305	85	5.16	1.73	13.86	241	1.03	0.00	336
168	314	286	270	425	377	82	82	92	86	85	n/a	109	302	88	4.98	1.77	14.07	240	1.03	0.00	334
170	312	279	268	421	375	82	82	92	86	85	n/a	109	299	86	4.84	1.78	14.15	239	1.03	0.04	331
172	309	275	267	418	374	82	82	92	86	85	n/a	108	295	86	4.82	1.78	14.20	238	0.99	0.06	329
174	307	282	265	414	371	82	83	92	85	84	n/a	108	292	90	4.75	1.82	14.22	236	0.93	0.00	328
176	304	278	264	412	369	82	82	92	87	84	n/a	107	290	85	4.66	1.86	14.27	234	0.93	0.04	325
178	302	277	262	409	367	83	83	91	85	84	n/a	106	287	87	4.60	1.88	14.33	233	0.89	0.00	323
180	299	273	260	406	365	83	83	91	85	84	n/a	106	284	84	4.54	1.93	14.36	232	0.89	0.06	320
182	295	274	258	403	363	82	82	91	86	84	n/a	105	281	88	4.57	1.92	14.32	230	0.83	0.00	319
184	293	271	256	400	361	82	82	91	86	85	n/a	105	278	84	4.48	2.01	14.35	228	0.83	0.04	316
186	289	271	255	397	358	82	82	91	85	84	n/a	105	276	87	4.17	2.04	14.64	226	0.79	0.00	314
188	287	263	254	394	357	82	82	90	86	85	n/a	105	272	84	3.98	2.11	14.75	225	0.79	0.06	311
190	285	259	251	390	355	82	82	90	85	84	n/a	104	269	84	3.88	2.09	14.88	223	0.73	0.00	308
192	283	261	250	387	352	82	82	90	85	84	n/a	104	266	86	3.87	2.09	14.86	222	0.73	0.00	306
194	275	258	247	384	350	82	81	90	85	84	n/a	104	264	86	3.90	2.11	15.11	219	0.73	0.04	303
196	267	257	243	381	348	82	82	90	85	84	n/a	103	261	83	3.95	2.11	14.99	215	0.69	0.06	299
198	264	260	240	379	345	82	82	90	86	84	n/a	103	258	86	3.74	2.03	15.18	212	0.63	0.00	298
200	263	262	239	375	343	82	82	90	86	84	n/a	103	256	83	4.13	1.58	15.06	211	0.63	0.00	296
202	262	266	237	372	341	82	81	89	85	84	n/a	102	253	84	4.06	1.59	15.08	210	0.63	0.04	296
204	260	247	236	369	338	82	82	89	85	84	n/a	102	251	84	3.93	1.64	15.13	210	0.59	0.00	290
206	258	248	234	366	336	82	82	89	85	83	n/a	101	249	83	3.89	1.65	15.20	209	0.59	0.06	289
208	257	256	233	363	333	82	82	89	85	84	n/a	101	247	84	3.91	1.67	15.13	208	0.53	0.00	288

210	254	254	232	361	331	82	81	89	85	84	n/a	101	245	85	3.86	1.70	15.21	206	0.53	0.04	286
212	253	260	230	358	329	82	82	89	85	84	n/a	100	243	84	3.81	1.75	15.20	205	0.49	0.00	286
214	251	252	229	354	326	82	81	89	84	83	n/a	100	241	85	3.65	1.98	15.24	205	0.49	0.00	282
216	250	252	227	352	324	82	82	88	84	83	n/a	100	240	84	3.67	1.87	15.24	203	0.49	0.00	281
218	248	260	226	350	321	82	82	89	85	83	n/a	100	238	84	3.67	1.93	15.24	202	0.49	0.06	281
220	247	261	224	348	318	82	82	88	84	83	n/a	100	236	84	3.67	1.97	15.23	201	0.43	0.04	280
222	245	257	224	345	316	82	82	88	85	84	n/a	100	234	85	3.88	1.63	15.36	200	0.39	0.00	277
224	247	255	222	342	315	82	81	88	85	84	n/a	100	232	84	3.83	1.65	15.31	199	0.39	0.00	276
226	249	249	221	340	314	82	81	88	85	83	n/a	99	230	86	3.79	1.74	15.27	199	0.39	0.00	274
228	250	250	220	338	311	82	82	88	85	83	n/a	99	229	86	3.84	1.75	15.24	199	0.39	0.06	273
230	249	253	218	337	309	82	81	89	84	83	n/a	99	227	85	3.80	1.74	15.24	199	0.33	0.00	273
232	247	254	217	332	306	82	81	89	84	83	n/a	99	226	87	3.83	1.77	15.16	199	0.33	0.04	271
234	245	255	215	330	304	82	81	89	84	83	n/a	99	225	87	3.84	1.84	15.14	199	0.29	0.00	270
236	245	250	214	328	303	82	81	88	85	83	n/a	99	223	83	3.93	1.84	15.06	199	0.29	0.01	268
238	242	249	213	327	300	82	82	89	84	83	n/a	99	223	87	3.85	1.94	15.09	197	0.28	0.06	266
240	240	254	213	325	300	82	82	89	84	83	n/a	99	222	87	3.84	1.93	15.09	196	0.23	0.00	266
242	239	257	212	324	297	82	81	89	84	83	n/a	99	221	88	3.85	1.97	15.08	194	0.22	0.04	266
244	238	249	211	322	296	82	81	89	84	83	n/a	99	221	87	3.87	2.00	15.04	194	0.19	0.00	263
246	237	242	211	321	294	82	81	89	84	83	n/a	99	220	87	4.09	1.63	15.15	193	0.19	0.00	261
248	236	244	210	318	292	82	82	89	84	83	n/a	99	219	88	3.89	1.58	15.30	193	0.18	0.06	260
250	237	263	208	317	291	82	82	89	84	83	n/a	99	218	88	3.61	1.74	15.43	193	0.12	0.00	263
252	237	258	207	315	290	82	82	89	84	83	n/a	99	216	88	3.58	1.79	15.42	193	0.12	0.04	261
254	235	253	205	314	288	82	81	89	84	83	n/a	99	215	88	3.96	1.65	15.22	192	0.09	-0.01	259
256	234	257	205	313	286	82	81	89	84	83	n/a	99	215	87	3.97	1.64	15.18	192	0.09	0.00	259
258	233	246	203	311	284	82	81	89	84	84	n/a	99	214	89	3.93	1.65	15.20	192	0.09	0.06	256
260	232	258	203	309	282	82	81	89	84	83	n/a	99	213	88	3.84	1.66	15.27	191	0.03	0.00	257
262	232	238	201	308	281	82	81	89	83	82	n/a	99	213	87	3.73	1.70	15.34	190	0.03	0.04	252
264	234	254	200	306	280	82	80	n/a	84	82	n/a	99	212	89	3.58	1.69	15.45	190	-0.01	0.00	255
266	234	250	200	305	278	83	81	n/a	85	86	n/a	98	211	90	3.56	1.76	15.43	190	-0.01	0.00	253

Manufacturer Foyers Suprême Inc.

Burn rate: 1.997 dry kg/hr

Model LASER-E

Pollu rate: 3.900 gr/hr

Pollution rate non 2.505 gr/hr

Date: 27th Aug 2016

Polluants: 8 mg

adjusted:

RUN #:

Delta Temp FB: -5 degF

Test Duration 174

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	Filter#1 Out T	DGM#2 Temp	Filter#2 In T	Filter#2 Out T	Filter#2 Temp	TunnelFlue gas Temp	Room Temp	CO2	CO	O ²	Bimetal Temp	Weight Remaining	Burn Rate	FB Temp	
0	393	409	287	474	420	87	86	89	86	87	n/a	102	346	97.75	3.27	1.21	16	257	15.79	397	
2	348	400	283	468	414	87	87	92	87	87	n/a	102	322	96.92	2.85	0.52	17	246	15.69	0.10	383
4	387	393	278	459	410	87	87	93	85	86	n/a	101	360	96.41	6.02	0.49	14	238	15.34	0.34	386
6	504	363	279	452	402	87	87	94	86	86	n/a	102	417	96.58	7.33	0.58	13	252	14.94	0.40	400
8	599	422	282	443	393	87	87	95	89	90	n/a	102	457	97.08	7.56	0.90	12	285	14.48	0.46	428
10	643	379	287	438	387	87	88	96	85	86	n/a	103	496	98.15	8.65	0.75	11	308	14.04	0.44	427
12	<u>671</u>	<u>421</u>	<u>290</u>	<u>432</u>	<u>382</u>	<u>87</u>	<u>87</u>	<u>97</u>	<u>86</u>	<u>86</u>	n/a	<u>103</u>	<u>512</u>	<u>98.71</u>	<u>8.33</u>	<u>0.52</u>	<u>12</u>	<u>329</u>	<u>13.64</u>	<u>0.40</u>	<u>439</u>
14	647	365	291	427	378	87	87	98	85	86	n/a	105	512	98.25	9.44	0.78	11	334	13.18	0.46	422
16	697	446	290	421	372	86	85	99	88	90	n/a	106	555	100.21	11.30	0.85	9	351	12.80	0.38	445
18	731	381	291	420	368	86	86	100	86	86	n/a	106	592	98.55	12.23	0.81	8	367	12.36	0.44	438
20	753	370	292	420	368	86	86	100	85	86	n/a	106	611	99.95	12.00	0.57	8	379	11.89	0.46	441
22	767	354	295	421	365	86	86	101	85	86	n/a	108	626	100.01	12.77	0.50	8	389	11.45	0.44	441
24	<u>788</u>	<u>426</u>	<u>296</u>	<u>423</u>	<u>366</u>	<u>86</u>	<u>86</u>	<u>102</u>	<u>87</u>	<u>86</u>	n/a	<u>107</u>	<u>645</u>	<u>100.19</u>	<u>13.22</u>	<u>0.44</u>	<u>7</u>	<u>401</u>	<u>10.99</u>	<u>0.46</u>	<u>460</u>
26	791	383	300	425	366	86	85	103	85	86	n/a	108	653	102.34	12.93	0.36	8	408	10.59	0.40	453
28	790	372	304	428	368	86	86	104	85	86	n/a	110	663	103.34	13.50	0.40	7	414	10.15	0.44	453
30	782	438	306	432	369	85	86	105	85	86	n/a	110	671	103.88	13.67	0.55	7	413	9.69	0.46	465
32	777	451	308	435	371	85	84	107	86	87	n/a	110	667	103.33	13.49	0.63	7	411	9.28	0.40	468
34	774	444	312	440	374	85	83	109	87	87	n/a	110	663	102.57	13.52	0.58	7	410	8.88	0.40	469
36	<u>770</u>	<u>451</u>	<u>319</u>	<u>444</u>	<u>375</u>	<u>85</u>	<u>84</u>	<u>111</u>	<u>88</u>	<u>89</u>	n/a	<u>110</u>	<u>660</u>	<u>100.98</u>	<u>13.44</u>	<u>0.57</u>	<u>7</u>	<u>412</u>	<u>8.54</u>	<u>0.34</u>	<u>472</u>
38	774	442	323	446	377	85	87	114	86	87	n/a	110	666	103.94	13.65	0.65	7	413	8.16	0.38	472
40	784	384	329	453	382	85	86	115	86	87	n/a	112	669	105.90	13.57	0.71	7	416	7.76	0.40	466
42	785	454	333	458	384	85	86	116	87	87	n/a	111	666	106.07	13.24	0.61	7	418	7.35	0.40	483
44	786	466	339	461	388	85	84	114	87	87	n/a	112	661	104.28	13.14	0.51	7	422	6.99	0.36	488
46	790	435	344	467	392	85	83	112	87	86	n/a	112	652	105.99	12.92	0.45	7	424	6.59	0.40	486
48	<u>781</u>	<u>444</u>	<u>350</u>	<u>473</u>	<u>394</u>	<u>85</u>	<u>86</u>	<u>111</u>	<u>87</u>	<u>87</u>	n/a	<u>113</u>	<u>641</u>	<u>106.78</u>	<u>12.59</u>	<u>0.34</u>	<u>8</u>	<u>423</u>	<u>6.25</u>	<u>0.34</u>	<u>489</u>
50	775	379	355	478	399	85	86	110	86	87	n/a	114	628	107.22	12.21	0.27	8	422	5.95	0.30	477
52	764	433	358	483	404	85	85	110	86	87	n/a	113	619	105.64	12.06	0.24	8	420	5.64	0.30	488
54	742	467	362	488	404	85	85	109	87	88	n/a	111	607	103.46	12.34	0.24	8	417	5.34	0.30	493
56	736	380	367	494	410	85	86	109	86	87	n/a	113	601	104.73	12.49	0.25	8	414	5.08	<u>0.26</u>	477
58	731	447	370	499	415	85	86	109	87	87	n/a	112	592	105.62	12.06	0.23	8	409	4.78	0.30	492
60	<u>714</u>	<u>439</u>	<u>374</u>	<u>505</u>	<u>418</u>	<u>85</u>	<u>86</u>	<u>107</u>	<u>86</u>	<u>87</u>	n/a	<u>113</u>	<u>580</u>	<u>106.42</u>	<u>11.60</u>	<u>0.17</u>	<u>8</u>	<u>404</u>	<u>4.55</u>	<u>0.23</u>	<u>490</u>
62	696	398	379	509	423	85	85	85	87	87	n/a	113	567	103.17	11.12	0.13	9	397	4.34	0.21	481
64	680	453	381	516	427	85	85	87	87	87	n/a	111	557	105.59	10.82	0.10	9	388	4.16	<u>0.18</u>	492
66	670	505	382	520	434	84	83	90	88	88	n/a	111	546	104.16	10.74	0.08	9	383	3.96	0.20	502
68	659	446	386	524	437	84	83	92	86	87	n/a	112	537	107.44	10.59	0.07	10	377	3.76	0.20	491
70	651	510	387	529	442	85	84	93	88	88	n/a	111	529	104.40	10.44	0.06	10	373	3.56	0.20	504
72	<u>645</u>	<u>482</u>	<u>388</u>	<u>531</u>	<u>445</u>	<u>84</u>	<u>82</u>	<u>95</u>	<u>87</u>	<u>88</u>	n/a	<u>112</u>	<u>522</u>	<u>105.41</u>	<u>10.29</u>	<u>0.06</u>	<u>10</u>	<u>370</u>	<u>3.39</u>	<u>0.16</u>	<u>498</u>
74	637	499	389	536	447	85	84	97	88	88	n/a	112	515	106.29	10.19	0.05	10	366	3.25	0.14	502
76	630	503	389	539	449	85	84	98	89	90	n/a	111	508	104.83	10.12	0.05	10	362	3.05	0.20	502
78	622	526	403	540	451	85	83	99	94	96	n/a	105	503	92.05	10.10	0.04	10	362	2.95	0.10	508
80	625	534	408	544	452	85	84	100	89	92	n/a	110	497	101.66	10.22	0.04	10	360	2.75	0.20	513
82	635	501	408	549	461	85	84	101	88	88	n/a	110	496	104.39	10.46	0.04	10	360	2.59	0.16	511
84	640	481	408	555	462	86	88	101	87	88	n/a	111	498	106.09	10.54	0.05	10	362	2.39	0.20	509
86	634	524	407	559	465	86	88	102	88	89	n/a	110	498	105.24	10.25	0.06	10	363	2.25	0.14	518
88	636	515	405	563	468	85	85	102	88	88	n/a	110	497	104.86	9.80	0.05	10	365	2.09	0.16	517
90	634	563	404	564	473	85	86	102	87	88	n/a	111	492	106.01	9.26	0.07	10	365	1.95	0.14	528
92	614	554	403	564	474	85	84	103	92	94	n/a	109	481	103.89	8.54	0.11	11	361	1.85	0.10	522
94	595	569	400	565	478	85	84	104	89	89	n/a	110	470	104.38	8.24	0.15	11	354	1.79	0.06	521
96	576	585	398	564	483	85	84	104	88	89	n/a	110	457	104.14	7.29	0.35	12	345	1.75	0.04	521
98	553	596	395	564	486	85	84	104	88	89	n/a	110	445	103.92	7.04	0.49	12	336	1.75	0.00	519
100	530	614	393	561	486	85	85	105	89	90	n/a	110	434	104.02	7.07	0.54	12	327	1.69	0.06	517
102	513	613	389	560	489	86	87	105	88	88	n/a	109	424	103.49	7.10	0.60	12	319	1.69	0.00	513
104	499	631	386	558	489	86	86	105	88	89	n/a	109	416	103.44	7.09	0.63	12	311	1.65	0.04	513
106	488	643	384	557	489	85	85	105	89	89	n/a	109	408	103.04	6.97	0.62	13	305	1.65	0.00	512
108	475	608	382	554	489	86	87	106	88	88	n/a	109	401	102.05	7.05	0.60	13	300	1.65	0.00	501

110	467	587	379	554	489	86	89	105	88	88	n/a	109	394	103.36	7.21	0.57	12	296	1.69	0.00	495
112	464	631	376	552	491	86	89	105	88	88	n/a	108	389	102.02	7.18	0.55	12	293	1.69	0.14	503
114	459	585	374	551	489	85	89	105	87	88	n/a	108	384	101.01	7.00	0.61	13	291	1.55	0.06	492
116	454	626	371	550	489	85	88	104	87	88	n/a	108	379	98.63	6.89	0.65	13	289	1.49	0.04	498
118	451	629	368	546	489	85	84	104	88	89	n/a	108	374	100.41	6.14	0.80	13	287	1.45	0.06	497
120	445	626	366	543	490	85	85	104	88	88	n/a	107	369	101.44	6.07	0.83	13	285	1.39	0.04	494
122	439	606	363	541	489	85	84	104	89	90	n/a	106	365	101.36	6.22	0.82	13	283	1.35	0.06	488
124	436	585	359	540	487	85	87	104	88	88	n/a	107	360	101.45	6.30	0.82	13	282	1.29	0.04	481
126	432	592	356	535	485	85	85	104	89	90	n/a	106	356	102.04	6.40	0.82	13	280	1.25	0.06	480
128	432	589	352	533	484	85	83	104	90	95	n/a	106	353	103.04	6.44	0.83	13	279	1.19	0.04	478
130	430	539	350	534	481	85	87	104	87	88	n/a	107	349	102.23	6.45	0.84	13	278	1.15	0.06	467
132	431	559	347	531	481	85	87	104	88	88	n/a	106	348	101.55	6.41	0.86	13	278	1.09	0.04	469
134	428	532	344	530	478	85	87	104	87	88	n/a	106	347	102.35	6.15	0.94	13	276	1.05	0.06	462
136	427	484	343	529	474	85	88	104	87	88	n/a	105	347	99.26	6.16	0.93	13	276	0.99	0.04	452
138	421	583	340	521	469	85	88	104	87	87	n/a	104	345	95.43	6.23	0.86	13	275	0.95	0.06	467
140	421	509	337	520	468	84	86	103	88	89	n/a	104	342	99.86	6.22	0.87	13	274	0.89	0.04	451
142	422	572	335	520	469	84	86	103	87	88	n/a	105	341	100.05	6.28	0.88	13	273	0.85	0.06	464
144	422	562	333	516	467	84	84	103	88	89	n/a	105	340	100.29	6.29	0.96	13	273	0.79	0.04	460
146	421	546	331	514	465	84	84	103	88	89	n/a	105	338	101.89	6.36	0.94	13	273	0.75	0.06	455
148	424	490	330	513	464	84	87	103	87	88	n/a	106	338	99.31	6.32	0.95	13	273	0.69	0.04	444
150	424	464	329	512	460	84	87	102	87	88	n/a	105	337	100.47	6.24	0.99	13	273	0.65	0.06	438
152	424	513	323	509	459	84	86	102	87	88	n/a	104	336	99.75	6.13	1.01	14	272	0.59	0.04	445
154	423	493	322	505	459	84	86	102	87	88	n/a	105	335	98.85	6.12	1.00	14	272	0.55	0.07	440
156	422	495	320	503	457	84	86	101	87	88	n/a	105	333	98.58	6.13	1.00	13	272	0.48	0.02	440
158	421	466	318	501	455	83	86	101	87	88	n/a	105	334	100.97	6.21	0.99	13	271	0.45	0.10	432
160	420	479	316	500	455	83	85	101	87	88	n/a	105	335	101.04	6.15	0.99	13	270	0.35	0.06	434
162	421	507	314	497	453	83	84	101	88	89	n/a	104	334	100.56	6.14	0.99	13	270	0.30	0.04	438
164	419	502	313	493	450	83	82	101	88	89	n/a	104	333	101.14	6.12	0.97	13	270	0.26	0.00	435
166	415	508	312	491	448	83	82	101	91	91	n/a	104	332	100.24	5.90	0.97	14	269	0.26	0.06	435
168	414	522	311	489	447	83	82	101	91	92	n/a	104	330	100.79	5.73	1.06	14	268	0.20	0.04	436
170	410	519	309	487	443	84	82	102	91	94	n/a	103	328	97.34	5.73	1.10	14	268	0.16	0.06	434
172	412	477	308	488	444	85	86	102	87	88	n/a	105	326	98.71	5.70	1.13	14	268	0.10	0.04	426
174	411	512	305	487	443	84	87	102	87	88	n/a	104	325	99.90	5.69	1.14	14	267	0.06	0.06	432

Manufacturer: Foyers Suprême Inc.

Model: LASER-E

Date: 28th Aug 2016

RUN #:

Test Duration: 180

Burn rate: 1.849 dry kg/hr

Pollu rate: 1.669 gr/hr

Polluants: 3 mg

Delta Temp FB: 54 degF

Pollution rate 0.901 gr/hr non adjusted:

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	Filter#1 Out T	Temp	DGM#2 In T	Out T	Filt#2 Temp	TunnelFlue gas Temp	Room Temp	CO2	CO	O ²	Bimeta Temp	Weight Remaining	Burn Rate	FB Temp	
0	292	368	255	394	351	88	88	89	90	91	n/a	93	262	88.96	1.73	1.09	18	212	15.12	332	
2	266	355	251	388	346	88	90	93	90	90	n/a	95	244	90.03	0.72	0.42	19	206	15.16	-0.04	321
4	357	347	246	382	342	88	90	94	90	90	n/a	94	319	89.14	7.52	0.37	13	209	14.73	0.44	335
6	546	358	247	376	339	88	89	96	91	91	n/a	96	428	90.15	10.21	0.41	10	248	14.13	0.60	373
8	636	362	255	374	337	88	89	97	90	90	n/a	95	478	89.41	10.19	0.92	10	298	13.63	0.50	393
10	657	379	261	375	335	88	88	98	89	90	n/a	99	509	95.52	10.05	0.98	10	323	13.17	0.46	401
12	<u>669</u>	<u>390</u>	<u>265</u>	<u>375</u>	<u>336</u>	<u>88</u>	<u>88</u>	<u>103</u>	<u>90</u>	<u>90</u>	n/a	<u>99</u>	<u>535</u>	<u>95.08</u>	<u>10.55</u>	<u>0.90</u>	<u>10</u>	<u>335</u>	<u>12.69</u>	<u>0.48</u>	<u>407</u>
14	679	403	269	377	335	88	88	106	90	91	n/a	100	554	96.02	10.25	1.16	10	346	12.19	0.50	413
16	688	420	275	379	338	88	88	106	92	93	n/a	101	572	90.32	11.00	1.11	9	351	11.75	0.44	420
18	709	418	281	382	340	88	88	106	91	91	n/a	101	581	90.85	11.70	0.97	8	364	11.29	0.46	426
20	732	429	287	386	342	88	88	106	91	92	n/a	102	595	97.36	12.18	0.79	8	376	10.79	0.50	435
22	750	432	292	391	346	88	88	106	91	92	n/a	105	609	99.65	12.38	0.77	8	387	10.39	0.40	442
24	<u>759</u>	<u>445</u>	<u>298</u>	<u>395</u>	<u>349</u>	<u>88</u>	<u>88</u>	<u>106</u>	<u>91</u>	<u>92</u>	n/a	<u>104</u>	<u>624</u>	<u>93.88</u>	<u>12.69</u>	<u>0.73</u>	<u>8</u>	<u>396</u>	<u>9.95</u>	<u>0.44</u>	<u>449</u>
26	768	434	304	401	354	88	89	108	92	93	n/a	105	636	98.07	12.85	0.68	7	404	9.55	0.40	452
28	767	452	309	407	359	88	88	109	91	92	n/a	104	635	96.92	12.75	0.65	8	407	9.09	0.46	459
30	762	446	315	414	363	88	88	110	91	91	n/a	106	639	98.40	13.14	0.79	7	408	8.69	0.40	460
32	761	458	321	421	368	88	88	110	91	92	n/a	105	646	101.88	13.35	0.70	7	408	8.30	0.38	466
34	765	463	327	431	374	88	88	111	91	92	n/a	106	645	100.47	12.67	0.49	8	410	7.90	0.40	472
36	<u>755</u>	<u>463</u>	<u>332</u>	<u>437</u>	<u>378</u>	<u>88</u>	<u>88</u>	<u>112</u>	<u>91</u>	<u>92</u>	n/a	<u>107</u>	<u>641</u>	<u>100.94</u>	<u>12.23</u>	<u>0.41</u>	<u>8</u>	<u>414</u>	<u>7.56</u>	<u>0.34</u>	<u>473</u>
38	745	483	336	440	382	88	88	112	93	95	n/a	108	634	99.06	12.04	0.41	8	415	7.26	0.30	477
40	746	472	339	445	387	88	88	112	93	94	n/a	107	628	96.45	12.29	0.29	8	415	6.90	0.36	478
42	752	489	342	450	392	88	88	112	94	95	n/a	103	624	96.27	12.35	0.28	8	418	6.56	0.34	485
44	750	481	347	455	398	89	89	111	94	95	n/a	106	617	97.10	12.28	0.24	8	419	6.26	0.30	486
46	747	472	350	462	402	89	89	110	94	95	n/a	106	610	100.05	12.10	0.19	8	419	5.96	0.30	487
48	<u>739</u>	<u>483</u>	<u>354</u>	<u>470</u>	<u>407</u>	<u>89</u>	<u>90</u>	<u>109</u>	<u>93</u>	<u>95</u>	n/a	<u>106</u>	<u>600</u>	<u>98.13</u>	<u>11.71</u>	<u>0.16</u>	<u>9</u>	<u>416</u>	<u>5.66</u>	<u>0.30</u>	<u>491</u>
50	726	481	357	477	412	89	90	111	92	93	n/a	106	588	100.45	11.39	0.14	9	412	5.40	0.26	491
52	710	479	361	482	417	89	90	112	93	95	n/a	107	578	94.78	11.49	0.10	9	406	5.15	0.24	490
54	706	470	364	489	421	89	90	112	93	94	n/a	105	568	93.61	11.41	0.09	9	403	4.89	0.26	490
56	696	478	367	495	425	89	90	112	93	94	n/a	106	559	92.89	11.28	0.06	9	400	4.65	<u>0.24</u>	492
58	689	473	369	501	430	89	90	113	93	94	n/a	106	551	102.20	11.10	0.06	9	396	4.45	0.20	492
60	<u>682</u>	<u>487</u>	<u>372</u>	<u>506</u>	<u>434</u>	<u>90</u>	<u>91</u>	<u>112</u>	<u>94</u>	<u>95</u>	n/a	<u>105</u>	<u>544</u>	<u>92.35</u>	<u>10.77</u>	<u>0.05</u>	<u>9</u>	<u>394</u>	<u>4.21</u>	0.24	<u>496</u>
62	669	494	375	512	440	90	92	86	94	94	n/a	105	535	94.26	10.43	0.05	10	391	4.01	0.20	498
64	655	503	376	516	444	90	91	89	92	92	n/a	105	525	101.05	10.08	0.05	10	383	3.87	<u>0.14</u>	499
66	641	498	377	521	448	90	91	92	92	92	n/a	105	516	100.61	9.90	0.06	10	376	3.67	0.20	497
68	627	499	380	523	452	90	90	94	93	93	n/a	104	507	95.80	9.80	0.06	10	370	3.51	0.16	496
70	621	499	380	527	457	90	90	95	93	94	n/a	104	500	97.38	9.69	0.06	11	363	3.31	0.20	497
72	<u>618</u>	<u>491</u>	<u>380</u>	<u>532</u>	<u>462</u>	<u>90</u>	<u>90</u>	<u>96</u>	<u>92</u>	<u>92</u>	n/a	<u>104</u>	<u>494</u>	<u>99.57</u>	<u>9.57</u>	<u>0.07</u>	<u>11</u>	<u>358</u>	<u>3.17</u>	<u>0.14</u>	<u>497</u>
74	612	503	386	537	466	89	90	97	91	92	n/a	105	490	100.07	9.32	0.07	11	355	3.01	0.16	501
76	600	489	395	536	468	89	90	98	92	93	n/a	105	484	97.29	9.26	0.07	11	353	2.87	0.14	498
78	595	498	396	538	471	89	90	99	91	93	n/a	105	479	99.78	9.21	0.07	11	350	2.71	0.16	500
80	594	485	397	540	475	89	90	100	93	94	n/a	103	476	94.95	9.26	0.06	11	348	2.57	0.14	498
82	594	471	398	542	477	89	89	101	93	94	n/a	99	474	92.70	9.41	0.04	11	349	2.41	0.16	496
84	594	500	397	543	482	89	90	101	93	93	n/a	103	474	97.25	9.46	0.05	11	350	2.27	0.14	503
86	601	507	395	546	487	89	90	102	92	93	n/a	104	477	97.35	9.53	0.06	11	350	2.07	0.20	507
88	595	484	394	548	493	89	90	103	91	92	n/a	104	472	101.17	8.08	0.15	12	352	1.97	0.10	503
90	565	476	395	552	495	89	90	104	93	94	n/a	99	459	94.33	6.85	0.34	13	345	1.87	0.10	497
92	542	496	392	550	496	89	90	104	94	94	n/a	103	447	93.82	6.42	0.48	13	335	1.81	0.06	495
94	518	508	388	549	497	89	90	104	93	93	n/a	103	432	98.51	5.68	0.75	14	325	1.71	0.10	492
96	495	507	383	543	495	89	90	105	93	94	n/a	103	418	97.91	5.19	0.92	14	315	1.67	0.04	485
98	475	510	377	541	494	89	90	105	93	93	n/a	103	406	97.19	5.18	0.98	14	304	1.61	0.06	479
100	458	517	374	537	489	89	90	104	94	95	n/a	102	395	94.21	5.21	1.03	14	297	1.57	0.04	475
102	451	499	368	534	489	89	90	104	93	94	n/a	103	385	98.06	5.19	1.06	14	290	1.51	0.06	468
104	438	507	364	528	486	89	90	104	94	95	n/a	102	376	97.42	4.95	1.16	14	285	1.47	0.04	465
106	427	525	359	523	484	90	90	104	94	95	n/a	101	368	96.89	4.90	1.23	14	281	1.41	0.06	464
108	417	524	355	520	479	90	91	104	94	94	n/a	102	359	95.44	4.92	1.29	14	277	1.41	0.00	459

