



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 Number: 24SFC

Model Name: Astra 24

Attention: Rafael Sanchez

TESTED BY:

Services Polytests inc.

695-B Gaudette

St-jean-sur-Richelieu, QC, J3B 7S7

TEST DATES: July 3rd to July 6th 2017

REPORT DATE: July 11th 2017

Project number: PI-20144

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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: July 3rd to July 6th 2017
- Test methods used:
 - Particulate emissions: ASTM E2780-10 ; ASTM E2515-11 methods 28R 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 fireplace
- Combustion system: non-catalytic
- Unit tested: 24SFC

Description

- The wood heater is equipped with a bi-metallic variable burn rate controller. The side walls of the combustion chamber are lined with cast iron panels, 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, a blower is installed into the unit.

1.3 RESULTS

Emission results obtained

- Weighted Average Emissions Rate: 1.91 g/hr
- Weighted Average Overall Efficiency: 67.9 %

Conformity: NSPS Phase 2020

1.4 PRETEST INFORMATION

Unit condition: The unit was received by carrier June 29th 2017 in good condition. The 50hrs of aging was made by the manufacturer.

Set up

- Venting system type: 6 inch steel pipe and insulated chimney
- System height from floor: 15 feet
- Particularities: Convection fan installed on all units

2 SUMMARY OF TEST RESULTS

2.1 SUMMARY RESULTS

<i>Category 2</i> .80 to 1.25 kg/hr.		<i>Category 2</i> .80 to 1.25 kg/hr.		<i>Category 3</i> 1.25 to 1.90 kg/hr.		<i>Category 4</i> Maximum	
Date	July 3 rd 2017	Date	July 4 th 2017	Date	July 5 th 2017	Date	July 6 th 2017
Run Number	1	Run Number	2	Run Number	3	Run Number	4
Emission Rate g/Hr.	1.31	Emission Rate g/Hr.	1.45	Emission Rate g/Hr.	2.91	Emission Rate g/Hr.	1.66
Burn Rate KG/Hr.	0.992	Burn Rate KG/hr.	0.937	Burn Rate KG/hr.	1.65	Burn Rate KG/hr.	1.866
BTU/Hr. (HHV)	12 733	BTU/Hr. (HHV)	12 237	BTU/Hr. (HHV)	20 384	BTU/Hr. (HHV)	23 872
Overall Efficiency (%)	68.7	Overall Efficiency (%)	69.9	Overall Efficiency (%)	65.5	Overall Efficiency (%)	68.4
CO Emissions (g/MJ Output)	7.41	CO Emissions (g/MJ Output)	5.68	CO Emissions (g/MJ Output)	6.35	CO Emissions (g/MJ Output)	2.93
CO Emissions (g/kg Dry Fuel)	100.85	CO Emissions (g/kg Dry Fuel)	78.61	CO Emissions (g/kg Dry Fuel)	82.43	CO Emissions (g/kg Dry Fuel)	39.71
CO Emissions (g/hr)	99.46	CO Emissions (g/hr)	73.23	CO Emissions (g/hr)	136.38	CO Emissions (g/hr)	73.71
ASTM E2515 Emissions – First Hour (g/hr)	7.49	ASTM E2515 Emissions – First Hour (g/hr)	9.26	ASTM E2515 Emissions – First Hour (g/hr)	9.19	ASTM E2515 Emissions – First Hour (g/hr)	3.48

Weighted particulate emission average of 4 test runs: 1.91 grams per hour.
Weighted average HHV efficiency of 4 test runs: 67.9%.
Average Co 1.71gr/min

2.2 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)	CO Emissions (g/Kg dry)	CO Emissions (g/MJ output)
1	2017-07-03	1,31	0,992	7,49	99,46	100,85	7,41
2	2017-07-04	1,45	0,937	9,26	73,23	78,61	5,68
3	2017-07-05	2,91	1,654	9,19	136,38	82,43	6,35
4	2017-07-06	1,66	1,866	3,48	73,71	39,71	2,93

2.3 WEIGHTED AVERAGE CALCULATION

Test No.	Burn Rate Kg/hr	(E) Ave. Emission Rate g/hr	Overall Efficiency (%)	Heat Output (BTU/HR)	CO (gr/min)	Prob.	(K) Weighting Factor
2	0,94	1,449	0,70	12 237	1,22	0,3205	0,3712
1	0,99	1,308	0,69	12 733	1,66	0,3712	0,5057
3	1,65	2,913	0,66	20 384	2,27	0,8262	0,5149
4	1,87	1,657	0,68	23 872	1,23	0,8862	0,1738
Average		1.91	64.9		1.71		

2.4 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	74	80	29,678	29,648	60	49,8	6	7
2	74	82	29,855	29,825	56,4	36,2	4	3
3	77	82	29,707	29,678	49,0	37,0	3	6
4	81	82	29,737	29,678	50,5	49,5	3	4

2.5 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	15,67	21,14	3,0	14,96	6,562	19,73	19	2	2	12
2	15,81	22,08	3,2	15,85	6,954	19,65	19	2	2	12
3	16,43	21,99	3,1	14,62	6,412	19,68	18,125	2	2	12
4	18,01	20,28	3,4	14,66	6,428	19,42	18,5	2	2	12

2.6 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	343	315,10	550,65	60,565	60,396	4,40	3,90
2	385	309,90	552,14	68,314	67,728	5,30	5,30
3	201	295,14	566,41	35,518	35,004	5,70	5,90
4	179	308,09	569,18	31,689	31,487	2,90	2,70

2.7 DILUTION TUNNEL DUAL TRAIN PRECISION

Run Number	Sample Ratio		Total Emission (g)		
	Train 1	Train 2	Train 1	Train 2	% Deviation
1	1784,52	1789,51	7,91	7,04	5,83%
2	1746,53	1761,64	9,26	9,34	0,43%
3	1670,22	1694,74	9,52	10,00	2,45%
4	1740,30	1751,47	5,10	4,78	3,19%

2.8 GENERAL SUMMARY OF RESULTS

<i>Run Number</i>	<i>Burn Rate (kg/hr)</i>	<i>Average Surface Temperature (F)</i>	<i>Change in surface Temperature (F)</i>	<i>Initial Draft (in. H2O)</i>	<i>static pressure tunnel (in. H2O)</i>	<i>Primary Air Setting</i>	<i>Run Time (min)</i>
1	0,992	304,77	-63,2	0,046	0,246	fully closed	343
2	0,937	298,57	-106,3	0,054	0,249	fully closed	385
3	1,654	421,80	-2,8	0,064	0,246	25 degree open	201
4	1,866	445,82	0,1	0,065	0,249	Full open	179

3 PROCESS DESCRIPTION

3.1 DISCUSSION

The unit have been received in a good condition, all test have been done using the convection fan at "ON" position. 50 hrs Aging has been done by the manufacturer, all data supply in appendix 4.

3.2 UNIT DIMENSIONS

Baffle

- Location: between top of combustion chamber and hearth
- Restriction: 1.75 X 23.5 inches at the front of unit
- Dimensions: covers the hearth area minus the restriction at front
- Material: Stainless steel baffle

Bricks

- Cast iron surrounding firebox

Flue gas exhaust

- Location: top flue
- 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 52 of 24SFC_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 3 of 24SFC_TECH_DRAW.pdf (5) for information on dimensions, materials, and assembly

Overall unit dimension

- Firebox dimensions: 18.297inch Wide at the front, 14.939inch Wide at the back x 15.2inch deep x 12.827inch high
- Usable volume : 2.27 cuft
- Overall fireplace dimension : 34 1/8 inch wide x 20 7/8 inch deep x 35 ½ high

Convection fan

- Convection fan 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 24SFC 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 45 of 24SFC_Tech_DRAW.pdf for details on the Primary Air Control assembly. Air supply system

Description

- Primary air: window wash design with air intake at the top of unit
- Secondary air: secondary tube design with air intake at 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
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	0.99 in ²
C *	Pilot	N/A	N/A	No	N/A

* 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

Imax: 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

3.3 OPERATION DURING TEST

Run #1

This run was performed on July 3rd 2017. It lasted 343 minutes and a category 2 burn rate was obtained at 0.99 kg/hr & emission at 1.31gr/hr. The convection fan was at on position during the entire test.

Run #2

This run was performed on July 4th 2017. It lasted 285 minutes and a category 2 burn rate was obtained at 0.94 kg/hr & emission at 1.45gr/hr. The convection fan was at on position during the entire test.

Run #3

This run was performed on July 5th 2017. It lasted 201 minutes and a category 3 burn rate was obtained at 1.65kg/hr & emission at 2.91gr/hr. The convection fan was at on position during the entire test.

Run #4

This run was performed on July 6th 2017. It lasted 179 minutes and a category 4 burn rate was obtained at 1.86 kg/hr & emission at 1.66gr/hr. The convection fan was at on position during the entire test.

- 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.

3.4 START-UP OPERATION

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

3.5 SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 15 feet from the tunnel entrance. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. The sampling section is a continuous 10 foot section of 8 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 4%. Tunnel samplers are located 56 inches downstream of the pitot tube and 16 inches upstream from the end of this section.

3.6 DRAWINGS

Various drawings of the stack gas sampling train and of dilution tunnel system are found in Appendix 6.

3.7 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 #	1
Date	03-07-2017
Technicien	M.M
Project #	pi 20144

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	24 FSC	
Combustion system	Non-Cat	
Appliance type	FIRE PLACE	
Firebox volume	2,28	cu ft.
Appliance weight empty	N.A	lbs
Appliance weight full	N.A	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	N.A	BTU/h Donnée fournie par le manfacturier
Targeted category	1	
Targeted output	N.A	BTU/h
Cp steel	N.A	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,987	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,996	Dimensionless
Equipment number (DGM #2):	EM 179	
Calibration Factor (DGM #3):	0,986	Dimensionless
Equipment number (DGM #3):	EM 070	Dimensionless

Tunnel

Targeted tunnel flow rate	280	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

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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):	100,5	100,4
Barometer (in.Hg):	29,677639	29,648109
Dry Bulb (F):	72,32	79,88
Humidity (%):	60	49,8
Air velocity (ft/min)	6	7

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

DGM room	
----------	--

Final: 533417,740	Liter
Initial: 531591,420	Liter
Final: 452877,360	Liter
Initial: 451074,780	Liter

Final: 1037,690	cuft
Initial: 962,000	cuft

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

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

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Date	03-07-2017
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
-------	-------	-------

14,4	16,0	17,6
------	------	------

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

Load Volume: cu. ft

Loading Density: 6,6 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	32,3	lbs./ft3
Dry Wood Density:	27,0	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	19	2,02	19,10	19,90	19,30	19,20	19,10	39,10368	99,75	19,3
1,5	3,5	19	1,82	20,10	19,90	20,60	20,30	20,40	36,8732	99,75	20,3
3,5	3,5	19	5,54	19,80	19,90	19,80	19,80	19,70	109,692	232,75	19,8
3,5	3,5	19	4,30	19,10	19,30	19,30	19,90	19,60	83,592	232,75	19,4
1,5	0,75	5	0,09			19,60			1,8032	5,63	19,6
1,5	0,75	5	0,09			19,30			1,737	5,63	19,3
1,5	0,75	5	0,09			20,10			1,809	5,63	20,1
1,5	0,75	5	0,11			20,60			2,3484	5,63	20,6
1,5	0,75	5	0,11			21,00			2,352	5,63	21,0
1,5	0,75	5	0,09			20,80			1,8304	5,63	20,8
1,5	0,75	5	0,11			20,60			2,1836	5,63	20,6
1,5	0,75	5	0,12			20,90			2,4662	5,63	20,9
1,5	0,75	5	0,12			19,90			2,3084	5,63	19,9
1,5	0,75	5	0,09			19,60			1,7248	5,63	19,6
1,5	0,75	5	0,11			20,00			2,28	5,63	20,0
1,5	0,75	5	0,15			20,60			3,09	5,63	20,6
										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	295,19388		20,1 %

Test Load Weight: 14,96 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	19,73	Dry(EPA)	19,73
		Dry(B415)	19,73

19,73
Must be 19-25

Wet:
must be 15,2-22

Coal Bed Range: lbs. to

3,7 lbs.

TEST CHARGE:

Coal bed weight: 3

lbs.

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Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,15 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=
0,961

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,063	72,09	0,2510
B center	0,062	72,36	0,2490
A1	0,052	72,13	0,2280
A2	0,058	72,18	0,2408
A3	0,063	72,31	0,2510
A4	0,053	72,29	0,2302
B1	0,052	72,390	0,2280
B2	0,059	72,460	0,2429
B3	0,065	72,530	0,2550
B4	0,051	72,530	0,2258
AVERAGE	0,0578	72,3270	0,2402

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Date	03-07-2017
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	36	600	601	1	37	602	608	11	50	609	630	20	631		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	107,7412	0,1270	0,1257	11,9939	107,9732	0,1279	0,1273	12,0492	107,6455	0,1266	0,1277	11,8186	0,1269	29/06/2017	18:00
Before (6)	107,7413	0,1271	0,1257	11,9940	107,9731	0,1278	0,1274	12,0493	107,6454	0,1265	0,1278	11,8187	0,1268	03/07/2017	09:30
After (1)	107,7425	0,1309	0,1256	11,9974	107,9736	0,1275	0,1271	12,0519	107,6463	0,1296	0,1273	11,8220	0,1271	03/07/2017	17:30
After (2)	107,7414	0,1304	0,1255	11,9954	107,9731	0,1273	0,1271	12,0505	107,6458	0,1295	0,1272	11,8205	0,1270	10/07/2017	08:00
After (3)	107,7414	0,1304	0,1255	11,9950	107,9731	0,1273	0,1271	12,0505	107,6458	0,1295	0,1272	11,8200	0,1270	11/07/2017	08:00
After (4)	107,7414	0,1304	0,1255	11,9950	107,9731	0,1273	0,1271	12,0505	107,6458	0,1295	0,1272	11,8200	0,1270	11/07/2017	17:00
After (5)															
After (6)	107,7414	0,1304	0,1255	11,9950	107,9731	0,1273	0,1271	12,0505	107,6458	0,1295	0,1272	11,8200	0,1270	11/07/2017	17:00
Difference	0,0001	0,0033	-0,0002	0,0010	0,0000	-0,0005	-0,0003	0,0012	0,0004	0,0030	-0,0006	0,0013	0,0002		
Total (mg)		4,2				4,6				4,1			0,2		
Total ajusté (mg)		4,00				4,40				3,90					

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Date	03-07-2017
Technicien	M.M

Elapsed	Raw data row	Weight	CO	CO ₂	O ₂	Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit
Time		Remaining				Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom
min		lbs	%	%	%	°F	°F	°F	°F	°F	°F	°F	°F
0,00	198,00	14,9	0,8	1,4	267,9	230,7	74,2	90,9	243,3	199,3	362,0	203,1	331,7
1,0	199,0	14,9	1,4	2,6	264,2	239,0	74,0	89,2	232,6	195,4	356,9	200,9	335,0
2,0	200,0	14,7	0,4	7,2	262,7	292,1	74,1	91,9	237,5	192,3	352,3	198,1	333,2
3,0	201,0	14,6	0,4	4,7	265,5	348,3	74,3	94,9	261,0	192,3	347,9	195,6	330,9
4,0	202,0	14,5	0,3	5,5	273,9	403,5	74,1	99,2	301,7	193,5	343,8	194,1	336,3
5,0	203,0	14,2	0,4	6,2	288,1	473,9	74,1	104,8	370,9	196,8	340,7	192,1	339,9
6,0	204,0	14,0	0,3	8,0	309,3	551,7	74,3	112,4	471,0	200,9	338,5	190,5	345,8
7,0	205,0	13,8	0,3	9,3	331,2	603,7	74,3	116,7	571,5	206,7	337,7	190,2	349,7
8,0	206,0	13,5	0,3	9,1	343,8	606,5	74,3	117,1	619,6	211,2	338,0	191,0	359,1
9,0	207,0	13,3	0,5	8,9	348,1	595,4	74,6	115,0	625,5	215,0	340,1	191,8	368,0
10,0	208,0	13,1	0,7	9,2	351,1	581,6	74,7	111,8	620,4	218,3	343,3	192,2	381,4
11,0	209,0	12,9	0,9	8,9	349,7	568,3	74,8	110,0	606,8	221,7	346,7	193,2	379,9
12,0	210,0	12,7	0,9	9,0	350,5	559,1	75,0	108,6	598,0	223,4	349,4	194,0	387,9
13,0	211,0	12,5	0,8	8,5	346,4	532,1	74,9	107,4	569,6	226,9	353,6	194,5	387,6
14,0	212,0	12,4	0,9	7,5	342,2	518,4	74,9	106,1	540,1	228,0	355,9	195,4	391,6
15,0	213,0	12,2	1,0	9,3	348,9	566,2	75,0	108,3	567,7	230,6	359,3	196,4	390,7
16,0	214,0	12,0	0,7	12,2	360,9	601,8	75,2	111,3	617,5	234,3	362,3	197,8	392,8
17,0	215,0	11,8	0,8	11,1	368,2	593,6	75,3	110,6	643,8	238,4	366,4	199,2	393,1
18,0	216,0	11,5	0,8	10,2	369,5	575,8	74,9	109,1	644,7	241,1	369,9	200,5	391,0
19,0	217,0	11,4	0,9	9,9	368,8	562,9	75,4	108,4	629,8	243,0	373,4	201,7	395,9
20,0	218,0	11,2	0,9	10,3	367,5	555,6	75,3	107,6	612,4	245,1	376,6	203,5	399,9
21,0	219,0	11,1	1,2	10,1	367,6	560,2	75,2	107,7	604,8	247,4	378,9	204,9	401,8
22,0	220,0	10,9	1,2	11,1	370,1	568,7	75,1	109,0	613,2	251,1	380,0	206,6	399,8
23,0	221,0	10,7	1,3	11,1	374,0	576,5	74,8	108,8	630,7	254,7	382,3	208,1	394,1
24,0	222,0	10,4	1,1	11,6	379,5	580,0	75,4	108,8	649,0	257,6	384,6	209,7	396,3
25,0	223,0	10,3	1,0	11,6	384,4	578,2	75,2	107,6	661,1	259,9	388,2	211,0	402,1
26,0	224,0	10,1	1,0	11,2	385,2	571,5	75,0	108,2	656,9	262,7	389,3	212,6	404,3
27,0	225,0	9,9	1,0	11,0	383,6	560,0	75,2	107,5	640,4	265,9	392,0	214,9	405,0
28,0	226,0	9,8	1,0	10,6	381,4	549,7	75,5	106,7	621,7	266,6	394,4	216,7	407,6
29,0	227,0	9,6	0,9	10,7	380,7	540,9	75,4	106,5	610,7	269,1	396,5	218,4	409,0
30,0	228,0	9,5	1,0	10,9	381,1	536,5	75,3	105,4	604,3	271,4	398,1	220,0	411,4
31,0	229,0	9,4	1,0	11,2	382,4	537,3	75,7	105,0	604,2	273,8	400,2	221,9	411,8
32,0	230,0	9,2	1,0	11,8	386,3	541,6	75,7	105,9	609,8	276,6	402,7	223,6	418,6
33,0	231,0	9,0	1,0	12,4	390,6	553,9	75,7	106,8	623,7	280,9	405,8	225,4	417,4
34,0	232,0	8,8	0,8	12,9	396,4	567,3	75,5	106,8	639,1	283,9	409,2	227,6	422,0
35,0	233,0	8,7	0,7	12,7	402,3	575,3	75,8	107,7	657,0	287,5	411,8	229,7	425,3
36,0	234,0	8,5	0,7	12,4	406,0	574,6	75,7	107,8	667,7	290,8	415,9	231,7	423,8
37,0	235,0	8,4	0,6	12,4	408,9	567,5	75,3	107,5	673,0	293,9	420,0	233,6	423,8
38,0	236,0	8,3	0,7	12,2	409,6	557,6	75,3	106,7	668,5	297,3	422,3	235,7	423,9
39,0	237,0	8,1	0,7	12,1	411,0	552,7	75,3	105,8	662,7	297,7	425,9	237,5	431,1
40,0	238,0	7,9	0,7	12,1	412,6	547,8	75,6	106,0	656,4	300,2	430,1	238,9	437,3
41,0	239,0	7,8	0,7	12,1	413,2	545,1	75,8	105,3	654,8	302,4	433,6	240,4	434,6
42,0	240,0	7,7	0,6	12,2	414,8	541,8	75,7	105,0	652,7	305,8	436,8	242,1	436,7
43,0	241,0	7,5	0,6	12,3	416,0	541,6	75,9	104,1	649,4	308,3	439,8	242,8	439,5
44,0	242,0	7,4	0,6	12,5	417,6	541,5	76,0	104,9	650,3	309,9	443,2	244,2	440,6
45,0	243,0	7,3	0,6	12,5	419,4	540,4	75,7	105,6	653,4	312,5	446,4	245,8	439,1
46,0	244,0	7,1	0,6	12,4	420,6	538,5	76,0	105,2	653,3	314,1	449,4	247,4	439,1
47,0	245,0	7,0	0,6	12,3	421,8	534,6	75,5	105,2	648,2	314,9	452,9	249,4	443,6
48,0	246,0	6,9	0,6	12,2	422,3	532,2	75,5	105,5	644,4	316,2	455,9	250,6	444,6
49,0	247,0	6,8	0,6	12,0	423,8	528,6	75,5	104,7	640,7	318,3	459,0	253,0	448,1
50,0	248,0	6,6	0,6	12,0	423,8	523,0	75,4	104,2	631,6	320,2	462,0	254,0	451,4
51,0	249,0	6,5	0,6	12,1	424,1	518,2	75,4	103,9	623,9	322,0	465,2	255,9	453,7
52,0	250,0	6,4	0,6	12,1	425,6	514,2	75,5	103,7	621,1	324,6	467,8	257,0	457,5
53,0	251,0	6,3	0,5	12,2	427,5	513,7	75,4	103,6	619,7	325,9	471,1	259,8	460,9
54,0	252,0	6,2	0,6	12,0	427,8	510,0	75,5	103,1	613,9	327,2	473,9	260,8	463,2
55,0	253,0	6,0	0,6	12,1	428,5	507,5	76,0	102,8	608,9	328,1	474,9	262,7	467,8
56,0	254,0	5,9	0,5	12,2	430,3	507,1	76,2	102,9	608,3	327,7	476,7	263,0	475,7
57,0	255,0	5,8	0,5	12,3	432,1	506,8	75,8	103,3	607,5	330,1	479,1	265,5	478,5
58,0	256,0	5,7	0,5	12,3	434,1	506,7	75,7	102,8	606,5	331,3	483,2	267,6	482,2
59,0	257,0	5,6	0,5	12,3	435,3	504,9	76,1	103,1	605,6	332,1	484,9	267,8	486,3
60,0	258,0	5,4	0,5	12,2	436,7	504,6	76,1	103,4	608,4	335,5	489,1	269,6	480,6
61,0	259,0	5,3	0,5	12,2	438,5	503,0	75,6	102,6	606,7	336,5	492,5	272,2	484,3
62,0	260,0	5,2	0,5	12,1	439,2	501,7	75,9	102,5	607,0	338,7	494,9	272,4	483,2
63,0	261,0	5,1	0,4	12,2	440,1	500,6	76,0	102,4	607,6	339,3	497,4	274,1	481,9
64,0	262,0	5,0	0,4	12,1	441,6	499,3	75,8	102,2	609,6	340,3	500,4	275,5	482,1
65,0	263,0	5,0	0,4	12,0	443,0	495,7	75,7	101,7	611,2	340,4	503,1	276,1	484,0
66,0	264,0	4,8	0,3	11,9	443,9	493,2	75,6	101,8	611,1	340,9	505,6	277,3	484,7
67,0	265,0	4,7	0,3	11,7	445,1	489,6	75,6	101,8	609,0	341,5	506,9	279,2	489,0
68,0	266,0	4,6	0,3	11,6	446,3	486,3	75,6	101,3	609,8	341,9	509,5	280,5	489,8
69,0	267,0	4,6	0,3	11,5	446,1	483,2	75,7	101,3	606,5	340,9	512,3	282,1	488,4
70,0	268,0	4,5	0,3	11,5	447,8	479,5	75,6	100,8	607,8	342,0	515,3	282,0	491,7
71,0	269,0	4,4	0,3	11,4	447,7	477,4	75,8	100,8	604,0	342,2	517,1	284,1	491,2
72,0	270,0	4,3	0,2	11,3	447,8	474,2	75,8	100,7	600,0	342,3	518,4	284,7	493,6
73,0	271,0	4,2	0,2	11,1	448,0	470,5	75,6	100,7	597,3	342,6	520,1	285,9	494,3
74,0	272,0	4,1	0,2	11,0	449,2	468,2	75,5	100,1	595,2	341,4	522,9	287,6	499,0
75,0	273,0	4,1	0,3	10,8	448,7	465,8	75,7	100,1	591,6	342,1	522,9	287,3	499,5
76,0	274,0	4,0	0,3	10,8	448,6	462,8	75,7	99,8	588,0	341,8	525,5	288,3	499,1
77,0	275,0	3,9	0,3	10,7	448,4	461,4	75,8	99,6	583,3	341,7	526,7	287,7	502,4
78,0	276,0	3,8	0,3	10,7	448,6	459,8	75,9	99,2	580,5	341,7	528,2	288,9	503,9
79,0	277,0	3,8	0,2	10,7	448,2	458,2	76,3	98,6	575,0	341,0	528,2	288,5	508,6
80,0	278,0	3,7	0,2	10,7	448,0	455,9	76,2	99,4	573,4	340,0	529,1	288,6	508,8
81,0	279,0	3,6	0,2	10,7	449,1	454,1	75,8	99,3	571,0	341,0	530,1	289,3	514,3
82,0	280,0	3,5	0,3	10,8	448,6	455,4	76,1	98,8	571,2	340,5	532,1	289,8	509,4
83,0	281,0	3,5	0,3	10,9	449,1	454,5	75,9	98,9	571,0	340,5	532,8	290,8	510,5
84,0	282,0	3,4	0,3	10,8	450,0	453,7	76,0	98,8	571,2	340,3	534,0	291,2	513,3
85,0	283,0	3,3	0,3	10,6	450,3	450,6	75,9	98,7	573,8	340,7	533,9	291,7	511,5
86,0	284,0	3,3	0,4	10,4	451,4	445,8	75,9	98,2	572,8	341,3	534,4	292,5	516,1
87,0	285,0												