110	412	524	350	516	474	90	91	104	92	93	n/a	101	352	95.13	4.96	1.31	14	274	1.31	0.00	455
112	409	507	346	511	471	90	92	103	93	93	n/a	98	348	91.56	4.95	1.35	14	273	1.31	0.00	449
114	403	516	343	507	468	90	91	103	94	94	n/a	100	342	94.91	4.87	1.39	14	270	1.31	0.04	447
116	401	532	338	502	463	90	92	102	93	93	n/a	98	337	91.02	4.81	1.45	14	269	1.27	0.06	447
118	396	519	335	496	458	90	91	101	93	93	n/a	96	332	92.11	4.71	1.54	14	267	1.21	0.00	441
120	391	526	332	495	457	91	91	n/a	93	93	n/a	98	326	94.63	4.45	1.72	15	265	1.21	0.04	440
122	389	499	329	490	453	91	91	n/a	93	93	n/a	99	320	96.12	4.32	1.86	15	263	1.17	0.06	432
124	384	503	325	487	448	92	91	n/a	93	92	n/a	101	314	97.99	4.01	1.95	15	260	1.11	0.04	430
126	379	502	323	483	447	92	91	n/a	93	93	n/a	100	309	92.93	3.97	1.92	14	259	1.08	0.00	427
128	373	481	319	478	442	92	91	n/a	92	92	n/a	100	304	97.23	3.93	1.91	14	257	1.08	0.06	418
130	369	474	316	474	439	92	91	n/a	93	93	n/a	99	300	94.83	3.98	1.89	14	254	1.02	0.04	414
132	364	482	313	470	435	92	91	n/a	92	92	n/a	94	296	92.14	3.98	1.88	14	252	0.98	0.00	413
134	360	469	309	467	432	92	91	n/a	91	92	n/a	95	292	93.80	3.99	1.88	14	251	0.98	0.06	407
136	358	475	303	463	427	92	91	n/a	93	93	n/a	97	288	95.31	4.01	1.88	14	248	0.92	0.00	405
138	355	463	296	458	426	92	91	n/a	93	93	n/a	98	286	97.83	3.98	1.89	14	246	0.92	0.10	399
140	353	446	293	454	421	92	91	n/a	92	92	n/a	94	284	91.98	3.97	1.86	14	246	0.82	0.00	393
142	352	447	291	450	418	92	92	n/a	93	93	n/a	97	281	96.25	3.94	1.85	14	244	0.82	0.04	392
144	349	455	290	446	416	92	91	n/a	93	93	n/a	96	279	94.28	3.97	1.85	14	244	0.78	0.06	391
146	348	458	287	444	413	92	92	n/a	92	92	n/a	96	275	96.46	4.07	1.71	14	242	0.72	0.00	390
148	347	452	285	442	411	92	91	n/a	92	93	n/a	93	273	92.23	3.96	1.69	14	241	0.72	0.04	387
150	345	420	283	438	409	92	91	n/a	93	92	n/a	97	270	97.00	3.91	1.66	15	239	0.68	0.06	379
152	345	455	281	434	405	92	91	n/a	91	91	n/a	93	268	91.80	4.00	1.66	14	239	0.62	0.00	384
154	346	442	278	430	402	92	91	n/a	92	92	n/a	95	266	94.68	4.07	1.65	14	239	0.62	0.04	380
156	346	438	277	428	399	92	91	n/a	92	92	n/a	96	266	91.99	4.95	1.33	14	238	0.58	0.06	377
158	348	430	275	425	395	92	91	n/a	91	92	n/a	93	265	91.60	4.74	1.29	14	239	0.52	0.04	375
160	350	463	273	423	395	92	91	n/a	92	92	n/a	95	265	94.70	4.74	1.25	14	239	0.48	0.06	381
162	352	459	272	421	393	92	91	n/a	92	92	n/a	95	266	94.63	4.76	1.27	14	240	0.42	0.04	380
164	354	472	270	418	390	91	91	n/a	91	92	n/a	96	266	92.21	4.70	1.28	14	240	0.38	0.06	381
166	354	494	269	415	388	92	91	n/a	92	91	n/a	97	267	95.27	4.80	1.21	14	241	0.32	0.04	384
168	357	488	269	414	388	91	91	n/a	91	92	n/a	97	267	90.86	4.80	1.21	14	241	0.28	0.06	383
170	359	496	267	412	387	91	91	n/a	91	92	n/a	97	267	96.59	4.78	1.21	14	242	0.22	0.00	384
172	360	499	267	408	386	91	91	n/a	93	93	n/a	96	267	91.73	4.83	1.21	14	243	0.22	0.04	384
174	361	510	267	405	384	91	91	n/a	92	93	n/a	95	267	92.68	4.83	1.19	14	244	0.18	0.00	385
176	362	509	265	402	383	92	91	n/a	92	92	n/a	96	268	94.23	4.79	1.17	14	245	0.18	0.06	384
178	362	519	265	400	381	92	92	n/a	91	92	n/a	94	268	91.08	4.66	1.12	14	245	0.12	0.04	385
180	359	526	264	399	382	92	92	n/a	92	92	n/a	95	267	92.87	4.41	1.10	14	244	0.08	0.06	386

Manufacture Foyers Suprême Inc.

Model: LASER-E

Date: 29th Aug 2016

RUN #:

Test Duration: 152

Burn rate: 2.053 dry kg/hr

Pollu rate: 1.696 gr/hr

Polluants: 3 mg

Delta Temp FB: 56 degF

Pollution rate 0.918 gr/hr

non adjusted:

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filt#2	TunnelFlue gas	Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB			
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp	Temp	Remaining	Rate	Temp			
0	298	362	247	416	365	87	87	84	86	85	n/a	92	244	89.16	1.96	1.09	17	208	14.17		338
2	274	386	245	410	360	87	87	88	85	85	n/a	91	237	88.11	1.23	0.49	19	202	14.06	0.10	335
4	416	366	241	408	358	86	87	88	84	84	n/a	92	320	89.49	7.88	0.26	12	212	13.56	0.50	358
6	610	342	244	403	352	86	86	89	84	85	n/a	92	434	89.84	9.55	0.61	10	262	13.02	0.54	390
8	687	340	250	400	349	86	85	90	84	85	n/a	94	474	92.20	9.73	0.70	10	308	12.54	0.48	405
10	703	392	259	399	350	86	85	91	84	85	n/a	93	504	90.83	10.03	0.78	10	336	12.07	0.46	421
12	<u>723</u>	<u>406</u>	<u>264</u>	<u>400</u>	<u>350</u>	<u>85</u>	<u>85</u>	<u>92</u>	<u>85</u>	<u>85</u>	n/a	<u>95</u>	<u>534</u>	<u>92.66</u>	<u>10.07</u>	<u>0.81</u>	<u>10</u>	<u>349</u>	<u>11.57</u>	<u>0.50</u>	<u>429</u>
14	744	402	269	404	352	85	84	93	84	85	n/a	97	556	93.44	11.08	0.77	9	361	11.07	0.50	434
16	759	379	275	405	350	85	84	94	84	85	n/a	97	579	93.46	11.37	0.70	9	372	10.63	0.44	434
18	774	418	279	407	351	85	84	95	84	85	n/a	98	601	93.65	11.79	0.66	8	381	10.12	0.50	446
20	790	414	288	414	357	85	84	99	84	85	n/a	98	622	94.56	12.04	0.63	8	390	9.62	0.50	453
22	792	412	297	421	361	84	83	98	85	85	n/a	100	625	94.88	12.35	0.57	8	402	9.16	0.46	457
24	<u>785</u>	<u>391</u>	<u>303</u>	<u>425</u>	<u>363</u>	<u>84</u>	<u>83</u>	<u>98</u>	<u>85</u>	<u>85</u>	n/a	<u>98</u>	<u>624</u>	<u>95.54</u>	<u>12.17</u>	<u>0.63</u>	<u>8</u>	<u>407</u>	<u>8.72</u>	<u>0.44</u>	<u>453</u>
26	780	458	310	429	367	84	83	97	84	85	n/a	98	625	91.16	12.08	0.61	8	413	8.37	0.34	469
28	759	475	316	434	371	84	83	96	84	85	n/a	97	616	92.71	11.96	0.50	8	410	7.97	0.40	471
30	760	379	325	444	375	83	83	96	84	85	n/a	98	614	93.96	12.07	0.52	8	409	7.53	0.44	457
32	758	373	335	455	383	83	83	96	84	85	n/a	99	611	92.37	11.97	0.48	8	411	7.12	0.40	461
34	758	394	343	463	389	83	83	96	84	85	n/a	100	609	92.65	11.73	0.44	8	413	6.76	0.36	469
36	<u>743</u>	<u>475</u>	<u>348</u>	<u>467</u>	<u>394</u>	<u>83</u>	<u>82</u>	<u>96</u>	<u>84</u>	<u>85</u>	n/a	<u>99</u>	<u>602</u>	<u>93.32</u>	<u>11.43</u>	<u>0.28</u>	<u>9</u>	<u>416</u>	<u>6.46</u>	<u>0.30</u>	<u>485</u>
38	734	494	352	471	396	83	81	97	85	85	n/a	101	594	95.76	11.25	0.24	9	411	6.12	0.34	489
40	730	477	358	477	403	83	83	98	85	85	n/a	100	589	93.46	11.34	0.20	9	409	5.82	0.30	489
42	739	479	364	485	407	83	83	98	84	85	n/a	99	585	92.87	11.46	0.23	9	414	5.46	0.36	495
44	742	502	369	493	414	83	83	99	85	85	n/a	100	582	95.12	11.47	0.18	9	416	5.21	0.24	504
46	732	521	375	501	423	83	82	100	85	85	n/a	101	574	94.79	10.77	0.14	9	413	4.91	0.30	510
48	<u>716</u>	<u>523</u>	<u>379</u>	<u>505</u>	<u>431</u>	<u>83</u>	<u>83</u>	<u>99</u>	<u>84</u>	<u>85</u>	n/a	<u>100</u>	<u>565</u>	<u>93.68</u>	<u>10.49</u>	<u>0.11</u>	<u>10</u>	<u>410</u>	<u>4.65</u>	<u>0.26</u>	<u>511</u>
50	700	499	383	513	441	83	83	99	84	85	n/a	99	554	92.29	10.32	0.10	10	405	4.43	0.22	507
52	687	437	387	521	445	83	83	99	85	85	n/a	99	543	92.62	10.33	0.08	10	398	4.17	0.26	495
54	681	478	390	528	454	83	83	99	84	85	n/a	100	534	94.94	10.25	0.06	10	392	3.97	0.20	506
56	674	511	386	529	457	83	83	100	85	85	n/a	101	527	96.49	10.09	0.05	10	389	3.76	0.20	511
58	661	506	386	533	460	83	82	100	85	85	n/a	102	521	95.35	10.04	0.05	10	383	3.52	0.24	509
60	<u>647</u>	<u>500</u>	<u>389</u>	<u>537</u>	<u>467</u>	<u>83</u>	<u>82</u>	<u>100</u>	<u>85</u>	<u>86</u>	n/a	<u>101</u>	<u>514</u>	<u>95.43</u>	<u>9.70</u>	<u>0.06</u>	<u>10</u>	<u>377</u>	<u>3.36</u>	0.16	<u>508</u>
62	632	440	394	544	468	83	83	82	85	85	n/a	100	506	94.93	9.53	0.06	11	371	3.16	0.20	496
64	625	492	393	549	477	83	83	85	85	86	n/a	101	498	95.20	9.47	0.06	11	365	3.02	0.14	507
66	616	520	394	551	484	83	83	88	85	86	n/a	100	492	95.13	9.14	0.07	11	361	2.96	0.06	513
68	605	544	394	554	488	83	83	89	84	85	n/a	99	486	92.83	9.01	0.07	11	358	2.86	0.10	517
70	598	537	394	558	486	83	83	91	84	85	n/a	99	480	91.97	8.94	0.09	11	354	2.66	0.20	515
72	<u>592</u>	<u>533</u>	<u>394</u>	<u>560</u>	<u>491</u>	<u>83</u>	<u>83</u>	<u>92</u>	<u>85</u>	<u>85</u>	n/a	<u>99</u>	<u>476</u>	<u>92.53</u>	<u>8.95</u>	<u>0.08</u>	<u>11</u>	<u>351</u>	<u>2.56</u>	<u>0.10</u>	<u>514</u>
74	592	520	394	562	494	83	83	93	84	85	n/a	99	473	93.54	9.00	0.07	11	350	2.36	0.20	513
76	600	454	395	566	496	83	82	94	85	85	n/a	99	473	94.10	9.22	0.06	11	350	2.15	0.20	502
78	596	529	397	572	500	83	83	95	85	85	n/a	99	470	92.94	8.64	0.07	11	351	2.01	0.14	519
80	574	549	396	570	502	83	83	95	84	85	n/a	98	460	92.46	7.32	0.34	12	345	1.91	0.10	518
82	550	562	395	570	505	83	83	96	84	85	n/a	97	447	92.69	6.89	0.47	13	334	1.85	0.06	516
84	529	576	393	571	505	82	83	96	84	85	n/a	98	435	92.12	6.65	0.63	13	324	1.75	0.10	515
86	520	483	393	574	507	82	83	96	84	85	n/a	98	425	92.67	6.56	0.73	13	316	1.65	0.10	495
88	507	573	389	574	509	83	83	97	84	85	n/a	98	417	93.07	6.28	0.81	13	312	1.61	0.04	510
90	499	580	386	570	507	82	83	97	85	85	n/a	98	409	91.90	6.01	0.86	14	308	1.51	0.10	509
92	490	599	383	568	509	82	82	97	84	85	n/a	97	401	90.49	5.83	0.91	14	303	1.51	0.00	510
94	482	615	391	567	506	82	83	97	84	85	n/a	95	393	91.33	5.64	0.95	14	301	1.45	0.06	512
96	470	572	392	564	506	82	83	97	84	85	n/a	96	383	91.49	5.22	1.08	14	297	1.41	0.04	501
98	457	588	389	560	506	82	83	97	84	85	n/a	95	375	89.68	5.18	1.11	14	291	1.31	0.10	500
100	450	569	383	554	500	82	83	97	84	85	n/a	96	368	91.27	5.33	1.09	14	286	1.25	0.06	491
102	445	498	379	555	502	82	83	96	84	85	n/a	96	361	91.92	5.27	1.14	14	283	1.21	0.04	476
104	438	561	376	552	500	82	82	96	84	84	n/a	95	355	90.19	5.28	1.18	14	280	1.15	0.06	485
106	430	569	371	547	498	82	82	96	86	85	n/a	95	350	93.32	5.22	1.21	14	277	1.05	0.10	483
108	428	563	368	546	495	82	82	96	84	85	n/a	95	345	89.72	5.23	1.24	14	275	1.01	0.04	480

110	426	538	362	541	491	82	83	96	85	85	n/a	95	341	90.49	5.23	1.29	14	273	0.95	0.00	471
112	423	527	358	535	489	82	81	96	86	85	n/a	95	337	92.66	5.05	1.35	14	271	0.95	0.04	466
114	419	505	354	535	486	83	82	96	85	85	n/a	96	335	92.78	4.98	1.39	14	269	0.91	0.10	460
116	413	503	351	530	481	83	83	96	84	85	n/a	95	332	91.14	4.89	1.43	14	268	0.81	0.06	456
118	413	510	347	527	482	83	83	96	85	85	n/a	96	328	92.98	4.78	1.52	14	265	0.75	0.04	456
120	409	456	345	526	481	83	82	96	85	85	n/a	96	326	93.13	4.73	1.56	14	264	0.71	0.10	443
122	408	479	343	525	482	83	83	96	85	85	n/a	96	323	92.23	4.60	1.63	15	262	0.61	0.00	447
124	405	426	340	523	480	83	83	96	85	85	n/a	96	321	92.54	4.56	1.66	15	261	0.61	0.06	435
126	401	452	338	521	477	83	83	96	85	85	n/a	96	317	92.15	4.49	1.49	15	259	0.55	0.04	438
128	398	430	333	519	474	83	83	96	85	85	n/a	96	313	92.67	4.24	1.49	15	258	0.51	0.06	431
130	394	447	330	512	473	83	83	96	85	85	n/a	96	309	92.98	4.10	1.52	15	256	0.45	0.04	431
132	389	428	328	510	470	83	83	96	85	85	n/a	96	305	92.75	4.01	1.58	15	254	0.41	0.00	425
134	383	467	324	502	464	83	82	96	87	86	n/a	96	302	94.15	3.93	1.62	15	252	0.41	0.10	428
136	381	461	321	499	460	83	84	96	85	85	n/a	96	300	92.85	3.99	1.63	15	250	0.31	0.00	424
138	379	415	317	496	454	83	84	97	85	86	n/a	96	298	92.67	3.93	1.63	15	249	0.31	0.06	412
140	375	408	314	491	451	83	84	97	85	85	n/a	96	294	92.41	3.76	1.72	15	247	0.25	0.04	408
142	372	437	312	489	448	83	84	97	85	85	n/a	96	290	91.92	3.60	1.75	15	245	0.21	0.00	411
144	369	402	308	483	444	83	83	97	85	85	n/a	96	288	93.49	3.69	1.73	15	244	0.21	0.06	401
146	364	379	305	481	443	83	84	98	85	85	n/a	95	286	91.34	3.71	1.68	15	242	0.15	0.04	394
148	361	343	304	479	437	83	84	98	85	85	n/a	95	284	91.84	3.56	1.68	16	241	0.11	0.06	385
150	358	383	301	476	437	83	83	98	85	85	n/a	95	282	92.16	3.53	1.68	16	239	0.05	0.00	391
152	354	410	298	471	435	83	83	98	86	86	n/a	95	281	91.40	3.54	1.66	16	237	0.05	0.04	394

Manufacturer: Foyers Suprême Inc.
 Model: LASER-E
 Date: 29th Aug 2016
 RUN #:
 Test Duration: 190

Burn rate: 1.697 dry kg/hr
 Pollu rate: 2.396 gr/hr
 Polluants: 5 mg
 Delta Temp FB: 137 degF
 Pollution rate 1.393 gr/hr
 non adjusted:

Time [min]	Unit top	Unit bottom	Unit back	Unit LH side	Unit RH side	DGM#1 In T	Filter#1 Out T	Temp	DGM#2 In T	Filter#2 Out T	Temp	TunnelFlue gas Temp	Room Temp	CO2	CO	O ²	Bimetal Temp	Weight Remaining	Burn Rate	FB Temp	
0	272	388	361	344	337	85	86	84	86	88	n/a	91	169	90.09	0.90	0.68	19	232	14.76	340	
2	251	386	357	340	331	85	87	89	86	86	n/a	92	172	90.95	0.22	0.17	20	227	14.86	-0.10	333
4	245	377	352	336	329	85	86	89	86	86	n/a	91	179	90.21	0.36	0.24	20	215	14.82	0.04	328
6	266	380	346	330	323	85	85	89	86	87	n/a	91	203	91.06	2.68	0.20	18	210	14.62	0.20	329
8	347	374	342	326	317	85	85	89	85	86	n/a	92	255	90.42	4.32	0.22	16	219	14.22	0.40	341
10	555	382	337	322	313	85	85	91	87	87	n/a	92	361	90.76	6.74	0.31	14	258	13.52	0.70	382
12	649	387	339	322	313	85	84	92	87	88	n/a	94	404	92.16	5.86	0.43	14	326	13.05	0.46	402
14	683	397	351	323	314	85	84	94	86	87	n/a	95	431	93.05	6.04	0.43	14	371	12.63	0.42	414
16	733	404	365	325	316	85	84	95	87	88	n/a	95	466	92.28	7.65	0.46	13	409	12.17	0.46	429
18	651	416	378	327	318	85	84	96	86	87	n/a	96	423	93.10	4.84	0.58	15	428	12.07	0.10	418
20	565	422	386	329	317	85	85	96	86	87	n/a	96	389	91.53	3.62	0.49	16	409	11.97	0.10	404
22	512	436	391	330	319	84	85	96	86	88	n/a	95	366	91.57	4.15	0.44	16	379	11.83	0.14	398
24	503	441	394	330	319	84	84	96	88	90	n/a	96	363	92.97	7.05	0.65	13	360	11.53	0.30	397
26	542	443	398	332	319	85	84	96	87	90	n/a	97	390	94.07	9.84	0.56	10	357	11.13	0.40	407
28	616	442	406	336	319	85	85	97	86	88	n/a	96	421	93.25	10.27	0.39	10	376	10.72	0.40	424
30	690	443	414	341	322	85	85	97	87	88	n/a	97	445	94.39	10.18	0.39	10	415	10.36	0.36	442
32	728	448	424	346	325	84	84	98	87	87	n/a	97	461	95.23	10.64	0.36	10	449	10.02	0.34	454
34	777	440	434	351	329	84	84	100	87	90	n/a	98	480	95.87	10.93	0.20	10	481	9.66	0.36	466
36	777	452	445	357	333	85	84	102	87	90	n/a	99	491	96.50	9.62	0.25	11	506	9.36	0.30	473
38	770	458	455	362	338	85	84	103	87	88	n/a	99	497	96.93	9.86	0.27	11	515	9.04	0.32	477
40	779	460	465	366	342	85	84	105	88	91	n/a	99	505	95.79	9.81	0.20	11	522	8.75	0.28	483
42	775	463	477	370	348	85	85	106	88	91	n/a	99	507	96.63	9.59	0.22	11	526	8.47	0.28	487
44	780	465	488	376	351	85	86	107	87	87	n/a	100	510	97.24	9.87	0.24	11	532	8.17	0.30	492
46	785	473	497	382	356	85	86	107	87	91	n/a	100	511	96.37	9.81	0.28	11	537	7.82	0.34	499
48	787	472	505	387	360	85	84	108	87	89	n/a	101	514	97.97	10.02	0.28	10	541	7.52	0.30	502
50	794	481	513	393	364	85	84	107	88	93	n/a	101	516	98.27	10.11	0.27	10	544	7.26	0.26	509
52	792	488	520	398	369	85	85	107	88	94	n/a	101	517	98.74	10.24	0.27	10	548	6.96	0.30	513
54	797	491	528	404	375	85	84	107	88	93	n/a	102	519	98.62	10.45	0.25	10	551	6.66	0.30	519
56	798	493	537	410	381	85	85	106	87	92	n/a	102	521	98.00	10.34	0.26	10	555	6.42	0.24	524
58	796	500	548	416	387	85	85	106	88	91	n/a	103	520	98.73	10.25	0.27	10	557	6.12	0.30	529
60	795	499	559	423	390	85	85	106	88	91	n/a	102	517	99.16	10.18	0.26	10	558	5.81	0.30	533
62	786	503	571	429	395	85	84	84	89	94	n/a	103	512	100.28	10.17	0.23	10	555	5.55	0.26	537
64	779	502	581	436	402	85	85	87	88	94	n/a	103	508	99.06	10.06	0.21	10	551	5.31	0.24	540
66	774	511	591	443	405	85	85	89	88	93	n/a	103	502	99.78	9.98	0.18	10	547	5.05	0.26	545
68	772	511	600	450	411	85	86	92	88	94	n/a	103	497	99.25	9.95	0.15	10	546	4.81	0.24	549
70	764	517	609	458	418	85	86	94	88	93	n/a	103	493	98.39	9.75	0.14	10	543	4.61	0.20	553
72	757	519	618	464	424	85	86	95	88	93	n/a	103	488	98.70	9.66	0.11	11	539	4.40	0.20	556
74	748	523	625	470	429	85	86	96	87	94	n/a	103	483	98.40	9.50	0.10	11	534	4.22	0.18	559
76	739	528	631	477	433	85	86	98	88	94	n/a	103	478	98.77	9.27	0.08	11	530	4.02	0.20	562
78	731	527	637	483	437	85	84	99	88	94	n/a	103	472	100.06	9.07	0.06	11	525	3.82	0.20	563
80	725	529	641	488	443	85	85	101	89	95	n/a	103	467	99.97	8.96	0.06	11	521	3.66	0.16	565
82	719	529	647	493	447	85	85	101	88	93	n/a	104	463	100.26	8.85	0.05	11	516	3.46	0.20	567
84	713	524	650	498	452	85	85	102	88	91	n/a	104	458	99.74	8.71	0.05	11	513	3.32	0.14	567
86	703	532	655	502	456	85	85	103	87	93	n/a	104	453	99.21	8.50	0.05	12	506	3.22	0.10	570
88	697	535	656	506	462	85	86	103	88	93	n/a	103	447	100.20	8.40	0.04	12	503	3.06	0.16	572
90	695	539	658	510	468	85	86	104	88	90	n/a	103	443	99.72	8.34	0.05	12	499	2.91	0.14	574
92	691	537	660	515	471	85	86	104	88	93	n/a	103	440	99.82	8.08	0.04	12	496	2.76	0.16	575
94	684	532	662	518	473	85	84	104	88	95	n/a	103	436	100.21	7.85	0.05	12	492	2.61	0.14	574
96	676	523	663	519	478	86	85	104	94	102	n/a	101	431	98.00	7.23	0.18	13	490	2.55	0.06	572
98	670	537	663	526	482	86	85	105	89	95	n/a	103	426	100.01	6.97	0.24	13	485	2.35	0.20	575
100	664	535	660	529	483	86	87	105	88	95	n/a	103	421	99.55	6.60	0.34	13	480	2.25	0.10	574
102	657	544	657	533	486	86	87	105	88	93	n/a	103	417	100.32	6.30	0.35	13	478	2.15	0.10	575
104	650	554	652	534	491	86	87	105	88	91	n/a	103	411	99.70	6.07	0.38	14	476	2.05	0.10	576
106	644	554	648	534	494	86	86	105	89	90	n/a	103	406	100.32	5.99	0.38	14	474	1.95	0.10	575
108	629	561	641	534	497	86	87	105	88	90	n/a	103	398	99.71	5.62	0.51	14	468	1.91	0.04	572

110	607	553	636	534	498	86	86	105	90	91	n/a	103	388	98.15	5.39	0.67	14	457	1.91	0.00	566
112	588	563	632	532	501	87	87	105	94	96	n/a	102	380	97.88	5.29	0.71	14	444	1.91	0.06	563
114	572	572	626	533	504	87	87	105	89	90	n/a	103	373	99.53	5.28	0.70	14	432	1.85	0.10	561
116	562	573	621	533	505	87	88	105	89	90	n/a	102	366	98.40	5.24	0.72	14	424	1.74	0.04	559
118	555	569	617	532	506	87	87	105	92	94	n/a	102	361	97.44	5.21	0.73	14	419	1.70	0.00	556
120	547	579	613	532	506	87	87	105	89	90	n/a	102	357	99.56	5.09	0.81	14	412	1.71	0.10	555
122	543	587	609	532	505	87	89	105	88	89	n/a	102	353	98.56	5.02	0.79	15	406	1.61	0.06	555
124	539	591	605	530	505	87	88	104	90	91	n/a	101	349	99.17	4.93	0.82	15	403	1.54	0.00	554
126	533	594	601	531	506	87	88	104	88	89	n/a	101	346	98.84	4.90	0.85	15	398	1.55	0.10	553
128	529	593	597	529	507	87	89	104	87	88	n/a	101	342	96.30	4.87	0.86	15	396	1.44	0.00	551
130	525	594	594	528	506	87	89	104	89	90	n/a	100	339	97.32	4.81	0.88	15	394	1.44	0.04	549
132	521	598	590	526	504	87	89	103	88	88	n/a	100	336	97.09	4.75	0.91	15	391	1.40	0.06	548
134	517	597	586	525	504	86	88	103	88	89	n/a	100	333	98.01	4.67	0.95	15	387	1.34	0.09	546
136	514	587	583	524	504	86	87	103	88	89	n/a	100	330	98.19	4.55	1.00	15	385	1.25	0.04	543
138	510	594	581	523	506	86	86	103	90	90	n/a	101	328	98.65	4.81	1.13	15	382	1.21	0.06	543
140	506	593	578	522	505	86	86	103	90	90	n/a	101	326	98.74	4.70	1.20	15	380	1.15	0.04	541
142	502	598	575	521	505	86	86	103	89	90	n/a	101	324	99.09	4.70	1.21	15	377	1.11	0.06	540
144	500	591	572	519	506	86	87	103	92	92	n/a	100	322	97.36	4.62	1.24	15	377	1.05	0.00	538
146	500	573	570	513	505	87	88	103	93	94	n/a	98	319	96.06	4.46	1.29	15	377	1.05	0.04	532
148	496	596	567	511	506	87	88	103	93	92	n/a	99	318	97.10	4.38	1.35	15	374	1.01	0.06	535
150	493	591	564	512	504	88	87	n/a	91	91	n/a	100	315	99.00	(0.05)	0.01	20	372	0.95	0.04	533
152	488	596	561	512	503	88	87	n/a	89	89	n/a	101	312	99.77	(0.04)	0.01	20	369	0.91	0.06	532
154	478	585	558	510	499	88	87	n/a	87	89	n/a	102	309	101.66	(0.01)	0.00	19	364	0.85	0.00	526
156	470	572	555	508	495	88	87	n/a	87	88	n/a	103	306	105.08	0.02	0.00	19	359	0.85	0.04	520
158	464	578	552	505	493	88	86	n/a	88	89	n/a	102	303	98.33	0.06	0.01	19	355	0.81	0.00	519
160	459	573	549	503	490	88	87	n/a	86	87	n/a	102	301	99.31	0.09	0.01	19	351	0.81	0.06	515
162	455	572	544	500	489	88	86	n/a	87	88	n/a	103	298	100.49	0.13	0.01	19	348	0.74	0.04	512
164	452	566	542	498	488	87	86	n/a	86	87	n/a	102	296	93.10	0.16	0.01	19	346	0.70	0.06	509
166	450	549	538	492	489	88	86	n/a	86	87	n/a	101	292	95.99	0.20	0.01	19	344	0.64	0.00	504
168	447	554	535	490	483	87	86	n/a	87	88	n/a	102	289	100.85	0.23	0.01	19	341	0.63	0.10	502
170	445	538	532	489	480	87	86	n/a	86	87	n/a	102	287	97.28	0.25	0.02	19	339	0.53	0.04	497
172	443	539	527	486	477	87	86	n/a	87	88	n/a	102	285	101.59	0.28	0.02	19	338	0.49	0.06	495
174	440	546	525	483	476	87	86	n/a	86	87	n/a	102	284	102.59	0.31	0.02	19	336	0.43	0.04	494
176	439	530	523	481	474	87	85	n/a	86	87	n/a	102	282	96.23	0.33	0.02	19	334	0.38	0.06	489
178	439	539	519	478	470	86	85	n/a	86	87	n/a	102	280	100.52	0.35	0.02	19	334	0.32	0.04	489
180	437	538	516	475	469	86	85	n/a	86	87	n/a	102	279	96.87	0.38	0.02	19	332	0.28	0.06	487
182	434	531	513	473	469	86	85	n/a	86	87	n/a	102	277	100.55	0.40	0.03	19	331	0.21	0.04	484
184	432	524	510	470	468	86	84	n/a	86	87	n/a	102	276	99.91	0.42	0.03	19	330	0.17	0.06	481
186	429	529	507	467	467	85	84	n/a	88	88	n/a	102	275	100.44	0.44	0.03	19	327	0.11	0.04	480
188	426	529	504	464	466	86	85	n/a	87	87	n/a	102	273	101.19	0.46	0.03	19	326	0.07	0.00	478
190	423	535	501	462	464	85	84	n/a	87	88	n/a	102	272	100.80	0.47	0.03	19	324	0.07	0.06	477

Manufacturer Foyers Suprême Inc.
 Model: LASER-E
 Date: 30th Aug 2016
 RUN #:
 Test Duration: 204

Burn rate: 1.553 dry kg/hr
 Pollu rate: 2.983 gr/hr
 Polluants: 8 mg
 Delta Temp FB: 110 degF
 Pollution rate 1.813 gr/hr
 non adjusted:

Time	Unit	Unit	Unit	Unit	Unit	DGM#1	Filter#1	DGM#2	Filt#2	TunnelFlue gas	Room	CO2	CO	O ²	Bimetal	Weight	Burn	FB			
[min]	top	bottom	back	LH side	RH side	In T	Out T	Temp	In T	Out T	Temp	Temp	Temp	Temp	Temp	Temp	Rate	Temp			
0	289	355	366	350	354	85	85	85	84	85	n/a	84	181	82.13	1.29	1.00	18	243	14.53	343	
2	267	387	361	349	350	84	84	87	84	84	n/a	87	183	90.13	0.42	0.31	20	235	14.48	0.05	343
4	281	366	357	341	344	84	85	87	83	83	n/a	84	209	84.72	3.10	0.25	17	226	14.43	0.05	338
6	372	359	354	336	340	84	84	87	84	84	n/a	84	273	81.78	6.15	0.23	14	236	13.87	0.56	352
8	552	391	360	334	336	84	83	89	83	83	n/a	87	376	88.03	7.95	0.43	12	273	13.26	0.60	394
10	691	418	373	333	334	84	83	90	85	85	n/a	88	454	89.58	7.87	0.49	12	344	12.78	0.48	430
12	<u>687</u>	<u>449</u>	<u>389</u>	<u>337</u>	<u>336</u>	<u>84</u>	<u>82</u>	<u>90</u>	<u>86</u>	<u>84</u>	n/a	<u>90</u>	<u>455</u>	<u>91.88</u>	<u>6.76</u>	<u>0.64</u>	<u>13</u>	<u>384</u>	<u>12.38</u>	<u>0.40</u>	<u>440</u>
14	676	466	403	341	338	84	82	91	86	85	n/a	92	458	93.22	6.83	0.70	13	399	11.98	0.40	445
16	676	473	416	342	340	84	83	90	86	85	n/a	92	450	92.65	7.25	0.58	13	415	11.68	0.30	449
18	599	477	426	343	341	84	83	93	85	85	n/a	91	413	91.37	5.22	0.86	14	415	11.54	0.14	437
20	544	485	431	346	342	84	83	94	86	86	n/a	92	395	92.16	6.99	0.97	13	394	11.23	0.30	430
22	539	484	435	349	341	84	83	95	85	85	n/a	91	400	91.12	9.27	0.84	11	379	10.93	0.30	430
24	<u>574</u>	<u>489</u>	<u>440</u>	<u>353</u>	<u>341</u>	<u>84</u>	<u>83</u>	<u>95</u>	<u>85</u>	<u>85</u>	n/a	<u>92</u>	<u>413</u>	<u>93.08</u>	<u>9.64</u>	<u>0.84</u>	<u>11</u>	<u>382</u>	<u>10.57</u>	<u>0.36</u>	<u>439</u>
26	628	473	445	357	341	84	83	96	86	86	n/a	91	424	92.81	9.99	0.69	10	404	10.23	0.34	449
28	676	477	451	359	344	84	83	96	86	86	n/a	92	437	92.13	10.01	0.59	10	431	9.93	0.30	461
30	714	461	457	361	347	84	83	97	86	87	n/a	91	451	92.64	10.67	0.42	10	455	9.57	0.36	468
32	711	475	464	366	350	84	83	97	88	87	n/a	91	453	92.53	9.87	0.52	11	470	9.32	0.24	473
34	717	490	469	372	354	84	83	97	88	86	n/a	94	454	95.60	10.33	0.49	10	478	8.96	0.36	480
36	<u>722</u>	<u>489</u>	<u>473</u>	<u>377</u>	<u>356</u>	<u>84</u>	<u>83</u>	<u>97</u>	<u>87</u>	<u>87</u>	n/a	<u>94</u>	<u>454</u>	<u>97.44</u>	<u>10.18</u>	<u>0.49</u>	<u>10</u>	<u>488</u>	<u>8.66</u>	<u>0.30</u>	<u>484</u>
38	718	415	478	377	360	84	84	97	87	86	n/a	92	453	89.64	10.42	0.47	10	493	8.44	0.22	470
40	719	475	482	380	365	84	84	97	87	87	n/a	92	454	94.69	10.96	0.41	10	495	8.18	0.26	484
42	726	476	487	386	368	84	83	97	88	89	n/a	93	457	95.93	11.42	0.35	9	500	7.87	0.30	489
44	735	491	493	391	371	85	83	97	88	88	n/a	93	462	94.65	11.73	0.29	9	505	7.63	0.24	496
46	739	485	499	395	375	85	84	98	88	88	n/a	94	466	98.74	11.99	0.28	9	509	7.37	0.26	499
48	<u>741</u>	<u>460</u>	<u>504</u>	<u>403</u>	<u>378</u>	<u>85</u>	<u>84</u>	<u>98</u>	<u>89</u>	<u>90</u>	n/a	<u>93</u>	<u>471</u>	<u>92.35</u>	<u>12.20</u>	<u>0.24</u>	<u>8</u>	<u>513</u>	<u>7.07</u>	<u>0.30</u>	<u>497</u>
50	735	454	511	406	383	85	84	98	88	88	n/a	90	475	90.07	11.89	0.23	9	516	6.83	0.24	498
52	738	475	519	411	387	85	85	99	88	88	n/a	93	477	93.22	12.61	0.31	8	518	6.57	0.26	506
54	755	470	526	416	391	85	85	100	87	88	n/a	92	483	94.75	13.04	0.33	8	524	6.27	0.30	512
56	763	482	536	422	396	85	84	102	89	89	n/a	92	487	97.01	13.15	0.34	7	531	5.96	<u>0.30</u>	520
58	766	513	546	431	399	85	84	103	87	87	n/a	95	489	99.26	13.14	0.35	7	537	5.66	0.30	531
60	<u>765</u>	<u>520</u>	<u>556</u>	<u>438</u>	<u>404</u>	<u>85</u>	<u>84</u>	<u>104</u>	<u>88</u>	<u>89</u>	n/a	<u>97</u>	<u>488</u>	<u>99.11</u>	<u>12.77</u>	<u>0.41</u>	<u>8</u>	<u>539</u>	<u>5.42</u>	0.24	<u>537</u>
62	758	506	567	441	409	85	86	106	90	89	n/a	94	484	99.08	12.36	0.40	8	537	5.16	0.26	536
64	753	518	576	448	415	86	86	105	87	87	n/a	95	478	96.88	12.01	0.38	8	535	5.02	<u>0.14</u>	542
66	742	459	587	452	417	86	86	106	88	89	n/a	89	472	89.07	11.72	0.33	9	530	4.75	0.26	531
68	728	506	594	456	423	86	86	106	87	88	n/a	92	465	97.37	11.44	0.28	9	524	4.61	0.14	542
70	722	463	601	460	428	85	86	105	86	87	n/a	89	459	89.13	11.38	0.20	9	519	4.41	0.20	535
72	<u>722</u>	<u>466</u>	<u>607</u>	<u>465</u>	<u>432</u>	<u>85</u>	<u>85</u>	<u>105</u>	<u>87</u>	<u>88</u>	n/a	<u>91</u>	<u>453</u>	<u>90.93</u>	<u>11.32</u>	<u>0.17</u>	<u>9</u>	<u>515</u>	<u>4.23</u>	<u>0.18</u>	<u>538</u>
74	719	463	612	468	437	85	86	104	86	87	n/a	89	448	91.80	11.19	0.17	9	513	4.07	0.16	540
76	720	490	616	473	442	85	85	104	86	87	n/a	90	444	93.11	11.49	0.16	9	513	3.87	0.20	548
78	721	501	619	479	447	85	85	86	89	89	n/a	91	443	96.48	11.53	0.15	9	513	3.67	0.20	553
80	725	506	622	480	452	85	85	90	89	89	n/a	91	441	98.78	11.62	0.14	9	513	3.46	0.20	557
82	721	454	626	485	456	85	85	92	87	88	n/a	90	440	87.48	11.09	0.24	9	516	3.32	0.14	548
84	707	514	629	488	461	85	85	95	89	90	n/a	92	435	95.14	10.51	0.26	10	511	3.16	0.16	560
86	692	511	632	492	463	85	85	96	90	90	n/a	92	428	94.40	9.98	0.35	10	505	3.05	0.11	558
88	681	547	634	498	467	85	85	96	90	88	n/a	93	421	100.24	9.76	0.36	10	498	2.92	0.13	565
90	671	514	637	500	470	85	85	97	88	89	n/a	91	415	95.37	9.73	0.38	10	491	2.82	0.10	558
92	662	465	640	499	469	85	86	97	85	85	n/a	86	410	86.86	9.77	0.33	10	483	2.66	0.16	547
94	655	538	639	502	473	85	85	97	88	88	n/a	92	404	96.27	9.82	0.29	10	477	2.56	0.10	562
96	644	543	641	507	478	85	84	98	89	89	n/a	92	398	98.45	9.44	0.35	10	472	2.46	0.10	562
98	634	504	641	510	482	85	85	98	87	88	n/a	88	394	90.19	9.49	0.29	10	467	2.36	0.10	554
100	632	549	639	515	483	85	84	98	90	90	n/a	93	391	95.31	9.39	0.29	10	463	2.22	0.14	563
102	628	533	638	517	486	85	85	99	89	89	n/a	91	386	95.91	8.68	0.46	11	460	2.11	0.10	560
104	620	543	637	516	490	85	85	99	88	88	n/a	89	380	92.88	8.43	0.54	11	457	2.06	0.06	561
106	612	529	635	518	493	85	85	99	90	90	n/a	92	375	92.50	8.29	0.58	11	452	1.95	0.10	557
108	606	477	633	517	496	85	85	98	87	88	n/a	89	369	87.71	7.54	0.65	12	448	1.92	0.04	546

110	599	499	630	517	499	85	85	98	87	88	n/a	90	363	90.97	7.31	0.75	12	442	1.85	0.00	549
112	590	521	628	516	501	85	85	97	86	87	n/a	88	357	92.10	7.24	0.82	12	436	1.85	0.04	551
114	578	569	624	519	505	85	84	97	90	89	n/a	93	351	96.48	6.80	1.00	13	431	1.82	0.06	559
116	561	578	619	521	507	85	85	98	89	89	n/a	93	345	99.98	6.39	1.13	13	423	1.75	0.04	557
118	549	577	615	518	508	85	85	99	90	90	n/a	92	340	96.45	6.30	1.20	13	415	1.71	0.06	553
120	538	570	610	519	508	85	85	99	88	88	n/a	94	334	95.10	6.24	1.22	13	408	1.65	0.10	549
122	530	586	605	517	509	86	85	99	90	91	n/a	93	330	98.53	6.04	1.29	13	403	1.55	0.00	549
124	523	561	601	513	511	86	85	99	89	90	n/a	91	325	93.39	5.97	1.35	13	398	1.55	0.04	542
126	516	576	596	511	510	86	86	99	90	89	n/a	93	321	96.72	5.93	1.40	13	392	1.51	0.06	542
128	511	552	591	504	510	86	87	98	87	88	n/a	89	316	93.19	5.84	1.43	13	389	1.45	0.00	534
130	505	506	585	501	507	86	87	97	87	88	n/a	89	311	88.25	5.73	1.39	14	384	1.45	0.00	521
132	501	588	581	504	508	85	86	98	90	91	n/a	90	307	95.83	5.61	1.44	14	381	1.45	0.10	536
134	496	567	576	499	508	86	86	98	88	89	n/a	89	304	95.63	5.49	1.47	14	378	1.35	0.00	529
136	489	594	572	501	507	86	86	98	89	88	n/a	93	300	100.15	5.25	1.42	14	373	1.35	0.14	533
138	480	597	568	501	506	86	86	98	91	90	n/a	93	298	98.24	5.04	1.52	14	369	1.21	0.00	530
140	473	596	564	501	504	86	86	99	89	88	n/a	94	296	96.81	4.79	1.65	14	364	1.21	0.06	527
142	466	582	559	500	501	86	86	99	87	87	n/a	94	294	95.67	4.88	1.66	14	359	1.15	0.04	522
144	462	584	554	498	500	86	86	99	87	87	n/a	93	292	98.61	4.73	1.76	14	356	1.11	0.03	519
146	457	546	551	493	498	87	87	99	88	90	n/a	90	289	89.93	4.72	1.83	14	352	1.08	0.03	509
148	452	570	547	489	497	86	88	99	89	89	n/a	92	287	95.25	4.80	1.78	14	349	1.05	0.00	511
150	450	565	543	487	495	86	87	98	89	89	n/a	91	284	94.70	4.86	1.78	14	347	1.06	0.04	508
152	447	567	540	486	493	86	87	98	89	89	n/a	92	282	97.23	4.73	1.87	14	346	1.01	0.06	507
154	444	551	537	482	491	86	87	98	87	88	n/a	88	280	91.37	4.81	1.85	14	344	0.95	0.00	501
156	441	572	534	483	489	86	87	98	89	89	n/a	92	278	96.65	4.77	1.87	14	341	0.95	0.04	504
158	439	554	530	480	486	86	87	97	87	88	n/a	91	276	93.42	4.77	1.83	14	339	0.91	0.00	498
160	438	559	528	477	485	86	86	97	88	88	n/a	90	274	94.90	4.78	1.86	14	338	0.91	0.06	497
162	436	553	526	475	483	86	87	96	87	88	n/a	89	272	94.55	4.67	1.90	14	336	0.85	0.04	495
164	435	536	523	471	481	85	86	96	88	89	n/a	90	270	90.06	4.75	1.88	14	335	0.81	0.06	489
166	433	530	522	468	478	85	87	96	86	87	n/a	89	269	93.26	4.46	1.83	15	335	0.75	-0.06	486
168	430	535	519	468	477	85	86	95	87	88	n/a	90	267	93.89	4.46	1.76	15	332	0.81	0.06	486
170	428	531	516	467	477	85	85	95	88	89	n/a	89	265	93.98	4.35	1.87	15	330	0.75	0.10	484
172	425	519	514	463	476	85	86	95	87	88	n/a	88	264	91.64	4.23	1.87	15	329	0.65	0.00	479
174	421	514	513	463	476	85	85	95	88	88	n/a	90	262	93.69	4.22	1.75	15	327	0.65	0.10	477
176	418	532	509	464	475	85	85	96	88	88	n/a	91	261	96.22	4.13	1.80	15	324	0.55	0.04	480
178	415	518	508	460	473	85	85	96	89	90	n/a	91	260	96.06	4.08	1.84	15	323	0.51	0.00	475
180	413	488	505	456	473	85	85	96	87	89	n/a	89	259	89.96	4.13	1.83	15	321	0.51	0.06	467
182	412	507	502	456	472	85	85	96	88	89	n/a	91	257	94.42	4.16	1.82	15	320	0.45	0.04	470
184	411	493	500	453	469	85	85	96	88	89	n/a	90	256	90.42	4.31	1.82	15	318	0.41	0.06	465
186	410	491	498	450	468	85	86	95	86	87	n/a	88	255	92.84	4.84	1.63	15	317	0.35	0.00	463
188	410	510	495	452	467	85	85	96	88	88	n/a	91	254	96.80	5.07	1.49	14	316	0.35	0.04	467
190	411	491	493	450	465	85	85	96	88	88	n/a	91	254	89.73	4.94	1.52	14	317	0.31	0.06	462
192	411	443	491	446	464	85	85	96	87	88	n/a	88	254	85.64	4.73	1.55	15	317	0.25	0.00	451
194	410	495	490	444	463	85	85	95	87	88	n/a	89	254	92.47	4.61	1.61	15	316	0.25	0.04	460
196	409	488	487	442	464	85	85	95	87	88	n/a	87	253	90.15	4.53	1.62	15	316	0.21	0.05	458
198	407	505	486	443	462	84	85	95	88	88	n/a	90	254	93.57	4.49	1.62	15	314	0.17	0.05	460
200	406	498	484	444	461	84	84	95	89	90	n/a	91	254	95.22	4.40	1.64	15	314	0.11	0.06	458
202	404	490	482	443	460	85	85	n/a	87	88	n/a	88	253	91.64	4.33	1.62	15	314	0.05	0.00	456
204	400	481	480	442	458	85	85	n/a	89	90	n/a	89	252	88.30	4.21	1.60	14	311	0.05	0.04	453

APPENDIX 5: Participants

Danick Power ing.
v-p operation
Services Polytests inc.
450.741.3636
www.polytests.com

Maxime Martin
Technicien
Services Polytests inc.
450.741.3636
www.polytests.com

APPENDIX 6: Drawings and specifications



Ambiance Elegance 36

Nova

Lotus

EPA Documents

Model Number: **24SF**

This product is proudly manufactured in North America by **SUPREME FIREPLACES INC.**

3594 Jarry East, Montreal, QC H1Z 2G4

T: 877-593-4722, F: 514-593-4424

www.supremem.com

Revised: October 2016

IMPORTANT: Keep the owner's manual for future use.

CONTENTS

1	Models.....	3
2	Assembly, Sub-Assembly, Sectional View, and Detailed Drawings	3
3	Air Flow Patterns	3
4	Volume Calculations.....	4
5	Marking and Name Plate	5
6	Electrical Components.....	6
7	30 Day Notice.....	7
8	Certification of Conformity	7
9	Wood Heater Application.....	7
10	QA Plan	7
11	Appliance Description	7
12	Gaskets	7
13	Combustion Air Inlet and Outlet	7
14	Primary Air Control.....	8
15	Unit Pre-Burn	8
15.1	Category 2.....	8
15.2	Category 3.....	9
15.3	Category 4.....	9
15.4	No Blower.....	9

1 Models

The engine will have the model number of 24SF, which comprises the standard components related to the combustion of the unit (such as the firebox, the controls, and the baffle system). However, the engine will be under three model names (Ambiance Elegance 36, Nova, and Lotus), which differ from one another through aesthetics and marketing strategies. Details are to be determined at a later date.

2 Assembly, Sub-Assembly, Sectional View, and Detailed Drawings

Please refer to 24SF_TECH_DRAW.pdf for all assembly, sub-assembly, sectional view, and detailed drawings.

3 Air Flow Patterns

The primary air enters into the unit from two channels; the air wash and the booster. The opening of the channels is regulated by an automatic bi-metal control (refer to Section 14). Please refer to the following illustrations:

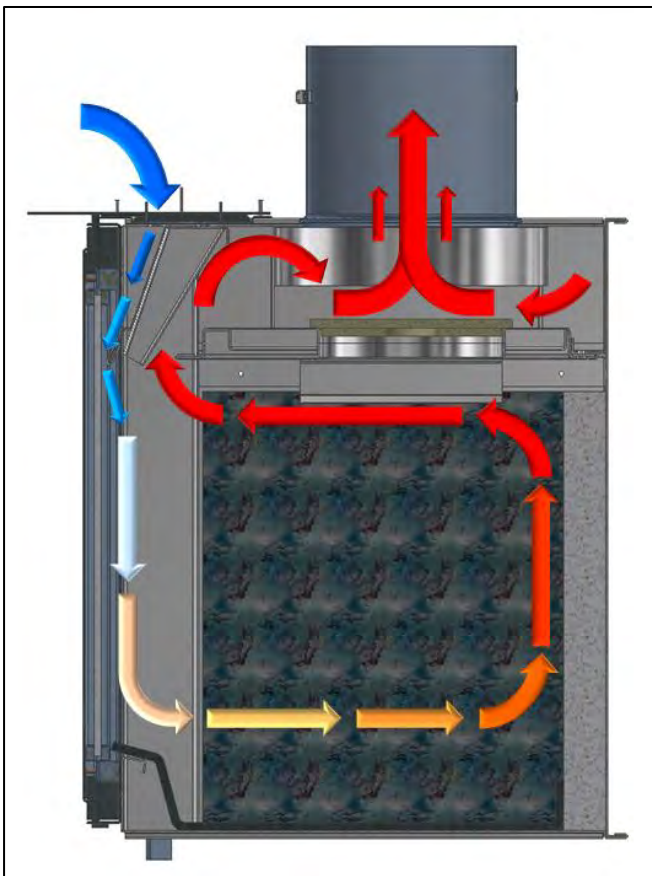


Figure 1: Primary Air through Air Wash Channel

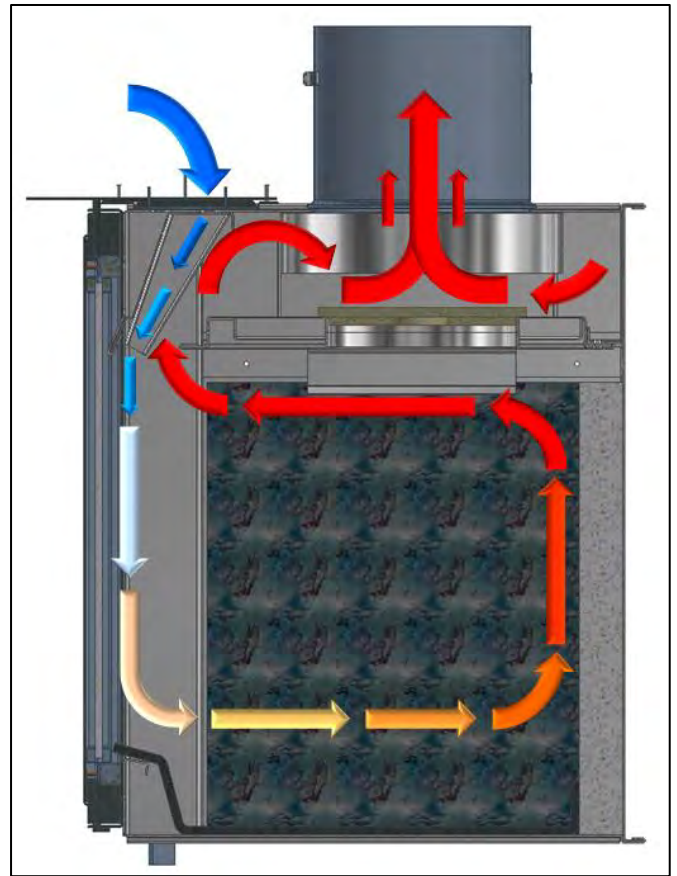


Figure 2: Primary Air through Booster Channel

The secondary air enters the combustion chamber from the top and through the baffle system. In contrast to the primary air, the secondary air intake is not regulated by a control and therefore remains completely open throughout the combustion cycle:

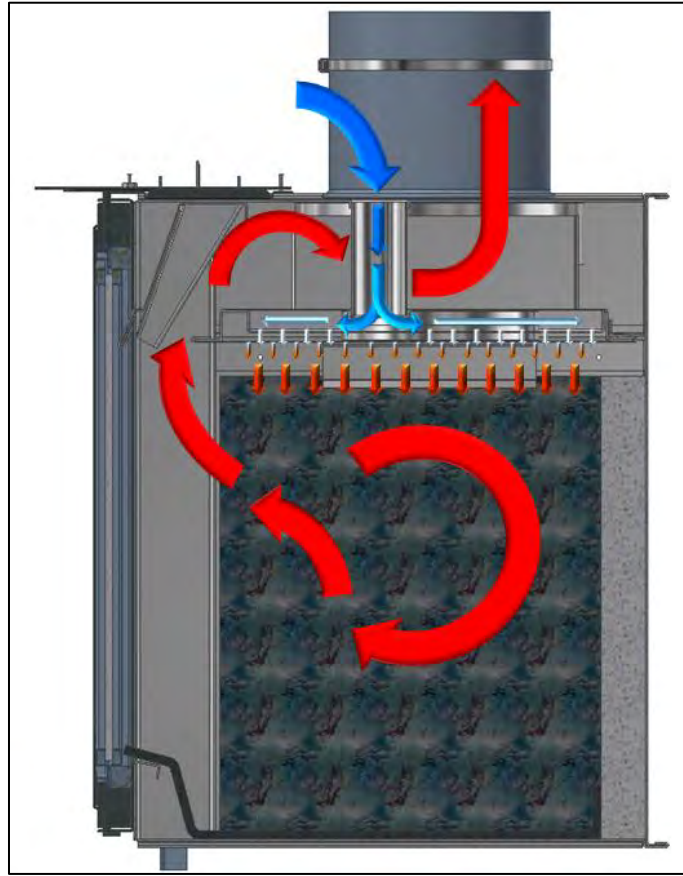


Figure 3: Secondary Air Flow Pattern

4 Volume Calculations

The usable firebox of the 24SF consists of a rectangular cuboid with a width of 24 in, depth of 12 in, and a height of 13.5 in, making a 2.25 ft³ combustion chamber (refer to Figure 4).

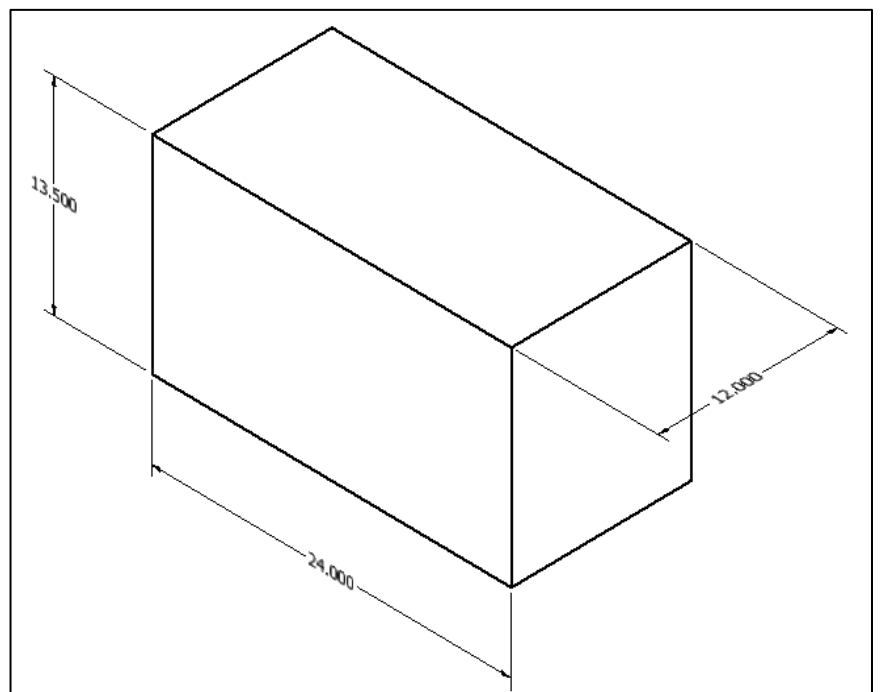


Figure 4: 24SF Usable Firebox

5 Marking and Name Plate

The marking of the unit are on a swivelling metal name plate located at the bottom left hand corner of the door (Part 5 of Figure 5). The contents of the marking are illustrated in Figure 6.