103,0	301,0	2,4	1,3	7,1	432,5	357,8	76,7	93,0	474,3	328,8	547,1	296,6	515,6
104,0	302,0	2,3	1,6	6,4	428,2	349,9	76,7	92,2	461,4	327,3	546,9	296,5	508,7
105,0	303,0	2,3	1,6	6,2	424,2	340,3	76,6	91,7	447,5	323,4	545,0	295,7	509,4
106,0	304,0	2,3	1,6	6,0	418,8	331,5	76,6	91,5	432,8	318,5	541,5	293,7	507,5
107,0	305,0	2,3	1,6	5,8	415,2	322,4	76,6	90,9	421,2	315,6	539,5	292,9	507,1
108,0	306,0	2,3	1,7	5,8	411,9	314,8	76,5	90,8	412,7	313,4	536,1	290,8	506,5
109,0	307,0	2,2	1,7	5,7	408,1	307,3	76,0	91,0	404,2	310,5	534,0	289,9	501,9
110,0	308,0	2,2	1,8	5,7	404,8	300,5	76,1	90,1	398,6	307,3	530,3	288,2	499,6
111,0	309,0	2,2	1,8	5,6	400,5	294,2	76,4	89,8	391,4	303,5	524,9	286,7	496,1
112,0	310,0	2,2	1,9	5,6	396,4	288,1	76,2	89,7	385,5	301,1	523,3	284,9	487,1
113,0	311,0	2,1	1,9	5,6	393,2	282,3	76,8	89,3	380,1	297,5	520,5	284,3	483,7
114,0	312,0	2,1	1,9	5,7	390,2	277,1	76,4	89,5	373,9	294,7	517,9	282,5	481,9
115,0	313,0	2,1	1,9	5,6	387,9	271,7	76,4	88,6	369,3	291,3	514,8	281,7	482,4
116,0	314,0	2,1	1,9	5,6	385,1	267,6	76,5	87,7	364,8	289,3	512,0	280,5	479,1
117,0	315,0	2,1	2,0	5,6	382,7	263,0	76,6	88,4	362,0	286,8	509,7	278,8	476,3
118,0	316,0	2,1	2,1	5,5	378,3	258,4	76,1	89,0	360,7	285,3	506,3	276,9	462,4
119,0	317,0	2,1	2,3	5,3	374,3	254,1	76,2	88,1	357,1	282,7	503,4	274,8	453,4
120,0	318,0	2,1	2,3	5,2	370,6	249,7	76,2	87,9	352,0	280,7	501,9	273,4	444,8
121,0	319,0	2,1	2,4	5,0	366,3	245,8	76,0	87,6	347,3	278,0	499,0	272,0	435,4
122,0	320,0	2,0	2,4	5,0	362,8	241,8	75,9	87,3	342,0	275,6	496,7	270,9	428,9
123,0	321,0	2,1	2,4	5,0	359,7	238,3	75,9	87,4	338,7	273,3	493,5	269,2	423,6
124,0	322,0	2,0	2,4	5,0	357,3	234,5	76,0	87,1	336,6	270,9	491,1	266,8	421,0
125,0	323,0	2,0	2,3	5,0	354,5	231,6	75,8	87,0	334,0	268,7	488,9	265,3	415,7
126,0	324,0	2,0	2,4	4,9	352,3	228,8	76,4	85,9	330,8	266,4	486,7	264,0	413,7
127,0	325,0	2,0	2,4	4,9	350,3	226,3	76,6	86,0	329,5	264,3	484,0	262,3	411,5
128,0	326,0	2,0	2,3	5,1	348,7	223,1	76,3	85,6	326,2	260,8	480,7	261,1	414,5
129,0	327,0	2,0	2,4	5,0	346,9	220,1	76,3	85,7	323,2	259,5	477,9	259,1	414,9
130,0	328,0	1,9	2,4	5,0	344,2	217,3	76,3	85,8	320,7	258,3	475,6	257,6	408,7
131,0	329,0	1,9	2,4	5,1	342,2	215,7	76,6	85,6	320,7	256,9	473,2	256,1	404,4
132,0	330,0	1,9	2,4	5,2	340,5	213,4	76,4	86,1	319,1	254,8	471,3	255,0	402,2
133,0	331,0	1,9	2,4	5,2	340,1	211,9	76,5	85,4	317,3	252,8	468,6	254,1	407,8
134,0	332,0	1,9	2,4	5,2	337,3	209,9	76,0	85,5	316,6	251,6	465,4	253,0	399,9
135,0	333,0	1,9	2,3	5,2	336,8	208,5	76,2	84,6	314,9	249,2	463,0	251,6	405,2
136,0	334,0	1,8	2,3	5,3	335,6	206,8	76,1	84,6	314,1	248,1	461,6	249,7	404,4
137,0	335,0	1,8	2,3	5,3	334,0	205,1	76,4	84,6	313,0	246,6	459,0	248,7	402,6
138,0	336,0	1,8	2,3	5,3	333,2	203,7	76,5	83,9	313,0	244,7	456,8	247,2	404,0
139,0	337,0	1,9	2,4	5,1	331,0	202,0	76,3	84,8	310,5	244,1	454,7	245,9	400,1
140,0	338,0	1,8	2,4	5,1	328,6	200,0	75,9	85,3	307,8	242,7	453,1	244,5	394,7
141,0	339,0	1,8	2,4	5,1	326,3	198,4	76,3	85,0	307,0	241,8	450,4	243,0	389,5
142,0	340,0	1,8	2,4	5,0	324,2	197,0	76,2	84,5	305,4	240,4	448,6	241,7	385,0
143,0	341,0	1,8	2,4	4,9	323,3	195,6	76,4	84,3	302,9	238,1	446,8	241,1	387,5
144,0	342,0	1,7	2,7	4,6	321,4	194,1	76,6	83,8	300,7	236,8	445,4	239,7	384,6
145,0	343,0	1,8	2,7	4,6	320,6	192,1	76,6	84,1	299,0	235,1	443,6	238,3	387,0
146,0	344,0	1,7	2,8	4,5	319,6	190,4	76,5	83,2	297,4	233,7	441,2	237,3	388,4
147,0	345,0	1,8	2,8	4,6	318,1	189,1	76,3	83,3	296,3	232,8	439,2	235,9	386,3
148,0	346,0	1,7	2,8	4,5	316,3	187,5	76,6	83,8	294,8	231,5	437,0	234,8	383,2
149,0	347,0	1,7	2,9	4,5	315,5	186,1	76,7	83,1	293,0	229,3	435,7	233,6	385,7
150,0	348,0	1,7	2,8	4,4	314,0	184,3	76,7	82,5	290,2	228,2	433,3	232,4	386,0
151,0	349,0	1,7	2,8	4,4	311,7	183,1	76,6	83,1	289,4	227,9	431,0	230,2	380,0
152,0	350,0	1,7	2,8	4,4	308,7	181,7	76,0	83,7	287,6	227,4	428,2	228,5	371,8
153,0	351,0	1,7	2,7	4,4	306,5	180,3	76,4	83,5	285,5	226,1	426,2	227,5	367,2
154,0	352,0	1,7	2,7	4,3	304,7	178,8	76,2	83,6	282,9	224,9	424,3	226,8	364,6
155,0	353,0	1,7	2,6	4,3	303,3	177,4	76,3	82,9	280,8	223,0	422,1	225,4	365,3
156,0	354,0	1,7	2,6	4,4	302,3	176,1	76,3	83,4	280,1	222,9	421,4	223,7	363,6
157,0	355,0	1,7	2,6	4,4	300,6	174,5	76,4	83,2	277,7	221,4	419,2	222,4	362,4
158,0	356,0	1,7	2,6	4,4	299,1	173,6	76,3	83,0	275,9	219,9	416,4	221,4	362,0
159,0	357,0	1,7	2,6	4,4	298,6	172,7	76,6	82,6	273,8	218,7	414,5	220,5	365,3
160,0	358,0	1,6	2,7	4,5	297,5	171,4	76,6	82,1	272,0	218,6	411,9	219,5	365,4
161,0	359,0	1,6	2,4	4,6	294,6	169,5	76,5	82,6	270,2	217,1	409,7	217,9	357,9
162,0	360,0	1,6	2,5	4,4	292,3	167,8	76,5	82,2	267,7	216,2	407,8	217,0	353,0
163,0	361,0	1,6	2,4	4,3	289,9	166,5	76,3	82,8	266,3	215,6	406,3	215,5	345,7
164,0	362,0	1,6	2,4	4,3	288,3	165,6	76,1	83,0	263,4	214,3	403,9	215,0	344,6
165,0	363,0	1,6	2,4	4,3	285,4	164,5	76,1	82,7	259,9	213,1	401,2	213,6	339,1
166,0	364,0	1,6	2,4	4,3	283,1	163,2	76,1	82,9	257,6	211,9	398,9	212,9	334,3
167,0	365,0	1,6	2,4	4,2	280,7	162,3	76,1	82,7	255,3	211,0	396,5	211,6	328,9
168,0	366,0	1,6	2,4	4,2	278,9	161,7	75,9	82,6	251,6	209,8	396,0	210,6	326,3
169,0	367,0	1,6	2,4	4,1	277,1	160,8	76,0	82,7	250,3	208,9	393,4	209,5	323,3
170,0	368,0	1,6	2,4	4,1	275,8	159,7	76,0	82,7	248,4	207,6	391,2	208,6	323,1
171,0	369,0	1,5	2,5	4,0	274,2	159,0	76,1	82,3	247,7	206,5	389,6	207,5	319,8
172,0	370,0	1,6	2,6	3,9	273,2	158,5	76,5	81,7	247,6	205,2	387,4	206,7	319,1
173,0	371,0	1,5	2,6	3,8	272,3	157,8	76,3	82,4	246,8	204,3	385,7	205,9	318,6
174,0	372,0	1,5	2,6	3,8	270,7	156,8	76,0	82,4	246,2	203,1	384,1	204,8	315,1
175,0	373,0	1,5	2,6	3,8	269,5	156,2	76,1	82,3	247,7	202,4	382,0	203,6	311,6
176,0	374,0	1,5	2,7	3,8	268,8	155,9	76,1	82,5	247,6	201,8	380,4	202,8	311,5
177,0	375,0	1,5	2,7	3,7	268,7	155,5	76,1	81,4	246,7	199,8	378,7	201,4	316,7
178,0	376,0	1,5	2,7	3,7	267,9	154,9	76,1	81,9	246,3	199,3	377,1	200,5	316,4
179,0	377,0	1,5	2,7	3,8	266,8	154,5	76,1	82,3	245,6	198,4	375,4	199,5	315,1
180,0	378,0	1,5	2,7	3,8	264,4	153,8	76,2	82,3	245,5	197,9	373,6	198,3	306,6
181,0	379,0	1,5	2,7	3,8	262,9	153,4	75,9	82,0	244,6	197,0	370,9	197,5	304,7
182,0	380,0	1,5	2,7	3,7	261,4	152,6	75,9	82,2	243,4	195,9	370,2	196,2	301,2
183,0	381,0	1,5	2,7	3,8	260,2	152,2	75,9	81,8	242,8	194,8	369,2	195,5	298,4
184,0	382,0	1,5	2,7	3,8	260,1	152,0	76,3	81,8	242,2	193,7	366,9	194,5	303,1
185,0	383,0	1,4	2,7	3,8	259,0	151,5	76,2	82,0	241,8	193,3	366,4	193,4	300,1
186,0	384,0	1,5	2,8	3,9	257,7	151,1	76,0	82,1	241,6	192,3	364,2	192,6	297,9
187,0	385,0	1,4	2,8	3,9	255,9	150,6	76,1	82,2	241,5	191,6	362,7	191,6	292,3
188,0	386,0	1,4	2,8	3,9	254,8	150,7	76,0	82,0	241,6	190,6	361,2	190,7	290,1
189,0	387,0	1,4	2,8	3,9	253,3	150,5	76,1	81,8	240,9	189,8	359,6	189,6	286,7
190,0	388,0	1,4	2,8	3,9	252,5	150,1	76,1	81,7	240,1	189,0	358,2	189,2	286,0
191,0	389,0	1,4	2,8	3,9	252,1	149,8	76,2	81,8	240,3	187,8	356,1	188,3	288,2
192,0	390,0	1,4	2,9	4,1	250,5	149,8	76,3	81,6	240,1	187,			