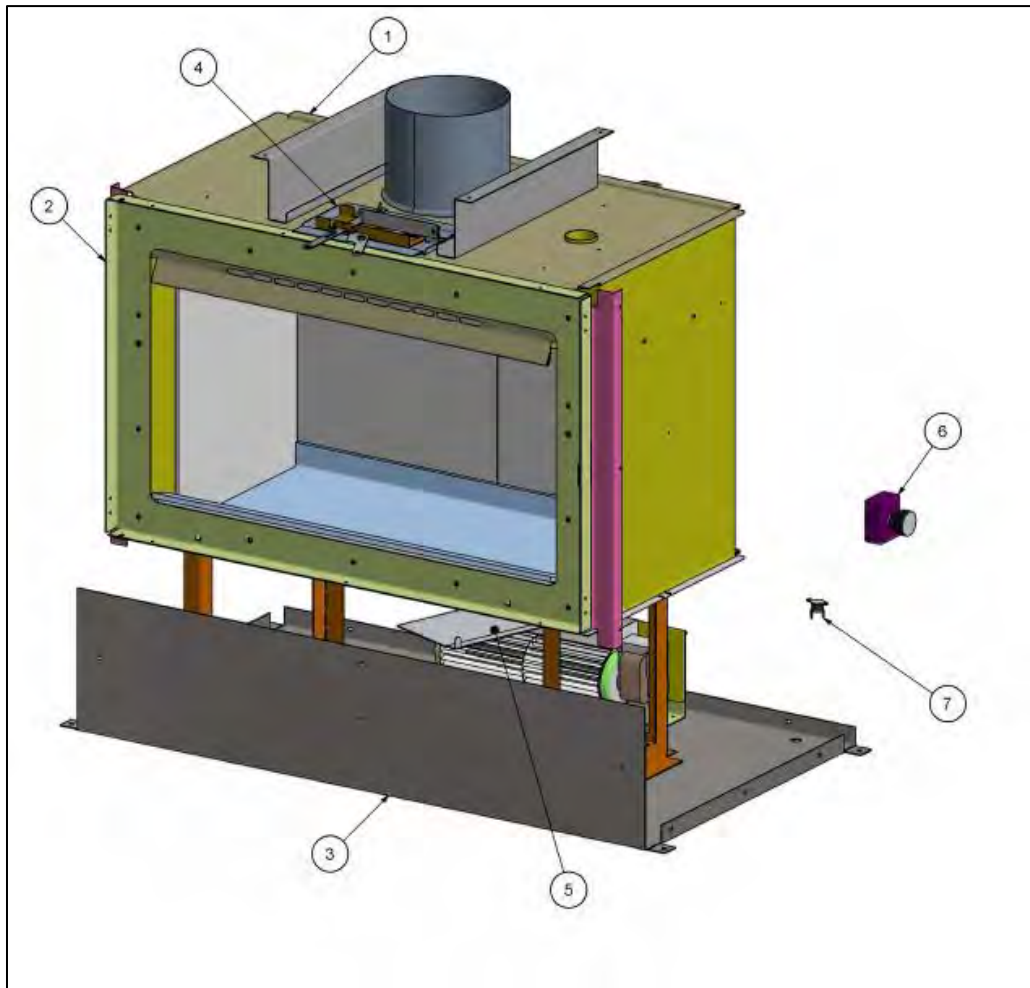


Figure 5: Firebox Assembly Stage 2


<p>MODEL NUMBER/NUMERO MODELE* 249F Ambiance Elegance <input type="checkbox"/> Nova <input type="checkbox"/> Lotus <input type="checkbox"/> SEPTEMBER 2016 / SEPTEMBRE 2016</p>	<p>U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using orb wood. Tested with EPA Method 28R orb wood standard at 1.77 gm/hr of emissions. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.</p>	<p>WH-249F 3684 Jarry E., Montreal, QC H1Z 2S4, Canada SUPREME DATE OF FABRICATION / DATE DE FABRICATION</p> <table border="1"> <thead> <tr> <th>JA</th> <th>FE</th> <th>MAR</th> <th>APR</th> <th>MAY</th> <th>JUN</th> <th>JUL</th> <th>AUG</th> <th>SE</th> <th>OCT</th> <th>NOV</th> <th>DE</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2016</td> <td></td> <td>2017</td> <td></td> <td>2018</td> <td></td> <td>2019</td> <td></td> <td>2020</td> <td></td> <td>2021</td> <td></td> </tr> </tbody> </table>	JA	FE	MAR	APR	MAY	JUN	JUL	AUG	SE	OCT	NOV	DE													2016		2017		2018		2019		2020		2021	
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Figure 6: Label

6 Electrical Components

The following table is the information of the electrical components seen in Figure 5 for the optional blower kit:

<u>Component</u>	<u>Part Number</u>	<u>Manufacturer</u>	<u>Rating</u>	<u>Listing</u>
Tangential Fan (1 per unit)	55416.32130	ebm-papst	115VAC, 60Hz, 56W	VDE, CSA, UL, CE
Thermo-disk (1 per unit)	36T22	Emerson	120VAC, 15A	UL, CSA
Speed Control (1 per unit)	KBWC-13K	KB Electronics Inc.	120 VAC, 2.5 A	UL, CSA
High Temperature Wiring	F18096	Coleman Cable Inc	150°C & 200°C 300V & 600V	UL, CSA
Ground Wire	20-050	Deca Cables	105°C, 600V	UL, CSA

The following figure illustrates the electrical connection for the optional blower kit:

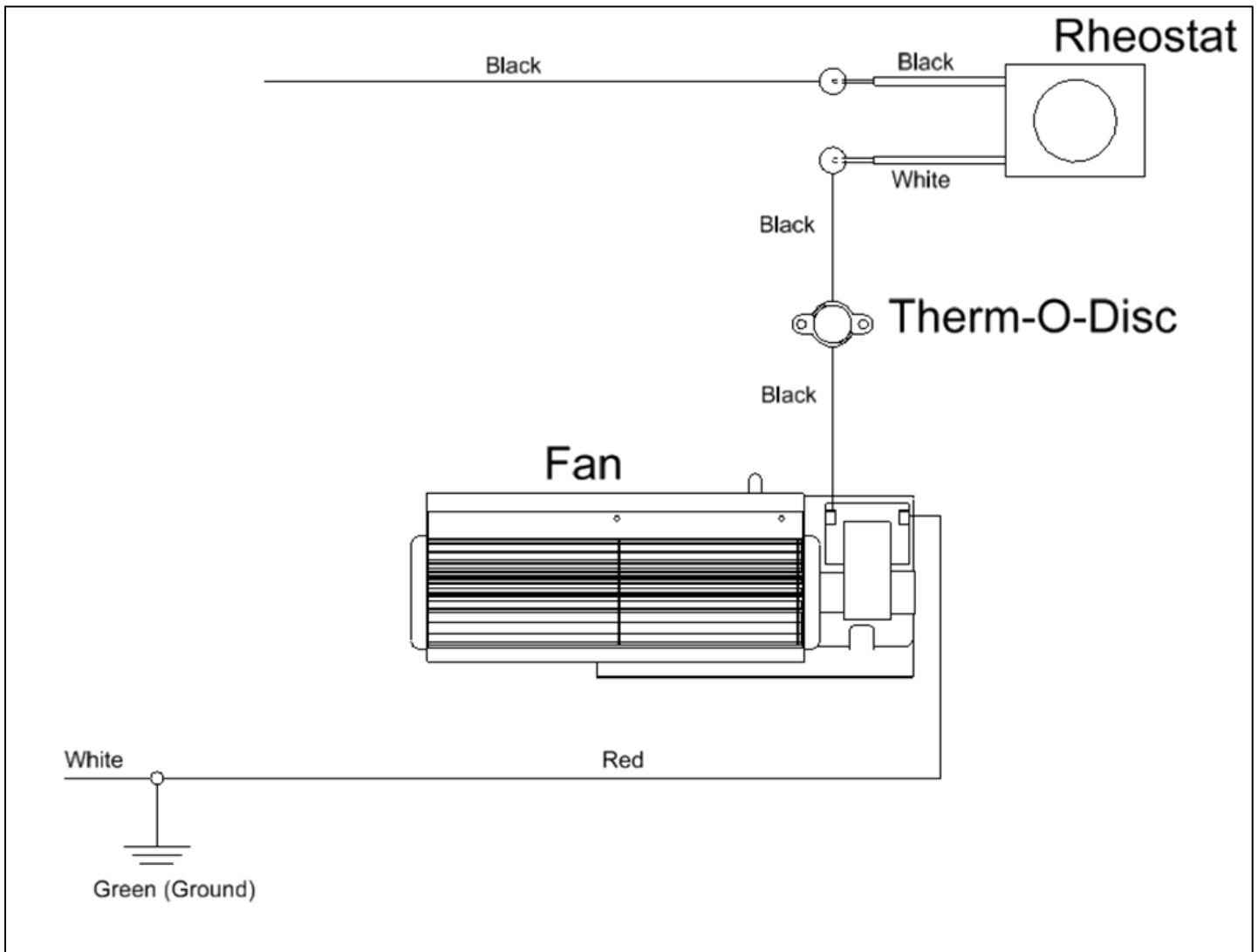


Figure 7: Electrical Connection for Optional Blower Kit

7 30 Day Notice

Please refer to NV200_EPA_NOTICE_C.pdf.

8 Certification of Conformity

Please refer to 24SF_COC_3.11.16.docx (certain sections need to be completed by 3rd party certifier).

9 Wood Heater Application

Please refer to 24SF_WHAF_3.11.16.docx (certain sections need to be completed by appliance certifier).

10 QA Plan

Please refer to 24SF_QA-QL_DL_PROGRAM.docx and 24SF_TECH_DRAW.pdf.

11 Appliance Description

The wood heater is equipped with a bi-metallic variable burn rate controller. The side walls of the combustion chamber are lined with soapstone slabs, allowing for a longer burn at a more uniform heat output. In addition, the casing of the combustion chamber is constructed out of stainless steel, allowing for a quick heat transfer. For the purpose of increasing the efficiency, an optional blower can be installed into the unit.

12 Gaskets

The door of the unit consists of three sections of gaskets, where 2 of them are holding the glass (SGI-260-0230) and 1 is sealing around the door onto the firebox (SGI-265-0125). Please refer to page 47 of 24SF_TECH_DRAW.pdf for information on dimensions, materials, and assembly details. The ANPGA gasket is located at the top edge of the flue and is used to seal the anchor plate onto the unit. Please refer to page 2 of 24SF_TECH_DRAW.pdf (5) for information on dimensions, materials, and assembly.

13 Combustion Air Inlet and Outlet

AIR INTRODUCTION SYSTEM		INLET (1) sq. in.			OUTLET
Identification	Type	Imin	Imax	Controlled	(sq. in.)
A *	Primary	0.05 in ²	4.75 in ²	Yes	28.27 in ²
B *	Secondary	1.77 in ²	1.77 in ²	No	-
C *	Pilot	N/A	N/A	No	-

14 Primary Air Control

The Primary Air Control is a patented mechanism (Patent No: US 7,325,541 B2) that regulates the air flow into the firebox based on the temperature of the unit. It is located on the top of the firebox, at the front center of the unit. The combustion air control of the 24SF has two components: the Activator and the Burn Rate Selector. The left combustion control lever is the Activator. When starting a fire or adding a new load of wood, the Activator must be pushed in to allow a primary source of air to enter the firebox. The Activator will retract automatically with heat. The right combustion control lever is the Burn Rate Selector. The Burn Rate Selector can slide sideways to achieve different burn rates. When the Burn Rate Selector is positioned to the left, a maximum burn rate is achieved and when it is positioned to the right, a minimum burn rate is set. Please refer to page 42 of 24SF_TECH_DRAW.pdf for details on the Primary Air Control assembly.

15 Unit Pre-Burn

15.1 Category 2

1. Load pieces of 2" X 4" BC Fir summing to a weight of 18 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the minimum burn rate position (Figure 9).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
6. Start the official test once the average temperature of the firebox has reached 260 to 270°F.

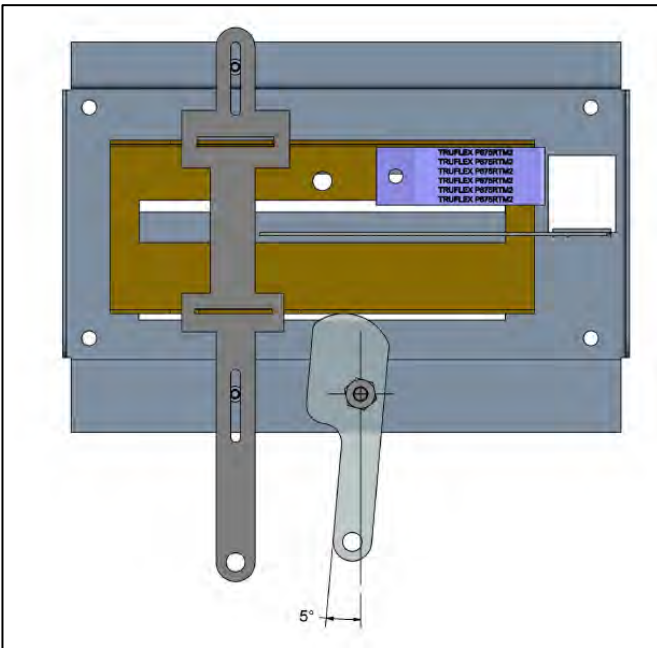


Figure 9: PAC Set to Maximum Burn Rate Position

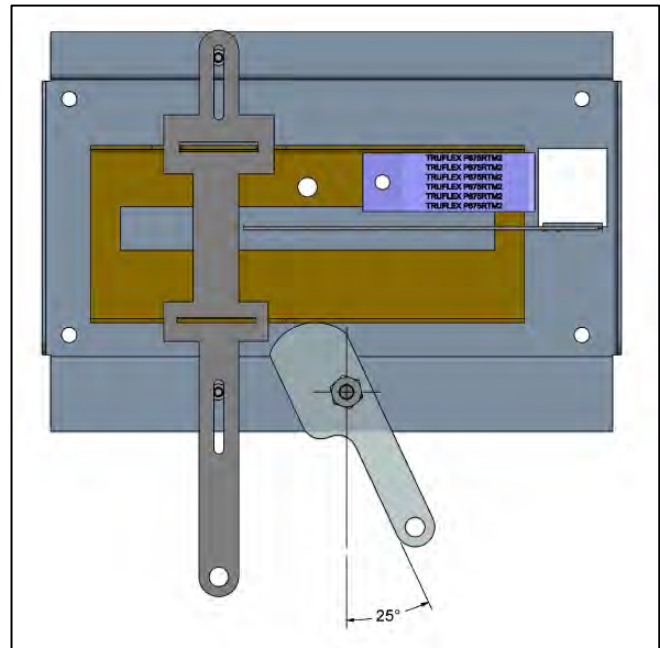


Figure 8: PAC Set to Minimum Burn Rate Position

15.2 Category 3

1. Load pieces of 2" X 4" BC Fir summing to a weight of 18 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the medium-high burn rate position (Figure 10).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall)
6. Start the official test once the average temperature of the firebox has reached 290 to 300°F.

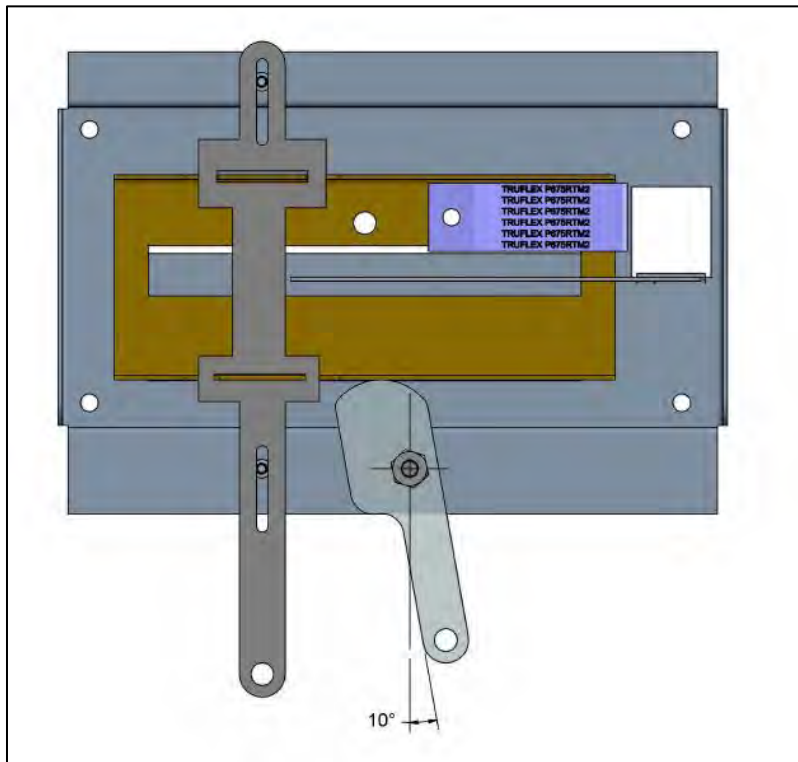


Figure 10: PAC Set to Medium-High Burn Rate Position

15.3 Category 4

1. Load pieces of 2" X 4" BC Fir summing to a weight of 20 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
5. Start the official test once the average temperature of the firebox has reached 320 to 340°F

15.4 No Blower

1. Load pieces of 2" X 4" BC Fir summing to a weight of 20 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the medium-low burn rate position (Figure 11).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
6. Start the official test once the average temperature of the firebox has reached 300 to 320°F.

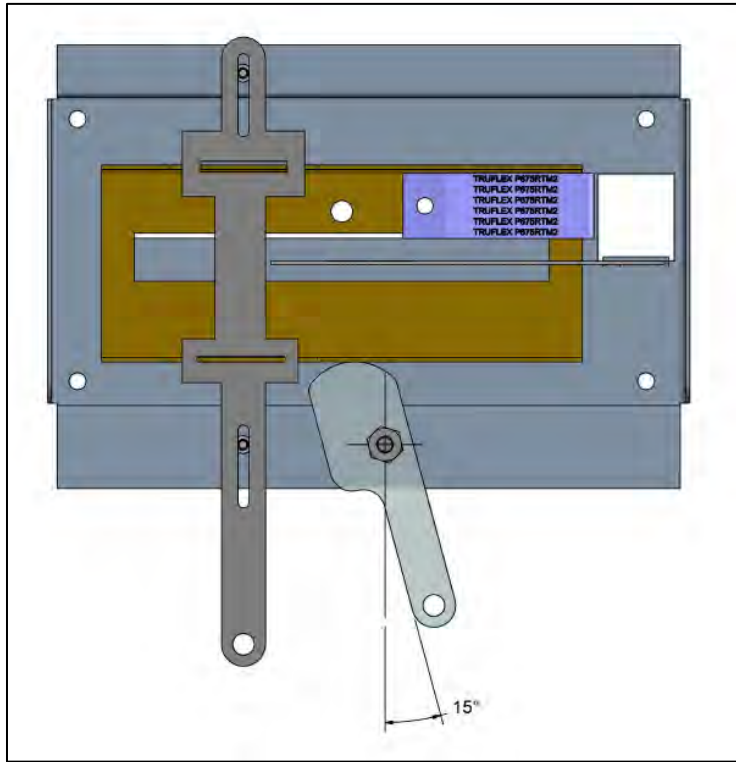


Figure 11: PAC Set to Medium-Low Burn Rate Position


MODEL NUMBER/NUMERO MODELE: 24SF
 Ambiance Elegance 36 Nova Lotus
 SEPTEMBER 2016 / SEPTEMBRE 2016

TESTED TO / TESTÉ SELON:
 CERTIFIED FOR CANADA AND USA / CERTIFIÉ POUR LE CANADA ET LES É-U
 MADE IN CANADA / FABRIQUÉ AU CANADA

MINIMUM CLEARANCES TO COMBUSTIBLES
DÉGAGEMENTS MINIMUMS AUX COMBUSTIBLES

ELECTRICAL RATING - OPTIONAL
ALIMENTATION ÉLECTRIQUE - OPTIONNEL
 VOLTAGE / VOLTAGE: 120 V
 FREQUENCY / FRÉQUENCE 60 Hz
 POWER / PUISSANCE 56 W

CAUTION Hot while in operation. Do not touch. Keep children, clothing, and furniture away. Contact may cause skin burns. See nameplate and instructions.

 Chaud pendant fonctionnement. Ne pas toucher. Garder les enfants, les vêtements et les meubles hors de portée. Risque de brûlures au contact. Voir la fiche signalétique et instructions.

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

Tested with EPA Method 28R crib wood standard at 1.77 gm/hr of emissions. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

WH-24SF **SUPRÊME** 3594 Jarry E., Montreal, QC
 H1Z 2G4, Canada

DATE OF FABRICATION / DATE DE FABRICATION											
JA	FE	MR	AR	MA	JN	JL	AU	SE	OC	NO	DE
2016		2017		2018		2019		2020		2021	

APPENDIX 7: Operator's manual



AMBIANCE

FIREPLACES | GRILLS

Elegance 36

Owner's Manual

**SUPREME**

Model Number: **24SFP**

This product is proudly manufactured in North America by **SUPREME FIREPLACES INC.**

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CONTENTS

- 1 SAFETY 1
- 2 GENERAL INFORMATION 2
 - 2.1 Overall Dimensions 2
 - 2.2 Specifications 3
 - 2.3 Combustion Air Control 3
 - 2.4 Cold Hand Key 4
 - 2.5 Chimney Sweeping Cap 4
 - 2.6 Door 4
 - 2.7 Certification Label..... 4
 - 2.8 Removable Ash Lip 4
 - 2.9 Optional Blower Kit..... 4
 - 2.10 Optional Hot Air Kit..... 4
 - 2.11 Optional Fresh Air Kit 5
- 3 INSTALLATION INSTRUCTIONS 6
 - 3.1 Location..... 6
 - 3.2 Chimney Installation 6
 - 3.3 Façade Installation 7
 - 3.4 Framing 7
 - 3.5 Hearth Extension..... 7
 - 3.6 Chase Installation..... 7
 - 3.7 Clearances to Combustibles..... 7
 - 3.8 Installation of Optional Blower Kit 7
 - 3.9 Installation of Hot Air Kit 7
 - 3.10 Installation of Fresh Air Kit..... 7
- 4 OPERATION INSTRUCTIONS..... 8
 - 4.1 Fuel..... 8
 - 4.2 First Fires 8
 - 4.3 Operating the Combustion Air Control 8
 - 4.4 Starting a Fire..... 9

4.5	Adding a New Load of Wood	10
4.6	Blower Operation (Optional)	10
5	TROUBLESHOOTING	11
5.1	Backdraft / Smoking	11
5.2	Over Firing	11
6	MAINTENANCE	12
6.1	Disposal of Ashes.....	12
6.2	Chimney Maintenance.....	12
6.3	Cleaning of Glass.....	13
6.4	Replacing Soapstone Slab	13
6.5	Replacement of Door Gasket	13
6.6	Replacement of Glass	14
6.7	Door Latch Lubrication	14
6.8	Paint.....	14
7	WARRANTY.....	15

1 SAFETY

SUPREME FIREPLACES INC. congratulates you on purchasing an Elegance 36 wood burning fireplace. This manual describes the installation and operation of the Elegance 36 non-catalytic wood heater. This heater meets the 2020 U.S. Environmental Protection Agency's crib wood emission limits for wood heaters sold after May 15, 2015. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 10,125 to 25,944 Btu/hr. In addition, this fireplace complies with the ULC-S610 and UL 127 standards.

SAFETY NOTICE: Carefully read this manual before installation and operation of this fireplace. A house fire may result if not properly installed. To reduce the risk of a fire, follow the installation instructions. Failure to follow instructions presented in this manual can lead to property damage, bodily injury or even death. Alterations or modifications made on the unit or the installation is strictly forbidden as it may predispose the user to hazardous risks. Contact your local building or fire officials for restrictions and installation inspection requirements in your area and the need to obtain a permit.

WARNING: This unit is hot during operation; keep children, pets, flammable liquids, or combustible materials at a safe distance. Ensure that all clearances to combustible materials are respected. Contact with the unit during operation may cause severe harm. Install a safety screen to keep children and pets away.

CAUTION:

- Do not connect this unit to a chimney flue serving another appliance.
- Do not connect to any air distribution duct or system.
- Never use chemicals to ignite the fire.
- Never burn waste or flammable fluids (such as gasoline, naphtha, or engine oil).
- Only burn dry natural cordwood.
- Never leave the unit unattended with the door open or unlatched.
- Only refuel this unit when the wood is reduced to embers.
- Always keep the door closed during operation.
- Do not operate this unit with a fireplace grate.
- Do not install an unvented gas log set into the firebox.
- Do not install this unit in a mobile home.
- Do not clean or service the unit while it is hot.
- Allow proper air flow by keeping the louvers/openings clear of any obtrusions.

Note: Failure to respect the above cautions may cause damages to the unit, damages to personal property, bodily harm and will void the warranty. "This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual."



WARRANTY REGISTRATION

Please register your SUPREME product online at <http://www.supremem.com/registration.php> to ensure full warranty coverage. Proof of purchase is required for all warranty claims.

2 GENERAL INFORMATION

2.1 Overall Dimensions

2.2 Specifications

Appliance Type:	Adjustable Burn Rate Wood Heater – Non-Catalytic
Fuel Type:	Dry Cordwood
Maximum Log Length:	24 in (609 cm)
Burn Time ¹ :	6 to 10 hrs
Firebox Volume:	2.4 ft ³ (0.069 m ³)
Heating Area:	500 to 2,000 ft ² (45 to 185 m ²)
Average Particulate Emissions Rate ² :	1.77 g/hr
Average CO Emissions Rate ³ :	106.9 g/hr
EPA Protocol:	Method 28R, ASTM2780-10, and ASTM2515-11
Efficiency (Crib Wood):	HHV ⁴ : 67.14% LHV ⁵ : 72.56%
Heat Output (Crib Wood):	10,125 to 25,944 BTU/hr (2,967 to 7,603 W)
Optimum Efficiency:	75%
Optimum Heat Output:	75,000 BTU (21.9 kWh)
Efficiency Protocol:	CSA B415.1-10

2.3 Combustion Air Control

The Combustion Air Control is a patented mechanism (Patent No: US 7,325,541 B2) that regulates the air flow into the firebox based on the temperature of the unit. It is located on the top of the firebox, at the front center of the unit. The combustion air control of the Elegance 36 has two components: the Activator and the Burn Rate Selector. The left combustion control lever is the Activator. When starting a fire or adding a new load of wood, the Activator must be pushed in to allow a primary source of air to enter the firebox. The Activator will retract automatically with heat. The right combustion control lever is the Burn Rate Selector. The Burn Rate Selector can slide sideways to achieve different burn rates. When the Burn Rate Selector is positioned to the left, a maximum burn rate is achieved and when it is positioned to the right, a minimum burn rate is set. For optimum efficiency, it is recommended to operate the unit with the Burn Rate Selector set at the low to medium/low position.

WARNING: Never manipulate the Combustion Air Control with bare hands as it gets hot when the Elegance 36 is in operation. Use the Cold Hand Key (see Section 2.3) to adjust the Combustion Air Control.

¹ Depending on combustion air control setting (see Section 4.3 for further details).

² Officially tested and certified by an independent.

³ Note that rate is smaller for low to medium/low burn rates.

⁴ Higher Heating Value.

⁵ Lower Heating Value.

2.4 Cold Hand Key

The Cold Hand Key is an accessory that comes standard with the Elegance 36 fireplace. The Cold Hand Key is a tool used to manipulate the Combustion Air Control Levers when it is hot.

2.5 Chimney Sweeping Cap

The chimney sweeping cap found at the baffle of the Elegance 36 allows easy access for chimney sweeping without having to remove any components of the firebox.

WARNING: The chimney sweeping cap should be blocking the access to the chimney at all times during combustion. A chimney sweeping cap that is not blocking the baffle hole during combustion is a safety hazard, will overheat the fireplace and void the warranty.

2.6 Door

The Elegance 36 wood burning fireplace comes with a Pyroceramic glass panel door. Pyroceramic is the highest grade available for fireplaces and stoves and can withstand temperatures up to 1300°F. To remove the door, open the door, lift it and pull it towards the bottom until the rod exits from the hinge holes.

2.7 Certification Label

The certification label contains important information regarding the installation and operation of the Elegance 36 fireplace. In addition, the serial number of the unit is permanently embossed onto the top right corner. The certification label is located below the bottom right corner of the door and is accessible by swiveling the plate.

2.8 Removable Ash Lip

The Ash Lip is a removable accessory that comes standard with the Elegance 36 fireplace. It is installed on the door holder (under the two small angled tags below the door) and prevents ashes from falling onto the front of the hearth. The Ash Lip can be installed with the door open or closed. It is safe to operate the unit without the Ash Lip.

NOTE: The door of the Elegance 36 must remain closed at all times during operation.

2.9 Optional Blower Kit

An AC tangential optional blower (electrical rating: 115V, 60Hz, and 56W) with a variable speed control can be installed into the Elegance 36 wood burning fireplace to maximize efficiency. Refer to Section *** for installation instructions.

WARNING: Make certain that the fireplace is not in operation and the blower is unplugged (breaker off) before accessing the electrical wiring of the blower kit.

CAUTION: Only a blower provided by SUPREME FIREPLACES INC. can be installed into the fireplace. Substituting the blower kit may result in overheating and will void the warranty.

2.10 Optional Hot Air Kit

The Optional Hot Air Kit allows heat to be drawn from the unit by a thermostatically controlled blower (electrical rating: ***V, ***Hz, and ***W) and dispersed to different areas of the house. This option is recommended when

the fireplace is installed in an area below the maximum heating space. A total of three kits can be installed onto one unit with a maximum distance of 25 feet. Note that a 5 inch insulated duct is required for the installation (item ordered separately). Refer to Section *** for installation instructions.

WARNING: Make certain that the fireplace is not in operation and that hot air blower is not powered (breaker off) before accessing the electrical wiring of the hot air kit.

CAUTION: Only a hot air kit provided by SUPREME FIREPLACES INC. can be installed onto the fireplace. Substituting the hot air kit may result in overheating and will void the warranty.

2.11 Optional Fresh Air Kit

The Optional Fresh Air Kit allows for exterior air (outdoors) to be drawn into the fireplace during operation of the unit. Note that a 4 inch insulated duct is required for the installation (item ordered separately). Refer to Section *** for installation instructions. Contact your local building official regarding mandatory fresh air kit installations within your area.

CAUTION: Only a fresh air kit provided by SUPREME FIREPLACES INC. can be installed onto the fireplace. Substituting the fresh air kit may result in overheating and will void the warranty.

3 INSTALLATION INSTRUCTIONS

Before installing the unit, consult an authority having jurisdiction (such as your municipal building department, your fire department, your fire prevention department...) to determine whether a permit is required. **CAUTION: Modifications/alterations to the unit/installation without written authorization from SUPREME FIREPLACES INC. are strictly forbidden and will void the warranty.** Refer to Section 1 for further safety information. Carefully read the instructions below before installing your Elegance 36.

3.1 Location

Determine the location of the Elegance 36 by taking into consideration the following criteria:

- The size of the room with respect to the heat output of the fireplace.
- The proximity of windows, doors, and traffic flow.
- The necessary amount of space in front of the unit for the hearth extension and mantel.
- The clearances to combustible materials.
- The passage of the chimney.

If possible, select a location for the fireplace that will minimize the number of offsets in the chimney course. Offsets will reduce the draft, complicate the chimney sweeper's work, and increase installation costs. Technical drawings outlining the chimney route should be prepared prior to the installation. NOTE: The cutting of joists and rafters for floor, ceiling, and roof chimney penetrations will affect the load bearing capacities of the dwelling structure. To determine whether additional support is required, consult your local building codes. Improper cutting of chimney openings in the attic and roof will affect the bearing and thermal insulating capacity, as well as the weather tightness of the dwelling. Avoid incorrect workmanship by consulting a professional engineer or a certified installer.

Through examination of the floor construction, ensure that the fireplace and chimney system is resting on a surface capable of withstanding its weight. Consult your building codes to see whether additional structural supports are required (applicable for rare and isolated cases).

Avoid having the chimney outlet near any obstructions (such as trees and roof offsets) as the draft of the chimney may be affected by wind turbulence. Ideally position the outlet of the chimney at the highest area of the roof.

NOTE: It is strongly recommended to install a carbon monoxide (CO) and smoke detector near the location of the unit.

3.2 Chimney Installation

The minimum chimney height from the base of the unit is 15 feet.

3.3 Façade Installation

3.4 Framing

3.5 Hearth Extension

3.6 Chase Installation

3.7 Clearances to Combustibles

3.8 Installation of Optional Blower Kit

3.9 Installation of Hot Air Kit

3.10 Installation of Fresh Air Kit

4 OPERATION INSTRUCTIONS

4.1 Fuel

The Elegance 36 is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods (moisture content below 20%), as compared to softwoods or to green or freshly cut hardwoods. The following are a few signs indicating that firewood is sufficiently dry for use: (a) cracks on the ends and surface of the logs, (b) lighter in weight, and (c) color (yellow/grey). It is recommended to use a moisture meter with pin sensors for determining accurately the moisture content of firewood (read manufacturer's instruction manual before operating). The optimum log length is 18-22 inches, preferably split in halves or quarters and left to dry under a cover or away from external elements for a minimum of one year prior to use. Use good quality dry cordwood only. DO NOT burn garbage, lawn clipping, yard waste, materials containing rubber (including tires), materials containing plastic, waste petroleum products, paints, paint thinners, asphalt products, materials containing asbestos, construction debris, demolition debris, railroad ties, pressure-treated wood, manure, animal remains, coal, salt water driftwood or other previously salt water saturated materials, unseasoned wood, paper products, cardboard, plywood, particle boards, or other foreign materials in this product. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater. Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke. Do not over fire the Elegance 36 fireplace. Over firing will damage the fireplace, is hazardous and will void the warranty. NOTE: Gas logs cannot be installed in the Elegance 36 fireplace.

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

Ecological or compressed logs containing chemical additives are not tested and approved to be used with the Elegance 36. Using them will overheat and damage the fireplace and void the warranty. Ecological or compressed logs that are 100% wood and contain no other additives can be safely used in the Elegance 36. Never use more than three of these logs at a time. Using more is not only dangerous, but will damage the fireplace and void the warranty. Follow the ecological log manufacturer's safety guidelines and recommendations and be sure that they are intended for use in fireplaces. Reload only once the previous load of wood has been consumed and only embers remain.

WARNING: Do not keep the door open while the fireplace is in operation.

4.2 First Fires

For the first 3 fires, burn a maximum of 3 logs at the medium to low burn rate (refer to Section 4.3) to allow for proper conditioning of the unit. Due to oil residues and the curing of the paint of the fireplace, it is normal to smell an odor for the first fires of the Elegance 36. Open a window or a door near the fireplace insert to ventilate the house during the first fires. Oil residues may cause light smoking.

4.3 Operating the Combustion Air Control

The burn rate and the heat output are related to the amount of air entering into the firebox. The combustion air control of the Elegance 36 has two components: the Activator and the Burn Rate Selector (see Section 2.2). When starting the fire or when adding a new charge of wood, the fireplace needs additional air in order to establish a good fire. When the wood starts to burn properly, the amount of air can be reduced depending on the heating requirements.

The left combustion control lever is the Activator. When starting a fire or adding a new load of wood, the Activator must be pushed in to allow maximum air to enter the firebox. The right combustion control lever is the Burn Rate Selector. The Burn Rate Selector can slide sideways to achieve different burn rates. When the Burn Rate Selector is positioned to the left, a maximum burn rate is achieved and when it is positioned to the right, a minimum burn rate is set. Keeping the Burn Rate Selector to the right will burn the wood slower. Keeping the Burn Rate Selector to the left will provide a stronger fire and keep the glass of the fireplace cleaner for longer. Adjust the burn rate according to your heating requirements and the quality of your wood. The combustion air control will automatically and gradually close the primary air source to the selected burn rate setting (right lever) with the presence of heat to maximize the burn time.

NOTE: The Burn Rate Selector can remain at the same setting at all times if the burn rate is satisfactory. However, the Activator must be pushed in when starting a fire or when adding a new load of wood.

WARNING: The combustion air openings should never be obstructed.

WARNING: Never manipulate the Combustion Air Control with bare hands as it gets hot when the Elegance 36 is in operation. Use the Cold Hand Key (see Section 2.3) to adjust the Combustion Air Control.

WARNING: This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.

4.4 Starting a Fire

The Elegance 36 has patented technologies and innovative features that make starting a fire quick and easy. Before starting a fire, assure that all the safety precautions mentioned in the owner's manual are being respected. The following instructions describe starting a fire in Elegance 36 fireplace using a "top-down" approach, which results in a cleaner, more efficient, and longer burn:

- a) Place two logs in the firebox. The logs should sit directly on the hearth from left to right (parallel with the door). Do not use a fireplace grate.
- b) Place a third log at angle above the two logs of step a).
- c) Place a fourth log above the logs of step a) and step b) (tilted upwards), which will result in a "pocket" at the center of the firebox.
- d) Push the left combustion control lever (the Activator) inwards.
- e) Slide the right combustion control lever (the Burn Rate Selector) to the desired burn rate. Positioning the Burn Rate Selector towards the left is for maximum burn rate and towards the right is for minimum burn rate.
- f) Place and ignite a firestarter within the "pocket". Make sure that the firestarter is visible from the opening (facing the front) and directly below the logs of step b) and step c).
- g) Once the firestarter is well lit, close the door. Do not leave the door open for more than 2 minutes.

CAUTION: The wood should be placed away from the door to avoid damage to the glass.

WARNINGS: Over firing the unit may result in overheating and can damage the fireplace and/or result in fire hazards. The maximum firewood load must not exceed 4 medium sized logs (approximately 30 pounds). This fireplace has been designed to burn with the door closed. When the fireplace is being used, the door should remain closed at all times. Failing to do so is a safety hazard, will damage the fireplace and void the warranty.

WARNING: Do not use fire accelerants to rekindle the fire if the first attempt to start the fire failed. Do not open the door. Simply reactivate the Activator by pushing it inwards.

NOTE: Sufficient air exchange is necessary for the fireplace to operate properly. Air is required in order to maintain the combustion of the fireplace. If the house is airtight, the fireplace may not function properly. If the fireplace is deprived of air, it will be necessary to provide a source of fresh air into the dwelling. This may be done by using an air exchanger unit or simply by opening a window or a door near the fireplace partially for a few minutes. Make sure that other equipment such as the kitchen exhaust fans or oil central heating systems does not affect the fireplace functionality. Large return ducts of central heating systems located in the same room as the fireplace may affect the proper functioning of the unit and may cause smoking.

4.5 Adding a New Load of Wood

WARNING: Open the door to reload only when the wood has been reduced to embers, otherwise there is a risk of smoke infiltration into the house.

When the wood has been reduced to embers and there's no visible flame, you may add a new load.

- a) Crack the Elegance 36 door open and wait a few moments before opening the door completely.
- b) Use your fireplace tools to gather the remaining embers at the center of the firebox.
- c) Activate the Activator by pushing it in.
- d) Once the embers begin to glow red, add the new load of wood in the firebox.
- e) Keep the door of the Elegance 36 slightly unlatched until you see a flame in the firebox. Never leave the Elegance 36 door unlatched without constant supervision.
- f) Completely latch the Elegance 36 door.

Assure that a flame is maintained. Avoid wood smoldering on top of embers as this will result in a dirty glass, excessive emissions, chimney creosote buildup and poor heat output. If wood is smoldering, ensure the Activator has been activated and unlatch the door slightly with supervision until a flame has been maintained.

4.6 Blower Operation (Optional)

The optional blower kit for the Elegance 36 consists of a blower mounted at the back/bottom of the unit and a heat sensory thermodisk; the blower will start and stop automatically in the presence and absence of heat respectively. A variable speed control allows the adjustment of the speed of the blower. Do not install a substitute kit as this may result in overheating and risk of fire. Refer to Section *** for the installation instructions of the optional blower kit.

When the fireplace gets hot and the thermodisk reaches 95°F, the blower will turn on. The average time it takes for the blower to activate is 30 to 45 minutes after starting a fire as explained in this manual (Section ***). The fans will turn off once the insert has cooled down and the thermodisk reaches 85°F. The speed of the blower can be adjusted with the variable speed control.

5 TROUBLESHOOTING

5.1 Backdraft / Smoking

Draft is the force created by a difference in pressure, which moves air from the appliance up through the chimney. It is important to operate the Elegance 36 with proper draft to ensure optimal performance of the unit. Draft is depended on the length of the chimney, local geography, nearby obstructions and other factors. Proper draft results in an upwards flow through chimney, which prevents smoke infiltrating into the house during operation of the unit. As the temperature of the unit and chimney rises during combustion, the draft consequently increases due to a higher difference in pressure.

In contrast, backdraft is air flow from the chimney into the house, which results in smoke infiltration from the appliance and/or the chimney joints during operation. The unit is experiencing backdraft if air is flowing out from the exhaust of the baffle system (within the firebox). Backdraft is most commonly caused by fans around the house (such as in the kitchen and bathrooms) simultaneously in operation, insufficient length of the chimney (less than 15 feet), or a blocked chimney. Refer to the following suggestions to eliminate backdraft:

- Close any fans operating around the house (specifically for the duration of ignition).
- Clean the chimney of any obtrusions (when the unit is cold).
- Open one window or one door near the Elegance 36.
- Heat the chimney by burning newspaper near the exhaust of the baffle system.

5.2 Over Firing

The appearance of a red glow on the exterior of the firebox (top and sides) and/or on the flue is a sign of over firing. Excess air entering the firebox, over fueling, or an abnormal strong draft causes the unit to reach drastic temperatures from an uncontrollable combustion. Over firing is a safety hazard and may result in permanent damage to the unit. In the occurrence of over firing:

- a) Make sure the Elegance 36 door is properly closed.
- b) Manually close the Combustion Air Control by pulling the Activator (left lever).
- c) Turn on the blower to the maximum speed. The red glow on the exterior of the firebox and/or the flexible liner should gradually disappear.

WARNING: Do not touch hot surfaces with bare hands. Always wear heat protecting gloves and use fireplace tools.

Guideline to avoid over firing:

- Always keep the door closed during operation.
- Inspect regularly the door gasket/glass and replace accordingly.
- Always operate the unit with the chimney sweeping cap in position, blocking the hole in the baffle.
- Never load more than 30 lbs of wood at a time.
- Ensure that there is no excess draft.

WARNING: Failure to follow the above guideline will void the warranty. Over firing is a safety hazard, can cause irreversible damages to the Elegance 36 and will void the warranty.

6 MAINTENANCE

6.1 Disposal of Ashes

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

- a) Let the firebox cool to ambient temperature before removing the ashes. It is recommended to remove the ashes once the bed has exceeded a height of 4 inches.
- b) Slowly open the door to prevent ashes from coming into the room.
- c) Place an ash bucket (metal container) near the fireplace, onto the non-combustible hearth.
- d) Using a shovel and brush, remove the bulk of the ashes from the firebox into the ash bucket. Note that it is not necessary to keep a thin bed of ashes for the next fire.
- e) Store the ash bucket (with the tight-fitting lid) on a non-combustible surface, away from any combustible materials, pending final disposal.

6.2 Chimney Maintenance

Creosote – Formation and Need for Removal: When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapor condenses in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire. The chimney connector and chimney burning wood or coal should be inspected at least once every two months during the heating season to determine if creosote buildup has occurred. **Never use chemical cleaners for your chimney.**

WARNING: In the case of a chimney fire: 1) close the door of the fireplace; 2) set the burn rate of the Combustion Air Control to minimum (Section 4.3); 3) call the local fire department (if assistance is needed); 4) use a dry chemical fire extinguisher (baking soda or sand) to control the fire.

CAUTION: Never use water to extinguish a fire as it may result to dangerous steam explosions. Do not use the unit until the chimney is inspected and repaired (if needed) by a qualified technician.

NOTE: Do not clean the chimney when the unit is in operation/hot. Follow the instructions below for sweeping the chimney of a Elegance 36 fireplace:

- a) Open the door of the unit.
- b) From within the firebox, displace the chimney sweeping cap located in the baffle by lifting and moving it to the side.
- c) Close the door of the unit.
- d) Using an appropriate sized chimney sweeping brush, clean the chimney from any creosote buildup and other residues.
- e) Remove all the fallen/loose creosote/residues from the firebox and baffle system (a shop vacuum cleaner can be used for a thorough cleaning).
- f) Place back the chimney sweeping cap.

CAUTION: Operating the unit without the chimney sweeping cap in position will result in over firing and void the warranty.

6.3 Cleaning of Glass

It is recommended to clean the glass door with a soft cloth, dampened with a non-abrasive solution, such as soap and water.

CAUTION: Cleaning the glass with an abrasive solution will result in surface scratches, reducing glass transparency and resistance to impacts.

The glass of the door may be cleaned with commercial products intended for fireplaces and stoves. After cleaning the glass, remove any remaining solutions with a wet cloth to avoid chemical reactions at elevated temperatures (“cloudiness” on the surface of the glass).

CAUTION: Do not apply commercial cleaners onto any painted surfaces as discoloration/peeling may occur.

NOTE: Never clean the glass when the unit is in operation or hot.

6.4 Replacing Soapstone Slab

Six soapstone slabs are assembled along the combustion chamber side walls (left, right, and back) allowing for a longer and a constant heat output. It is recommended to perform a weekly check on the condition of the slabs to ensure proper operation of the unit. The soapstone slabs need to be replaced when it is gravely chipped and/or cracked. Failure to replace the soapstone slab under the mentioned conditions will alter the performance of the unit. Refer to the following instructions for replacing a soapstone slab:

- a) Order the replacement kit for the Elegance 36 soapstone slab.
- b) Remove the door from the firebox and place it face down on a soft surface. NOTE: Rotate the handle to permit proper placing.
- c) Remove the bottom plate (hearth) by lifting it out of the firebox.
- d) Remove the retainer at the top of the damaged slab by unfastening the two screws. Note that 1 retainer holds 2 slabs.
- e) Remove and replace the damaged slab.
- f) Assemble the retainer by fastening the two screws.
- g) Insert the bottom plate (hearth) and door to its original position.

WARNING: Do not operate the unit with any of the soapstone slabs missing.

6.5 Replacement of Door Gasket

SUPREME FIREPLACES INC. assembles heat resistant graphite coated gaskets on the doors of all products, allowing for a proper seal of the unit at extreme temperatures (up to 1000°F). It is recommended to perform a weekly visual check on the condition of the ¾” gasket to ensure proper operation of the unit. The ¾” gasket of your door needs to be replaced when 1) the fibers of the gasket are coming loose and 2) the gasket is disintegrating. Failure to replace a gasket under the mentioned conditions can cause irreversible damage to the unit due to over firing. Refer to the following instructions for replacing the ¾” gasket:

- a) Order the replacement kit for the Elegance 36 ¾” door gasket.
- b) Remove the door from the firebox and place it face down on a soft surface. NOTE: Rotate the handle to permit proper placing.
- c) Cover all painted surfaces of the door to avoid damages.
- d) Using a wedging tool or flat head screwdriver, gently remove the old ¾” gasket (along with the old silicone) from the door framing.
- e) Apply a bead of high temperature silicone along the groove of the metal brackets.

- f) Place the new $\frac{3}{4}$ " gasket around the door framing and cut any excess gasket with scissors. NOTE: It is recommended to tape the extremity of the gasket for a cleaner result.

Give significant amount of time to allow the silicone to cure before reinstalling the door onto the firebox. A slight resistance is expected when closing the door with the new $\frac{3}{4}$ " gasket; the door will close normally after the gasket has taken proper shape.

6.6 Replacement of Glass

SUPREME FIREPLACES INC. uses a high quality 5mm thick Pyroceram III / Keralite ceramic glass that can withstand temperatures up to 1300°F. It is recommended to perform a weekly visual check for any damages or cracks on the glass.

WARNING: Avoid striking the glass and slamming the door shut. Never operate the unit with a broken or damage glass.

CAUTION: Wear protective gloves when handling broken glass. Refer to the following instructions for replacing the glass:

- a) Order the replacement kit for the Elegance 36 glass.
- b) Remove, clean, and dispose any broken glass from the door and the surroundings.
- c) Remove the door from the firebox and place it face down on a soft surface. NOTE: Rotate the handle to permit proper placing.
- d) Using a wedging tool or flat head screwdriver, gently remove the $\frac{3}{4}$ " gasket (along with the silicone) from the door framing.
- e) Using a wrench, remove the 8 nuts fastened around the door framing.
- f) Remove the first row of metal brackets (2 small and 2 big) and thin gasket.
- g) Remove the damage glass and clean thoroughly the door framing from loose glass fragments.
- h) Place the new glass onto the second row of thin gasket, centered with the door framing.
- i) Place back the first row of metal brackets (2 small and 2 big) and thin gasket.
- j) Using a wrench, fasten the 8 nuts around the door framing (do not over-tighten).
- k) Apply a bead of high temperature silicone along the groove of the metal brackets.
- l) Place the $\frac{3}{4}$ " gasket back into position.

Give significant amount of time to allow the silicone to cure before reinstalling the door onto the firebox.

6.7 Door Latch Lubrication

Lightly lubricate the hook of door latch (CM0031) on a yearly basis to prevent abrasive wear.

6.8 Paint

Paint touch-ups can be performed on the unit using a high temperature paint (in aerosol spray can format) by Stove Bright®. Refer to your invoice to determine the precise color of your unit. Contact your local hearth shop for further information on purchasing this paint.

NOTE: Apply the paint in a well ventilated area. If applying paint to the door, properly cover/mask the glass of the door using painters tape and cardboard. Wait for paint to dry before operating the unit. Refer to the instructions on the label of the aerosol spray can for proper paint application. **WARNING: Never apply paint to the unit during operation or when it is hot.**

7 WARRANTY

SUPREME FIREPLACES INC. warrants that the factory-built fireplaces, fireplace inserts, and stoves will be free from defects in material and workmanship, under normal use and service, for a period of **twenty-five (25) years** from the date of purchase.

This warranty is only intended for the original retail purchaser, given that the product was purchased from SUPREME FIREPLACES INC. or one of its authorized dealers. This warranty is conditional upon correct installation and intended use of the products and does not cover damages caused by misuse. This warranty shall be void if the fireplace and stove is not installed by an authorized qualified technician in accordance with the installation instructions in the manual provided with this product. The installation must meet local and national building codes.

WARRANTY LIMITATIONS:

Abuse and improper use of the unit may cause irreversible damage and will void the warranty.

- I. During the first two years of the Limited Warranty, SUPREME FIREPLACES INC. will provide replacement parts at no charge and will also pay for reasonable labor costs, except for the parts listed in the EXCLUSIONS portion of this warranty.
- II. During the third through the fifth year of the limited warranty, SUPREME FIREPLACES INC. will provide replacement parts (if available) at no charge, except for the parts mentioned in the EXCLUSIONS portion of this warranty. Supreme Fireplaces Inc. shall not be responsible for any labor costs.
- III. From the sixth through the twenty-fifth year of the limited lifetime warranty, SUPREME FIREPLACES INC. will provide replacement parts (if available) at 50% of the retail price, except for the parts listed in the EXCLUSIONS portion of this warranty. SUPREME FIREPLACES INC. shall not be responsible for any labor costs.

Transportation, packaging, and other related costs or expenses arising from the replacement or repair of defective parts will not be covered by this warranty, nor will SUPREME FIREPLACES INC. assume responsibility for them.

EXCLUSIONS:

SUPREME FIREPLACES INC. shall not be responsible for any labor costs for the replacement or repair of any electrical components, painted/plated parts, secondary air burning system, and the combustion air control.

The following parts are guaranteed for 1 year: blowers, painted/plated parts, secondary air burning system, soapstone, and door gasket.

The following parts are guaranteed for 90 days: ceramic glass (**thermal breakage ONLY**).

This warranty applies to normal residential use only. Damages caused by acts nature or natural disasters, accidents, over firing, misuse, abuse, negligence, improper installation, alterations or substitutions of components of the fireplace insert, abrasives, chemical cleaners, and negligence are not covered by this warranty. Burning anything other than natural wood will damage your fireplace and void the warranty.

SUPREME FIREPLACES INC. will not be responsible for environmental conditions such as inadequate vents or ventilation, excessive venting configurations or negative air pressures which may or may not be caused by mechanical systems such as exhaust fans, furnaces, clothes dryers, etc.

The manufacturer at its discretion may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of the defective part(s).

The manufacturer shall in no event be responsible for any consequential damages of any nature, which are in excess of the original purchase price of the product. Any complete fireplace, or part thereof, that is replaced or serviced under this warranty will be warranted for a period not exceeding the remaining term of the original warranty.

This **Limited Lifetime Warranty** is effective on all appliances sold and supersedes any and all warranties currently in existence.

Please register your SUPREME product online at <http://www.supremem.com/registration.php> to ensure full warranty coverage. Prior to contacting SUPREME FIREPLACES INC., have the following information available for warranty claim processing:

- Customer information (name, telephone number, and address)
- Proof of purchase
- Model name and serial number (see Section 2.7)
- Detailed description of defected component
- Digital pictures (if necessary)

In the case of a return for repair or replacement, it is the responsibility of the customer to adequately package the component/unit to prevent further damage during transport. Items sent to the SUPREME FIREPLACES INC. without an open warranty claim will be returned to the sender.

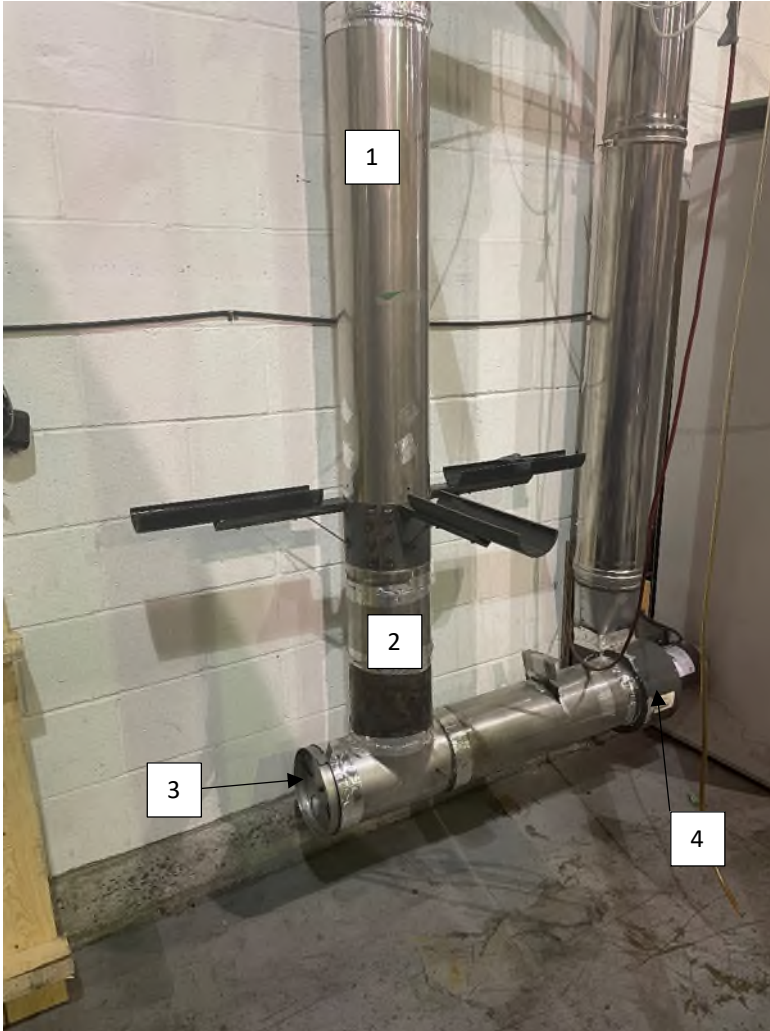
Warranty claims should be addressed to:

SUPREME FIREPLACES INC.
3594 Jarry East, Montreal, QC
H1Z 2G4, Canada
T: 877-593-4722, F: 514-593-4424
Website: www.supremem.com
E-mail: info@supremem.com

APPENDIX 8: Photographs of test set up

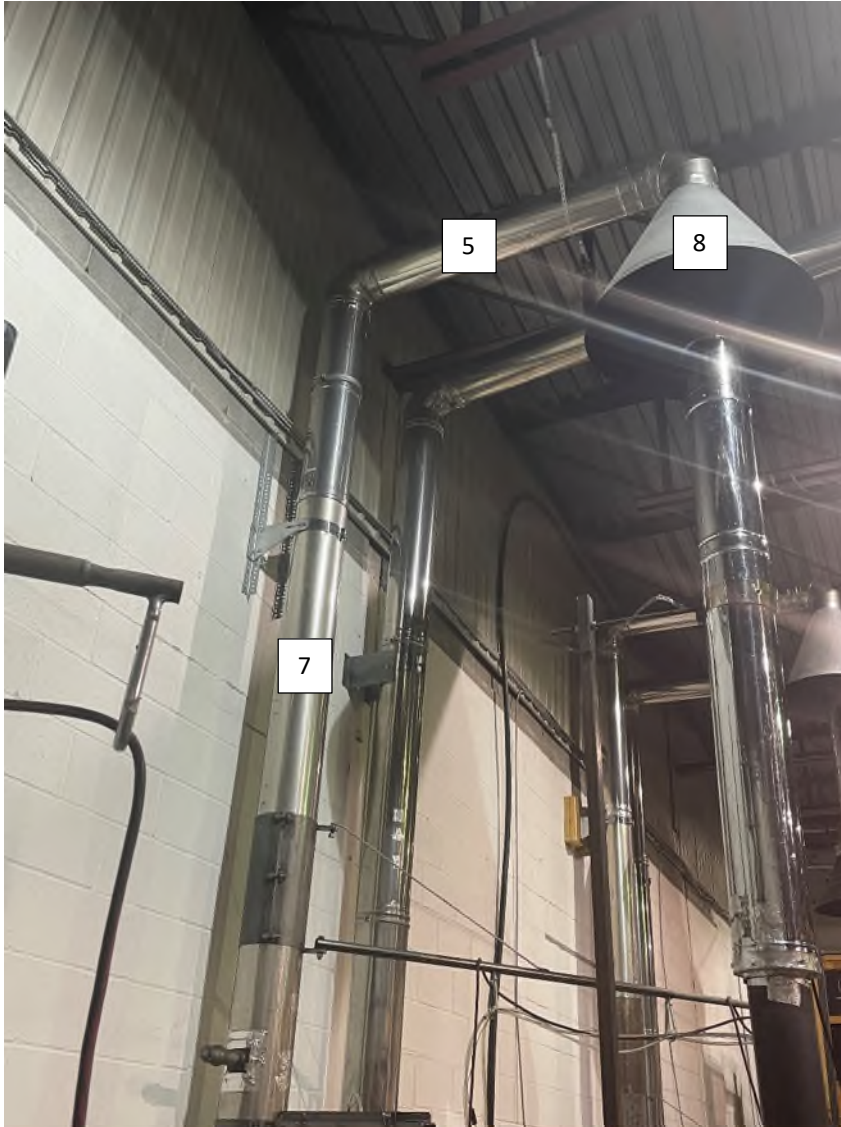
Dilution picture Dia 8

Picture 1: Sampling system



- 1 : 8 in dia Stainless steel pipe
- 2 : 16 in. Between sampling probe and lower elbow
- 3 : Air intake with damper to adjust flow rate
- 4 : Exhaust blower