209,0	407,0	1,2	2,2	5,6	239,6	141,9	76,7	81,0	225,3	177,1	335,8	179,7	280,0
210,0	408,0	1,2	2,2	5,5	239,3	141,0	76,2	81,3	225,6	177,8	335,3	179,3	278,4
211,0	409,0	1,2	2,3	5,5	239,7	141,0	76,5	80,9	225,6	176,5	334,7	179,0	282,5
212,0	410,0	1,2	2,3	5,4	238,2	140,3	76,4	81,3	227,0	176,4	332,5	178,3	276,5
213,0	411,0	1,2	2,2	5,4	238,1	140,1	76,4	81,5	227,8	176,4	331,3	178,2	276,8
214,0	412,0	1,2	2,1	5,5	237,7	140,2	76,4	81,5	227,2	175,9	330,4	177,5	277,7
215,0	413,0	1,2	2,1	5,5	237,0	140,1	76,5	81,7	228,2	175,7	329,8	177,8	273,8
216,0	414,0	1,2	2,1	5,5	235,7	140,1	76,4	81,4	228,6	175,4	328,8	177,1	268,6
217,0	415,0	1,1	2,1	5,6	234,1	139,8	76,5	81,3	226,8	174,8	327,2	176,8	264,8
218,0	416,0	1,2	2,0	5,6	233,3	140,0	76,5	81,4	225,7	174,2	326,3	176,6	263,9
219,0	417,0	1,1	2,1	5,5	233,7	140,4	76,5	81,3	225,6	173,9	325,6	176,2	267,2
220,0	418,0	1,1	2,2	5,3	234,2	140,1	76,4	81,3	226,1	173,6	325,1	176,2	269,8
221,0	419,0	1,1	2,3	5,3	233,1	140,2	76,6	81,0	226,3	173,1	323,7	175,6	266,7
222,0	420,0	1,1	2,3	5,3	234,0	140,1	76,5	81,2	226,3	172,5	323,8	175,3	271,9
223,0	421,0	1,0	2,4	5,3	233,5	139,5	76,6	81,0	226,8	172,4	322,8	174,9	270,7
224,0	422,0	1,1	2,3	5,3	232,9	139,5	76,8	81,2	227,1	171,9	321,4	174,2	270,0
225,0	423,0	1,1	2,3	5,3	233,2	139,0	76,5	80,8	226,1	171,1	321,0	174,4	273,2
226,0	424,0	1,0	2,3	5,4	232,0	139,1	76,7	81,1	224,7	171,3	320,2	174,2	269,7
227,0	425,0	1,1	2,3	5,3	231,5	138,9	76,6	81,6	223,7	171,1	319,3	173,7	269,8
228,0	426,0	1,1	2,3	5,4	230,7	138,7	76,6	81,4	222,5	170,3	318,8	173,5	268,7
229,0	427,0	1,0	2,3	5,3	229,8	138,5	76,5	81,4	222,7	170,1	317,6	173,3	265,0
230,0	428,0	1,0	2,3	5,4	229,3	138,2	76,4	81,3	221,8	169,7	317,3	173,4	264,3
231,0	429,0	1,0	2,4	5,3	229,6	138,0	76,4	81,3	222,1	169,6	316,4	173,0	266,8
232,0	430,0	1,0	2,4	5,3	229,2	137,6	76,6	81,1	222,9	169,1	315,1	172,7	266,3
233,0	431,0	1,0	2,4	5,4	228,9	137,5	76,7	81,1	223,3	168,7	314,9	172,5	265,3
234,0	432,0	1,0	2,4	5,3	229,4	137,6	76,7	81,1	224,5	168,5	314,7	172,2	267,2
235,0	433,0	1,0	2,4	5,3	230,4	137,2	76,8	81,0	225,1	167,7	313,9	171,8	273,6
236,0	434,0	1,0	2,4	5,4	230,3	136,7	76,3	81,1	223,9	167,9	313,5	171,4	274,9
237,0	435,0	1,0	2,4	5,3	229,5	136,3	76,4	81,1	222,7	167,9	312,2	171,6	272,9
238,0	436,0	1,0	2,4	5,3	228,7	136,1	76,5	81,4	221,2	167,5	312,0	171,4	271,4
239,0	437,0	1,0	2,4	5,3	227,6	136,1	76,6	80,7	220,4	167,2	310,8	171,2	268,3
240,0	438,0	1,0	2,4	5,3	228,1	135,9	76,8	81,3	220,1	166,8	310,1	171,0	272,6
241,0	439,0	0,9	2,5	5,3	228,5	136,1	76,6	81,2	221,0	166,5	310,1	170,9	274,0
242,0	440,0	0,9	2,5	5,3	227,0	136,1	76,6	81,3	222,0	166,1	308,9	170,7	267,2
243,0	441,0	0,9	2,6	5,3	226,6	135,9	76,7	81,0	223,5	165,8	308,1	170,3	265,5
244,0	442,0	0,9	2,6	5,3	226,3	136,1	76,7	81,0	223,7	165,8	308,0	170,1	263,7
245,0	443,0	0,9	2,6	5,3	226,1	136,0	76,6	81,0	225,0	165,5	307,5	169,5	263,0
246,0	444,0	0,9	2,6	5,3	225,0	135,8	76,6	81,3	224,4	165,5	306,3	169,5	259,2
247,0	445,0	0,9	2,6	5,3	224,8	136,1	76,6	81,2	224,9	164,9	306,9	169,3	258,2
248,0	446,0	0,9	2,6	5,4	224,7	136,1	76,8	81,1	225,2	164,8	306,0	169,1	258,3
249,0	447,0	0,8	2,6	5,4	226,2	136,1	76,8	80,7	225,9	164,5	306,1	168,8	265,6
250,0	448,0	0,9	2,5	5,4	226,3	136,1	76,8	81,2	226,5	164,6	305,9	168,6	265,8
251,0	449,0	0,9	2,7	5,2	227,1	136,6	76,8	81,0	228,0	164,0	305,8	168,3	269,3
252,0	450,0	0,9	2,8	5,1	228,2	137,5	77,0	81,0	229,0	163,3	305,5	168,0	275,2
253,0	451,0	0,8	3,0	5,3	228,0	137,5	76,9	81,2	230,3	163,0	305,1	167,9	273,8
254,0	452,0	0,8	3,0	5,3	228,3	137,8	77,0	80,8	231,5	163,0	304,5	167,8	274,8
255,0	453,0	0,8	3,0	5,3	228,3	138,4	76,8	80,8	232,4	162,9	304,3	167,7	274,4
256,0	454,0	0,8	3,0	5,3	229,6	138,7	77,1	80,7	233,0	162,5	303,9	167,3	281,1
257,0	455,0	0,8	3,0	5,3	228,3	139,0	76,5	81,0	233,5	162,7	303,5	167,1	274,6
258,0	456,0	0,8	3,1	5,3	229,1	139,7	76,9	80,7	233,4	162,1	303,4	166,9	279,6
259,0	457,0	0,8	3,1	5,3	230,5	140,2	77,1	80,4	233,4	161,8	302,4	166,7	288,1
260,0	458,0	0,7	3,1	5,3	229,4	140,3	76,9	80,8	234,4	162,1	302,2	166,4	282,0
261,0	459,0	0,7	3,1	5,3	228,2	140,5	76,8	80,9	234,7	162,1	302,0	165,8	276,6
262,0	460,0	0,7	3,1	5,3	228,2	140,6	77,0	81,1	234,1	161,6	301,6	165,6	278,2
263,0	461,0	0,7	3,0	5,3	229,0	140,8	77,0	81,3	234,8	162,0	301,8	165,7	280,8
264,0	462,0	0,7	3,0	5,3	227,0	140,7	77,0	81,6	234,8	162,4	300,7	165,7	271,6
265,0	463,0	0,7	3,0	5,3	226,7	140,8	76,9	81,4	234,6	161,7	300,3	165,6	271,0
266,0	464,0	0,7	3,0	5,2	226,0	140,6	77,0	81,1	233,8	161,0	300,4	165,1	269,8
267,0	465,0	0,7	2,9	4,9	225,0	140,3	77,1	81,0	230,8	160,7	300,2	165,0	268,3
268,0	466,0	0,7	3,0	5,0	224,8	140,2	76,7	81,3	229,6	160,8	300,7	164,9	268,1
269,0	467,0	0,7	3,0	4,9	223,4	140,3	77,0	81,4	229,1	160,3	299,3	164,8	263,6
270,0	468,0	0,7	3,1	4,9	223,8	140,1	76,9	81,0	227,9	160,3	300,0	164,3	266,6
271,0	469,0	0,6	3,0	4,9	223,7	139,8	77,1	81,2	227,3	159,9	299,5	164,1	267,7
272,0	470,0	0,6	3,0	4,9	223,2	139,6	77,2	81,0	227,3	159,8	299,1	163,5	266,3
273,0	471,0	0,6	3,0	4,9	223,6	139,3	76,9	81,1	225,7	159,8	298,8	163,5	270,1
274,0	472,0	0,6	3,0	4,9	222,7	138,6	77,0	81,0	222,2	159,5	298,1	163,4	270,3
275,0	473,0	0,6	2,9	4,7	222,9	137,9	76,9	80,9	219,2	159,1	297,0	163,3	275,8
276,0	474,0	0,6	2,9	4,7	222,4	137,2	77,0	81,3	219,6	159,0	297,0	162,8	273,6
277,0	475,0	0,6	3,1	4,8	222,2	137,1	77,1	81,1	221,8	158,4	296,2	162,7	271,7
278,0	476,0	0,6	3,1	4,8	221,7	137,3	76,9	81,3	224,2	158,2	295,5	162,5	268,1
279,0	477,0	0,6	3,1	4,9	221,7	137,6	77,0	80,9	225,0	158,1	295,3	162,2	268,1
280,0	478,0	0,6	3,1	4,9	223,1	137,8	77,1	80,9	226,6	157,6	296,3	161,8	273,4
281,0	479,0	0,5	3,1	5,0	223,3	137,9	77,2	81,1	227,2	157,2	295,7	161,7	274,4
282,0	480,0	0,5	3,2	5,0	223,7	138,3	77,3	80,9	228,9	157,2	294,9	161,4	276,2
283,0	481,0	0,5	3,2	5,0	224,2	138,7	77,1	80,7	228,8	157,0	294,6	161,4	279,1
284,0	482,0	0,5	3,3	5,0	223,4	138,9	77,0	81,1	230,0	157,2	294,4	160,8	274,8
285,0	483,0	0,5	3,3	5,0	222,8	139,2	77,2	81,1	231,0	157,2	294,6	160,7	270,3
286,0	484,0	0,5	3,3	5,0	222,5	139,3	77,0	81,5	232,1	157,3	295,0	160,5	267,4
287,0	485,0	0,5	3,3	5,0	220,8	139,6	77,0	81,4	231,8	156,9	294,6	160,4	260,3
288,0	486,0	0,5	3,4	4,8	219,4	139,7	77,0	81,4	232,1	156,8	293,7	160,1	254,4
289,0	487,0	0,5	3,4	4,7	219,9	140,3	77,0	81,1	233,1	156,2	293,4	159,7	257,2
290,0	488,0	0,5	3,4	4,7	220,0	140,2	77,0	81,3	233,0	155,9	293,4	159,2	258,3
291,0	489,0	0,4	3,4	4,6	218,5	140,9	77,1	81,3	233,5	155,8	293,1	158,7	251,4
292,0	490,0	0,4	3,4	4,6	218,6	141,0	77,2	81,0	233,5	155,1	293,1	158,5	253,0
293,0	491,0	0,4	3,4	4,7	220,0	140,7	77,3	81,2	233,0	154,6	293,8	158,5	260,1
294,0	492,0	0,4	3,5	4,7	220,0	140,8	77,2	81,4	233,5	154,9	293,6	158,4	259,7
295,0	493,0	0,4	3,5	4,7	219,4	140,9	76,9	81,4	234,1	155,1	293,6	158,4	256,0
296,0	494,0	0,4	3,4	4,7	219,2	141,2	77,1	81,0	234,1	154,8	294,3	157,9	255,0
297,0	495,0	0,4	3,2	4,8	220,6	141,2	77,0	81,1	236,2	154,0	294,1	157,5	261,3
298,0	496,0	0,4	2,4	5,5	220,2	140,3	77,4	81,5	236,1	154,			

315,0	513,0	0,2	2,8	4,9	213,5	137,0	77,3	81,8	235,6	151,4	292,0	152,3	236,4
316,0	514,0	0,2	2,9	4,9	214,4	137,1	77,2	81,6	234,5	151,2	292,6	152,2	241,5
317,0	515,0	0,2	2,9	4,8	213,9	136,9	77,1	81,7	234,0	151,0	292,0	152,0	240,6
318,0	516,0	0,2	3,1	4,5	213,5	136,8	77,2	81,5	232,7	151,1	291,8	151,7	240,3
319,0	517,0	0,2	3,1	4,5	212,3	136,9	77,4	81,5	232,3	151,0	291,1	151,2	235,9
320,0	518,0	0,2	3,1	4,5	212,3	136,3	77,3	81,8	231,6	150,6	291,7	151,3	236,6
321,0	519,0	0,2	3,1	4,4	213,0	136,3	77,5	81,3	230,3	150,0	292,1	151,1	241,7
322,0	520,0	0,2	3,0	4,4	213,2	136,0	77,4	81,7	231,4	149,8	290,4	150,9	243,4
323,0	521,0	0,2	2,4	4,9	212,0	135,8	77,3	82,0	232,5	150,0	289,8	150,6	237,1
324,0	522,0	0,2	2,3	5,1	212,1	135,9	77,4	81,6	231,8	149,6	290,0	150,4	238,5
325,0	523,0	0,1	2,2	5,1	211,6	135,4	77,5	81,6	231,2	149,2	289,1	150,0	238,3
326,0	524,0	0,1	2,2	5,0	211,2	135,4	77,5	81,7	230,9	149,1	288,7	149,8	237,4
327,0	525,0	0,1	2,2	4,9	210,8	135,1	77,0	82,1	231,2	149,1	287,7	149,3	236,5
328,0	526,0	0,1	2,2	4,9	209,7	135,0	77,4	82,0	231,5	148,7	287,8	149,2	231,4
329,0	527,0	0,1	2,2	4,9	209,2	135,0	77,4	82,0	230,6	148,5	286,7	149,0	231,2
330,0	528,0	0,1	2,2	4,9	208,4	135,1	77,3	82,0	230,7	148,4	286,1	148,8	227,8
331,0	529,0	0,1	2,1	4,9	207,4	134,6	77,4	81,9	229,2	148,3	285,5	148,6	225,3
332,0	530,0	0,1	2,0	4,8	208,0	134,6	77,3	81,8	227,6	147,6	285,7	148,2	230,7
333,0	531,0	0,1	2,0	4,7	207,7	134,3	77,4	81,6	227,8	147,3	285,1	148,0	230,3
334,0	532,0	0,1	2,0	4,8	207,5	133,8	77,3	81,9	227,1	147,6	285,3	147,5	229,9
335,0	533,0	0,1	2,0	4,8	206,5	133,4	77,3	82,0	226,1	147,6	284,6	147,2	227,1
336,0	534,0	0,1	2,0	4,7	206,9	133,2	77,6	81,7	225,5	147,3	284,2	147,2	230,5
337,0	535,0	0,1	2,1	4,7	206,2	133,1	77,3	81,9	224,4	147,3	283,3	146,8	229,1
338,0	536,0	0,1	2,1	4,7	205,7	133,2	77,5	81,5	224,8	146,7	282,7	146,7	227,4
339,0	537,0	0,1	2,0	4,7	205,9	132,8	77,3	81,5	224,8	146,7	282,4	146,4	229,3
340,0	538,0	0,1	2,0	4,7	206,5	132,4	77,1	81,5	223,9	146,3	281,9	145,9	234,4
341,0	539,0	0,1	2,0	4,7	206,4	132,2	77,4	81,7	223,2	146,6	281,3	145,9	235,1
342,0	540,0	0,1	2,0	4,7	205,6	132,0	77,3	81,8	223,3	146,7	280,5	145,7	232,0
343,0	541,0	0,0	2,1	4,7	204,6	132,2	77,4	81,8	223,5	146,4	279,7	145,4	228,2

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,3 g/hr

Burn Rate : 0,992 Dry kg/hr

Test Duration: 343 min

PRESSURE FACTOR: DGM 1 0,96850
 DGM 2 0,97052
 DGM 3 0,99141

BAROMETRIC PRESSURE
 Average: 29,662874 in Hg
 Start: 29,677639 in Hg
 End: 29,648109 in Hg

TEMPERATURE FACTORS DGM 1 0,98236
 DGM 2 0,98151
 DGM 3 0,98446

DGM CONTROLLER VALUES

DGM 1 Final: 18837,470 Cuft
 Initial: 18772,974 Cuft

VOLUMES SAMPLED DGM 1 60,565 SCft
 DGM 2 60,396 SCft
 DGM 3 72,839 SCft

DGM 2 Final: 15993,213 Cuft
 Initial: 15929,556 Cuft

DGM #3 Final: 1037,690 Cuft
 Initial: 962,000 Cuft

TOTAL TUNNEL VOLUME : 108079

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1784,524
 Sample Train 2: 1789,511

DGM 1 537,482 °R
 DGM 2 537,947 °R

Paticulate concentration
 Sample Train 1 0,000076 g/dscf
 Sample Train 2 0,000068 g/dscf
 Room 0,000003 g/dscf

CALIBRATION FACTORS

DGM 1 0,9870
 DGM 2 0,9960
 DGM #3 0,9860

TUNNEL FLOW RATE: 315,100 Dscfm

TOTAL EMISSIONS
 Sample Train 1 7,91 g
 Sample Train 2 7,04 g

PARTICULATE CATCH
 Total Sample Train 1: 4,60 mg
 Total Sample Train 2: 4,10 mg
 Total Sample Train 1 1st hour: 4,20 mg

EMISSION RATES
 Sample Train 1 1,38 g/hr
 Sample Train 2 1,23 g/hr

1st hour emission rate 7,49 g/hr

DEVIATION: 5,83%

Cs Train 1 Train 2
 7,595E-05 6,78852E-05

Manufacturer: FOYER SUPREME
Model: 24 FSC

Run: 1
Project #: pi 20144
Test Duration: 343 min

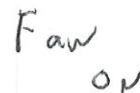
	HHV	LHV
Eff	68,70%	74,26%
Comb Eff	92,78%	92,78%
HT Eff	74,05%	80,03%
Output	13 423	kJ/h
Burn Rate	0,99	kg/h
Grams CO	569	g
Input	19 537	kJ/h
MC wet	16,48	

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-ult} 19,64
F₀
1,061

Overall Heating Efficiency:	68,70%	Air Fuel Ratio (A/F)	
Combustion Efficiency:	92,78%	Dry Molecular Weight (M _d)	29,58
Heat Transfer Efficiency:	74,05%	Dry Moles Exhaust Gas (N _p):	427,74
		Air Fuel Ratio (A/F)	12,14

Heat Output:	12 733 Btu/h	13 423 kJ/h
Heat Input:	18 533 Btu/h	19 537 kJ/h
Burn Duration:	5,72 h	
Burn Rate:	2,17 lb/h	0,986 kg/h
Stack Temp:	286,3 Deg. F	141,3 Deg. C



Model: 24 SPC

Reviewer:

TEST LOAD CONFIGURATION

~~S 18 L~~

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

Side view	Front view	Top view

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

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

PRE / POST CHECKS

 Date: 2-17-07-03

 Manufacturer: foyer supreme

 Model: 24 FSC

 Project #: PI 20144

 Run: 1

 Tech: MR

 Reviewer: BP

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.....

6 (max50 Fpm)	7 (max50 Fpm)
ok	ok
4 sides	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%.....

2-17-07-03
2-17-07-03
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
36	37	50
600	602	609
601	608	630
11	11	12
ok	ok	ok

Date: 2.12.03.03

 Manufacturer: foyer supreme
SAMPLING EQUIPMENT CHECK OUT

 Model: 24 FSC

 Project #: p1 2.144

 Run: 1

 Tech: MM

 Reviewer: DP
Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	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)	53159,80	53348,64	53159,00	53348,84	451074,34	452878,21
Initial 1minute DGM (Liter)	53159,75	53348,64	53159,00	53348,84	451074,33	452878,26
Change © (Liter)	0,05	0,01	0	0,04	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 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	4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2017-07-03 Manufacturer: Forge Supreme Model: 24 RSC
 Project #: PI 20144 Run: 1 Tech: MM Reviewer: LD

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	100mg, 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%

CONTINUOUS ANALYZERS

Date: 20 12 03 03 Manufacturer: Foyer Supreme Model: 24 FSC
 Project #: PL 20 144 Run: 1 Tech: MM Reviewer: NP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 100.5 (KPa.) Static pressure (P_q) 0.15 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963 Ft²
 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	0.063	72.09
B - Centroid	3.00	3.50	4	0.062	72.36
A-1	0.40	0.50	0.50	0.052	72.13
A-2	1.50	1.75	2	0.058	72.18
A-3	4.50	5.25	6	0.063	72.31
A-4	5.60	6.5	7.5	0.053	72.29
B-1	0.40	0.50	0.50	0.052	72.37
B-2	1.50	1.75	2	0.059	72.96
B-3	4.50	5.25	6	0.065	72.53
B-4	5.60	6.5	7.5	0.051	72.53
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)

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

CONTINUOUS ANALYZERS

Date: 2017-07-03 Manufacturer: Foxboro Model: 24 SC
 Project #: PI 20144 Run: 1 Tech: MR Reviewer: SP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2,948	2,921	0,996	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,91	17,82	9,74	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	0.008	2,928	1.000	0.008	0.02	0.020	0.15	0.004	0.05	✓	
CO ₂	0.01	17,76	9.72	0.01	0.02	0.15	0.5	0.01	0.5	✓	
O ₂	na	na	na	-	na	-	na	-	na	✓	

TEST DATA LOG

Date: 2017-07-03 Manufacturer: Foghorn Supreme Model: 24 FSC
 Project #: PI 10144 Run: 1 Tech: _____ Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	533 417,74	452 877,36	037 69 047 69 m.m.
Initial (Liter)	531 591,42	4510 79,78	964,00

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	100,5	100,4
Dry Bulb (F):	74,32	79,88
Humidity (%):	60,0	49,8

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: 2012-07-03 Manufacturer: Foyer Supreme Model: 24 fsc
 Project #: PI 20144 Run: 1 Tech: nm Reviewer: dp

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*					
2 x 4 x 10 in.	1328 lbs.	223	219	221	21.8	226	
2 x 4 x 10 in.	1380 lbs.	213	223	212	221	216	
2 x 4 x 10 in.	1378 lbs.	223	213	223	226	228	
2 x 4 x 10 in.	1296 lbs.	213	213	211	212	216	
2 x 4 x 10 in.	1316 lbs.	212	206	208	203	206	
2 x 4 x 10 in.	1379 lbs.	208	209	213	211	216	
2 x 4 x 10 in.	1240 lbs.	203	208	206	201	200	
2 x 4 x 10 in.	1226 lbs.	206	208	209	210	209	
2 x 4 x 10 in.	1220 lbs.	208	216	213	218	213	
2 x 4 x 10 in.	1282 lbs.	206	199	196	193	199	
2 x 4 x 10 in.	1220 lbs.	209	210	216	213	218	
2 x 4 x 10 in.	1420 lbs.	209	206	207	207	206	
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: 15,67 lbs

FUEL DATA

Date: 2017-07-03 Manufacturer: Foyer Supreme Model: 24 FSC
 Project #: PT 20144 Run: 1 Tech: mm Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*				
1 1/4"	x 3 1/4" x 14 in.	2,024 lbs.	191	199	193	192	191
1 1/4"	x 3 1/4" x 14 in.	1,820 lbs.	201	199	206	203	204
3 1/4"	x 3 1/4" x 14 in.	5,54 lbs.	198	199	198	198	197
3 1/4"	x 3 1/4" x 14 in.	4,30 lbs.	191	197	193	194	196
1 1/4"	x 3 1/4" x 5 in.	0,092 lbs.			196		
1 1/4"	x 3 1/4" x 5 in.	0,090 lbs.			193		
1 1/4"	x 3 1/4" x 5 in.	0,090 lbs.			201		
1 1/4"	x 3 1/4" x 5 in.	0,114 lbs.			206		
1 1/4"	x 3 1/4" x 5 in.	0,112 lbs.			210		
1 1/4"	x 3 1/4" x 5 in.	0,088 lbs.			208		
1 1/4"	x 3 1/4" x 5 in.	0,106 lbs.			206		
1 1/4"	x 3 1/4" x 5 in.	0,118 lbs.			209		
1 1/4"	x 3 1/4" x 5 in.	0,116 lbs.			199		
1 1/4"	x 3 1/4" x 5 in.	0,088 lbs.			196		
1 1/4"	x 3 1/4" x 5 in.	0,114 lbs.			202		
1 1/4"	x 3 1/4" x 5 in.	0,120 lbs.			206		
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: 14,96 lbs Min 20%: 299 Max 25%: 375

Date: 2017-06-29 Manufacturer: Fogex Supreme Model: 24 SFC
Project #: PT 20144 Run: 1 Tech: MR Reviewer: DR

		SYSTEM 1 - 1 st hour						SYSTEM 1			
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Back Filter Number	gaskets	Blank
Date	Time	36	600	601	1	37	602	608	11	631	
2017-06-29 18:00	107.7412	0.1270	0.1257	11.9939	107.9732	0.1279	0.1273	12.0492	0.1269		
2017-07-03 9:30	107.7413	0.1271	0.1257	11.9940	107.9731	0.1278	0.1274	12.0493	0.1268		

		SYSTEM 1 - 1 st hour						SYSTEM 1			
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Back Filter Number	gaskets	Blank
Date	Time	36	600	601	1	37	602	608	11	631	
2017-07-03 17:30	107.7425	0.1309	0.1256	11.9974	107.9736	0.1275	0.1271	12.0519	0.1270		
2017-07-10 8:00	107.7419	0.1304	0.1255	11.9954	107.9731	0.1273	0.1271	12.0505	0.1270		
2017-07-11 8:00	107.7414	0.1304	0.1255	11.9950	107.9731	0.1273	0.1271	12.0505	0.1270		
2017-07-11 17:00	107.7414	0.1304	0.1255	11.9950	107.9731	0.1273	0.1271	12.0505	0.1270		

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2017-06-29 Project #: PT 20144 Run: 1 Manufacturer: Fager Supra Model: 24 SFC
Tech: MM Reviewer: BD

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2017-06-29	18:00	1076454	0,1266	0,1277	11,8186
2017-07-03	9:30	1076454	0,1265	0,1278	11,8187

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2017-07-03	8:00	1076463	0,1296	0,1273	11,8120
2017-07-10	8:00	1076458	0,1295	0,1272	11,8205
2017-07-11	8:00	1076458	0,1295	0,1272	11,8200
2017-07-14	17:00	1076458	0,1295	0,1272	11,8200

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	04-07-2017
Technicien	M.M
Project #	pi 20144

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	24 FSC	
Combustion system	Non-Cat	
Appliance type	FIRE PLACE	
Firebox volume	2,28	cu ft.
Appliance weight empty	N.A	lbs
Appliance weight full	N.A	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	N.A	BTU/h Donnée fournie par le manfacturier
Targeted category	1	
Targeted output	N.A	BTU/h
Cp steel	N.A	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,987	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,996	Dimensionless
Equipment number (DGM #2):	EM 179	
Calibration Factor (DGM #3):	0,986	Dimensionless
Equipment number (DGM #3):	EM 070	Dimensionless

Tunnel

Targeted tunnel flow rate	280	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi 20144
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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):	101,1	101
Barometer (in.Hg):	29,854819	29,825289
Dry Bulb (F):	73,58	81,86
Humidity (%):	56,4	36,2
Air velocity (ft/min)	4	3

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

DGM room	
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Final: 535469,550	Liter
Initial: 533419,900	Liter
Final: 454888,260	Liter
Initial: 452880,090	Liter

Final: 122,450	cuft
Initial: 37,690	cuft

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

186

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

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FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
14,4	16,0	17,6

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

Load Volume: cu. ft

Loading Density: 7,0 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	34,2	lbs./ft3
Dry Wood Density:	28,6	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	19	2,03	19,30	19,10	19,20	19,20	19,60	39,09984	99,75	19,3
1,5	3,5	19	1,84	19,50	19,90	19,50	19,30	19,60	36,06864	99,75	19,6
3,5	3,5	19	5,32	19,70	20,20	19,60	19,90	19,60	105,4152	232,75	19,8
3,5	3,5	19	5,23	19,10	19,20	19,20	19,40	19,90	101,33024	232,75	19,4
1,5	0,75	5	0,12			20,10			2,3316	5,63	20,1
1,5	0,75	5	0,12			20,60			2,4308	5,63	20,6
1,5	0,75	5	0,13			21,00			2,688	5,63	21,0
1,5	0,75	5	0,11			20,30			2,233	5,63	20,3
1,5	0,75	5	0,12			20,40			2,4072	5,63	20,4
1,5	0,75	5	0,11			21,00			2,352	5,63	21,0
1,5	0,75	5	0,12			21,30			2,556	5,63	21,3
1,5	0,75	5	0,11			21,60			2,4624	5,63	21,6
1,5	0,75	5	0,11			20,30			2,3142	5,63	20,3
1,5	0,75	5	0,11			21,00			2,394	5,63	21,0
1,5	0,75	5	0,11			21,00			2,394	5,63	21,0
1,5	0,75	5	0,15			21,20			3,0952	5,63	21,2
										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	
								SUM MCx	311,57232		20,5 %

Test Load Weight: 15,85 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	19,65	Dry(EPA)	19,65
		Dry(B415)	19,65

19,65
Must be 19-25

Wet: 16,42
must be 15,2-22

Coal Bed Range: lbs. to

4,0 lbs.

TEST CHARGE:

Coal bed weight: 3,2

lbs.

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Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,15 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=
0,954

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,062	72,64	0,2490
B center	0,061	73,35	0,2470
A1	0,051	72,24	0,2258
A2	0,056	72,38	0,2366
A3	0,059	73,35	0,2429
A4	0,052	73,39	0,2280
B1	0,050	73,300	0,2236
B2	0,060	73,350	0,2449
B3	0,056	73,370	0,2366
B4	0,053	73,280	0,2302
AVERAGE	0,0560	73,0650	0,2365

Project nu.	pi 20144
Date	04-07-2017
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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	12	101	204	22	16	212	214	32	39	604	605	53	632		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	94,5430	0,1271	0,1279	11,7252	108,7541	0,1280	0,1269	11,9898	110,2789	0,1270	0,1263	11,7606	0,1280	03/07/2017	18:00
Before (6)	94,5431	0,1271	0,1279	11,7253	108,7542	0,1280	0,1268	11,9899	110,2790	0,1269	0,1263	11,7607	0,1280	04/07/2017	09:30
After (1)	94,5446	0,1317	0,1280	11,7272	108,7546	0,1276	0,1266	11,9918	110,2792	0,1309	0,1260	11,7628	0,1281	04/07/2017	17:00
After (2)	94,5437	0,1312	0,1279	11,7262	108,7542	0,1276	0,1265	11,9911	110,2790	0,1306	0,1259	11,7620	0,1280	10/07/2017	08:00
After (3)	94,5436	0,1310	0,1279	11,7262	108,7542	0,1276	0,1265	11,9906	110,2791	0,1308	0,1261	11,7622	0,1280	11/07/2017	08:00
After (4)	94,5436	0,1310	0,1279	11,7262	108,7542	0,1276	0,1265	11,9906	110,2791	0,1308	0,1261	11,7622	0,1280	11/07/2017	17:00
After (5)															
After (6)	94,5436	0,1310	0,1279	11,7262	108,7542	0,1276	0,1265	11,9906	110,2791	0,1308	0,1261	11,7622	0,1280	11/07/2017	17:00
Difference	0,0005	0,0039	0,0000	0,0009	0,0000	-0,0004	-0,0003	0,0007	0,0001	0,0039	-0,0002	0,0015	0,0000		
Total (mg)		5,3				5,3				5,3			0		
Total ajusté (mg)		5,30				5,30				5,30					

Project nu. pi 20144
Date 04-07-2017
Technicien

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,4 g/hr

Burn Rate : 0,937 Dry kg/hr

Test Duration: 385 min

PRESSURE FACTOR: DGM 1 0,97413
 DGM 2 0,97773
 DGM 3 0,99733

BAROMETRIC PRESSURE
 Average: 29,840054 in Hg
 Start: 29,854819 in Hg
 End: 29,825289 in Hg

TEMPERATURE FACTORS DGM 1 0,98162
 DGM 2 0,98070
 DGM 3 0,98263

DGM CONTROLLER VALUES

DGM 1 Final: 18909,929 Cuft
 Initial: 18837,546 Cuft

VOLUMES SAMPLED DGM 1 68,314 SCft
 DGM 2 67,728 SCft
 DGM 3 81,902 SCft

DGM 2 Final: 16064,228 Cuft
 Initial: 15993,310 Cuft

DGM #3 Final: 122,450 Cuft
 Initial: 37,690 Cuft

TOTAL TUNNEL VOLUME : 119313

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1746,527
 Sample Train 2: 1761,643

DGM 1 537,888 °R
 DGM 2 538,389 °R

Paticulate concentration
 Sample Train 1 0,000078 g/dscf
 Sample Train 2 0,000078 g/dscf
 Room 0,000000 g/dscf

CALIBRATION FACTORS

DGM 1 0,9870
 DGM 2 0,9960
 DGM #3 0,9860

TUNNEL FLOW RATE: 309,904 Dscfm

TOTAL EMISSIONS
 Sample Train 1 9,26 g
 Sample Train 2 9,34 g

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

EMISSION RATES
 Sample Train 1 1,44 g/hr
 Sample Train 2 1,46 g/hr

1st hour emission rate 9,26 g/hr

DEVIATION: 0,43%

Cs Train 1 Train 2
 7,758E-05 7,82539E-05

Elapsed	Raw data row	Weight				Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit
Time		Remaining	CO	CO ₂	O ₂	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom
min		lbs	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F
0,00	186,00	15,8	0,3	0,4	304,8	232,0	74,0	95,5	255,8	223,5	422,4	222,2	400,2
1,0	187,0	15,7	0,8	1,3	301,8	262,1	74,1	92,1	253,5	219,6	415,4	219,7	401,0
2,0	188,0	15,5	0,6	4,2	306,3	345,8	74,5	97,4	289,0	215,7	410,5	217,0	399,3
3,0	189,0	15,4	0,5	6,1	318,3	429,8	74,4	103,6	363,7	214,7	404,3	214,2	394,4
4,0	190,0	15,1	0,6	7,0	335,7	503,6	74,6	110,3	467,1	214,4	399,1	212,1	385,6
5,0	191,0	14,8	0,5	8,9	355,8	571,7	74,7	116,3	573,3	215,9	396,0	210,8	382,8
6,0	192,0	14,6	0,5	9,8	371,2	592,4	74,6	118,3	652,5	218,6	393,3	211,1	380,3
7,0	193,0	14,4	0,7	8,5	370,2	570,0	74,8	114,4	645,9	222,1	392,7	211,3	378,8
8,0	194,0	14,2	0,5	8,4	369,3	577,1	75,1	112,9	630,2	225,2	393,6	211,4	386,2
9,0	195,0	14,0	0,6	9,8	369,3	574,5	75,0	111,7	619,1	227,3	393,9	212,1	394,2
10,0	196,0	13,8	0,7	9,1	367,9	570,6	75,0	111,0	610,6	231,3	394,4	212,8	390,3
11,0	197,0	13,6	0,7	9,3	369,0	573,2	74,9	111,2	614,5	233,4	393,9	213,0	390,0
12,0	198,0	13,4	0,8	9,6	373,2	590,8	75,1	112,2	627,9	234,7	395,4	214,0	394,2
13,0	199,0	13,2	0,7	9,8	377,8	588,6	75,3	111,5	640,8	235,8	395,6	214,5	402,2
14,0	200,0	13,0	0,8	9,9	378,4	579,3	75,4	111,2	642,3	238,2	395,7	214,7	401,1
15,0	201,0	12,8	0,8	10,4	379,6	580,6	75,2	111,5	644,1	240,4	397,2	215,7	400,7
16,0	202,0	12,6	0,9	10,9	381,3	581,8	75,7	112,1	645,8	242,9	397,7	217,3	402,6
17,0	203,0	12,4	1,0	11,0	381,8	586,2	75,0	112,7	650,0	245,7	398,7	218,7	396,2
18,0	204,0	12,2	1,0	11,3	384,2	593,0	75,0	112,8	659,5	247,9	400,1	219,7	394,0
19,0	205,0	12,0	0,9	11,7	387,6	598,5	75,2	112,3	669,9	249,9	402,7	221,5	393,9
20,0	206,0	11,8	0,9	11,9	392,4	600,8	75,5	111,5	679,1	250,9	404,1	222,7	405,2
21,0	207,0	11,6	0,8	12,2	396,5	604,4	75,5	112,0	687,7	254,6	406,5	224,5	409,1
22,0	208,0	11,4	0,8	12,6	400,0	608,0	75,2	112,7	700,8	257,4	409,2	225,2	407,5
23,0	209,0	11,2	0,7	12,9	403,0	605,7	74,8	112,2	713,1	260,0	412,0	226,7	403,0
24,0	210,0	11,1	0,6	12,7	405,4	601,8	74,8	112,6	718,9	261,8	413,7	228,4	404,0
25,0	211,0	10,9	0,6	12,8	406,3	601,4	75,1	112,2	717,9	264,9	417,3	229,9	401,7
26,0	212,0	10,7	0,6	12,8	406,4	594,6	75,2	111,1	715,2	267,0	420,3	231,5	397,9
27,0	213,0	10,6	0,5	12,4	406,7	586,5	75,3	110,4	707,4	269,4	424,2	232,4	400,1
28,0	214,0	10,4	0,7	12,1	406,0	580,8	75,0	110,4	699,7	270,5	426,2	233,9	399,9
29,0	215,0	10,2	0,6	12,1	407,6	573,6	75,1	110,1	701,0	272,2	429,2	234,7	400,9
30,0	216,0	10,1	0,5	12,3	409,5	571,6	75,3	110,0	703,0	275,1	431,7	236,4	401,1
31,0	217,0	9,9	0,5	12,5	410,3	569,2	75,6	110,0	703,0	276,5	434,5	238,3	399,5
32,0	218,0	9,8	0,5	12,7	411,5	569,0	75,6	109,2	704,6	278,5	437,7	239,7	397,0
33,0	219,0	9,6	0,4	12,6	412,1	566,8	75,4	108,8	702,4	279,9	440,0	241,3	397,1
34,0	220,0	9,4	0,4	12,5	411,4	562,7	75,7	108,9	698,6	281,7	442,9	242,9	390,7
35,0	221,0	9,3	0,4	12,4	410,4	560,2	75,4	108,8	692,4	283,7	446,0	244,1	385,8
36,0	222,0	9,2	0,4	12,4	411,2	558,9	76,0	108,7	689,8	284,0	448,2	245,7	388,4
37,0	223,0	9,0	0,4	12,4	412,8	556,6	76,0	108,1	686,9	284,7	450,5	247,1	395,0
38,0	224,0	8,9	0,4	12,4	414,4	554,9	76,1	106,9	685,9	285,8	452,6	248,9	398,9
39,0	225,0	8,8	0,4	12,3	415,6	551,6	75,8	106,7	683,4	289,2	454,7	250,5	400,3
40,0	226,0	8,6	0,4	12,3	416,2	552,0	76,2	107,8	682,0	291,1	457,3	252,1	398,6
41,0	227,0	8,5	0,4	12,4	416,4	553,9	76,4	105,9	676,4	294,0	460,3	253,4	397,9
42,0	228,0	8,4	0,4	12,6	419,1	554,8	76,3	107,2	678,6	293,0	461,9	254,9	407,3
43,0	229,0	8,2	0,3	12,9	422,3	558,4	76,1	107,9	681,3	295,5	465,9	256,7	412,0
44,0	230,0	8,0	0,3	13,0	423,3	561,6	76,0	107,8	688,7	300,3	467,8	258,3	401,3
45,0	231,0	7,9	0,3	13,0	423,0	562,1	75,8	108,0	689,9	302,9	469,7	259,3	393,1
46,0	232,0	7,8	0,3	13,0	425,2	564,0	75,8	108,7	695,1	303,9	472,1	260,9	394,1
47,0	233,0	7,7	0,3	13,0	427,6	564,3	75,8	107,2	697,2	305,4	474,5	263,1	397,6
48,0	234,0	7,6	0,2	12,9	429,4	563,1	76,4	107,4	699,6	309,9	477,1	265,3	394,8
49,0	235,0	7,4	0,3	12,8	430,8	562,4	75,8	108,1	699,2	310,2	480,1	268,0	396,2
50,0	236,0	7,3	0,3	12,8	431,4	559,4	76,7	107,5	700,3	313,9	483,1	269,9	390,1
51,0	237,0	7,1	0,3	12,6	430,5	551,3	76,7	107,6	694,5	316,3	485,4	271,6	384,5
52,0	238,0	7,0	0,3	12,6	430,5	545,2	76,5	106,8	688,9	316,8	488,0	274,1	385,0
53,0	239,0	6,9	0,3	12,8	430,3	543,2	76,4	105,7	687,7	319,1	490,9	275,3	378,7
54,0	240,0	6,7	0,3	13,0	432,0	544,0	76,4	106,2	689,6	320,9	494,6	276,5	378,5
55,0	241,0	6,6	0,3	13,1	434,5	544,2	76,3	105,8	692,4	321,8	497,5	279,1	381,5
56,0	242,0	6,5	0,3	13,2	437,5	545,8	76,4	105,8	696,1	324,7	500,2	280,0	386,3
57,0	243,0	6,3	0,3	13,3	440,3	548,1	76,5	106,3	696,5	325,9	502,1	282,2	394,5
58,0	244,0	6,2	0,3	13,3	442,1	549,7	76,6	107,3	698,1	329,9	508,2	283,5	390,9
59,0	245,0	6,1	0,2	13,3	443,3	550,8	76,4	105,6	698,9	331,9	512,0	285,0	389,0
60,0	246,0	6,0	0,2	13,4	443,6	551,6	76,4	107,5	697,6	333,6	516,6	286,4	383,9
61,0	247,0	5,9	0,2	13,4	445,8	553,5	77,1	107,1	699,0	334,4	520,7	289,8	385,2
62,0	248,0	5,7	0,2	13,4	448,4	553,1	76,5	107,3	699,1	338,1	524,0	291,0	390,1
63,0	249,0	5,6	0,2	13,4	448,5	552,4	77,0	106,9	699,6	340,5	526,5	292,5	383,2
64,0	250,0	5,5	0,2	13,3	449,2	550,8	76,0	107,3	699,7	341,6	530,2	295,6	379,1
65,0	251,0	5,3	0,2	13,1	448,0	547,5	76,6	106,6	694,8	344,3	533,0	295,8	372,2
66,0	252,0	5,2	0,2	13,0	449,8	543,1	76,7	106,7	689,3	344,4	536,1	301,3	377,8
67,0	253,0	5,1	0,2	12,8	449,9	539,4	76,7	107,1	684,1	347,4	539,5	304,6	374,0
68,0	254,0	5,0	0,2	12,6	449,9	535,2	76,8	105,8	680,0	349,4	540,9	307,7	371,6
69,0	255,0	5,0	0,2	12,3	449,8	528,6	76,9	105,5	669,6	349,4	543,7	311,5	374,6
70,0	256,0	4,9	0,2	12,0	450,3	519,5	76,7	105,4	657,3	349,8	546,2	317,9	380,6
71,0	257,0	4,8	0,2	11,6	449,5	512,4	76,9	104,5	647,9	350,8	548,3	318,1	382,5
72,0	258,0	4,6	0,2	11,4	447,8	503,6	76,4	104,1	642,2	351,6	550,1	319,7	375,2
73,0	259,0	4,6	0,1	11,2	446,2	495,4	76,3	104,0	633,7	350,5	553,5	323,4	369,8
74,0	260,0	4,5	0,1	10,9	444,4	490,2	76,1	103,8	625,9	348,6	554,9	324,6	368,2
75,0	261,0	4,4	0,1	10,8	444,4	484,6	76,1	103,4	619,3	346,4	557,0	328,3	371,1
76,0	262,0	4,4	0,1	10,7	444,4	478,8	77,0	102,5	613,1	345,7	557,9	330,2	374,9
77,0	263,0	4,3	0,2	10,5	443,5	474,0	76,5	101,6	608,1	344,5	558,3	332,1	374,6
78,0	264,0	4,2	0,2	10,5	442,3	469,8	76,3	101,8	603,4	342,8	558,5	334,0	372,9
79,0	265,0	4,1	0,2	10,4	442,5	466,2	76,3	102,3	599,1	341,7	558,6	335,6	377,6
80,0	266,0	4,1	0,2	10,4	441,4	463,6	76,4	101,6	595,9	340,9	559,2	334,8	376,2
81,0	267,0	4,0	0,2	10,4	440,5	460,0	77,0	100,4	593,0	339,2	558,9	334,8	376,7
82,0	268,0	3,9	0,2	10,3	440,4	458,5	76,6	100,4	587,3	337,2	559,2	336,1	382,5
83,0	269,0	3,9	0,2	10,4	440,7	456,1	77,1	99,7	586,3	338,3	558,4	337,1	383,5
84,0	270,0	3,8	0,2	10,4	441,6	454,5	76,9	98,7	586,4	336,3	559,0	336,1	389,9
85,0	271,0	3,7	0,2	10,6	442,5	452,8	76,2	99,0	588,4	335,9	559,2	336,8	392,1
86,0	272,0	3,6	0,1	10,7	442,2	453,4	76,1	99,6	591,8	335,4	560,8	337,3	385,6
87,0	2												