Picture 2: Hood



5 : 8 in. dia. Stainless steel pipe

6 : na

7 : 10 feet long between velocity port and upper elbow

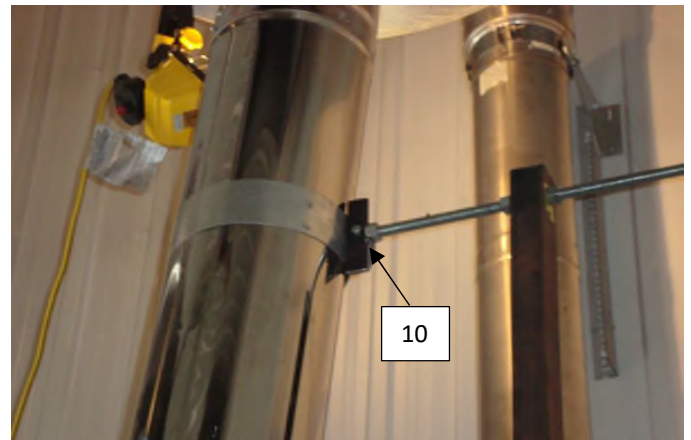
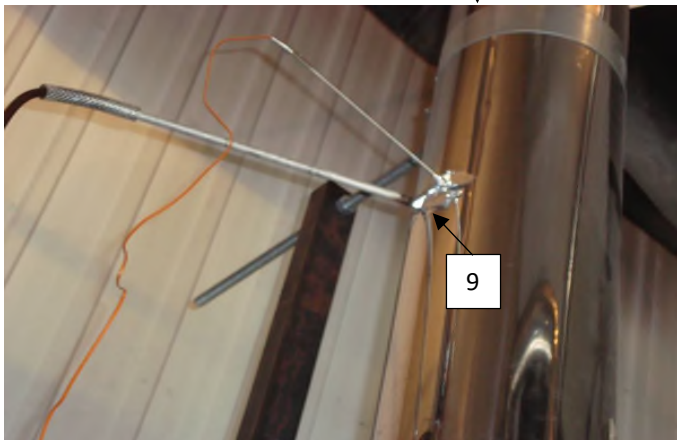
8 : 48 in. dia. Galvanized steel smoke captures hood

Picture 3: Stack sampling



Picture 3.1: Gas analysis and temperature probe

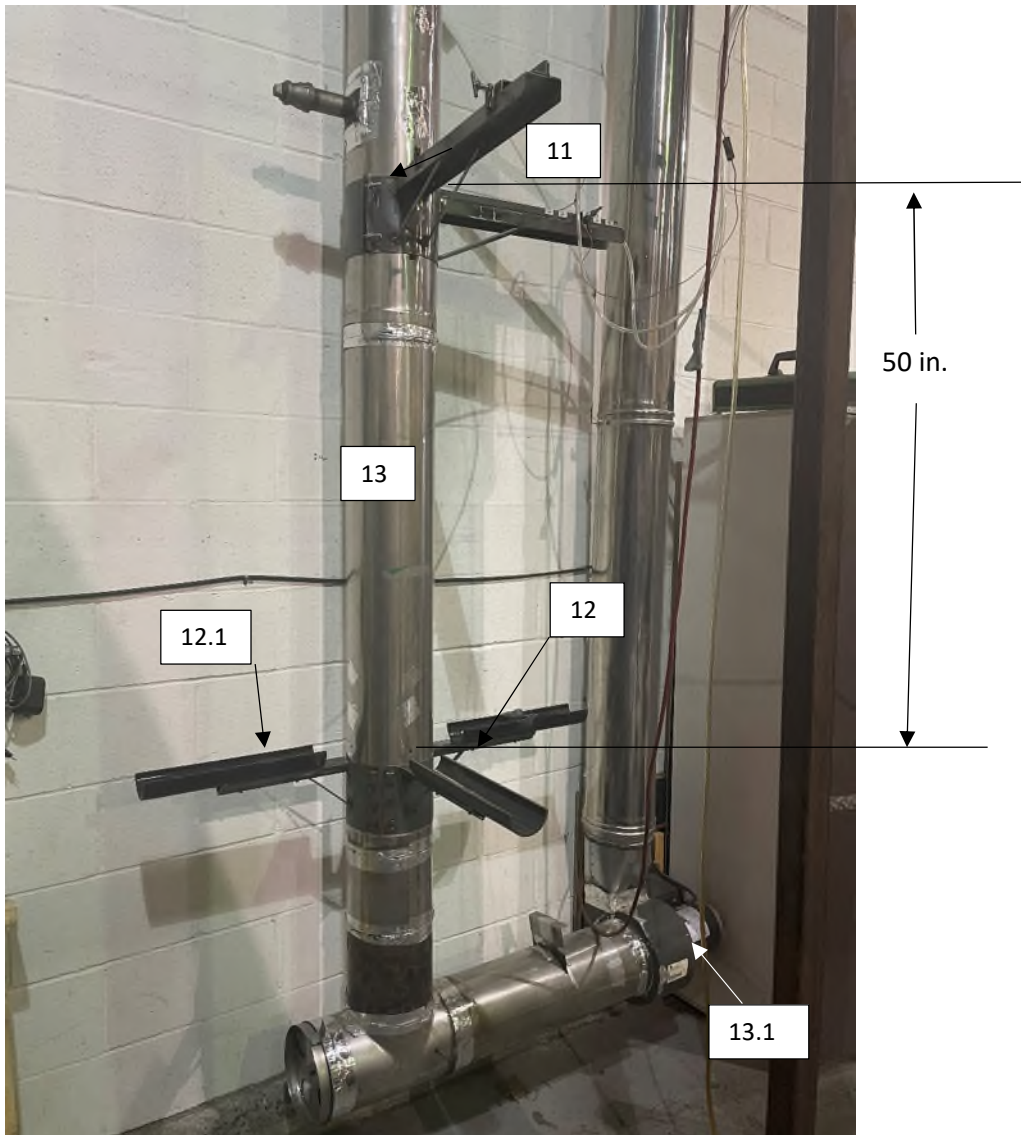
Picture 3.2: chimney support



9 : Temperature and gas analyser sampling ports located 9 feet above platform

10 : Exhaust system support bracket

Picture 4: Tunnel flow measurement and sampling probe



11: Velocity port

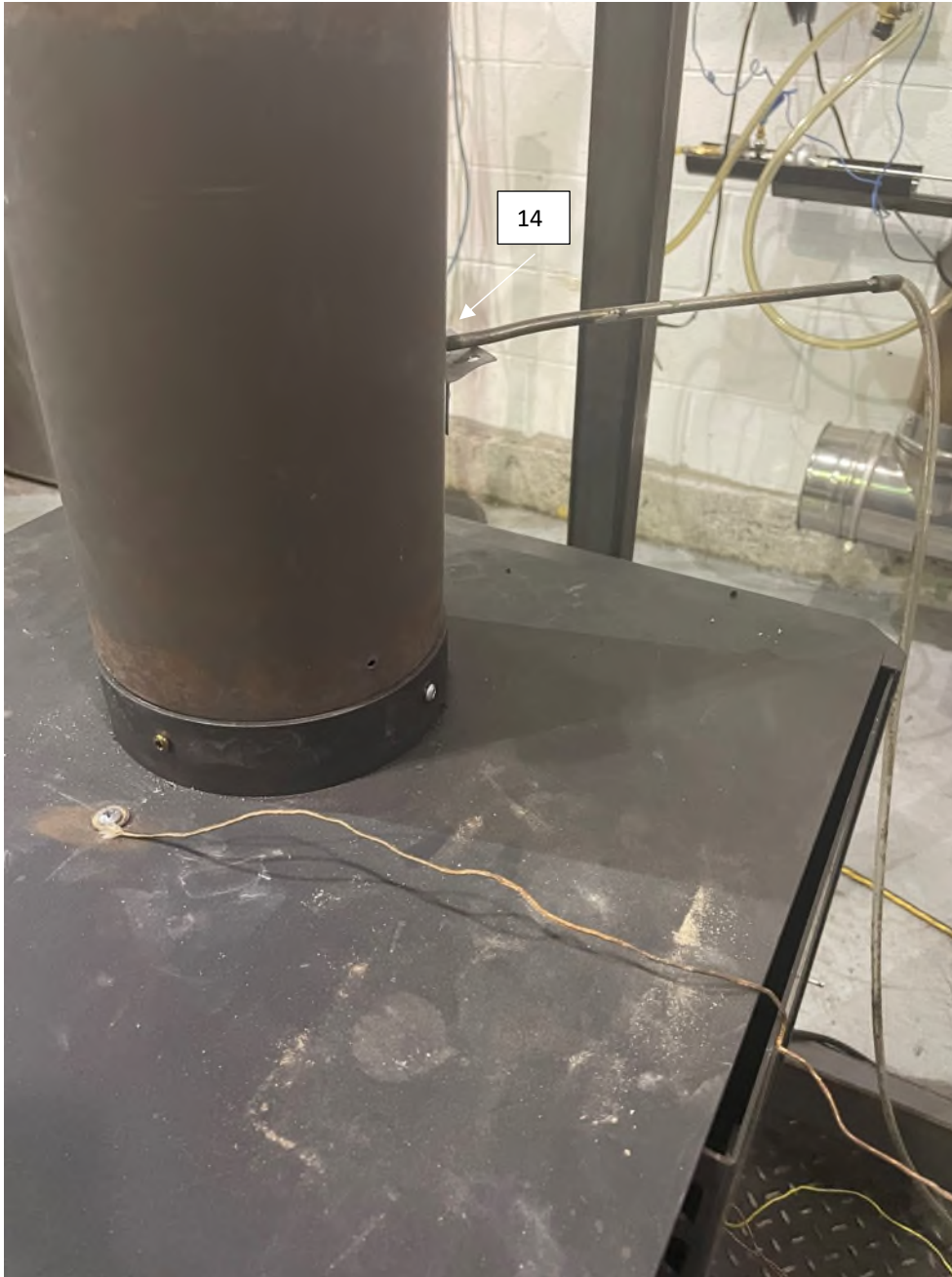
12: Sampling port, 2 sampling probes with 2x47 mm. dia.filter each.

12.1: Sampling port, sampling probes with 2x47 mm. dia.filter each., for first hour sampling

13:18 feet long dilution tunnel

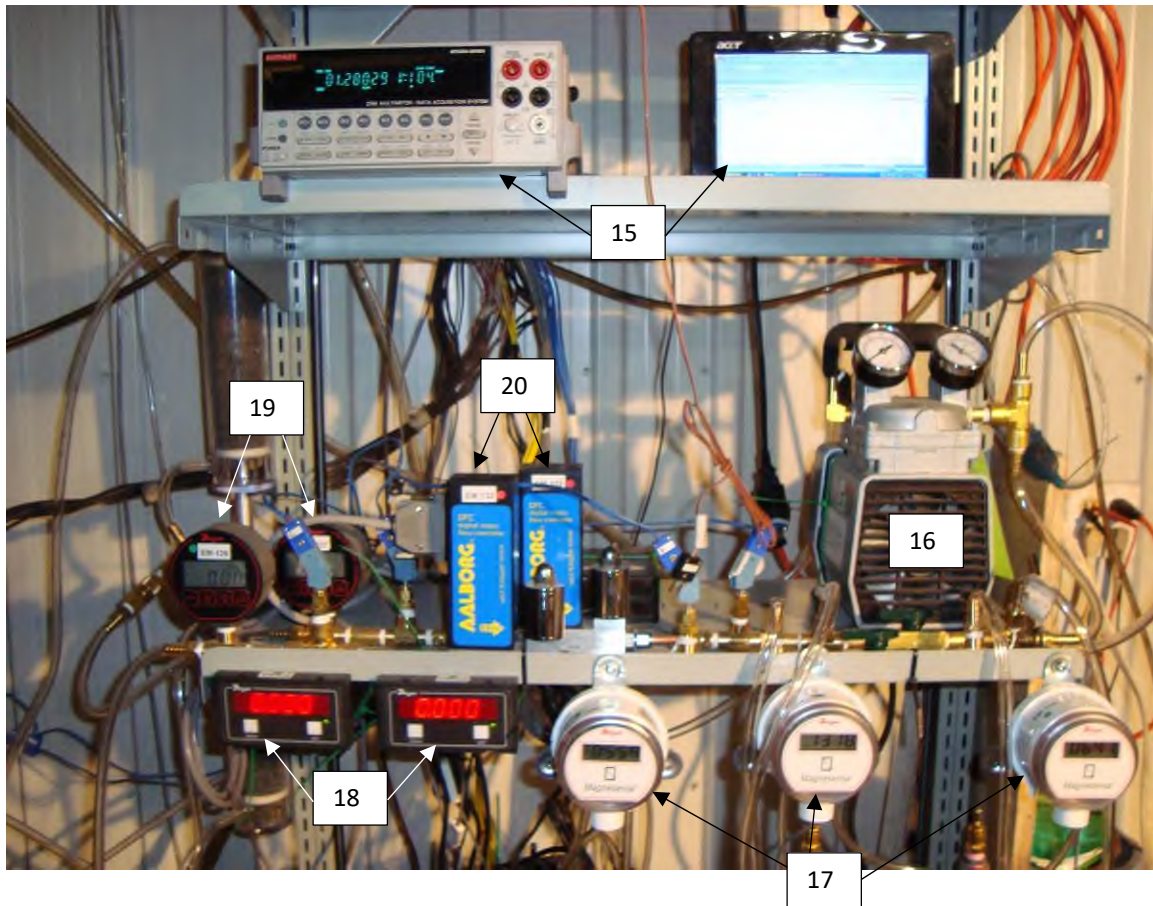
13.1: Extraction blower

Picture 5: Draft sampling



14 : Draft sampling port located 6 in. from the flue outlet

Picture 6: Equipments

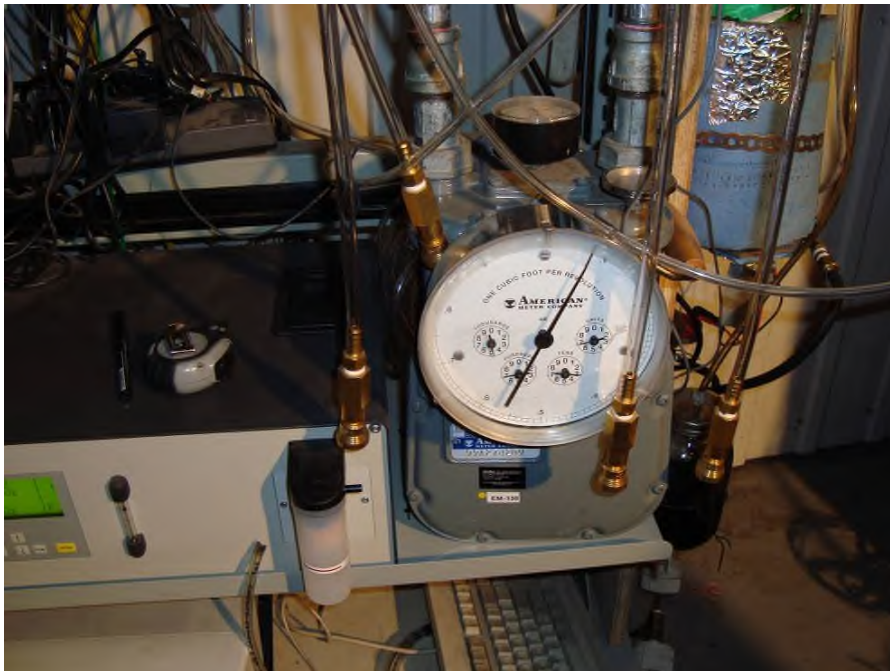


- 15 : Acquisition system
- 16 : Vacuum pump
- 17 : Digital manometer
- 18 : Digital read out for mass flow meter
- 19 : Digital vacuum gage
- 20 : Mass flow meter

Picture 7: Gaz analyser



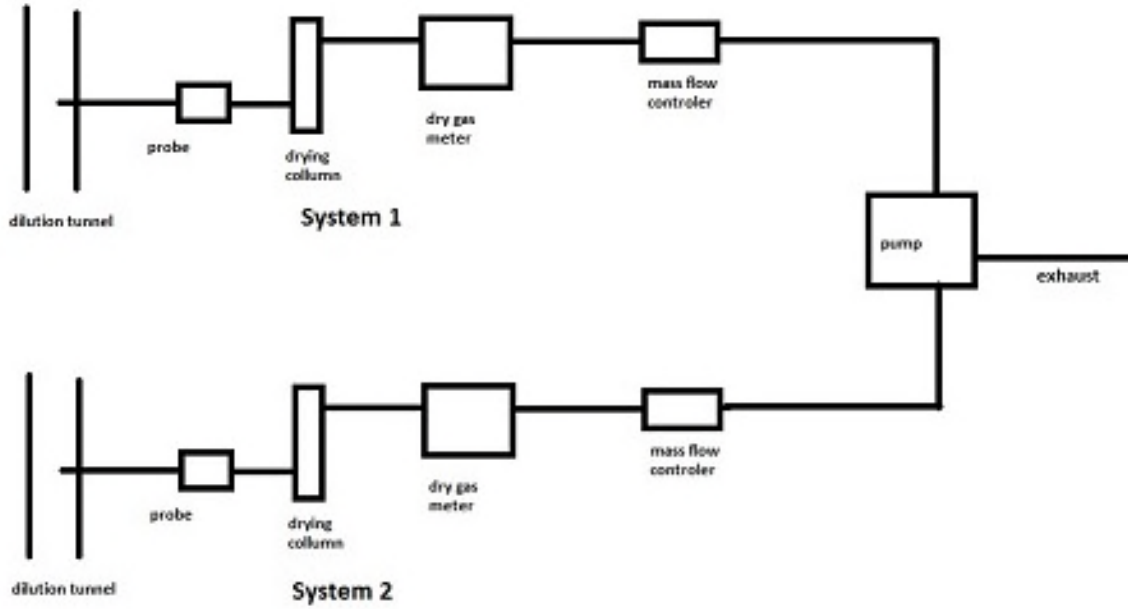
Picture 8: Reference dry gas meter



Picture 11: Dry gas meter



Picture 12: Dilution tunnel sample system



Picture 13: Dilution tunnel

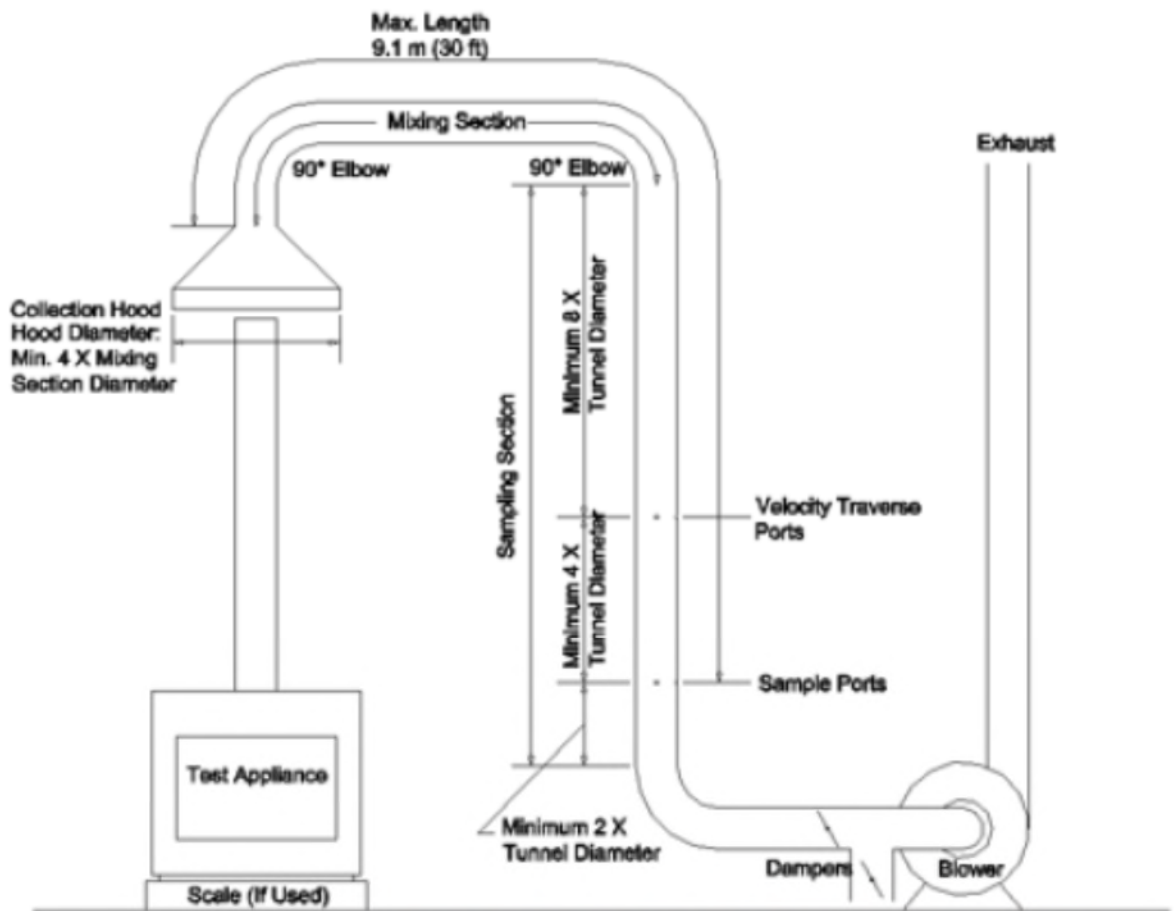


FIG. 3 Steel-Constructed Dilution Tunnel Apparatus

APPENDIX 9: Test load photographs

Run 1 September 6th 2016, 24SF maximum burn rate

Testing load



Testing load side view



Load in the heater



Back view of the heater



Run 2 September 7th 2016, 24SF minimum burn rate

Testing load



Load in the heater



Testing load side view



Run 3 September 8th 2016, 24SF medium burn rate

Testing load



Load in the heater



Testing load side view



Run 4 September 9th 2016, 24SF maximum burn rate

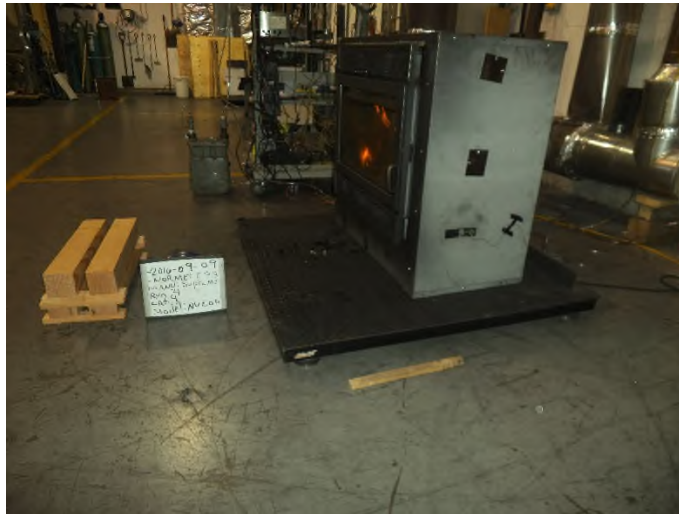
Testing load



Load in the heater



Testing load side view



Run 5 September 12th 2016, 24SF minimum burn rate

Testing load



Load in the heater



Testing load side view



Run 6 September 13th 2016, 24SF minimum burn rate

Testing load



Load in the heater



Testing load side view



Run 7 September 14th 2016, 24SF No fan confirmation test

Testing load



Load in the heater



Testing load side view



APPENDIX 10: Laboratory Operating Procedures

POLYTESTS Services inc.

SFBA EMISSIONS AND EFFICIENCY TESTING LABORATORY OPERATING PROCEDURE

INTRODUCTION

This document provides a step by step guide for the technician conducting tests to EPA standard requirements. Procedures outlined here, when followed, will result in tests in conformance with EPA Methods 28R, ASTM E2780, ASTM E2515, ASTM E2618, Method 28WHH, Method 28 PTS.

The primary measurements to be made are particulate emissions rates. The technician's duties include the following steps.

1. Incoming inspection of test units.
2. Set-up of test units.
3. Preliminary testing to establish unit operating procedures and familiarity with operating controls.
4. Calibration of test equipment.
5. Set-up, checking and operation of sampling apparatus.
6. Conduct of tests including complete record keeping and data recording for non-automated functions.
7. Operation of hardware and software included in automatic data acquisition system.
8. Review and analysis of data at test completion to ensure test validity.

The technician running this test must be familiar with the following documents, which are to be kept in the laboratory at all, times.

EPA METHODS

1. EPA Methods 28R
2. ASTM E2780
3. ASTM E2515
4. ASTM E2618
5. Method 28WHH
6. Method 28 PTS

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SFBA EMISSIONS AND EFFICIENCY TESTING LABORATORY OPERATING PROCEDURE

I. APPLIANCE INSPECTION AND SET-UP

A. INCOMING INSPECTION

1. Check for completeness of unit including parts, accessories, installation and operating instructions, drawings and specifications etc. Note any discrepancies or missing parts or information.
2. Check for shipping damage. If damage has occurred, notify the laboratory manager. In some cases, repairs may be made, provided the manufacturer and laboratory manager concur that repairs will not affect the unit's performance. If damage is irreparable, a new unit will need to be obtained.
3. Note whether unit is catalytic or non-catalytic.
4. Mark unit with manufacturer's name, model number, work order number and date received.
5. If unit is safety listed, note label data including listing agency and serial number. If unit is not listed, mark all data sheets "UNLISTED". Test results will not be released until unit passes safety tests without modification unless authorized by laboratory manager.

B. UNIT SET-UP

1. All new units must be operated for a breaking in period as follows.
 - a) Non-catalytic units: Ten (48) hours at medium burn rate with Douglas Fir scrap or cordwood.
 - b) Catalytic units: Fifty (50) hours at medium burn rate with Douglas Fir scrap or cordwood.

During these break-in runs the unit may be connected to a lab chimney and fuel additions noted into the corresponding data acquisition file. For catalytic units, a thermocouple must be installed in the catalyst.

Record catalyst temperature at 1-hour intervals or on chart recorder. Operating should continue until data shows at least fifty (50) hours of operation with catalyst temperature in excess of 800 degrees Fahrenheit (active range).

For non-catalytic units a stack thermocouple should be installed and stack temperature recorded at 1-hour intervals. Fourty-eight (48) hours minimum burn time with a stack temperature of at least 250 degrees Fahrenheit is required.

2. Once break-in is completed, allow unit to cool. Clean unit thoroughly.

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SFBA EMISSIONS AND EFFICIENCY TESTING LABORATORY OPERATING PROCEDURE

3. Unit is to be placed on scale for testing. Prior to proceeding with verification process, scale should be turned on and allowed to warm up for one (1) hour minimum. Zero scale and check calibration with standard weights. One (1) 1 kg weight and one (1) 2 kg weight are provided for this purpose. Use scale verification test form no. EPA-7-TP to record results. If scale fails to reproduce weights within tolerance, check with laboratory manager before proceeding.
 4. If scale checks out, place unit on scale and align so chimney will be centered in hood.
 5. Attach chimney connector and chimney. Be sure all joints are sealed below sampling points. Chimney and connector should be cleaned with a wire brush. Be sure chimney connector terminates and chimney starts at proper level above scale platform. Chimney must be supported from scale so that it does not touch test enclosure or hood walls.
 6. Thermocouples should be attached to surfaces of unit prior to testing. EPA requires a thermocouple on the bottom of the firebox. This must be installed prior to putting the unit on the scale. In some cases, the required thermocouple locations will be inaccessible on finished units. These units should have thermocouples installed by the manufacturer during construction. Check with the laboratory manager if problems are encountered in proper thermocouple attachment.
 7. Measure firebox dimensions and record on data forms nos. EPA-2-TP. Make a three dimensional sketch of the firebox including firebrick, baffles and obstructions. Calculate firebox volume in cubic feet with both addition and subtraction methods using forms nos. EPA-3-TP and EPA-4-TP. See Section 6.2.4 of EPA Method 28 for details of firebox volume determination.
 8. If unit is catalytically equipped, additional thermocouples must be installed upstream and downstream of catalyst. Thermocouples should also be placed in the primary and secondary combustion chambers of all units.
 9. Plug thermocouples into data acquisition system jacks making a check of locations and jack numbers for each test on data form no. EPA-5-TP.
 10. Note that inserts are tested as if they are freestanding stoves.
 11. Dilution tunnel should be cleaned prior to each certification test series and at anytime a higher burn rate follows a lower test burn rate.
- II. SAMPLING SYSTEM – SET-UP
- A. GAS ANALYSIS**
1. Instruments should be turned on and allowed to warm up for one (1) hour minimum.

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2. Calibrate analyzers as follows:

NOTE : Prior to proceeding with calibration, make sure to use NIST traceable 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 nitrogen, 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 CO₂ and CO analyzers are “ZEROED” on nitrogen. The O₂ 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 (O₂ should be 20.93, CO and CO₂ should equal 0).
- 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 H₂SO₄
Impinger #2: 100 ml distilled water and 5 ml H₂SO₄
Impinger #3: Empty
Impinger #4: 200 – 300 grams silica gel (dry)
- 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.