103,0	289,0	2,6	0,8	8,0	429,3	395,5	76,7	95,2	500,8	326,5	574,1	342,1	403,1
104,0	290,0	2,5	1,0	7,6	426,0	386,8	77,4	94,7	488,0	324,8	571,7	339,7	405,6
105,0	291,0	2,5	1,1	7,4	422,5	376,9	77,3	94,2	478,5	323,6	569,1	339,2	402,0
106,0	292,0	2,5	1,2	7,0	419,6	369,2	77,4	93,1	469,8	321,7	566,7	337,9	402,0
107,0	293,0	2,4	1,1	7,0	417,9	360,8	77,4	92,5	463,0	320,1	565,8	337,0	403,4
108,0	294,0	2,4	1,2	7,0	416,8	352,3	77,1	92,2	453,4	317,6	564,8	335,3	412,8
109,0	295,0	2,4	1,2	6,9	415,4	344,5	77,0	93,4	448,3	318,0	563,4	335,1	412,4
110,0	296,0	2,4	1,3	6,8	413,7	336,3	77,2	92,4	442,9	315,7	561,9	334,1	413,8
111,0	297,0	2,3	1,3	6,8	410,5	329,9	77,5	92,2	437,4	313,1	559,7	332,7	409,4
112,0	298,0	2,3	1,4	6,8	407,5	323,0	76,9	91,7	432,6	310,1	556,0	330,8	408,1
113,0	299,0	2,3	1,4	6,7	404,5	316,3	76,9	91,5	426,8	307,6	554,7	327,3	406,3
114,0	300,0	2,3	1,5	6,7	402,6	310,8	76,8	90,4	421,1	306,5	551,9	326,4	407,2
115,0	301,0	2,3	1,5	6,6	402,5	304,3	77,3	90,2	414,5	301,6	548,9	325,6	422,0
116,0	302,0	2,3	1,6	6,6	401,5	299,3	77,3	89,3	410,1	300,5	546,6	323,7	426,7
117,0	303,0	2,2	1,5	6,5	397,8	293,9	77,0	88,3	403,5	298,7	542,3	320,4	423,9
118,0	304,0	2,2	1,6	6,3	395,5	288,9	76,8	88,8	396,6	295,6	539,9	321,6	423,9
119,0	305,0	2,2	1,6	6,2	395,0	283,7	77,2	89,5	391,1	295,2	537,7	320,8	430,0
120,0	306,0	2,2	1,6	6,1	394,4	279,2	77,2	89,8	387,3	292,9	534,6	320,4	436,7
121,0	307,0	2,2	1,7	6,1	392,4	275,2	77,4	88,5	382,6	290,5	531,5	318,6	439,0
122,0	308,0	2,1	1,7	6,0	389,8	271,1	76,9	88,8	381,3	289,8	529,1	315,4	433,7
123,0	309,0	2,1	1,7	6,0	386,9	266,2	77,3	89,1	378,6	287,7	527,5	313,4	427,2
124,0	310,0	2,1	1,8	6,0	384,4	262,4	77,1	88,6	376,2	285,5	524,7	310,6	424,9
125,0	311,0	2,1	1,8	6,0	382,2	258,3	76,6	88,0	372,8	283,1	522,2	308,3	424,5
126,0	312,0	2,1	1,9	6,0	380,3	254,2	76,4	88,2	369,9	281,7	519,6	306,2	424,3
127,0	313,0	2,1	1,9	5,9	377,6	250,9	76,2	88,5	369,4	280,0	517,3	303,6	417,7
128,0	314,0	2,0	1,7	5,6	375,6	247,8	76,5	88,3	366,9	277,9	515,8	301,3	415,8
129,0	315,0	2,1	1,8	5,4	373,5	244,5	76,6	88,2	361,9	276,7	513,1	299,9	416,0
130,0	316,0	2,0	1,9	5,3	370,7	241,7	76,3	87,5	357,2	274,3	510,3	297,9	413,6
131,0	317,0	2,0	1,9	5,4	367,9	238,0	76,4	87,4	353,3	272,2	507,2	295,2	411,6
132,0	318,0	2,0	1,9	5,3	366,3	235,0	76,6	87,4	350,2	270,7	504,3	292,2	414,1
133,0	319,0	2,0	1,9	5,3	365,1	231,9	76,6	86,7	348,7	268,6	501,9	291,0	415,2
134,0	320,0	2,0	1,9	5,3	361,9	228,4	76,2	87,0	347,0	266,9	498,9	287,0	409,8
135,0	321,0	2,0	1,9	5,3	358,4	225,6	76,5	87,0	343,7	264,6	495,0	283,0	405,4
136,0	322,0	2,0	1,9	5,3	355,8	222,7	76,3	86,8	340,0	262,3	491,7	280,7	404,2
137,0	323,0	1,9	1,9	5,3	353,6	220,0	76,2	86,9	337,6	260,6	489,6	278,9	401,3
138,0	324,0	1,9	2,0	5,2	351,2	217,5	76,4	87,0	333,3	258,9	486,9	276,2	400,6
139,0	325,0	1,9	2,0	5,2	349,5	215,4	76,3	86,6	331,3	257,2	484,6	273,5	400,8
140,0	326,0	1,9	2,0	5,2	347,4	213,0	76,1	86,6	328,6	256,2	482,8	271,3	398,0
141,0	327,0	1,9	2,0	5,2	345,7	210,8	76,2	86,4	327,1	253,6	479,7	269,7	398,5
142,0	328,0	1,9	2,0	5,2	343,9	208,8	76,2	85,9	325,6	252,2	477,0	268,7	396,0
143,0	329,0	1,9	2,0	5,1	342,1	207,0	76,5	85,0	323,1	250,6	474,4	266,8	395,8
144,0	330,0	1,9	2,0	5,1	340,8	204,5	76,4	84,4	320,5	248,9	472,0	265,7	396,7
145,0	331,0	1,9	2,0	5,2	338,7	202,8	76,5	84,8	318,2	248,0	468,8	264,2	394,4
146,0	332,0	1,9	2,0	5,1	337,2	201,0	76,4	84,3	315,6	246,0	466,9	262,3	395,3
147,0	333,0	1,9	2,1	5,1	336,1	199,3	76,5	85,2	312,2	244,8	464,4	261,2	397,8
148,0	334,0	1,8	2,1	5,1	334,5	197,6	76,7	85,0	312,3	244,2	462,3	259,9	393,9
149,0	335,0	1,8	2,1	5,1	331,7	195,9	76,5	85,0	311,8	243,1	459,8	258,3	385,3
150,0	336,0	1,8	2,1	5,1	329,7	194,3	76,2	85,1	310,8	241,1	458,0	255,6	383,2
151,0	337,0	1,8	2,1	5,1	328,1	192,7	76,5	85,2	308,2	240,5	456,1	254,4	381,4
152,0	338,0	1,8	2,1	5,1	326,0	191,3	76,5	85,1	305,8	239,0	454,0	252,5	378,8
153,0	339,0	1,8	2,1	5,1	323,9	190,0	76,1	84,9	305,5	237,7	451,3	250,2	375,1
154,0	340,0	1,8	2,1	5,1	322,2	188,8	76,1	84,8	305,9	236,0	448,7	248,8	371,7
155,0	341,0	1,8	2,1	5,1	321,2	187,2	76,2	84,9	303,4	234,6	447,0	247,9	373,3
156,0	342,0	1,8	2,2	5,1	319,7	186,1	76,3	85,0	302,3	233,8	445,0	246,3	370,9
157,0	343,0	1,7	2,2	5,0	317,6	184,4	76,2	85,1	300,5	232,8	442,7	245,4	366,9
158,0	344,0	1,7	2,2	4,9	316,1	183,0	76,2	84,8	299,3	231,7	441,1	243,4	364,9
159,0	345,0	1,7	2,2	4,9	314,5	181,9	75,9	84,8	298,2	230,2	438,6	241,6	363,9
160,0	346,0	1,7	2,2	5,0	313,2	181,1	76,1	84,6	296,2	229,0	435,9	240,6	364,1
161,0	347,0	1,7	2,2	4,9	311,8	179,9	76,1	84,5	295,8	228,1	433,9	239,1	362,0
162,0	348,0	1,7	2,2	4,9	310,9	178,4	76,3	84,7	294,7	226,9	431,4	237,8	363,7
163,0	349,0	1,7	2,2	4,9	309,4	176,9	76,4	84,2	293,9	225,4	429,8	236,4	361,3
164,0	350,0	1,7	2,2	4,8	307,4	175,7	76,0	83,9	292,6	224,5	427,1	234,4	358,5
165,0	351,0	1,7	2,3	4,8	306,1	175,2	76,3	83,7	290,2	223,7	425,2	233,3	358,0
166,0	352,0	1,6	2,3	4,7	303,9	174,4	76,2	83,6	288,6	222,4	424,1	231,9	352,4
167,0	353,0	1,7	2,5	4,5	302,3	173,6	76,1	83,7	286,9	221,3	421,4	230,9	351,1
168,0	354,0	1,7	2,5	4,4	302,1	172,8	76,5	82,9	285,1	219,2	419,8	229,6	356,9
169,0	355,0	1,6	2,5	4,4	300,4	171,3	76,0	83,6	283,9	218,6	418,1	228,2	353,1
170,0	356,0	1,6	2,6	4,4	298,4	170,1	76,2	83,2	282,8	217,5	415,5	227,0	349,4
171,0	357,0	1,6	2,6	4,3	297,5	168,6	76,2	83,4	280,6	216,2	413,0	225,6	352,1
172,0	358,0	1,6	2,6	4,3	296,4	167,6	75,9	83,6	279,4	215,3	410,9	224,2	352,3
173,0	359,0	1,6	2,7	4,3	296,1	166,7	76,2	83,3	279,6	214,1	408,9	223,5	354,6
174,0	360,0	1,6	2,6	4,2	294,7	165,8	76,2	83,5	279,5	212,8	406,2	222,7	352,3
175,0	361,0	1,6	2,8	4,1	293,8	165,2	76,1	83,0	278,1	211,7	404,7	221,3	353,2
176,0	362,0	1,6	2,9	3,9	292,8	164,2	76,4	83,2	276,0	211,5	402,6	219,5	354,3
177,0	363,0	1,6	2,9	3,9	290,8	163,4	76,6	82,3	274,3	210,3	400,9	218,5	350,1
178,0	364,0	1,6	2,9	3,9	289,4	162,7	76,0	82,4	273,1	209,3	398,4	217,7	348,7
179,0	365,0	1,6	2,9	3,9	288,5	161,7	76,4	82,5	272,4	208,3	396,8	217,2	347,8
180,0	366,0	1,5	2,9	3,9	287,5	160,5	76,4	81,6	270,1	207,2	394,5	215,6	350,0
181,0	367,0	1,6	2,9	3,8	286,0	159,7	76,3	81,6	268,6	206,1	392,6	215,1	347,6
182,0	368,0	1,5	2,9	3,8	284,4	158,9	76,4	81,6	268,3	205,1	390,6	213,7	344,3
183,0	369,0	1,5	2,8	3,8	284,2	157,9	76,1	82,1	266,5	204,2	389,5	212,6	348,2
184,0	370,0	1,5	2,8	3,8	283,0	157,2	76,4	81,5	265,4	202,8	386,8	211,6	348,7
185,0	371,0	1,5	2,8	3,8	282,1	156,1	76,5	81,3	263,3	202,9	384,4	210,6	349,2
186,0	372,0	1,5	2,8	3,8	281,1	155,5	76,6	81,7	262,9	201,7	382,5	209,5	348,8
187,0	373,0	1,5	2,8	3,7	279,9	154,8	76,7	81,8	261,7	201,0	381,0	208,6	346,9
188,0	374,0	1,5	2,8	3,7	278,5	154,1	76,7	82,2	260,7	199,4	379,3	207,2	346,0
189,0	375,0	1,5	2,8	3,7	277,0	153,0	76,5	82,3	259,2	198,5	377,0	205,9	344,6
190,0	376,0	1,5	2,8	3,7	275,7	151,7	76,5	82,2	257,8	197,3	374,9	204,8	343,8
191,0	377,0	1,5	2,8	3,7	274,3	151,1	76,4	82,2	255,7	196,5	373,2	203,1	342,8
192,0	378,0	1,5	2,8	3,7	272,0	150,4	76,4	82,3	254,1	196,			

209,0	395,0	1,4	2,6	3,5	250,9	138,4	76,8	80,9	233,2	181,5	341,2	185,5	313,2
210,0	396,0	1,3	2,6	3,5	249,4	138,1	76,8	80,8	231,5	181,1	339,3	184,8	310,0
211,0	397,0	1,4	2,5	3,4	248,8	137,3	76,8	80,8	229,9	180,6	337,8	183,9	312,0
212,0	398,0	1,4	2,5	3,4	247,5	137,2	76,7	80,4	230,5	179,5	336,4	183,3	307,9
213,0	399,0	1,4	2,5	3,4	246,2	136,5	76,7	80,9	229,8	178,6	335,0	182,5	304,8
214,0	400,0	1,3	2,5	3,4	243,8	136,0	76,7	81,2	228,9	177,9	333,0	181,4	297,7
215,0	401,0	1,3	2,4	3,4	242,9	135,5	76,8	80,9	228,0	177,0	331,4	180,7	297,7
216,0	402,0	1,3	2,5	3,4	241,4	135,2	76,9	81,0	227,1	176,7	330,1	180,2	292,8
217,0	403,0	1,3	2,5	3,4	240,8	134,8	76,9	81,3	226,3	176,1	328,8	179,4	293,4
218,0	404,0	1,3	2,4	3,4	239,6	134,2	76,7	80,9	225,7	175,6	328,3	178,8	289,9
219,0	405,0	1,3	2,4	3,4	237,8	134,0	76,6	81,1	224,2	175,1	326,0	177,9	285,9
220,0	406,0	1,3	2,4	3,3	237,0	133,7	76,7	81,0	223,4	174,8	325,3	177,1	284,6
221,0	407,0	1,3	2,4	3,4	236,5	133,5	76,9	80,6	223,7	174,1	323,5	176,6	284,6
222,0	408,0	1,3	2,4	3,4	235,9	133,1	76,8	80,7	222,6	174,1	321,7	175,7	285,5
223,0	409,0	1,3	2,5	3,4	234,4	132,9	76,7	80,3	221,9	172,9	320,1	174,6	282,4
224,0	410,0	1,3	2,4	3,4	233,5	132,5	76,7	80,4	221,7	172,1	318,7	173,6	281,6
225,0	411,0	1,3	2,5	3,4	232,9	132,4	76,7	80,6	220,9	171,8	317,9	173,0	280,7
226,0	412,0	1,3	2,5	3,4	232,1	132,0	76,9	80,6	220,4	171,3	316,5	172,2	280,3
227,0	413,0	1,3	2,5	3,4	231,7	132,0	76,8	80,6	220,0	170,4	315,3	171,7	281,4
228,0	414,0	1,3	2,5	3,4	232,3	131,4	76,9	80,2	219,0	169,7	314,3	171,1	287,4
229,0	415,0	1,3	2,5	3,4	230,3	131,1	76,7	80,1	218,9	169,4	312,8	170,0	280,6
230,0	416,0	1,3	2,4	3,4	228,7	130,6	76,8	80,7	218,8	169,0	311,8	169,5	274,2
231,0	417,0	1,2	2,4	3,3	228,3	130,2	76,8	80,5	217,8	168,5	311,0	168,6	275,7
232,0	418,0	1,2	2,4	3,3	227,9	130,0	76,8	80,5	217,6	168,0	309,5	167,9	276,3
233,0	419,0	1,3	2,3	3,3	226,9	129,5	76,8	80,6	217,0	167,5	308,2	167,6	274,2
234,0	420,0	1,2	2,3	3,3	224,9	129,0	76,8	81,0	215,7	166,7	307,0	166,9	268,4
235,0	421,0	1,2	2,3	3,3	223,5	128,9	76,8	80,6	214,9	166,7	305,9	166,1	264,3
236,0	422,0	1,2	2,3	3,3	223,3	128,9	76,9	80,4	215,2	166,3	305,1	165,8	264,3
237,0	423,0	1,2	2,3	3,3	222,6	128,8	77,0	80,4	214,9	165,2	303,9	165,3	263,9
238,0	424,0	1,2	2,3	3,3	222,2	128,8	77,1	80,3	214,9	164,9	303,1	164,8	263,2
239,0	425,0	1,2	2,4	3,4	222,0	128,8	77,1	80,2	215,0	164,8	302,3	164,3	263,4
240,0	426,0	1,2	2,4	3,4	221,0	128,5	77,0	80,6	215,2	164,4	301,6	164,1	259,6
241,0	427,0	1,2	2,5	3,5	220,6	128,5	77,0	80,5	215,1	163,7	300,6	163,3	260,2
242,0	428,0	1,2	2,5	3,5	219,7	128,5	77,1	80,9	214,8	163,4	299,0	162,6	259,1
243,0	429,0	1,2	2,5	3,5	219,5	128,5	77,1	80,4	214,8	162,7	298,3	161,6	260,0
244,0	430,0	1,2	2,5	3,5	219,5	128,5	77,0	80,5	214,6	162,2	298,1	161,3	261,0
245,0	431,0	1,2	2,6	3,5	219,0	128,6	77,1	80,4	214,9	161,5	296,7	160,6	261,2
246,0	432,0	1,2	2,5	3,5	217,8	128,9	77,1	80,3	214,9	161,4	295,5	160,3	256,8
247,0	433,0	1,2	2,5	3,5	217,5	128,8	77,2	80,4	213,8	160,9	295,2	160,0	257,4
248,0	434,0	1,2	2,5	3,4	216,7	128,8	77,2	80,4	213,6	160,9	294,0	159,7	255,5
249,0	435,0	1,2	2,5	3,4	216,1	128,7	77,1	80,5	213,4	160,4	293,4	158,8	254,7
250,0	436,0	1,1	2,5	3,4	215,5	128,4	77,2	80,5	213,2	159,7	292,4	158,2	254,0
251,0	437,0	1,1	2,5	3,4	214,9	128,0	77,2	80,7	212,3	159,0	291,9	157,7	253,8
252,0	438,0	1,1	2,5	3,4	214,7	128,0	77,2	80,4	211,3	158,9	290,8	157,0	255,2
253,0	439,0	1,1	2,5	3,4	213,6	127,6	77,2	80,4	211,0	158,7	289,8	157,0	251,5
254,0	440,0	1,1	2,5	3,4	212,1	127,1	77,1	80,7	210,5	159,4	289,6	156,7	244,0
255,0	441,0	1,1	2,2	3,1	211,3	146,9	77,1	81,3	210,1	158,2	288,0	156,1	244,1
256,0	442,0	1,1	1,8	3,5	211,5	139,0	77,2	81,0	211,7	157,4	288,0	155,4	244,9
257,0	443,0	1,1	2,1	4,9	211,1	134,8	77,3	80,9	212,6	157,2	287,2	155,1	243,6
258,0	444,0	1,1	2,2	4,3	211,4	132,8	77,3	80,8	212,2	156,9	287,3	154,9	245,9
259,0	445,0	1,1	2,3	3,8	211,2	131,7	77,4	80,6	211,1	156,8	285,9	154,5	247,6
260,0	446,0	1,1	2,4	3,4	210,9	131,3	77,4	80,6	210,0	156,5	285,7	153,7	248,8
261,0	447,0	1,1	2,4	3,3	211,0	130,8	77,5	80,6	209,1	156,3	285,4	153,5	250,8
262,0	448,0	1,0	2,4	3,3	209,2	130,3	77,6	81,1	208,9	156,0	284,3	153,2	243,6
263,0	449,0	1,1	2,4	3,3	208,5	129,9	77,6	80,9	208,4	155,9	284,5	153,0	240,8
264,0	450,0	1,1	2,4	3,2	208,7	129,4	77,7	80,8	206,8	155,5	283,5	152,5	245,1
265,0	451,0	1,1	2,4	3,2	208,1	128,7	77,7	80,7	206,2	155,3	282,5	151,9	244,5
266,0	452,0	1,0	2,4	3,2	207,4	128,2	77,7	80,9	205,3	155,1	281,6	151,6	243,4
267,0	453,0	1,1	2,4	3,2	206,7	127,7	77,7	80,7	204,6	154,4	281,1	151,1	242,5
268,0	454,0	1,1	2,4	3,2	206,1	127,5	77,7	80,9	203,4	154,6	280,4	150,8	241,3
269,0	455,0	1,0	2,4	3,2	206,0	127,1	77,6	80,9	202,4	154,4	279,9	150,1	243,0
270,0	456,0	1,0	2,4	3,2	205,3	126,8	77,9	81,0	202,3	154,2	279,4	149,7	241,1
271,0	457,0	1,0	2,4	3,2	205,0	126,6	77,8	80,9	201,5	153,5	278,5	149,4	242,3
272,0	458,0	1,0	2,4	3,2	204,6	126,2	78,0	81,1	200,5	153,5	278,4	149,5	240,9
273,0	459,0	1,0	2,3	3,1	204,4	125,6	78,0	81,2	199,3	153,3	277,4	149,2	242,5
274,0	460,0	1,0	2,3	3,0	203,7	125,4	78,1	81,0	198,9	152,8	277,3	148,8	240,7
275,0	461,0	1,0	2,2	3,0	202,9	124,8	78,1	81,0	197,6	152,8	276,0	148,3	239,8
276,0	462,0	1,0	2,2	3,0	202,6	124,5	78,2	81,2	196,3	152,4	275,4	147,9	240,9
277,0	463,0	1,0	2,2	3,0	202,7	124,1	78,2	81,4	196,4	152,2	274,5	147,5	242,8
278,0	464,0	1,0	2,2	3,0	201,6	123,9	78,3	81,2	195,4	152,0	273,3	147,1	240,3
279,0	465,0	1,0	2,2	3,0	201,6	123,3	78,2	81,3	194,5	151,4	273,2	146,7	242,0
280,0	466,0	1,0	2,2	3,1	200,4	123,3	78,3	81,2	194,4	151,4	272,2	146,5	237,7
281,0	467,0	1,0	2,3	3,2	199,9	123,3	78,4	81,5	194,4	152,2	271,3	146,4	235,4
282,0	468,0	0,9	2,2	3,0	198,4	143,7	78,4	83,5	192,5	151,2	270,5	146,1	231,6
283,0	469,0	1,0	1,4	2,4	199,1	136,8	78,4	81,9	196,9	150,7	270,5	145,8	231,6
284,0	470,0	0,9	2,1	4,4	199,3	132,9	78,4	81,6	200,8	151,2	269,5	145,4	229,6
285,0	471,0	0,9	2,1	4,7	199,1	131,2	78,3	81,6	203,9	151,1	269,6	145,5	225,4
286,0	472,0	0,9	2,1	4,8	199,8	130,7	78,5	81,9	206,5	151,0	269,8	145,2	226,6
287,0	473,0	0,9	2,2	4,9	199,9	131,1	78,6	81,7	209,5	150,8	269,8	144,9	224,6
288,0	474,0	0,9	2,4	5,0	201,2	131,3	78,5	81,9	211,8	150,6	270,1	144,8	228,5
289,0	475,0	0,9	2,6	5,1	201,5	131,6	78,4	81,6	214,0	150,8	270,0	144,8	227,9
290,0	476,0	0,9	2,6	5,5	202,4	132,0	78,5	81,7	216,9	151,3	269,5	144,6	229,6
291,0	477,0	0,9	2,3	6,2	202,9	131,8	78,5	81,5	219,6	151,2	269,2	144,2	230,2
292,0	478,0	0,8	2,3	6,5	203,3	131,9	78,5	81,5	221,9	151,2	269,2	144,2	229,9
293,0	479,0	0,9	2,3	6,6	203,4	131,7	78,5	81,6	223,1	151,1	269,2	144,0	229,7
294,0	480,0	0,9	2,3	6,6	203,9	131,8	78,5	81,7	223,6	151,0	270,1	143,9	231,1
295,0	481,0	0,8	2,3	6,6	204,1	131,7	78,5	81,6	223,4	151,3	270,0	143,8	232,2
296,0	482,0	0,8	2,3	6,5	204,0	131,8	78,6	81,7	223,4	151,2	269,9	144,0	231,7
297,0	483,0	0,8	2,3	6,4	204,3	131,9	78,6	81,9	223,9	151,3	269,9	144,0	232,5
298,0	484,0	0,8	2,3	6,3	204,5	131,7	78,7	81,9	224,0	151,			