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- 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 ambient conditions on data form no. EPA-8-TP.

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. EPA-10-TP. 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.
 - 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.)

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c) Allow vacuum indication to stabilize for two (2) minutes, then record time and dry gas (DGM₁) and (DGM₂) meter readings. Wait ten (10) minutes and record dry gas meter readings again (DGM₃, DGM₄). 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 CFM₁ or CFM₂ is greater than .02 CFM, leakage is unacceptable and system must be resealed.

If CFM₁ or CFM₂ 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. Record leakage rates on form no. EPA-5-TP

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.

III. 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. Record individual piece load on form no. EPA-11-TP.

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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. Record moisture of each individual piece load on form no. EPA-11-TP.

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. EPA-9-TP.
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 anemometer. 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.

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8. All fuel additions, air intake settings and operational characteristics shall be noted with associated time stamp on form no. EPA-1-TP.

C. TEST RUN

1. Once the targeted test fuel bed weight is obtained, 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 verify at each interval that the following readings are correctly logged by the data acquisition system and make observations of any unusual or non routine events that could occur.
 - 1) Rotometer readings.
 - 2) Tunnel pitot tube reading.
(Zero regularly between readings)
 - 3) Gas meter readings.
 - 4) Temperature readings.
 - 5) Draft reading
 - 6) Test load weight
 - 7) CO, CO₂ and O₂ 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

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other equipment. Be sure dryers and filters are working and monitor impinger train for proper water and ice levels etc.

- 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.

IV. POST TEST PROCEDURES

A. 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. EPA-10-TP.

B. 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.

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.

APPENDIX 11: Sample calculations

Validation du fichier de calcul avec les équations provenant des normes:

ASTM E2515-11

ASTME2618

Dry burn rate (BR)

Equation used

B415.1, 13.4

$$BR = \left[\frac{60W_{WD}}{\theta} \right] \left[\frac{100 - \%M_W}{100} \right]$$

Nomenclature

BR	Dry wood burn rate, kg/hr (lb/hr)
W_{WD}	Total mass of wood burned (wet basis) during the test run, kg (lb)
θ	Total time of test run, minutes
$\%M_W$	Average moisture in test fuel charge, wet basis, % To convert from dry basis to wet basis: % moisture wet basis =

Sample calculation

Data

W_{WD}	16,444 lbs
θ	456 min
$\%M_W$	17,90 %

Calculation

BR	0,806 Dry kg/hr
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Volume of gas sample corrected to dry standard conditions ($V_{m(std)}$)

Equation used

ASTM 2515, equation 6

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

Nomenclature

$V_{m(std)}$	Volume of gas sample , corrected to standard conditions, dscm ³ (dscf)
K_1	17.64 R/in Hg
V_m	Volume of gas sample
Y	DGM calibration factor
P_{bar}	Barometric pressure mmHg (in Hg)
ΔH	Average pressure at the outlet of the dry gas meter mm water (in. Water)
T_m	Absolute average dry gas meter temperature K (R)

Sample calculation

Data

V_m	83,10 dcf
Y	0,992
P_{bar}	29,97 in Hg
ΔH	-0,4657 in Hg
T_m	545,0 R

Calculation

$V_{m(std)}$	78,74 dscf
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Total amount of particulate matter collected (m_n)

Equation used

ASTM 2515, equation 12

$$m_n = F_1 + F_2 + \Delta PF$$

Nomenclature

m_n	Total amount of particulate matter collected, mg
F_1	Particulate matter collected on front filter, mg
F_2	Particulate matter collected on second filter, mg
ΔPF	Post-test weight gain of probe and filter holder assembly, mg

Sample calculation

Data

F_1	0,0033 g
F_2	0,000 g
ΔPF	0,002 g

Calculation

m_n	5,200 mg
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Calculation based of train 2 data

Particulate concentration (C_s)

Equation used

ASTM 2515, equation 13

$$C_s = (0,001 \text{ g/mg}) \times \left(\frac{m_n}{V_{m(\text{std})}} \right)$$

Nomenclature

C_s	Concentration of particulate matter in stack gas or dilution tunnel, dry basis, corrected to standard conditions, g/dsm^3 (g/dscf)
m_n	Total amount of particulate matter collected in the sampling train, mg
$V_{m(\text{std})}$	Volume of gas sample measured corrected to dry standard conditions, dsm^3 (dscf)

Sample calculation

Data

m_n	5,200 mg
$V_{m(\text{std})}$	78,74 dscf

Calculation

C_s	0,000066 g/dscf
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Calculation based of train 2 data

Particulate concentration for room air (C_r)

Equation used

ASTM 2515, equation 14

$$C_r = (0,001 \text{ g/mg}) \times \left(\frac{m_r}{V_{mr(std)}} \right)$$

Nomenclature

C_r	Concentration of particulate matter in room air, dry basis, corrected to standard conditions, g/dsm ³ (g/dscf)
m_r	Total amount of particulate matter collected in the sampling train, mg
$V_{mr(std)}$	Volume of room air sample measured corrected to dry standard conditions, dsm ³ (dscf)

Sample calculation

Data

m_r	0,100 mg
$V_{mr(std)}$	55,41 dscf

Calculation

C_r	0,000002 g/dscf
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Calculation based of train 2 data

Adjustment factor for alternative pitot tube placement (FP)

Equation used

ASTM 2515, equation 1

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

Nomenclature

V_{strav}	Average gas velocity cacluated after the Pitot tube traverse
V_{scent}	Average gas velocity at the center of the dilution tunnel cacluated after the multi-point Pitot traverse
F_P	Adjustment factor for center of tunnel pitot tube placement

Sample calculation

Data

V_{strav}	0,0539
V_{scent}	0,0555

Calculation

F_P	0,971171
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Average dilution tunnel gas velocity (V_S)

Equation used

ASTM 2515, equation 9

$$V_S = F_p K_p C_p (\sqrt{\Delta P})_{avg} \sqrt{\frac{T_S}{P_S M_S}}$$

Nomenclature

V_S	Average dilution tunnel gas velocity, m/s (ft/s)
K_p	Pitot tube constant For the metric units: $34.97 \text{ m/sec} \left[\frac{(\frac{g}{\text{mole}})(\text{mm Hg})}{(^{\circ}\text{K})(\text{mm H}_2\text{O})} \right]^{1/2}$ For English units: $85.49 \text{ ft/sec} \left[\frac{(\frac{\text{lb}}{\text{mole}})(\text{in Hg})}{(^{\circ}\text{R})(\text{in H}_2\text{O})} \right]^{1/2}$
C_p	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
F_p	Pitot tube correction factor
$(\sqrt{\Delta P})_{avg}$	Average square root of each individual velocity head (ΔP)
P_{bar}	Barometric pressure at measurement site, mm H ₂ O (in. H ₂ O)
P_g	Stack static pressure, mm Hg (in. Hg)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
M_S	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78 or 29 for CSA B415
t_s	Dilution tunnel temperature, °C (°F)
T_S	Absolute dilution tunnel temperature, °K (°R), or $273 + t_s$ for metric units, $460 + t_s$ for English units

Sample calculation

Data

K_p	85,49
C_p	0,99
F_p	0,971
$(\sqrt{\Delta P})_{avg}$	0,2251 in H ₂ O ^{1/2}
P_{bar}	29,97 in Hg
P_g	0,23 in H ₂ O
P_S	29,99 in Hg
M_S	28,78 lb/lb-mol
t_s	95,92 F

T_s 555,92 R

Calculation

V_s 14,8505 ft/s

Average dilution tunnel gas flow rate (Qstd)

Equation used

ASTM 2515, equation 3

$$Q_{std} = 60(1 - B_{ws})V_S A \left(\frac{T_{std}}{T_S}\right) \left(\frac{P_S}{P_{std}}\right)$$

Nomenclature

Q_{std}	Total gas flow rate corrected to dry standard conditions, dsm^3/min (dscf/min)
60	Conversion factor minutes per hour
B_{ws}	Water vapour in the dilution tunnel stream, proportion by volume (may be assumed to be 2%)
V_S	Average dilution tunnel gas velocity, m/s (ft/s)
A	Cross-sectional area of dilution tunnel, m^2 (ft^2)
T_{std}	Standard absolute temperature, 293 °K (528°R)
T_S	Absolute average dilution tunnel temperature, K ($^{\circ}\text{R}$), or $273 + t_s$ for metric units, $460 + t_s$ for English units
t_s	Dilution tunnel temperature, °C (°F)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
P_{bar}	Barometric pressure at measurement site, mm Hg (in. Hg)
P_g	Dilution tunnel static pressure, mm Hg (in. Hg)
P_{std}	Standard absolute pressure, 760 mm Hg (29.92 in. Hg)

Sample calculation

Data

B_{ws}	0,02
V_S	14,851
A	0,349 ft^2
T_{std}	528 R
T_S	555,92 R
P_S	29,989 in Hg
P_{std}	29,92 in Hg

Calculation

Q_{std}	290,17 dscf/min
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Particulate emission rate (E)

Equation used

$$E = (C_s - C_r)Q_{std}$$

Nomenclature

E	Particulate emission rate, g/hr
C_s	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, g/dscm ³ (g/dscf)
C_r	Concentration of particulate matter in room air, g/dscm ³ (g/dscf)
Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm ³ /min (dscf/min)

Sample calculation

Data

C_s	0,000066 g/dscf
C_r	0,000002 g/dscf
Q_{std}	290,17 dscf/min

Calculation

E	0,02 g/min
E	1,12 g/h

Calculation based on train 2 data.

Total particulate emission rate (E_T)

Equation used

ASTM 2515, equation 15

$$E_T = (C_S - C_r)Q_{std}\theta$$

Nomenclature

E_T	Total particulate emission, g
C_S	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, g/dscm ³ (g/dscf)
C_r	Concentration of particulate matter in room air, g/dscm ³ (g/dscf)
Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm ³ /min (dscf/min)
θ	Total sampling time, min

Sample calculation

Data

C_S	0,000066 g/dscf
C_r	0,000002 g/dscf
Q_{std}	290,17 dscf/min
θ	456 min

Calculation

E 8,50 g
Calculation based on train 2 data.

Average gas velocity in dilution tunnel during each min interval, i, of the test run

Equation used

ASTM 2515, equation 10

$$v_{si} = F_p K_p C_p \sqrt{\Delta p_i} \sqrt{\frac{T_{si}}{P_s M_s}}$$

Nomenclature

	Average gas velocity in dilution tunnel during each min interval, i of the test run
v_{si}	m/sec (ft/sec)
F_p	Pitot tube correction factor
K_p	Pitot tube constant
	For the metric units: $34.97 \text{ m/sec} \left[\frac{(\frac{g}{\text{mole}})(\text{mm Hg})}{(^{\circ}\text{K})(\text{mm H}_2\text{O})} \right]^{1/2}$
	For English units: $85.49 \text{ ft/sec} \left[\frac{(\frac{\text{lb}}{\text{mole}})(\text{in Hg})}{(^{\circ}\text{R})(\text{in H}_2\text{O})} \right]^{1/2}$
C_p	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
Δp_i	interval, i, of the test run
T_{si}	Absolute average gas temperature in the dilution tunnel during the i^{th} minutes
P_s	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{\text{bar}} + P_g$
M_s	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78

Sample calculation

Data

i=1		i=2	
F_p	0,971	F_p	0,971
K_p	85,49	K_p	85,49
C_p	0,99	C_p	0,99
Δp_i	0,053 in H ₂ O	Δp_i	0,053 in H ₂ O
T_{si}	548,8 R	T_{si}	548,5 R
P_s	29,99 in Hg	P_s	29,99 in Hg
M_s	28,78 lb/lb-mol	M_s	28,78 lb/lb-mol

Calculation

i=1		i=2	
v_{si}	15,11 ft/sec	v_{si}	15,07 ft/sec

Percent of proportional sampling rate (PR)

Equation used

B415, equation 13.1

$$PR = \left(\frac{\theta V_{mi(std)} V_S T_m T_{Si}}{\theta_i V_m V_{Si} T_{mi} T_S} \right) \times 100$$

Nomenclature

PR	Percent of proportional sampling rate (%)
θ	Total sampling time, min
θ_i	Time of interval, 1 min
V_m	Volume of gas sample measured by the DGM, dsm ³ (dscf)
$V_{mi(std)}$	Volume of gas sample measured by the digital mass flow controller during the i th 1 minutes interval, dsm ³ (dscf)
V_S	Average gas velocity in the dilution tunnel, ft/min
V_{Si}	Average gas velocity in the dilution tunnel during the i th 10 minutes interval, ft/min
T_m	Absolute average digital mass flow controller temperature, K (R)
T_{mi}	Absolute average digital mass flow controller temperature during the i th 1 minutes
T_S	Absolute average gas temperature in the dilution tunnel, K (R)
T_{Si}	Absolute average gas temperature in the dilution tunnel during the i th 1 minutes

Sample calculation

Data

train =1			train =2		
θ	456	min	θ	456	min
θ_i	1	min	θ_i	1	min
V_m	81,24	dcf	V_m	78,77	dcf
$V_{mi(std)}$	0,180	cuft	$V_{mi(std)}$	0,1719	cuft
V_S	14,86	ft/sec	V_S	14,86	ft/sec
V_{Si}	15,116	ft/sec	V_{Si}	15,116	ft/sec
T_m	544,7	R	T_m	545,0	R
T_{mi}	540,14	R	T_{mi}	540,55	R
T_S	555,92	R	T_S	555,92	R
T_{Si}	548,8	R	T_{Si}	548,8	R

Calculation

train=1		train=2	
PR	99,0 %	PR	97,3 %

Filter face velocity check

Equation used

$$FV_{max} = \frac{V_{mL}}{1} \times \frac{1}{F_A}$$

Nomenclature

FV_{max}	Maximum filter face velocity during the test run, m/min (ft/min)
V_{mL}	Largest 1 minute interval metered gas volume value recorded during the test run, dm ³ (dcf)
F_A	Filter area exposed to gas sample during train operation, m ² (ft ²)

Sample calculation

Data

V_{mL}	0,167 dcf
F_A	0,0116 ft ²

Calculation

FV_{max}	14,41 ft/min
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Dual train precision

Equation used

$$\frac{\text{Train 1} - \text{average train 1 and train 2}}{\text{average train 1 and train 2}} \times 100 \leq 7.5\%$$

Nomenclature

Dual train precision	Deviation between emission's train 1 and 2
Train 1	Total emission for train 1
Train 2	Total emission for train 2

Sample calculation

Data

Train 1	9,17 g
Train 2	8,46 g

Calculation

Dual train precision	4,02 %
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Analyzer drift checks

Equation used

$$Drift = \frac{\Delta R}{span} \times 100$$

Nomenclature

Drift	The change in analyzer response to calibration gas over the duration of the test run
ΔR	The difference between the analyzer response at the end of the test run and the
Span	The upper limit of the instrument range, ppmv or %

Sample calculation

Data

ΔR	0,015 %
Span	5 %

Calculation

Drift	0,30 %
-------	--------

Calculated with CO concentration values.

APPENDIX 12: Volume calculations

4 Volume Calculations

The usable firebox of the 24SF consists of a rectangular cuboid with a width of 24 in, depth of 12 in, and a height of 13.5 in, making a 2.25 ft³ combustion chamber (refer to Figure 4).

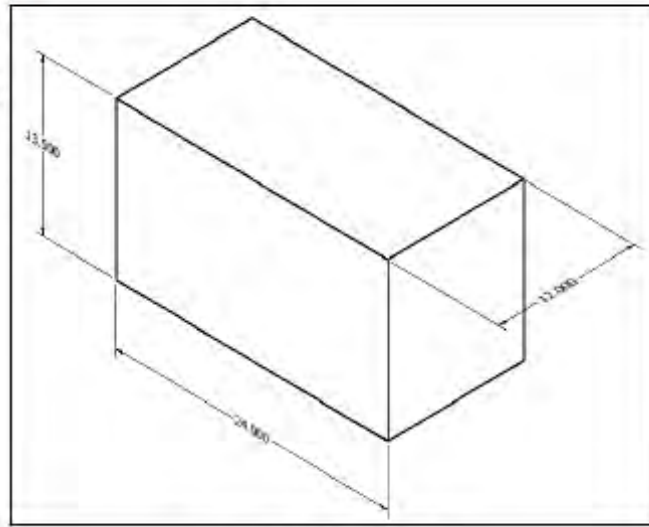


Figure 4: 24SF Usable Firebox

APPENDIX 13: Operating instruction

14 Primary Air Control

The Primary Air Control is a patented mechanism (Patent No: US 7,325,541 B2) that regulates the air flow into the firebox based on the temperature of the unit. It is located on the top of the firebox, at the front center of the unit. The combustion air control of the 24SF has two components: the Activator and the Burn Rate Selector. The left combustion control lever is the Activator. When starting a fire or adding a new load of wood, the Activator must be pushed in to allow a primary source of air to enter the firebox. The Activator will retract automatically with heat. The right combustion control lever is the Burn Rate Selector. The Burn Rate Selector can slide sideways to achieve different burn rates. When the Burn Rate Selector is positioned to the left, a maximum burn rate is achieved and when it is positioned to the right, a minimum burn rate is set. Please refer to page 42 of 24SF_TECH_DRAW.pdf for details on the Primary Air Control assembly.

15 Unit Pre-Burn

15.1 Category 2

1. Load pieces of 2" X 4" BC Fir summing to a weight of 18 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the minimum burn rate position (Figure 9).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
6. Start the official test once the average temperature of the firebox has reached 260 to 270°F.

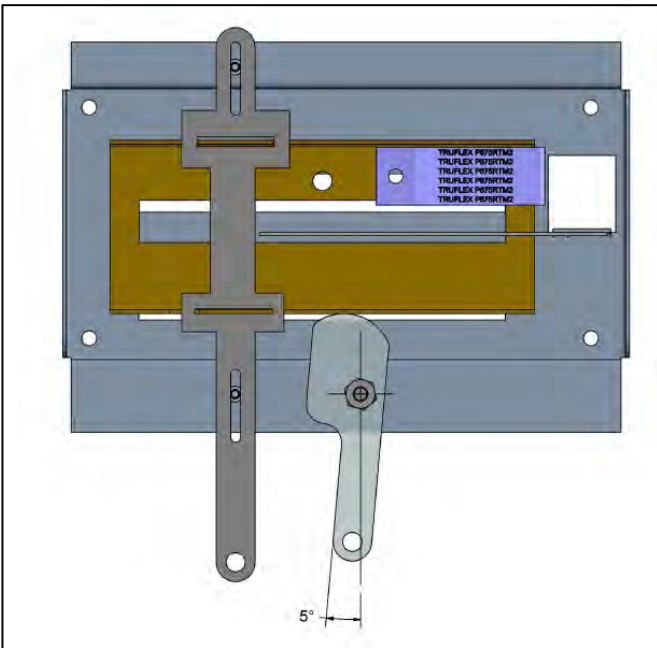


Figure 9: PAC Set to Maximum Burn Rate Position

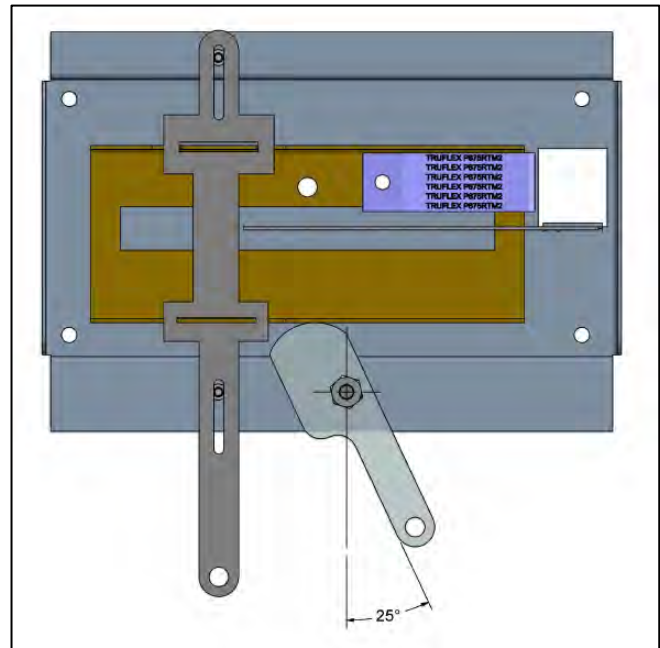


Figure 8: PAC Set to Minimum Burn Rate Position

15.2 Category 3

1. Load pieces of 2" X 4" BC Fir summing to a weight of 18 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the medium-high burn rate position (Figure 10).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall)
6. Start the official test once the average temperature of the firebox has reached 290 to 300°F.

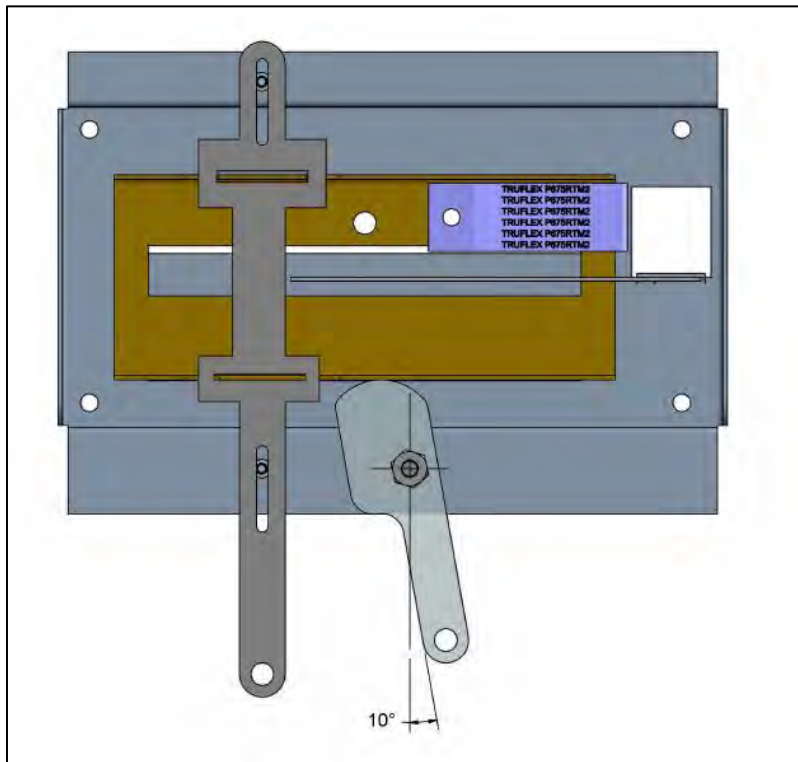


Figure 10: PAC Set to Medium-High Burn Rate Position

15.3 Category 4

1. Load pieces of 2" X 4" BC Fir summing to a weight of 20 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
5. Start the official test once the average temperature of the firebox has reached 320 to 340°F

15.4 No Blower

1. Load pieces of 2" X 4" BC Fir summing to a weight of 20 lbs.
2. Place and ignite a firestarter at the bottom of the load.
3. Activate the control, set the burn rate to the maximum (Figure 8), and close the door.
4. Once half the load is remaining, set the PAC to the medium-low burn rate position (Figure 11).
5. Throughout the combustion, crush and mix the wood until a uniform charcoal bed is created with a v-groove along the center of the firebox (door to back wall).
6. Start the official test once the average temperature of the firebox has reached 300 to 320°F.

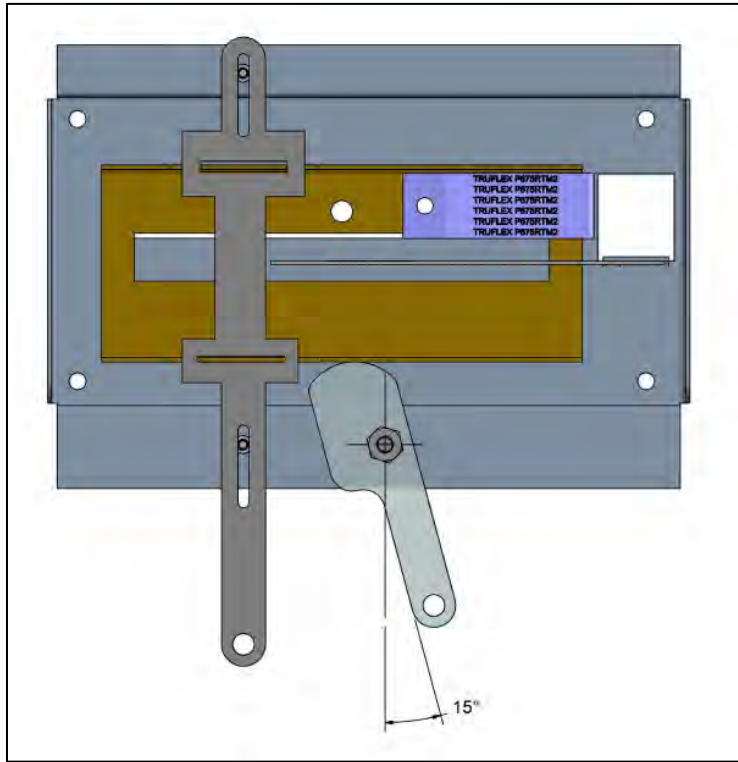


Figure 11: PAC Set to Medium-Low Burn Rate Position

APPENDIX 14: Drawing Air flow pattern

1 Models

The engine will have the model number of 24SF, which comprises the standard components related to the combustion of the unit (such as the firebox, the controls, and the baffle system). However, the engine will be under three model names (Ambiance Elegance 36, Nova, and Lotus), which differ from one another through aesthetics and marketing strategies. Details are to be determined at a later date.

2 Assembly, Sub-Assembly, Sectional View, and Detailed Drawings

Please refer to 24SF_TECH_DRAW.pdf for all assembly, sub-assembly, sectional view, and detailed drawings.

3 Air Flow Patterns

The primary air enters into the unit from two channels; the air wash and the booster. The opening of the channels is regulated by an automatic bi-metal control (refer to Section 14). Please refer to the following illustrations:

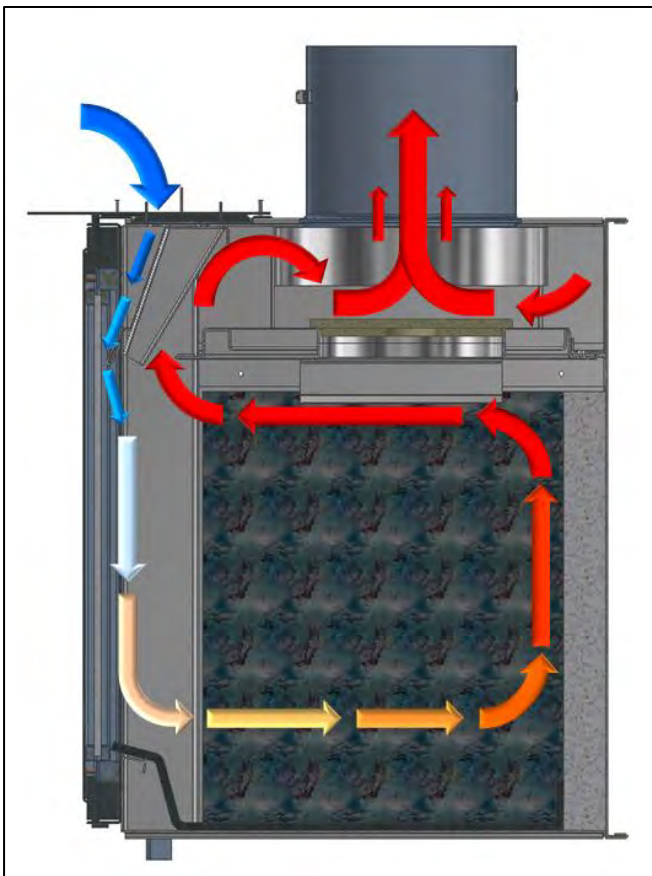


Figure 1: Primary Air through Air Wash Channel

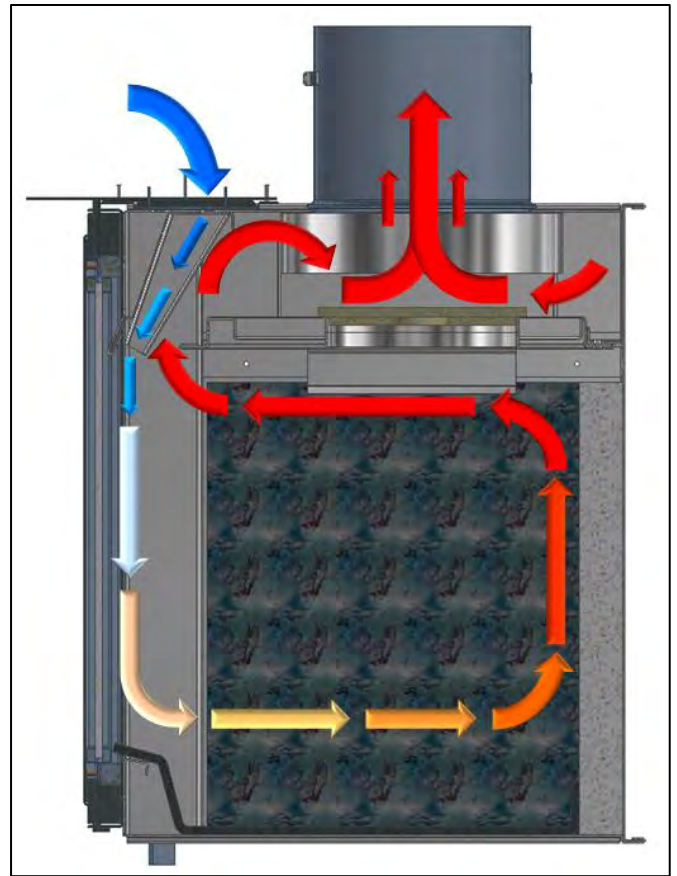


Figure 2: Primary Air through Booster Channel

The secondary air enters the combustion chamber from the top and through the baffle system. In contrast to the primary air, the secondary air intake is not regulated by a control and therefore remains completely open throughout the combustion cycle:

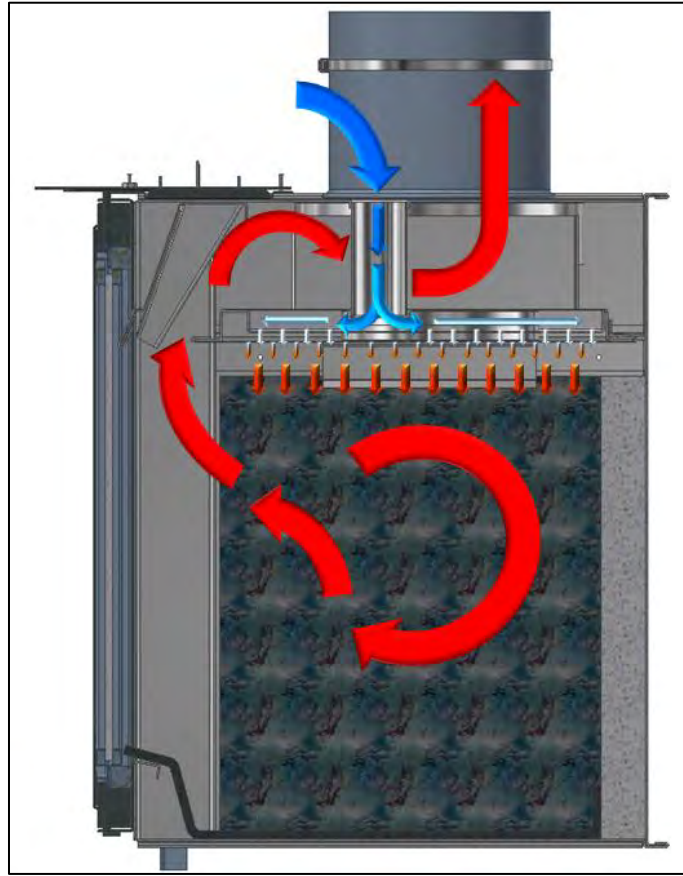


Figure 3: Secondary Air Flow Pattern

4 Volume Calculations

The usable firebox of the 24SF consists of a rectangular cuboid with a width of 24 in, depth of 12 in, and a height of 13.5 in, making a 2.25 ft³ combustion chamber (refer to Figure 4).