315,0	501,0	0,6	2,2	5,8	204,8	127,1	79,2	82,3	205,1	150,4	262,0	144,2	262,2
316,0	502,0	0,6	2,2	5,9	205,0	127,2	79,2	82,1	205,3	150,3	261,4	144,2	263,8
317,0	503,0	0,6	2,2	6,0	205,6	127,0	79,2	82,3	204,7	150,5	260,7	144,2	268,2
318,0	504,0	0,6	2,3	6,0	205,5	126,7	79,3	82,3	205,5	150,7	260,5	144,3	266,5
319,0	505,0	0,6	2,3	5,8	205,2	126,8	79,3	82,3	206,3	150,3	259,7	144,4	265,5
320,0	506,0	0,6	2,3	5,8	205,4	127,5	79,4	82,5	206,4	150,6	259,4	144,5	265,9
321,0	507,0	0,6	2,3	5,8	205,6	127,5	79,2	82,6	206,3	150,7	259,2	144,8	267,3
322,0	508,0	0,6	2,3	5,7	205,4	127,7	79,2	82,7	206,1	150,7	258,9	144,8	266,5
323,0	509,0	0,6	2,3	5,6	205,8	127,5	79,3	82,6	205,3	150,4	258,3	144,7	270,2
324,0	510,0	0,5	2,3	5,6	204,8	127,9	79,3	82,6	205,3	150,3	257,9	144,7	265,7
325,0	511,0	0,5	2,5	5,4	205,5	128,1	79,3	82,7	204,6	150,4	256,8	144,6	271,2
326,0	512,0	0,5	2,5	5,3	205,8	128,7	79,3	82,6	204,5	150,1	256,7	144,5	273,2
327,0	513,0	0,5	2,5	5,2	204,6	128,6	79,4	82,6	203,4	150,2	255,8	144,7	268,9
328,0	514,0	0,5	2,6	5,2	204,8	128,5	79,5	82,6	203,1	150,2	255,7	144,6	270,3
329,0	515,0	0,5	2,5	5,2	204,9	128,6	79,5	82,8	203,1	150,5	255,6	144,7	270,6
330,0	516,0	0,5	2,5	5,4	205,1	128,8	79,6	82,9	203,8	150,6	254,9	144,9	271,6
331,0	517,0	0,5	2,6	5,3	205,7	129,1	79,7	82,9	202,6	150,6	254,9	144,8	275,9
332,0	518,0	0,5	2,7	5,0	205,1	129,3	79,8	82,9	201,6	150,7	254,3	145,1	273,8
333,0	519,0	0,5	2,8	4,9	205,8	129,3	79,8	82,9	201,4	150,4	254,4	145,2	277,9
334,0	520,0	0,5	2,8	4,8	206,4	129,7	79,7	83,0	201,1	150,8	254,0	145,3	281,0
335,0	521,0	0,5	2,9	4,8	206,5	129,6	79,7	82,9	200,7	150,6	253,3	145,2	282,7
336,0	522,0	0,4	2,8	4,9	206,1	129,4	79,8	83,1	200,2	150,3	252,6	145,0	282,3
337,0	523,0	0,4	2,8	4,9	205,6	129,6	79,9	83,0	200,1	149,9	251,6	144,6	281,6
338,0	524,0	0,4	3,0	4,8	205,4	129,8	79,6	83,0	200,1	150,0	252,0	144,5	280,3
339,0	525,0	0,4	3,0	4,7	205,4	129,7	79,8	82,9	200,1	150,3	251,4	144,6	280,8
340,0	526,0	0,4	2,9	4,8	205,0	129,9	79,8	82,9	200,1	150,2	251,4	144,8	278,6
341,0	527,0	0,4	2,7	5,2	204,7	130,0	79,7	83,0	200,1	150,6	250,9	145,2	276,7
342,0	528,0	0,4	2,9	5,0	204,9	130,1	79,7	82,9	200,3	150,5	250,5	145,1	278,2
343,0	529,0	0,4	2,8	5,1	204,8	130,0	79,6	82,8	199,8	150,4	249,7	145,0	278,9
344,0	530,0	0,4	2,8	5,0	205,3	130,2	79,6	82,7	199,4	150,0	249,6	145,3	282,2
345,0	531,0	0,4	2,7	5,1	204,8	130,2	79,7	83,0	199,8	150,1	248,7	145,2	280,1
346,0	532,0	0,3	2,7	5,2	204,7	130,8	79,7	82,9	200,6	149,9	248,8	145,3	278,8
347,0	533,0	0,4	2,8	5,2	204,9	130,8	79,7	83,0	201,7	150,0	248,0	145,2	279,5
348,0	534,0	0,3	2,8	5,2	204,5	131,5	79,7	83,0	201,7	149,6	247,2	144,9	278,9
349,0	535,0	0,3	2,9	5,2	204,1	132,1	79,7	83,0	202,1	149,9	247,0	145,0	276,7
350,0	536,0	0,3	2,9	5,3	204,6	132,5	79,8	83,0	202,3	149,9	246,8	145,1	278,8
351,0	537,0	0,3	2,9	5,2	204,6	132,9	79,8	83,2	203,8	149,6	246,4	145,7	277,7
352,0	538,0	0,3	2,9	5,3	204,7	133,4	79,9	83,2	204,1	149,8	245,9	145,6	278,2
353,0	539,0	0,3	2,9	5,2	204,9	134,1	79,9	83,3	204,4	149,9	245,5	145,8	279,0
354,0	540,0	0,3	2,9	5,2	205,1	134,6	79,9	83,3	205,3	150,1	245,3	145,9	278,7
355,0	541,0	0,3	2,9	5,2	205,0	134,7	80,0	83,4	204,8	149,8	245,1	146,0	279,5
356,0	542,0	0,3	2,7	5,2	204,5	134,6	80,0	83,4	204,0	149,8	244,5	146,1	278,1
357,0	543,0	0,3	2,3	5,6	204,3	134,3	80,1	83,5	202,8	149,8	244,0	146,2	278,7
358,0	544,0	0,2	2,4	5,7	203,1	133,8	80,0	83,8	201,7	149,8	243,3	146,5	274,4
359,0	545,0	0,2	2,6	5,3	202,9	134,1	80,1	83,5	201,2	149,6	243,0	146,4	274,4
360,0	546,0	0,2	2,7	5,3	203,0	134,4	80,2	83,5	200,9	149,7	242,7	146,2	275,7
361,0	547,0	0,2	2,7	5,3	203,2	134,6	80,3	83,7	201,3	149,6	242,2	146,4	276,5
362,0	548,0	0,2	3,0	5,1	204,0	134,9	80,3	83,8	200,9	149,0	242,1	146,4	281,4
363,0	549,0	0,2	3,0	5,0	204,0	134,7	80,1	83,6	201,1	148,9	242,0	146,5	281,4
364,0	550,0	0,2	3,3	4,7	204,1	135,0	80,2	83,8	200,6	149,2	241,9	146,6	282,0
365,0	551,0	0,2	3,4	4,5	204,1	135,3	80,2	83,7	200,4	149,3	241,3	146,6	283,0
366,0	552,0	0,1	3,5	4,5	204,6	135,4	80,4	83,8	200,0	149,4	241,1	146,7	285,6
367,0	553,0	0,2	3,4	4,5	205,0	134,9	80,3	83,9	198,6	148,7	240,8	146,7	290,3
368,0	554,0	0,1	3,4	4,5	204,9	135,3	80,3	84,0	198,1	149,1	240,0	146,9	290,6
369,0	555,0	0,1	3,4	4,4	204,6	135,1	80,3	84,0	196,9	148,5	239,5	146,8	291,1
370,0	556,0	0,1	3,4	4,4	204,8	135,0	80,3	84,1	197,4	148,6	239,2	147,2	291,9
371,0	557,0	0,1	3,4	4,4	204,4	135,1	80,3	83,9	197,8	148,7	239,1	147,3	289,1
372,0	558,0	0,1	3,4	4,4	204,5	134,5	80,4	84,0	197,0	148,9	239,2	147,6	289,8
373,0	559,0	0,1	3,2	4,2	203,7	133,5	80,4	84,0	196,3	148,9	238,9	147,7	286,7
374,0	560,0	0,1	3,0	4,0	202,8	133,2	80,4	84,0	196,9	149,3	238,8	147,4	281,7
375,0	561,0	0,1	3,0	3,9	203,3	132,7	80,5	84,0	195,2	148,6	238,6	147,5	286,6
376,0	562,0	0,1	2,9	3,9	203,2	132,4	80,5	84,0	194,6	148,0	238,1	147,5	287,6
377,0	563,0	0,1	2,9	3,9	203,6	131,8	80,3	84,1	194,1	148,2	237,4	147,4	291,2
378,0	564,0	0,1	2,8	3,8	202,9	131,8	80,6	84,0	192,7	148,4	236,9	147,2	289,4
379,0	565,0	0,1	2,8	3,7	202,3	132,1	80,6	84,1	191,6	147,6	236,2	146,9	289,4
380,0	566,0	0,1	2,7	3,7	201,4	131,9	80,5	83,9	191,0	147,5	235,4	146,7	286,4
381,0	567,0	0,1	2,8	3,8	201,1	132,1	80,4	84,1	190,4	147,4	235,1	146,8	285,8
382,0	568,0	0,1	2,8	3,8	200,4	131,9	80,6	83,9	189,6	147,2	234,8	146,4	283,8
383,0	569,0	0,1	2,8	3,8	198,9	132,1	80,6	83,9	188,8	146,9	234,5	146,0	278,4
384,0	570,0	0,1	2,8	3,8	198,9	132,3	80,5	84,0	188,5	146,7	234,1	146,0	279,0
385,0	571,0	0,0	2,8	3,8	198,5	132,3	80,6	84,1	187,3	146,7	233,3	145,8	279,6

Manufacturer: FOYER SUPREME
Model: 24 FSC

Run: 2
Project #: pi 20144
Test Duration: 385 min

	HHV	LHV
Eff	69,90%	75,55%
Comb Eff	94,44%	94,44%
HT Eff	74,02%	80,00%
Output	12 900	kJ/h
Burn Rate	0,93	kg/h
Grams CO	470	g
Input	18 454	kJ/h
MC wet	16,42	

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-ult} 19,64
F₀
1,061

Overall Heating Efficiency: 69,90%
Combustion Efficiency: 94,44%
Heat Transfer Efficiency: 74,02%

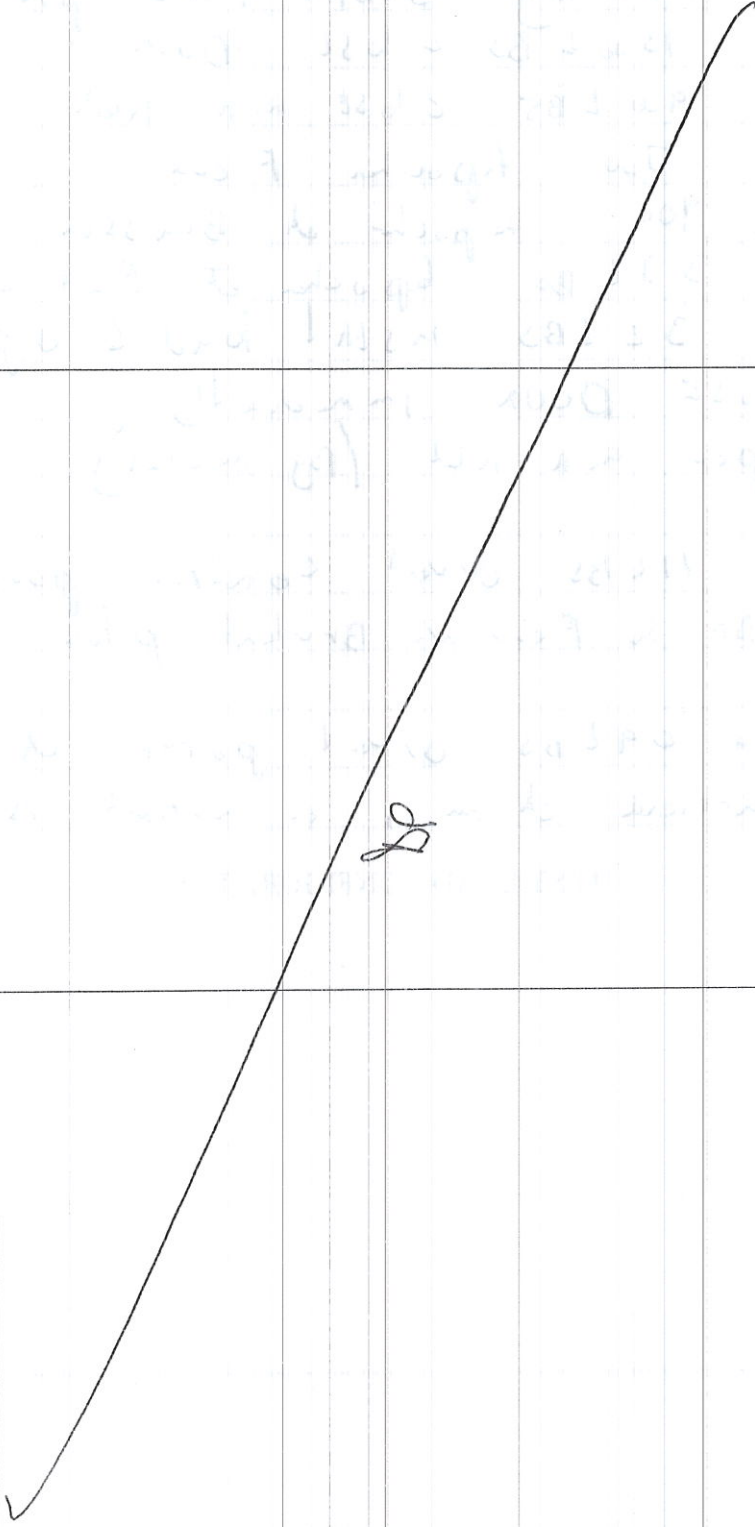
Air Fuel Ratio (A/F)	
Dry Molecular Weight (M _d)	29,54
Dry Moles Exhaust Gas (N _p):	445,06
Air Fuel Ratio (A/F)	12,64

Heat Output:	12 237 Btu/h	12 900 kJ/h
Heat Input:	17 505 Btu/h	18 454 kJ/h
Burn Duration:	6,42 h	
Burn Rate:	2,05 lb/h	0,932 kg/h
Stack Temp:	299,1 Deg. F	148,4 Deg. C

Date: 2.12.07.04 Manufacturer: Fogor Supreme Model: 24 SFC
Project #: PI 20 144 Run: 2 Tech: MM Reviewer: DP

	No kind ling	SLANT	FINE	preload	setting	°
D1	13,00 LBS	close	Door			Door
D1	900 LBS	close	air	inlet		
D1	700	tapocher	F	cur		
D1	400	tapocher	at	Brass		
D1	300 LBS	tapocher	at	Paul	channel	
D1	32 LBS	instal	load	to	open	(by metal)
	close	Door	immediately			
	open	air	inlet	(by metal)		
D1	11 LBS	over	control	pour	15 sec.	
	CAN	to	F	cur	no	Brulant plus
A+	0.9 LBS	over	porte	at	prie	morceaux
	arrivent	à	m	15	à	avant 15 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		SUBTRACTION	
	ft3	Volume	ft3	Volume
V measure				
V ashlip				
%				
V usable				
Usable Firebox: _____				
Test load weight: _____ Minimum: _____ Maximum: _____				
Déviation: _____				

DP

PRE / POST CHECKS

Date: 2017-07-04 Manufacturer: Fager Supreme Model: 24 SFC
 Project #: PI 20144 Run: 2 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Facility Conditions:

Air Velocity from less than 2 feet

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%.....

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface (±125°F).....

Proportional Checks:

Thermocouple check.....

Pitot Clean.....

Pitot verification.....

Sampling Train ID Numbers:

Probe.....

Filter Front.....

Filter Back.....

Filter Thermocouple.....

Filter (<90°F).....

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

Pre-Test

Post-Test

4 (max 50 Fpm)	3 (max 50 Fpm)
OK	OK
4 sides	OK

2017-07-03
2017-07-03
OK
OK

OK

OK	°F
OK	°F

OK
OK
OK

Train 1 st hour	Train 1	Train 2
12	16	39
101	212	604
204	214	605
11	11	12
OK	OK	OK

SAMPLING EQUIPMENT CHECK OUT

Date: 2017-07-04 Manufacturer: Fogco Supreme Model: 29 SFC
 Project #: PT 10144 Run: 2 Tech: MM Reviewer: DP

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	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)	533419.71	535420.45	533419.58	535420.51	534528.79 36	454889.18
Initial 1minute DGM (Liter)	533419.30	535420.44	533419.58	535420.51	452879.35	454889.16
Change © (Liter)	0.01	0.01	0	0.02	0.01	0.02
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 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	4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2012-07-04 Manufacturer: Foyer Supreme Model: 24 SFC
 Project #: PI 20144 Run: 2 Tech: MM Reviewer: DO

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	<u>EM-090</u>	<u>44</u> lbs, Class F	<u>44</u> lbs
Wood	<u>EM-090</u>	<u>44</u> lbs, Class F	<u>44</u> lbs
Analytical	<u>EM-128</u>	<u>100</u> mg, Class S	<u>100</u> mg
Analytical	<u>EM-129</u>	<u>200</u> g, Class S	<u>200</u> 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: 2017-07-04 PM Manufacturer: Foyer Supreme Model: 24 SFC
 Project #: PT 20144 Run: 2 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 1011 (KPa.) Static pressure (P_q) 0.15 (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	0.062	72.64
B - Centroid	3.00	3.50	4	0.061	73.35
A-1	0.40	0.50	0.50	0.051	72.24
A-2	1.50	1.75	2	0.056	72.38
A-3	4.50	5.25	6	0.059	73.35
A-4	5.60	6.5	7.5	0.052	73.39
B-1	0.40	0.50	0.50	0.050	73.30
B-2	1.50	1.75	2	0.060	73.38
B-3	4.50	5.25	6	0.056	73.37
B-4	5.60	6.5	7.5	0.053	73.28
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.

Date: 2017-07-04

 Manufacturer: Foyer Supreme

 Model: 24 SFC

 Project #: PI 20144

 Run: 2

 Tech: MR

 Reviewer: [Signature]
Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2,949	2,921	0.993	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,90	17,82	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	0.005	2,940	0.996	0.005	0.02	0.009	0.15	0.003	0.05	✓	
CO ₂	0	1782	969	0	0.02	0.05	0.5	0.03	0.5	✓	
O ₂	na	na	na	—	na	—	na	—	na	✓	

TEST DATA LOG

Date: 2017-07-04 Manufacturer: Fogon Supreme Model: 24 SFC
 Project #: PI 20144 Run: 2 Tech: MM Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	535 469,55	454 888,26	123,45
Initial (Liter)	533 419,90	452 880,09	047,037 69 N/A

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101,1	101,0
Dry Bulb (F):	73,58	81,86
Humidity (%):	56,4	36,2

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: 2017-07-04 Manufacturer: Fogor Supreme Model: 24 SFC
 Project #: PI 2.144 Run: 2 Tech: mm Reviewer: BP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
2 x 4 x 10 in.	1306 lbs.	23.1	22.6	22.3	21.9	23.0
2 x 4 x 10 in.	1224 lbs.	22.8	22.8	22.4	22.7	23.0
2 x 4 x 10 in.	1352 lbs.	23.1	22.4	22.6	22.4	22.6
2 x 4 x 10 in.	1358 lbs.	21.9	21.9	21.4	22.0	22.4
2 x 4 x 10 in.	1230 lbs.	22.3	22.6	22.1	22.3	22.1
2 x 4 x 10 in.	1234 lbs.	23.6	23.5	22.6	21.3	21.6
2 x 4 x 10 in.	134 lbs.	22.3	22.9	22.8	22.1	22.2
2 x 4 x 10 in.	1304 lbs.	23.0	22.6	22.9	20.1	20.6
2 x 4 x 10 in.	1320 lbs.	20.9	20.3	20.9	20.6	20.7
2 x 4 x 10 in.	1394 lbs.	21.1	21.6	21.3	20.9	20.1
2 x 4 x 10 in.	1416 lbs.	22.8	22.9	22.5	22.5	22.4
2 x 4 x 10 in.	1282 lbs.	21.4	21.8	21.6	22.0	23.0
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.					

TEST LOAD WEIGHT: 15,81 lbs

FUEL DATA

 Date: 20170704

 Manufacturer: Fogco Supreme

 Model: 34 SFC

 Project #: PJ 20144

 Run: 2

 Tech: MM

 Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*					
1 1/4	x 3 1/4 x 14 in.	2,028 lbs.	193	191	192	192	196	
1 1/4	x 3 1/4 x 14 in.	1,844 lbs.	195	199	195	193	196	
3 1/4	x 3 1/4 x 14 in.	5,324 lbs.	197	200	196	199	196	
3 1/4	x 3 1/4 x 14 in.	5,234 lbs.	191	192	192	194	199	
1 1/4	x 3/4 x 5 in.	0,116 lbs.			201			
1 1/4	x 3/4 x 5 in.	0,118 lbs.			206			
1 1/4	x 3/4 x 5 in.	0,128 lbs.			210			
1 1/4	x 3/4 x 5 in.	0,110 lbs.			203			
1 1/4	x 3/4 x 5 in.	0,118 lbs.			204			
1 1/4	x 3/4 x 5 in.	0,112 lbs.			210			
1 1/4	x 3/4 x 5 in.	0,120 lbs.			213			
1 1/4	x 3/4 x 5 in.	0,114 lbs.			216			
1 1/4	x 3/4 x 5 in.	0,114 lbs.			203			
1 1/4	x 3/4 x 5 in.	0,114 lbs.			210			
1 1/4	x 3/4 x 5 in.	0,114 lbs.			210			
1 1/4	x 3/4 x 5 in.	0,116 lbs.			212			
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: 1585 lbs Min 20%: 317 Max 25%: 396

Date: 2017.07.03 Manufacturer: fogger supreme Model: 24 SFC
Project #: 07 20144 Run: 2 Tech: MM Reviewer: DP

		SYSTEM 1 - 1 st hour					SYSTEM 1				
Pre-test Weight Record	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
Date	Time	12	101	204	22	212	214	32	632		
2017.07.03	18:00	94,5436	0,1271	0,1279	11,7252	108,7541	0,1280	11,9898	0,1280		
2017.07.04	9:30	94,5431	0,1271	0,1279	11,7253	108,7542	0,1280	11,9899	0,1280		

		SYSTEM 1 - 1 st hour					SYSTEM 1				
Post-test Weight Record	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
Date	Time	12	101	204	22	212	214	32	632		
2017.07.04	17:00	94,5446	0,1317	0,1280	11,7272	108,7546	0,1276	11,9918	0,1281		
2017.07.10	8:00	94,5437	0,1312	0,1279	11,7262	108,7547	0,1275	11,9911	0,1280		
2017.07.11	8:00	94,5436	0,1310	0,1279	11,7262	108,7542	0,1276	11,9906	0,1280		
2017.07.11	17:00	94,5436	0,1310	0,1279	11,7262	108,7542	0,1276	11,9906	0,1280		

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2017-07-03 Project #: PI 20144 Run: 42 Manufacturer: Soger Supreme Model: 24 SFC
 Tech: MM Reviewer: DD

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-03	18:00	110 2789	0 1270	0 1263
2017-07-04	09:30	110 2790	0 1269	0 1263

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-04	17:00	110 2792	0 1309	0 1260
2017-07-10	8:00	110 2790	0 1306	0 1259
2017-07-11	8:00	110 2791	0 1308	0 1261
2017-07-11	17:00	110 2791	0 1308	0 1261

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	05-07-2017
Technicien	M.M
Project #	PI 20144

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	24 FSC	
Combustion system	Non-Cat	
Appliance type	FIRE PLACE	
Firebox volume	2,28	cu ft.
Appliance weight empty	N.A	lbs
Appliance weight full	N.A	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	N.A	BTU/h Donnée fournie par le manfacturier
Targeted category	1	
Targeted output	N.A	BTU/h
Cp steel	N.A	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,987	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,996	Dimensionless
Equipment number (DGM #2):	EM 179	
Calibration Factor (DGM #3):	0,986	Dimensionless
Equipment number (DGM #3):	EM 070	Dimensionless

Tunnel

Targeted tunnel flow rate	280	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	PI 20144
Date	05-07-2017
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):	100,6	100,5
Barometer (in.Hg):	29,707169	29,67763883
Dry Bulb (F):	76,64	82,4
Humidity (%):	49	37
Air velocity (ft/min)	3	6

DGM #1	Final:	18947,972	cuft
	Initial:	18909,986	cuft
DGM #2	Final:	16101,487	cuft
	Initial:	16064,395	cuft

DGM room	
----------	--

	Final:	536546,810	Liter
	Initial:	535471,170	Liter
	Final:	455943,320	Liter
	Initial:	454893,010	Liter

	Final:	166,900	cuft
	Initial:	122,460	cuft

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

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

Project nu.	PI 20144
Date	05-07-2017
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
-------	-------	-------

14,4	16,0	17,6
------	------	------

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

Load Volume: cu. ft

Loading Density: 6,4 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	32,8	lbs./ft3
Dry Wood Density:	27,4	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	18,125	1,92	19,40	19,20	19,70	19,80	19,80	37,5936	95,16	19,6
1,5	3,5	18,125	1,73	19,60	19,20	19,90	19,70	19,80	33,93792	95,16	19,6
3,5	3,5	18,125	4,92	19,90	19,30	19,20	19,40	19,20	95,4868	222,03	19,4
3,5	3,5	18,125	4,63	19,60	19,30	19,60	19,90	20,00	91,07904	222,03	19,7
1,5	0,75	5	0,13			20,10			2,6934	5,63	20,1
1,5	0,75	5	0,12			20,60			2,3896	5,63	20,6
1,5	0,75	5	0,12			20,30			2,436	5,63	20,3
1,5	0,75	5	0,12			21,00			2,436	5,63	21,0
1,5	0,75	5	0,11			21,60			2,4624	5,63	21,6
1,5	0,75	5	0,11			21,30			2,4282	5,63	21,3
1,5	0,75	5	0,12			19,90			2,3084	5,63	19,9
1,5	0,75	5	0,11			20,60			2,3484	5,63	20,6
1,5	0,75	5	0,11			20,20			2,3028	5,63	20,2
1,5	0,75	5	0,11			20,90			2,3826	5,63	20,9
1,5	0,75	5	0,12			21,30			2,5986	5,63	21,3
1,5	0,75	5	0,13			21,90			2,8032	5,63	21,9
										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	287,68696		20,5 %

Test Load Weight: 14,62 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	19,68	Dry(EPA)	19,68
		Dry(B415)	19,68

19,68
Must be 19-25

Wet:
must be 15,2-22

Coal Bed Range: lbs. to

3,7 lbs.

TEST CHARGE:

Coal bed weight: 3,1

lbs.

Project nu.	PI 20144
Date	05-07-2017
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,15 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=
0,953

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,059	74,98	0,2429
B center	0,060	74,99	0,2449
A1	0,050	75,02	0,2236
A2	0,056	75,09	0,2366
A3	0,057	75,01	0,2387
A4	0,049	74,91	0,2214
B1	0,050	75,080	0,2236
B2	0,058	75,110	0,2408
B3	0,053	74,920	0,2302
B4	0,049	74,960	0,2214
AVERAGE	0,0541	75,0070	0,2324

Project nu.	PI 20144
Date	05-07-2017
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	11	230	233	9	13	235	236	52	42	238	239	54	240		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	93,7271	0,1287	0,1279	11,8514	95,1515	0,1266	0,1284	11,8191	110,3075	0,1283	0,1268	11,8956	0,1272	04/07/2017	18:00
Before (6)	93,7272	0,1287	0,1278	11,8515	95,1516	0,1267	0,1285	11,8192	110,3076	0,1284	0,1269	11,8956	0,1273	05/07/2017	09:30
After (1)	93,7284	0,1332	0,1279	11,8535	95,1519	0,1261	0,1280	11,8213	110,3087	0,1322	0,1267	11,8982	0,1273	05/07/2017	15:00
After (2)	93,7277	0,1330	0,1278	11,8522	95,1517	0,1261	0,1279	11,8205	110,3083	0,1321	0,1267	11,8973	0,1273	10/07/2017	08:00
After (3)	93,7277	0,1330	0,1278	11,8522	95,1517	0,1261	0,1279	11,8205	110,3083	0,1321	0,1267	11,8973	0,1273	11/07/2017	08:00
After (4)															
After (5)															
After (6)	93,7277	0,1330	0,1278	11,8522	95,1517	0,1261	0,1279	11,8205	110,3083	0,1321	0,1267	11,8973	0,1273	11/07/2017	08:00
Difference	0,0005	0,0043	0,0000	0,0007	0,0001	-0,0006	-0,0006	0,0013	0,0007	0,0037	-0,0002	0,0017	0,0000		
Total (mg)		5,5				5,7				5,9			0		
Total ajusté (mg)		5,50				5,70				5,90					

Project nu.	PI 20144
Date	05-07-2017
Technicien	mm

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 2,9 g/hr

Burn Rate : 1,654 Dry kg/hr

Test Duration: 201 min

PRESSURE FACTOR: DGM 1 0,96912
DGM 2 0,97010
DGM 3 0,99239

BAROMETRIC PRESSURE
Average: 29,692404 in Hg
Start: 29,707169 in Hg
End: 29,677639 in Hg

TEMPERATURE FACTORS DGM 1 0,97754
DGM 2 0,97673
DGM 3 0,97933

DGM CONTROLLER VALUES

DGM 1 Final: 18947,972 Cuft
Initial: 18909,986 Cuft

VOLUMES SAMPLED DGM 1 35,518 SCft
DGM 2 35,004 SCft
DGM 3 42,586 SCft

DGM 2 Final: 16101,487 Cuft
Initial: 16064,395 Cuft

DGM #3 Final: 166,900 Cuft
Initial: 122,460 Cuft

TOTAL TUNNEL VOLUME : 59323

TEMPERATURES

SAMPLE RATIOS
Sample Train 1: 1670,219
Sample Train 2: 1694,735

DGM 1 540,133 °R
DGM 2 540,579 °R

Paticulate concentration
Sample Train 1 0,000160 g/dscf
Sample Train 2 0,000169 g/dscf
Room 0,000000 g/dscf

CALIBRATION FACTORS

DGM 1 0,9870
DGM 2 0,9960
DGM #3 0,9860

TUNNEL FLOW RATE: 295,140 Dscfm

TOTAL EMISSIONS
Sample Train 1 9,52 g
Sample Train 2 10,00 g

PARTICULATE CATCH
Total Sample Train 1: 5,70 mg
Total Sample Train 2: 5,90 mg
Total Sample Train 1 1st hour: 5,50 mg

EMISSION RATES
Sample Train 1 2,84 g/hr
Sample Train 2 2,98 g/hr

1st hour emission rate 9,19 g/hr

DEVIATION: 2,45%

Cs Train 1 Train 2
0,0001605 0,000168551

Elapsed	Raw data row	Weight	CO	CO ₂	O ₂	Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit
Time		Remaining				Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom
min		lbs	%	%	%	°F	°F	°F	°F	°F	°F	°F	°F
0,00	171,00	14,6	0,2	0,3	340,4	268,7	76,1	70,7	268,1	237,2	415,8	281,1	499,7
1,0	172,0	14,4	0,6	1,2	338,9	326,3	76,1	85,9	277,0	232,6	411,5	275,8	497,5
2,0	173,0	14,2	0,5	4,6	343,8	384,8	76,1	101,3	315,8	230,5	405,0	271,0	496,6
3,0	174,0	14,1	0,4	5,5	353,9	440,7	75,9	104,9	380,6	230,2	400,1	267,3	491,3
4,0	175,0	13,9	0,4	6,7	366,3	488,2	76,2	105,7	459,3	232,5	395,4	260,6	483,7
5,0	176,0	13,7	0,4	7,5	377,9	519,5	76,3	112,5	525,5	234,6	392,9	252,0	484,6
6,0	177,0	13,5	0,7	7,9	393,1	550,7	76,3	119,2	599,6	239,3	390,8	250,7	485,2
7,0	178,0	13,3	0,4	8,6	399,9	567,0	76,2	122,7	628,7	241,7	390,0	249,3	489,7
8,0	179,0	13,1	0,6	8,5	399,7	561,3	76,4	121,5	631,1	242,8	388,5	246,3	489,6
9,0	180,0	12,9	0,6	7,5	397,9	540,4	76,5	117,0	619,5	244,2	388,5	245,5	491,8
10,0	181,0	12,8	0,8	7,7	396,4	542,6	76,7	117,4	609,5	244,3	388,1	244,8	495,0
11,0	182,0	12,6	0,8	8,0	397,9	554,0	76,7	119,9	618,8	245,5	388,4	244,0	492,6
12,0	183,0	12,4	0,8	8,2	398,8	556,7	76,5	120,5	620,9	245,4	387,7	244,3	495,6
13,0	184,0	12,2	0,7	8,6	401,0	559,8	76,7	121,2	631,1	246,9	388,4	243,5	495,2
14,0	185,0	12,0	0,7	8,6	402,2	558,2	76,8	120,8	636,4	247,5	388,4	242,4	496,6
15,0	186,0	11,8	0,8	8,9	402,2	560,8	76,5	121,4	639,3	249,1	387,8	242,3	492,7
16,0	187,0	11,6	0,8	9,0	403,8	563,2	76,8	121,9	644,0	249,3	388,5	242,1	495,2
17,0	188,0	11,5	0,8	9,3	405,1	563,7	77,2	122,0	648,2	250,2	388,9	241,7	496,3
18,0	189,0	11,3	0,7	9,4	406,1	564,6	76,7	122,2	652,6	251,4	388,7	241,8	496,1
19,0	190,0	11,2	0,7	9,7	407,5	569,8	76,8	123,3	663,5	252,4	389,3	242,1	490,4
20,0	191,0	10,9	0,6	9,8	409,1	571,8	76,6	123,8	668,6	253,3	390,0	243,0	490,5
21,0	192,0	10,8	0,7	10,0	410,8	576,3	76,6	124,7	678,9	253,7	391,6	242,6	487,4
22,0	193,0	10,6	0,7	10,2	413,0	586,2	76,7	126,9	688,3	255,5	392,2	242,9	485,9
23,0	194,0	10,5	0,6	10,5	416,6	593,6	76,6	128,5	703,0	256,1	393,8	244,5	485,6
24,0	195,0	10,3	0,6	10,3	418,1	594,4	77,2	128,7	708,9	257,5	393,8	245,4	485,2
25,0	196,0	10,1	0,6	10,5	419,9	599,3	77,0	129,7	712,5	258,3	394,8	246,2	487,8
26,0	197,0	9,9	0,5	10,7	421,8	606,8	77,2	131,3	717,7	261,4	397,0	246,9	485,9
27,0	198,0	9,7	0,5	10,9	424,3	612,4	77,3	132,6	723,1	262,2	398,3	247,4	490,6
28,0	199,0	9,5	0,5	11,2	426,8	623,9	77,6	135,1	732,2	265,5	400,8	248,6	486,9
29,0	200,0	9,4	0,5	11,5	429,2	634,9	77,8	137,4	740,9	268,5	404,6	250,5	481,5
30,0	201,0	9,2	0,4	11,7	432,2	641,4	77,7	138,8	747,5	270,1	406,6	252,3	484,7
31,0	202,0	9,0	0,4	11,7	435,3	644,8	77,2	139,6	751,2	272,3	409,1	254,5	489,1
32,0	203,0	8,9	0,4	11,8	436,9	646,7	77,5	140,0	752,7	275,1	411,9	255,9	489,0
33,0	204,0	8,7	0,4	11,9	439,0	653,9	77,5	141,5	755,3	278,3	414,8	257,5	488,8
34,0	205,0	8,5	0,4	12,1	443,1	658,6	77,3	142,6	759,1	282,2	418,4	259,4	496,4
35,0	206,0	8,3	0,4	12,1	445,9	659,7	78,0	142,8	763,0	284,1	422,4	262,2	497,8
36,0	207,0	8,2	0,3	12,2	448,5	659,4	77,6	142,7	765,3	286,7	425,7	264,5	500,5
37,0	208,0	7,9	0,4	12,2	451,2	660,1	78,0	142,9	767,4	290,8	429,2	267,1	501,5
38,0	209,0	7,8	0,3	12,2	452,3	657,3	78,2	142,3	765,6	295,0	434,6	269,5	496,7
39,0	210,0	7,6	0,3	12,3	454,5	656,6	77,9	142,1	767,3	298,4	439,9	271,6	495,6
40,0	211,0	7,4	0,3	12,3	454,6	654,6	78,6	141,7	765,8	302,3	445,1	273,2	486,5
41,0	212,0	7,3	0,3	12,4	456,3	652,4	78,1	141,2	763,3	305,5	449,4	275,4	487,7
42,0	213,0	7,1	0,3	12,2	456,9	649,7	77,6	140,6	756,7	308,5	453,4	278,3	487,6
43,0	214,0	7,0	0,3	12,0	457,5	647,0	78,2	140,0	752,8	311,5	457,6	280,9	484,5
44,0	215,0	6,8	0,3	12,0	455,9	642,2	78,5	139,0	742,7	314,6	462,2	283,3	476,4
45,0	216,0	6,7	0,3	11,8	454,8	636,1	78,6	137,7	730,2	318,1	467,0	285,5	473,1
46,0	217,0	6,5	0,2	11,6	454,1	630,2	78,7	136,4	716,1	320,1	470,6	286,8	477,0
47,0	218,0	6,3	0,2	11,5	454,2	626,0	78,8	135,5	711,3	322,6	475,0	288,5	473,8
48,0	219,0	6,3	0,2	11,3	452,9	618,4	78,1	133,9	698,1	324,2	478,8	290,3	473,1
49,0	220,0	6,1	0,2	11,1	452,5	611,8	78,7	132,4	687,7	326,2	483,9	293,1	471,6
50,0	221,0	6,0	0,2	11,0	451,9	605,1	78,4	131,0	675,3	329,0	486,6	294,9	473,6
51,0	222,0	5,9	0,2	11,0	450,9	598,2	78,5	129,5	667,1	330,3	490,1	295,2	471,9
52,0	223,0	5,7	0,2	11,0	451,5	596,3	78,5	129,1	660,6	331,7	492,9	297,6	474,7
53,0	224,0	5,6	0,2	11,3	452,0	593,5	77,8	128,5	655,1	333,3	495,0	299,7	476,7
54,0	225,0	5,5	0,2	11,4	453,4	592,1	77,9	128,2	651,5	334,3	498,7	300,9	481,5
55,0	226,0	5,3	0,2	11,4	455,7	590,2	78,2	127,8	648,7	337,8	501,5	305,7	484,8
56,0	227,0	5,2	0,2	11,6	457,9	590,9	78,1	127,5	649,5	338,8	506,2	306,6	488,7
57,0	228,0	5,1	0,2	11,5	459,4	589,8	78,2	127,5	646,6	340,6	509,1	310,3	490,4
58,0	229,0	4,9	0,2	11,5	460,0	590,1	78,5	119,6	645,3	342,4	512,1	312,2	487,8
59,0	230,0	4,8	0,2	11,6	463,0	588,5	79,5	116,3	645,3	345,3	517,2	319,4	487,8
60,0	231,0	4,7	0,2	11,6	465,2	587,4	79,4	115,8	645,9	346,6	521,7	323,2	488,3
61,0	232,0	4,6	0,2	11,4	467,2	582,7	79,3	115,3	643,8	349,0	527,5	329,7	486,1
62,0	233,0	4,5	0,1	11,2	468,1	578,5	79,4	115,3	638,1	349,9	531,5	333,1	487,9
63,0	234,0	4,4	0,2	11,1	470,1	574,5	78,9	114,7	636,2	352,7	536,4	342,5	482,5
64,0	235,0	4,3	0,1	10,9	472,0	568,9	79,4	113,9	629,4	354,2	540,8	352,1	483,7
65,0	236,0	4,2	0,1	10,8	471,9	562,9	79,0	113,3	623,8	353,9	543,7	352,9	485,4
66,0	237,0	4,1	0,1	10,5	474,1	559,2	79,5	112,5	618,5	357,2	546,6	365,7	482,4
67,0	238,0	4,0	0,1	10,4	475,3	553,0	79,1	112,4	612,4	357,5	549,1	368,7	488,9
68,0	239,0	3,9	0,2	10,3	477,0	548,2	79,4	111,2	607,0	358,2	553,4	370,1	496,0
69,0	240,0	3,7	0,1	10,1	479,9	542,6	79,2	111,1	606,6	359,9	556,6	372,5	503,9
70,0	241,0	3,7	0,2	9,8	479,5	536,9	78,8	111,8	601,7	359,0	558,7	373,5	504,6
71,0	242,0	3,6	0,2	9,8	482,6	532,1	78,4	112,7	597,0	360,1	560,5	387,0	508,7
72,0	243,0	3,5	0,2	9,7	485,4	528,6	79,1	111,3	593,1	360,4	561,5	388,8	523,0
73,0	244,0	3,5	0,2	9,6	493,6	525,8	79,0	111,1	589,1	361,5	564,9	393,3	559,3
74,0	245,0	3,4	0,2	9,6	498,0	522,4	78,9	111,4	586,0	361,3	566,2	396,2	580,2
75,0	246,0	3,3	0,2	9,6	498,4	519,7	78,8	111,8	582,4	362,0	565,0	396,5	586,4
76,0	247,0	3,3	0,2	9,6	501,5	518,2	78,6	111,0	582,3	362,5	569,2	405,9	587,7
77,0	248,0	3,2	0,1	9,6	501,8	516,9	79,1	111,2	581,1	363,4	570,3	405,4	588,9
78,0	249,0	3,1	0,1	9,6	502,0	515,7	78,9	110,9	579,9	364,0	570,9	405,2	590,2
79,0	250,0	3,0	0,1	9,7	502,5	515,4	78,7	110,5	580,2	363,4	571,4	403,9	593,5
80,0	251,0	2,9	0,1	9,8	504,0	516,0	79,1	110,9	583,7	365,5	574,2	404,4	592,2
81,0	252,0	2,8	0,1	9,9	505,8	518,1	79,2	110,0	588,2	365,5	575,7	403,0	596,7
82,0	253,0	2,7	0,1	10,1	507,7	521,3	79,3	109,6	595,0	365,1	577,8	402,9	597,5
83,0	254,0	2,7	0,1	10,4	510,4	525,3	79,0	111,2	606,0	365,9	578,6	403,3	598,2
84,0	255,0	2,5	0,1	10,6	512,1	529,3	78,8	111,2	613,7	366,4	580,1	402,8	597,5
85,0	256,0	2,5	0,1	10,5	513,3	528,4	79,1	111,7	609,6	367,1	581,9	403,2	604,8
86,0	257,0	2,4	0,1	10,3	513,6	526,1	79,5	111,2	603,2	369,0	582,4	408,6	604,6
87,0	258,0	2											