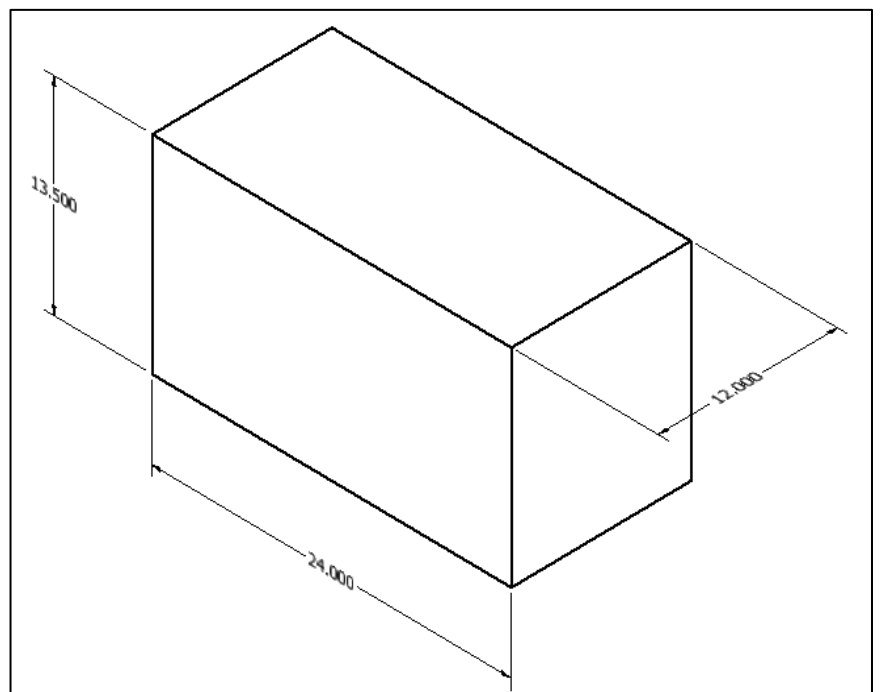


Figure 4: 24SF Usable Firebox

APPENDIX 15: WHA, 30 Day notice, Co, Others

**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
 2015 Standards of Performance for New Residential Wood Heaters, New Residential
 Hydronic Heaters and Forced-Air Furnaces Application
 40 CFR PART 60 SUBPARTS AAA AND QQQQ**

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to 40 CFR PART 60 Subparts AAA AND QQQQ, Sections 60.533(b), 60.5475(b), and Appendix A-8. This document may be revised periodically without public notice. If you have additional questions, please contact Rafael Sanchez at 202-564-7028 or via email at sanchez.rafael@epa.gov.

Contents

Application for US EPA certification	2
Wood Burning Heaters.....	6
I. Test Method 28R for Certification and Auditing of Wood Heaters.....	6
A. <i>Summary Results – Adjustable Wood Burning Heaters</i>	6
B. <i>Summary Results – Single Burn Rate Wood Burning Heaters</i>	8
C. <i>Summary Results – Pellet Heaters</i>	9
Hydronic Heaters	10
II. Test Method 28WHH for Measurement of Particulate Emissions and Heating Efficiency of Wood-Fired Hydronic Heating Appliances..	10
Table 1A. Data Summary Part A	10
.....	10
Table 1B. Data Summary Part B	11
Table 1C: Additional (Hangtag) Information	12
Table 2. Annual Weighting	13
III. Test Method 28WHH for Certification of Cord Wood-Fired Hydronic Heating Appliances With Partial Thermal Storage	14
Table 2A. Data Summary Part A	14
Table 2B. Data Summary Part B	15
Table 3C. Data Summary Part D	17
Forced-Air Furnaces.....	18
IV. Forced-Air Furnaces.....	18

**APPLICATION FOR A CERTIFICATE OF COMPLIANCE PURSUANT TO 40 CFR
PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

GENERAL INFORMATION

Manufacturer's Name:
Foyers Supreme Incorporated

Heater Type (Circle One):	Adjustable Burn Rate Wood Heater	Pellet Stove	Single Burn Rate Heater	Hydronic Heater	Forced Air Furnace	Other:
Hydronic Heater Type (Circle One):	Traditional	Full Storage	Partial Storage	Indoor/Outdoor	Other:	
Forced-Air Furnace Type (Circle One):	Small (less than 65,000 BTU/hr heat output)		Large (greater than 65,000 BTU/hr heat output)		Other:	
Fuel Tested:	Crib	Pellet	Cordwood	Wood Chips	Other:	

Test Method(s) Method 28R **Catalyst: No**

Model Number: 24SF
Model Names: Ambiance Elegance 36; Novo; Lotus

Physical Address (Street number and Address, not P.O. Box): 3594 Jarry, East	Mailing Address: 3594 Jarry, East, Montreal, QC, H1Z 2G4, Canada
--	--

City: Montreal	State: QC, Canada	ZIP Code: H1Z 2G4
-----------------------	--------------------------	--------------------------

Phone: (514) 593-4722	Email: alexander@supremem.com	Website: www.supremem.com
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EPA Submission Date of 30 day Notice: 29th of July, 2016

MANUFACTURER'S AUTHORIZED REPRESENTATIVE INFORMATION

Name: Alexander Marcakis

Position/Title: Engineering Department

Address: 3594 Jarry, East

City: Montreal	State: QC, Canada	ZIP Code: H1Z 2G4
-----------------------	--------------------------	--------------------------

Phone: (514) 593-4722	E-mail: alexander@supremem.com	Website: www.supremem.com
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Remarks:

EPA-APPROVED TEST LABORATORY

**APPLICATION FOR A CERTIFICATE OF COMPLIANCE PURSUANT TO 40 CFR
PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

Name of Test Laboratory:
Polytests Services inc.

Name of Person Authorized or Responsible for Conducting Compliance Test: Danick Power

Position/Title: VP operation

Address: 695-B Gaudette,

City: St-Jean-sur-Richelieu

State: Quebec, Canada

ZIP Code: J3B 7S7

Phone: 450 741-3636

Email: dpower@polytests.com

Website: www.polytests.com

Remarks:

EPA-Approved Third Party Certifier

Name of Certifier Entity: Dirigo Laboratories, Inc.

Name of Person Authorized or Responsible for Reviewing Test Report and/or Issuing Certification of Conformity:
John Steinert

Position/Title:
President

Address: 11785 SE Hwy. 212 Suite 305

City: Clackamas

State: OR

ZIP Code: 97015

Phone: (503) 650-0088

Email: jsteinert@dirigolab.com

Website: www.dirigolab.com

Remarks:

COMPLIANCE STATEMENTS AND ACKNOWLEDGEMENTS – SECTIONS 60.533(B) AND 60.5475(B)

INSTRUCTIONS: PLEASE READ THE BELOW STATEMENTS AND AFFIRMATIONS AND ADDRESS ACCORDINGLY.

FOR EMISSIONS DATA SUMMARY TABLES SEE ATTACHMENTS

1. Engineering Drawings Statement

Engineering drawings and specifications of components that may affect emissions (including specifications for each component listed in paragraphs (k)(2), (3) and (4) of 60.533(b) and 60.5475(b). Manufacturers may use assembly or design drawings that have been prepared for other purposes, but must designate on the drawings the dimensions of each component listed in paragraph (k) of this section. Manufacturers must identify tolerances of components listed in paragraph (k)(2) of 60.533(b) and 60.5475(b) that are different from those specified in that paragraph, and show that such tolerances cannot reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits. The drawings must identify how the emission-critical parts, such as air tubes and catalyst, can be readily inspected and replaced.

2. Firebox Statement Requirement

A statement whether the firebox or any firebox component (including the materials listed in paragraph (k)(3) of 60.533(b) and 60.5475(b) will be composed of material different from the material used for the firebox or firebox component in the wood heater on which certification testing was performed, a description of any such differences and demonstration that any such differences may not reasonably be anticipated to adversely affect emissions or efficiency.

3. CBI

Clear identification of any claimed confidential business information (CBI). Submit such information under separate cover to the EPA CBI Office; Attn: Residential Wood Heater Compliance Program Lead, 1200 Pennsylvania Ave., NW, Room 7138, MS:2227A, Washington, DC 20460. **Note that all emissions data, including all information necessary to determine emission rates in the format of the standard, cannot be claimed as CBI.**

4. Valid Certification Statement

All documentation pertaining to a valid certification test, including the complete test report and, for all test runs: Raw data sheets, laboratory technician notes, calculations and test results. Documentation must include the items specified in the applicable test methods. Documentation must include discussion of each test run and its appropriateness and validity, and must include detailed discussion of all anomalies, whether all burn rate categories were achieved, any data not used in the calculations and, for any test runs not completed, the data collected during the test run and the reason(s) that the test run was not completed and why. The burn rate for the low burn rate category must be no greater than the rate that an operator can achieve in home use and no greater than is advertised by the manufacturer or retailer. The test report must include a summary table that clearly presents the individual and overall emission rates, efficiencies and heat outputs. Submit the test report and all associated required information, according to the procedures for electronic reporting specified in § 60.537(f) and 60.5475(f).

5. Warranties

A copy of the warranties for the model line, which must include a statement that the warranties are void if the unit is used to burn materials for which the unit is not certified by the EPA and void if not operated according to the owner's manual.

6. Q/A Statement

A statement that the manufacturer will conduct a quality assurance program for the model line that satisfies the requirements of paragraph (m) of this section.

7. Laboratory Sealing of Unit

A statement describing how the tested unit was sealed by the laboratory after the completion of certification testing and asserting that such unit will be stored by the manufacturer in the sealed state until 5 years after the certification test.

8. Statements that the wood heaters manufactured under this certificate will be—

- (i) Similar in all material respects that would affect emissions as defined in § 60.531 to the wood heater submitted for certification testing, and labeled as prescribed in § 60.536 and 60.5478.
- (ii) Accompanied by an owner's manual that meets the requirements in § 60.536 and 60.5478. In addition, a copy of the owner's manual must be submitted to the Administrator and be available to the public on the manufacturer's web site.

9. Third Party Certification Statement

A statement that the manufacturer has entered into contracts with an approved laboratory and an approved third-party certifier that satisfy the requirements of paragraph (f) of this section.

10. Approved laboratory/third party Statement

A statement that the approved laboratory and approved third-party certifier are allowed to submit information on behalf of the manufacturer, including any claimed to be CBI.

11. Manufacturer's Website Certification Test Reports Availability Statement

A statement that the manufacturer will place a copy of the certification test report and summary on the manufacturer's web site available to the public within 30 days after the Administrator issues a certificate of compliance.

12. Transferability Acknowledgement Statement

A statement of acknowledgment that the certificate of compliance cannot be transferred to another manufacturer or model line without written approval by the Administrator.

13. Statement about Selling Wood Heaters without an EPA Certificate

A statement acknowledging that it is unlawful to sell, distribute or offer to sell or distribute an affected wood heater without a valid certificate of compliance.


ALEXANDER MARCAKIS
ENGINEERING DEPARTMENT

26th of October, 2016

Print Name and Title:

Date:

Signature of responsible representative of the manufacturer certifying the accuracy of the above statements:



The authorized or responsible party whose signature is above is certifying that the manufacturer has complied with and will continue to comply with all requirements of the 2015 NSPS for compliance certification and that the manufacturer remains responsible for compliance regardless of any error by the test laboratory or third-party certifier.

Attachments

Instructions: Please complete the section applicable to your certification request. You may substitute your own data tables in lieu of the ones shown below provided that all the information is captured.

WOOD BURNING HEATERS

I. Test Method 28R for Certification and Auditing of Wood Heaters

A. SUMMARY RESULTS – ADJUSTABLE WOOD BURNING HEATERS

Category 2 .80 to 1.00 kg/hr.		Category 2 .80 to 1.00 kg/hr.		Category 3 1.25 to 1.90 kg/hr.		Category 3 1.25 to 1.90 kg/hr.		Category 4 Maximum	
Date	13/09/16	Date	07/09/16	Date	12/09/16	Date	08/09/16	Date	09/09/16
Run Number	6	Run Number	2	Run Number	5	Run Number	3	Run Number	4
Emission Rate g/Hr.	4.3	Emission Rate g/Hr.	1.2	Emission Rate g/Hr.	1.33	Emission Rate g/Hr.	1.6	Emission Rate g/Hr.	1.7
Burn Rate KG/hr.	0.804	Burn Rate KG/hr.	0.806	Burn Rate KG/hr.	1.3	Burn Rate KG/hr.	1.68	Burn Rate KG/hr.	2.13
BTU/Hr. (HHV)	10125	BTU/Hr. (HHV)	10364	BTU/Hr. (HHV)	17203	BTU/Hr. (HHV)	20786	BTU/Hr. (HHV)	25944
Overall Efficiency (%)	67.03	Overall Efficiency (%)	68.43	Overall Efficiency (%)	67.72	Overall Efficiency (%)	65.73	Overall Efficiency (%)	64.68
CO Emissions (g/MJ Output)	21.47	CO Emissions (g/MJ Output)	6.577	CO Emissions (g/MJ Output)	12.43	CO Emissions (g/MJ Output)	16.75	CO Emissions (g/MJ Output)	12.13
CO Emissions (g/kg Dry Fuel)	122.7	CO Emissions (g/kg Dry Fuel)	89.16	CO Emissions (g/kg Dry Fuel)	71.77	CO Emissions (g/kg Dry Fuel)	93.86	CO Emissions (g/kg Dry Fuel)	66.91
CO Emissions (g/hr)	98.65	CO Emissions (g/hr)	71.86	CO Emissions (g/hr)	97.03	CO Emissions (g/hr)	157.96	CO Emissions (g/hr)	142.83
ASTM E2515 Emissions – First Hour (g/hr)	24	ASTM E2515 Emissions – First Hour (g/hr)	7.46	ASTM E2515 Emissions – First Hour (g/hr)	3.33	ASTM E2515 Emissions – First Hour (g/hr)	5.53	ASTM E2515 Emissions – First Hour (g/hr)	4.49

Weighted particulate emission average of 5 test runs: 1.77 grams per hour.

Weighted average HHV efficiency of 5 test runs: 67.14%.



Certificate of Conformity

Issued to: Foyers Supreme, AKA Supreme Fireplace
Alexander Marcakis
3594 Jarry East
Montreal, QC H1Z 2G4
Canada
(877) 593-4722

Model(s): Ambiance Elegance 36, 24SF, Novo 24 - Soapstone

Effective Date: November 20, 2016

Revision Dates: 7/5/2017, 2/21/2022

Renewal Date: 2/21/2022

Report # Polytest Report # PI-20131

Certification tests were performed by Services Polytests, Inc. located at: 695-B Gaudette- St-jean-sur-Richelieu, QC, J3B 7S7 CANADA.

PFS TECO certifies conformity to the following per 40 CFR Part 60 §60.533 (f) (A):

- The test report is complete and accurate.
- The instrumentation used for the test was properly calibrated.
- The representative model tested meets the applicable emission limits.
- The tests have been conducted per the appropriate guidelines.
- The manufacturer's Quality Control Plan has been reviewed to ensure that all production units are similar in all material respects that would affect emissions to the tested/certified model and that the units in the model line will meet all (other) applicable requirements.

PFS TECO certifies that the emissions levels as measured in the test report are in compliance with the 2020 PM emission limit of ≤ 2.0 g/hr using crib wood.

The weighted average emissions for the 24FN wood heaters are **1.8 g/hr** with a weighted average efficiency of **67%**. Average CO emissions are **1.7 g/min.**

Issued by: PFS TECO
11785 SE Highway 212
Suite 305
Clackamas, OR 97015

John Steinert, Vice President hearth Products Division

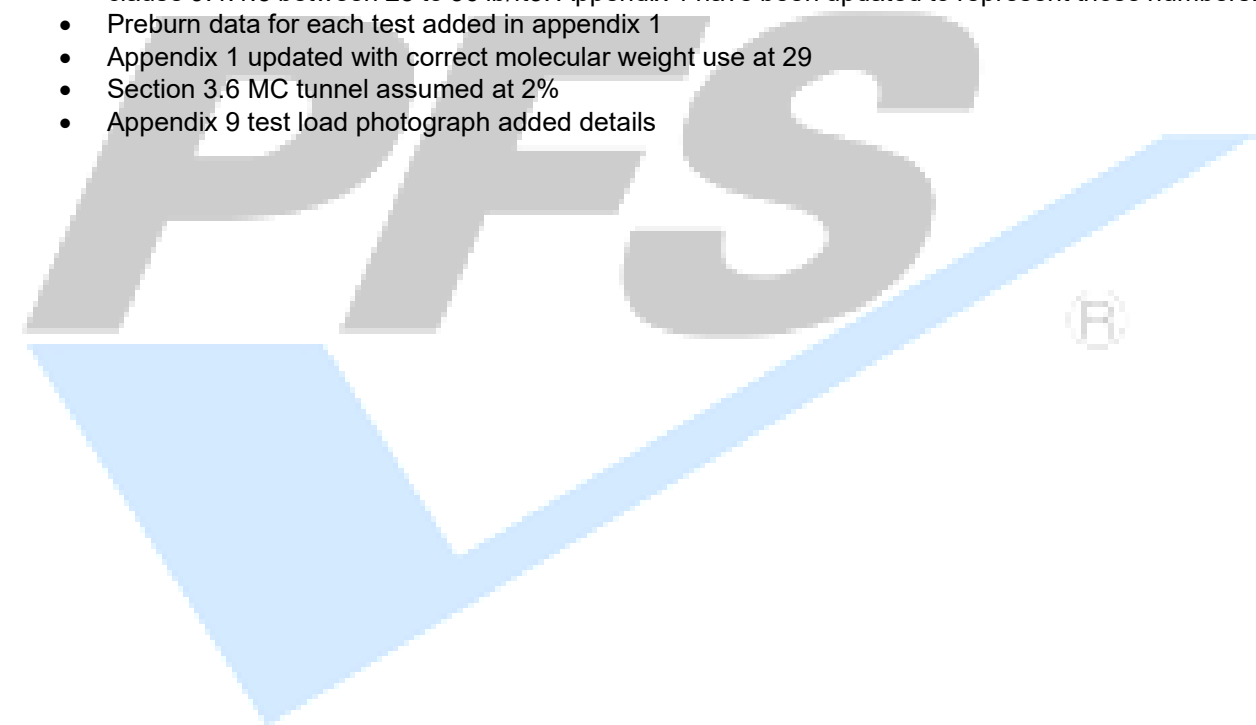


Revision July 5, 2017:

- Added Novo 24 Soapstone model name to Certificate of Conformity. No K-list items were changed. No additional testing required.

Revision: February 21, 2022

- Update comments p.12, 3.4 operation during testing for validities, anomalies, appropriateness.
- Negative weights on back filters addressed and handled properly, none on probe or gaskets.
- Clarification of two run at lowest setting trying for cat 1. P12
- Additional letter for TYPO's about mixing baffle in the original report.
- Table 2.6 p.9 updated for dual train precision in g/kg.
- Fuel density have been recalculating to exclude spacers and found compliant for each run as per clause 9.4.1.3 between 25 to 36 lb/ft³. Appendix 1 have been updated to represent those numbers.
- Preburn data for each test added in appendix 1
- Appendix 1 updated with correct molecular weight use at 29
- Section 3.6 MC tunnel assumed at 2%
- Appendix 9 test load photograph added details



**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

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- ▶ The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov.
- ▶ This notice must be received by the EPA at least 30 days before the start of testing.

GENERAL INFORMATION

Manufacturer's Name:
Foyers Supreme Incorporated

Appliance Type (Circle One):	<u>Adjustable Burn Rate Wood Heater</u>	Pellet Stove	Single Burn Rate Heater	Hydronic Heater	Forced Air Furnace	Other:
Hydronic Heater Type (Circle One):	Traditional	Full Storage	Partial Storage	Indoor/Outdoor	Other:	
Forced-Air Furnace Type (Circle One):	Small (less than 65,000 BTU/hr heat output)		Large (greater than 65,000 BTU/hr heat output)			Other:
Fuel Type:	<u>Crib</u>	Pellet	Cordwood	Other:		

Model Name and Number:
NV200

Catalyst: No

Mailing Address:
3594 Jarry East, Montreal, QC, H1Z 2G4, Canada

Street Address:
3594 Jarry East, Montreal, QC, H1Z 2G4, Canada

City: Montreal	State: Quebec (Canada)	ZIP Code: H1Z 2G4
Phone: (514) 593-4722	Fax: (514) 593-4424	Web Site: www.supremem.com

Address of Manufacturing Facility:
3594 Jarry East, Montreal, QC, H1Z 2G4, Canada

City: Montreal	State: Quebec (Canada)	ZIP Code: H1Z 2G4
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EPA APPROVED TEST LABORATORY

Name and Title of Authorized Representative: Gaétan Piédalue

Company: Polytests Services Inc.

**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

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- ▶ The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov.
- ▶ This notice must be received by the EPA at least 30 days before the start of testing.

Phone: (450) 741-3636	E-mail: gpiedalue@polytests.com	Fax: N/A
City: St-Jean-sur-Richelieu	State: Quebec (Canada)	ZIP Code: J3B 7S7

EPA APPROVED THIRD-PARTY CERTIFIER

Name and Title of Authorized Representative: John Steinert, President

Company: Dirigo Laboratories, Inc.

Phone: (503) 650-0088	E-mail: jsteinert@dirigolab.com	Fax: N/A
City: Clackamas	State: OR	ZIP Code: 97015

COMPLIANCE TEST INFORMATION

Test Method(s): EPA Method 28R

Date(s) of Proposed Test: Week of the 6th of September, 2016

**Testing Location:
Polytests Services Inc.
695 B rue Gaudette,
St-Jean-sur-Richelieu
QC, Canada, J3B 7S7**


**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

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- ▶ The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov.
- ▶ This notice must be received by the EPA at least 30 days before the start of testing.

Alexander Marcakis

Print Name and Title of Authorized Official



Signature

Friday July 29th, 2016

Date

Remarks:

v1

St-jean-sur-Richelieu, September 8th 2021

Att.: Rafael Sanchez, Steffan Johnson

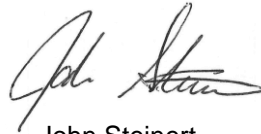
Subject: TYPO, mixing baffle in template report

In our report template we forgot to remove the reference of the mixing baffle in the dilution tunnel in the description section 3.1 and in the drawing in appendix 8 for our report template. This TYPO will can be found in most of our EPA reports. In reality the mixing baffles has been removed from the tunnel in 2015 when the E.P.A. review the regulation and refer to the ASMT E2515 for sampling standard. Our Iso 17025 accreditor (IAS) has audited Polytests for the ASMT E2515 and other testing method in March 2015 and found the dilution tunnel compliant to the standard (no mixing baffle in place). Moreover, we have been audited every two years by the EPA proficiency testing and dilution tunnel have been dismantling and inspected by the auditor and no mixing baffle was in the dilution tunnels. In order to fix this issue, reports are updated to remove the TYPO and updated the drawing of the dilution tunnel in appendix 8.

Thank you
Best regards,



Danick Power
Polytests services inc.
695-B Gaudette
St-jean-sur-richelieu
J3B 7S7
Phone. : 450 741-3636
e-mail: infos@polytests.com



John Steinert
Vice President Hearth Products Division
PFS TECO
11785 SE Hwy 212 - Ste 305
Clackamas, OR 97015
john.steinert@pfsteco.com
503-650-0088

IAS Laboratory Assessment Report

File or TL No.: File 2014-12-10

Laboratory Name: Services Polytests, Inc.

Laboratory Address: 695B Gaudette, St. Jean-sur-Richelieu, Quebec, J3B 7S7, Canada

Name and Title of Laboratory Contact: Gaetan Piedalue, P. Eng.; President

Name of Assessor: Douglas Sickles, P.E.

Date(s) of Assessment: March 16-20, 2015

Use this space to record names and titles of persons present at opening meeting:

Services Polytests : Gaetan Piedalue, P. Eng.; President ; Danick Power, VP,
Operation Manager; Marie-Josée Brudeau, Quality Manager

IAS: Douglas Sickles, P.E.

Use this space to record names and titles of persons present at closing meeting:

Services Polytests : Gaetan Piedalue, P. Eng.; President ; Danick Power, VP,
Operations Manager

IAS: Douglas Sickles, P.E.

Signature of Laboratory Representative:

Signature of Assessor:

Reviewer Comments:

Reviewed by:

Date:

<u>Report</u>	<u>Date</u>	<u>Client</u>	<u>Product</u>	<u>Standards</u>	<u>Tested By:</u>	<u>Reviewer</u>
P-1164	12-2012	ICC	Chimney Liner	ULC S640, UL 1777	Alain Lefebvre	Danick Power
P-1223	10-2014	ICC	Flexible Liner	ULC S640, UL 1777	Alain Lefebvre	Danick Power
P-1231	12-2014	ESIM	Automatically fed pellet/wood chip fired boiler	CSA B366.1 CSA B415.1 UL 2523 EPA Method 28 WHH ASTM 2515A	Maxime Martin	Danick Power
P-1246	11-2014	JA Roby	Wood Stove	UL 1482, ULC S627		Danick Power

TEST METHODS DEMONSTRATED AND REVIEWED:

Test methods demonstrated: (many tests shared between standards)

Test Standard/Method	Title
ANSI/UL 1482	Solid Fuel Type Room Heaters
CAN/ULC S627	Standard for Space Heaters for use with Solid Fuels
ASTM E1509	Standard Specification for Room Heaters, Pellet Fuel Burning type
CAN/CSA B366.1	Solid Fuel Fired Heating Appliances
CAN/CSA B415	Performance Testing of Solid Fuel Burning Heating Appliances
ASTM E2515	Determination of particulate matter collected by a dilution tunnel

Test methods that involved interviews and equipment review:

Test Standard/Method	Title
ULC S628	Fireplace Inserts
ANSI/UL 2523	Solid Fuel Fired Hydronic Heating Appliances, Water Heaters and Boilers
CAN/ULC S610	Standard for Factory Built Fireplaces
ANSI/UL 127	Factory Built Fireplaces
ANSI/UL 391	Solid Fuel and Combination Fuel Central and Supplementary Furnaces"
CAN/ULC S632	Standard for Heat Shields
ANSI/UL 1618	Wall protectors, floor protectors and hearth extensions
EPA 40 CFR Part 60, Subpart AAA, Method 28R	Certification and Auditing of Wood Heaters
EPA 40 CFR Part 60, Subpart QQQ, Method 28WHH	Measurement of Particulate Emissions and Heating Efficiency of Wood-Fired Hydronic Heating Appliances
E2558,E2618, E2779, E2780	Particulate Matter Emissions for Wood, heaters, Pellet heaters, Boilers, Wood Fireplaces
ULC S604	Standard for Factory-Built type A Chimneys
ULC S629	Standard for 650°C Factory-Built Chimneys
UL 103	Factory-Built Chimneys for Residential type and Building Heating Appliances
ULC S640	Standard for Lining Systems for New Masonry Chimneys
ULC S641	Standard for Factory-Built Chimney connectors and wall pass-through assemblies
UL 1777	Chimney Liners
ULC S635	Standard for Lining Systems for Existing Masonry or Factory-Built Chimneys and Vents