103.0	274.0	1,7	1,2	5,0	465,6	380,1	78,9	100,0	414,3	337,9	566,7	408,6	600,6
104.0	275.0	1,7	1,2	5,0	465,0	372,9	78,8	100,0	406,0	333,6	562,2	414,9	608,1
105.0	276.0	1,7	1,3	5,0	462,1	367,0	79,1	99,5	400,8	330,9	557,1	412,5	609,2
106.0	277.0	1,7	1,3	5,1	460,6	362,1	78,3	99,1	394,3	327,5	555,5	413,3	612,5
107.0	278.0	1,6	1,3	5,1	464,3	357,4	78,4	99,1	391,5	324,0	551,2	441,3	613,6
108.0	279.0	1,6	1,4	5,2	462,9	352,5	78,6	98,7	387,4	321,0	550,5	438,5	617,0
109.0	280.0	1,6	1,4	5,1	463,1	348,2	78,9	98,4	384,6	318,4	546,1	447,0	619,3
110.0	281.0	1,6	1,4	5,1	464,4	344,9	78,7	97,8	383,1	315,8	543,0	462,7	617,3
111.0	282.0	1,6	1,4	5,1	463,7	341,3	78,9	97,0	380,1	312,6	539,2	470,2	616,5
112.0	283.0	1,6	1,4	5,1	463,0	339,5	78,8	96,8	376,5	308,3	535,1	467,4	627,6
113.0	284.0	1,5	1,4	5,2	462,6	336,0	79,0	96,5	371,7	305,1	531,3	463,7	641,2
114.0	285.0	1,5	1,4	5,2	461,6	333,3	79,0	96,4	365,4	302,2	528,4	460,5	651,5
115.0	286.0	1,5	1,4	5,1	459,1	330,6	79,0	95,5	364,2	300,4	525,0	457,9	648,0
116.0	287.0	1,5	1,4	5,0	456,4	327,7	79,2	96,0	364,7	298,2	522,9	450,5	645,7
117.0	288.0	1,4	1,5	5,0	455,0	324,7	78,8	95,8	363,2	296,3	520,9	446,1	648,7
118.0	289.0	1,4	1,5	5,0	453,6	322,4	78,9	96,1	361,6	293,6	518,1	441,9	652,7
119.0	290.0	1,4	1,5	5,0	452,3	320,8	79,2	95,7	360,2	291,5	514,6	440,2	655,2
120.0	291.0	1,4	1,6	5,0	450,4	318,3	79,0	95,2	358,2	289,5	513,3	440,0	650,9
121.0	292.0	1,4	1,6	4,8	448,4	316,6	79,0	95,0	358,7	288,0	511,1	433,4	650,6
122.0	293.0	1,3	1,6	4,8	446,7	314,1	79,0	94,7	355,9	286,5	509,3	430,9	650,8
123.0	294.0	1,4	1,6	4,7	445,7	311,3	79,4	94,1	351,6	282,6	506,2	429,3	658,7
124.0	295.0	1,3	1,6	4,7	443,6	309,2	79,6	93,6	349,4	282,2	503,3	425,7	657,7
125.0	296.0	1,3	1,6	4,7	442,3	307,1	79,5	92,5	344,1	279,0	502,1	422,9	663,2
126.0	297.0	1,3	1,7	4,6	439,1	304,9	79,5	94,0	341,3	277,8	499,9	420,6	656,0
127.0	298.0	1,3	1,7	4,6	437,0	302,6	79,5	93,9	340,6	276,9	497,6	421,4	648,6
128.0	299.0	1,3	1,7	4,6	433,9	300,9	79,3	94,4	340,7	276,2	493,9	417,8	640,8
129.0	300.0	1,2	1,7	4,7	432,7	298,8	79,6	93,2	338,7	273,9	491,2	414,3	645,2
130.0	301.0	1,2	1,7	4,7	430,6	296,5	79,5	93,1	335,7	272,3	488,3	411,5	645,0
131.0	302.0	1,2	1,7	4,7	430,0	294,3	79,7	93,2	333,1	270,8	486,8	410,8	648,4
132.0	303.0	1,2	1,7	4,8	427,4	292,6	79,8	92,9	329,8	269,4	484,1	408,8	645,0
133.0	304.0	1,2	1,7	4,9	422,8	291,6	79,8	91,5	329,0	268,2	481,9	401,2	633,5
134.0	305.0	1,1	1,7	4,8	422,2	290,8	79,7	91,7	327,1	267,1	479,5	398,5	638,6
135.0	306.0	1,1	1,7	4,8	419,9	289,7	79,8	92,7	326,2	265,8	477,0	393,6	637,0
136.0	307.0	1,1	1,7	4,7	417,9	287,8	80,0	93,0	325,5	265,1	475,6	391,3	632,1
137.0	308.0	1,1	1,8	4,5	416,1	287,6	80,2	92,6	324,3	264,0	473,1	390,2	628,9
138.0	309.0	1,0	1,7	4,7	414,2	287,2	80,3	91,9	324,3	261,7	470,2	386,3	628,4
139.0	310.0	1,1	1,7	4,7	411,2	285,5	79,8	92,7	325,7	262,2	468,7	383,2	616,2
140.0	311.0	1,0	1,7	4,7	409,5	284,9	80,1	92,5	325,1	259,9	467,3	378,3	616,8
141.0	312.0	1,0	1,7	4,7	407,7	284,4	80,5	92,1	323,9	258,8	465,8	374,6	615,5
142.0	313.0	1,0	1,8	4,6	406,4	283,6	80,6	91,8	323,7	257,4	463,4	372,0	615,3
143.0	314.0	1,0	1,8	4,6	405,0	283,1	80,6	92,5	325,0	256,5	461,9	370,5	611,1
144.0	315.0	1,0	1,8	4,5	403,9	282,5	80,1	91,6	323,6	254,1	459,9	369,7	612,4
145.0	316.0	1,0	1,8	4,4	402,0	281,7	80,4	91,7	321,9	253,5	458,5	365,5	610,7
146.0	317.0	0,9	1,8	4,4	400,0	280,2	80,1	92,2	322,0	252,7	456,5	362,6	606,4
147.0	318.0	0,9	1,9	4,4	398,5	277,9	80,4	91,4	319,9	251,1	454,5	360,8	606,4
148.0	319.0	0,9	1,8	4,3	396,1	275,9	80,4	91,6	317,1	250,8	452,9	356,2	603,6
149.0	320.0	0,9	2,0	4,0	392,3	274,3	80,3	91,2	314,9	249,4	450,1	355,7	591,6
150.0	321.0	0,9	2,0	4,0	388,9	272,0	80,4	90,9	312,1	248,6	448,2	352,8	582,8
151.0	322.0	0,9	1,9	3,9	384,4	270,5	80,3	91,9	309,2	248,1	447,6	346,5	570,6
152.0	323.0	0,8	1,9	3,9	382,0	269,2	80,7	91,2	306,1	246,4	444,7	345,1	567,5
153.0	324.0	0,8	1,9	3,9	378,7	267,8	80,7	92,0	303,1	246,1	441,9	343,8	558,8
154.0	325.0	0,8	1,9	3,9	376,7	266,8	80,6	91,3	301,4	243,9	440,6	342,6	555,2
155.0	326.0	0,8	1,9	4,0	375,1	265,9	80,4	91,8	297,2	243,3	437,6	340,5	556,8
156.0	327.0	0,8	1,9	4,0	371,8	264,7	80,7	91,2	295,2	241,9	436,4	336,6	549,0
157.0	328.0	0,8	1,9	3,9	368,5	263,9	80,8	90,9	293,8	240,6	433,8	329,6	544,9
158.0	329.0	0,8	1,9	4,0	366,4	263,6	80,8	90,2	293,1	239,4	431,2	326,9	541,6
159.0	330.0	0,7	1,9	4,0	364,2	262,6	80,6	90,5	291,8	238,7	429,6	323,5	537,4
160.0	331.0	0,7	1,9	4,0	363,1	261,7	80,6	91,3	289,3	238,1	428,3	321,2	538,7
161.0	332.0	0,7	1,9	4,1	360,8	260,8	80,9	90,5	287,4	237,1	426,5	319,0	534,3
162.0	333.0	0,7	1,9	4,0	359,1	259,7	80,8	90,3	286,1	236,3	424,9	316,3	532,0
163.0	334.0	0,7	1,9	3,9	357,2	258,6	80,9	90,7	285,7	235,8	422,7	315,1	526,8
164.0	335.0	0,7	2,0	3,9	355,1	257,5	80,9	90,4	283,6	234,4	421,5	314,2	522,0
165.0	336.0	0,7	2,0	3,9	353,8	257,2	80,6	90,6	283,2	234,0	419,7	313,6	518,3
166.0	337.0	0,6	2,0	3,9	352,3	256,3	80,8	90,6	283,4	233,5	418,5	311,1	515,0
167.0	338.0	0,6	2,0	3,9	351,2	255,6	80,9	90,0	280,5	232,7	416,4	307,1	519,4
168.0	339.0	0,6	2,0	3,9	350,2	254,8	80,8	89,8	279,2	232,2	415,0	305,7	519,1
169.0	340.0	0,6	2,0	3,9	349,1	254,5	81,0	89,8	278,1	231,7	413,5	302,2	520,1
170.0	341.0	0,6	2,0	3,9	347,5	253,1	81,1	90,1	276,5	230,0	411,7	301,3	517,8
171.0	342.0	0,6	2,0	3,9	345,6	252,2	81,1	89,8	276,6	229,0	410,0	299,5	512,8
172.0	343.0	0,5	2,0	3,9	343,3	251,7	81,0	89,8	275,6	229,3	409,2	297,8	504,9
173.0	344.0	0,5	2,0	3,9	341,7	251,0	80,8	90,7	274,4	228,6	406,8	294,3	504,2
174.0	345.0	0,5	2,0	3,9	340,4	249,8	80,7	90,2	275,1	228,1	405,6	293,5	499,5
175.0	346.0	0,5	2,0	3,8	339,3	248,5	80,9	90,5	274,2	227,1	405,0	292,4	497,9
176.0	347.0	0,5	2,0	3,7	338,2	247,5	80,6	90,0	274,0	226,9	403,6	291,1	495,5
177.0	348.0	0,5	2,0	3,7	336,0	247,1	80,8	89,6	272,3	225,8	401,7	289,9	490,5
178.0	349.0	0,5	2,0	3,7	334,5	246,7	80,8	89,4	272,2	224,8	400,2	288,7	486,8
179.0	350.0	0,5	1,9	3,7	333,4	246,2	80,8	89,5	270,5	224,4	398,8	287,8	485,5
180.0	351.0	0,4	2,0	3,7	331,3	245,5	80,9	89,3	268,9	223,9	396,4	286,2	481,0
181.0	352.0	0,4	1,6	4,2	328,9	245,5	81,0	89,9	267,1	223,6	394,4	284,3	474,8
182.0	353.0	0,4	1,5	5,1	327,9	246,6	80,8	89,7	267,1	222,3	393,5	283,0	473,6
183.0	354.0	0,3	1,5	5,2	328,5	247,3	80,9	90,2	267,9	221,9	392,3	281,3	479,3
184.0	355.0	0,4	1,5	5,2	329,4	248,5	80,6	90,5	267,8	221,1	390,6	279,9	487,8
185.0	356.0	0,3	1,4	5,3	329,7	250,1	80,9	89,7	267,7	220,9	389,3	278,6	492,2
186.0	357.0	0,3	1,4	5,5	331,4	252,5	81,2	89,8	270,5	220,8	387,8	278,0	500,0
187.0	358.0	0,3	1,4	5,5	332,7	254,5	81,2	90,2	273,0	220,7	387,7	277,5	504,7
188.0	359.0	0,3	1,4	5,4	334,9	256,1	81,2	90,4	275,0	220,7	386,6	278,5	513,9
189.0	360.0	0,2	1,4	5,1	335,9	256,4	81,1	90,4	276,3	221,0	386,2	276,9	519,2
190.0	361.0	0,2	1,4	4,9	337,9	257,0	81,3	90,4	276,8	220,3	386,2	276,8	529,5
191.0	362.0	0,2	1,5	4,9	339,2	257,0	81,1	90,5	275,8	220,2	385,2	275,8	539,2
192.0	363.0	0,2	1,5	4,8	339,6	256,4	81,2	89,8	275,7	22			

Manufacturer: FOYER SUPREME
Model: 24 FSC

Run: 3
Project #: PI 20144
Test Duration: 201

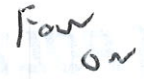
	min	
	HHV	LHV
Eff	65,56%	70,86%
Comb Eff	94,27%	94,27%
HT Eff	69,55%	75,17%
Output	21 489	kJ/h
Burn Rate	1,65	kg/h
Grams CO	457	g
Input	32 776	kJ/h
MC wet	16,44	

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-ult} 19,64
F₀
1,061

	Air Fuel Ratio (A/F)	
Overall Heating Efficiency:	65,56%	Dry Molecular Weight (M _d) 29,65
Combustion Efficiency:	94,27%	Dry Moles Exhaust Gas (N _p): 447,50
Heat Transfer Efficiency:	69,55%	Air Fuel Ratio (A/F) 12,76

Heat Output:	20 384 Btu/h	21 489 kJ/h
Heat Input:	31 092 Btu/h	32 776 kJ/h
Burn Duration:	3,35 h	
Burn Rate:	3,65 lb/h	1,655 kg/h
Stack Temp:	421,4 Deg. F	216,3 Deg. C



Project #: PI 20144

Run: 3

Reviewer:

2

- 31 LBS Insult load
open an inlet (By pass)
close Door immediately

TEST LOAD CONFIGURATION

PRE / POST CHECKS

Date: 2017-07-05 Manufacturer: Foyer Supreme Model: 2451c
 Project #: PI 20144 Run: 3 Tech: MM Reviewer: DO

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.....

3 (max 50 Fpm)	6 (max 50 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%.....

2017-07-03
2017-07-03
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
11	13	42
230	235	238
233	236	239
n	n	12
OK	OK	OK

SAMPLING EQUIPMENT CHECK OUT

Date: 2017-07-05 Manufacturer: Foghorn Supreme Model: 24 SFC
 Project #: PT 2144 Run: 3 Tech: MM Reviewer: DO

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	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)	535470.79	536547.77	535471.04	536547.89	454871.26	455944.38
Initial 1minute DGM (Liter)	535470.79	536547.76	535470.94	536547.82	454871.26	455944.21
Change © (Liter)	0	0.01	0.10	0.07	0.10	0.09
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	.4
Check OK (no change after 15 sec.)	OK	OK	OK	OK

CONTINUOUS ANALYZERS

Date: 20170705 Manufacturer: Foxm Supreme
 Project #: PI 20144 Run: 3 Tech: mm

Model: 24 SFC
 Reviewer: NP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2,950	2,949	0.996	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17,86	17,85 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	0.003	2,941	0.996	0.003	0.02	9.009	0.15	0	0.05	Y	
CO ₂	0	17.73	9.67	0	0.02	9.13	0.5	9.04	0.5	Y	

TEST DATA LOG

Date: 2012-07-05 Manufacturer: Fogger Supreme Model: 24 SFC
 Project #: PT 20144 Run: 3 Tech: MM Reviewer: JP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	536 546 81	455 943 32	166 90
Initial (Liter)	535 471 17	454 893 01	122 46

AMBIENT CONDITIONS

		Before	After
Barometer (kPa):		100.6	100.5
Dry Bulb (F):	4%	49.0	37.0
Humidity (%):	OF DP	76.64	82.40

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: 2017-07-05 Manufacturer: Foyer Supreme Model: 24 SFC
 Project #: PI 20144 Run: 3 Tech: MM Reviewer: DO

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size		Weight		Meter Moisture Content (% dry)*				
2	x 4 x 10 in.	1,172	lbs.	22.6	22.3	22.1	22.9	22.3
2	x 4 x 10 in.	1,390	lbs.	22.2	22.9	22.0	22.8	22.9
2	x 4 x 10 in.	1,272	lbs.	22.6	21.0	22.1	22.3	22.9
2	x 4 x 10 in.	1,310	lbs.	21.9	22.0	22.6	22.3	22.8
2	x 4 x 10 in.	1,266	lbs.	22.7	22.6	22.4	22.4	22.7
2	x 4 x 10 in.	1,338	lbs.	21.9	21.6	21.3	21.0	21.2
2	x 4 x 10 in.	1,240	lbs.	21.8	21.0	20.9	20.6	21.0
2	x 4 x 10 in.	1,248	lbs.	22.1	22.6	22.3	22.6	21.9
2	x 4 x 10 in.	1,304	lbs.	22.3	23.0	23.1	23.4	23.6
2	x 4 x 10 in.	1,214	lbs.	22.9	22.6	23.0	22.8	22.6
2	x 4 x 10 in.	1,236	lbs.	21.9	21.3	21.0	21.0	21.2
2	x 4 x 10 in.	1,224	lbs.	20.9	20.6	20.3	21.9	21.3
2	x 4 x 10 in.	1,322	lbs.	20.1	20.6	20.3	20.6	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.					

TEST LOAD WEIGHT: 1643 lbs

FUEL DATA

Date: 2017-07-05 Manufacturer: Foyer Supreme Model: 24 SFC
 Project #: PI 20144 Run: 3 Tech: MM Reviewer: MD

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*						
1 1/2 x 3 1/4 x 18 1/2 in.	1920 lbs.	194	192	197	198	198		
1 1/2 x 3 1/4 x 18 1/2 in.	1728 lbs.	196	192	199	197	198		
3 1/2 x 3 1/4 x 18 1/2 in.	4922 lbs.	199	193	192	194	192		
3 1/2 x 3 1/4 x 18 1/2 in.	4628 lbs.	196	193	196	199	200		
1 1/2 x 3 1/4 x 5 in.	0134 lbs.			201				
1 1/2 x 3 1/4 x 5 in.	0116 lbs.			206				
1 1/2 x 3 1/4 x 5 in.	0120 lbs.			203				
1 1/2 x 3 1/4 x 5 in.	0116 lbs.			210				
1 1/2 x 3 1/4 x 5 in.	0114 lbs.			216				
1 1/2 x 3 1/4 x 5 in.	0114 lbs.			213				
1 1/2 x 3 1/4 x 5 in.	0116 lbs.			199				
1 1/2 x 3 1/4 x 5 in.	0114 lbs.			206				
1 1/2 x 3 1/4 x 5 in.	0114 lbs.			202				
1 1/2 x 3 1/4 x 5 in.	0114 lbs.			209				
1 1/2 x 3 1/4 x 5 in.	0122 lbs.			213				
1 1/2 x 3 1/4 x 5 in.	0128 lbs.			219				
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: 1462 lbs Min 20%: 2.92 Max 25%: 366

Date: 2017-07-05 Manufacturer: foyer supralite Model: 24 SFC
 Project #: PT 20144 Run: 3 Tech: MR Reviewer: ND

		SYSTEM 1 - 1 st hour					SYSTEM 1				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank		
Date	Time	11	230	233	MM/SS	9	13	235	236	52	240
2017-07-04 18:00	93.7271	0.1287	0.1279	11.8514	95.1515	0.1266	0.1284	11.8191	0.1272		
2017-07-05 9:30	93.7272	0.1287	0.1278	11.8515	95.1516	0.1267	0.1285	11.8192	0.1273		

		SYSTEM 1 - 1 st hour					SYSTEM 1				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank		
Date	Time	11	230	233	9	13	235	236	52	240	
2017-07-05 15:00	93.7284	0.1332	0.1279	11.8535	95.1519	0.1261	0.1280	11.8213	0.1273		
2017-07-10 8:00	93.7277	0.1330	0.1278	11.8522	95.1517	0.1261	0.1279	11.8205	0.1273		
2017-07-11 8:00	93.7277	0.1330	0.1278	11.8522	95.1517	0.1261	0.1279	11.8205	0.1273		

Date: 2017-07-05 Manufacturer: Fogyn Super-L Model: 24 SFC
 Project #: PI 20144 Run: 3 Tech: MR Reviewer: BP

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-05	18:00	110 3075	0 1283	11 8956
2017-07-05	9:30	110 3076	0 1284	11 8956

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-05	15:00	110 3087	0 1322	11 8982
2017-07-10	9:00	110 3083	0 1321	11 8973
2017-07-11	8:00	110 3083	0 1321	11 8973

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	07-06-2017
Technicien	M.M
Project #	PI 20144

Description de l'unité

Manufacturier	FOYER SUPREME	
Modèle	24 FSC	
Combustion system	Non-Cat	
Appliance type	FIRE PLACE	
Firebox volume	2,28	cu ft.
Appliance weight empty	N.A	lbs
Appliance weight full	N.A	lbs

Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	N.A	BTU/h Donnée fournie par le manfacturier
Targeted category	1	
Targeted output	N.A	BTU/h
Cp steel	N.A	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	0,987	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,996	Dimensionless
Equipment number (DGM #2):	EM 179	
Calibration Factor (DGM #3):	0,986	Dimensionless
Equipment number (DGM #3):	EM 070	Dimensionless

Tunnel

Targeted tunnel flow rate	280	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	PI 20144
Date	07-06-2017
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):	100,7	100,5
Barometer (in.Hg):	29,736699	29,677639
Dry Bulb (F):	80,06	82,4
Humidity (%):	50,5	49,5
Air velocity (ft/min)	3	4

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

DGM room	
----------	--

Final: 537519,060	Liter
Initial: 536555,310	Liter
Final: 456893,020	Liter
Initial: 455947,040	Liter

Final: 206,200	cuft
Initial: 166,900	cuft

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

169

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

Project nu.	PI 20144
Date	07-06-2017
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
14,4	16,0	17,6

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

Load Volume: cu. ft

Loading Density: 6,4 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	32,4	lbs./ft3
Dry Wood Density:	27,1	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	18,5	1,94	19,30	19,40	19,30	19,20	19,10	37,32588	97,13	19,3
1,5	3,5	18,5	1,80	20,00	19,10	19,20	19,20	19,20	34,88936	97,13	19,3
3,5	3,5	18,5	5,04	19,60	19,80	19,20	19,10	19,30	97,8536	226,63	19,4
3,5	3,5	18,5	4,50	19,10	19,20	19,10	19,30	19,40	86,45156	226,63	19,2
1,5	0,75	5	0,11			19,90			2,2288	5,63	19,9
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	0,12			20,10			2,3718	5,63	20,1
1,5	0,75	5	0,11			20,80			2,3712	5,63	20,8
1,5	0,75	5	0,11			20,70			2,3598	5,63	20,7
1,5	0,75	5	0,11			20,90			2,3408	5,63	20,9
1,5	0,75	5	0,11			20,90			2,3826	5,63	20,9
1,5	0,75	5	0,11			20,10			2,2914	5,63	20,1
1,5	0,75	5	0,12			20,60			2,5132	5,63	20,6
1,5	0,75	5	0,11			20,30			2,1924	5,63	20,3
1,5	0,75	5	0,12			20,40			2,4888	5,63	20,4
										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	284,6014		20,2 %

Test Load Weight: 14,66 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	19,42	Dry(EPA)	19,42
		Dry(B415)	19,42

19,42
Must be 19-25

Wet: 16,26
must be 15,2-22

Coal Bed Range: lbs. to

3,7 lbs.

TEST CHARGE:

Coal bed weight: 3,4

lbs.

Project nu.	PI 20144
Date	07-06-2017
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,15 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=
0,951

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,061	77,45	0,2470
B center	0,062	77,57	0,2490
A1	0,050	77,44	0,2236
A2	0,057	77,38	0,2387
A3	0,058	77,53	0,2408
A4	0,051	77,51	0,2258
B1	0,051	77,530	0,2258
B2	0,060	77,620	0,2449
B3	0,056	77,460	0,2366
B4	0,051	77,430	0,2258
AVERAGE	0,0557	77,4920	0,2358

Project nu.	PI 20144
Date	07-06-2017
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	9	12	16	2	30	231	232	4	35	237	241	6	243		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,4476	0,1276	0,1269	11,9567	110,2389	0,1271	0,1255	11,9063	109,2834	0,1271	0,1280	12,0551	0,1282	05/07/2017	17:30
Before (6)	61,4476	0,1277	0,1270	11,9567	110,2390	0,1272	0,1256	11,9064	109,2835	0,1272	0,1280	12,0552	0,1283	06/07/2017	08:30
After (1)	61,4477	0,1291	0,1263	11,9599	110,2401	0,1272	0,1255	11,9074	109,2846	0,1292	0,1278	12,0590	0,1285	06/07/2017	14:00
After (2)	61,4477	0,1290	0,1263	11,9585	110,2392	0,1270	0,1255	11,9076	109,2839	0,1290	0,1278	12,0559	0,1285	10/07/2017	08:00
After (3)	61,4477	0,1290	0,1263	11,9580	110,2392	0,1270	0,1255	11,9076	109,2839	0,1292	0,1278	12,0559	0,1285	11/07/2017	08:00
After (4)	61,4477	0,1290	0,1263	11,9580	110,2392	0,1270	0,1255	11,9076	109,2839	0,1292	0,1278	12,0559	0,1285	11/07/2017	17:00
After (5)															
After (6)	61,4477	0,1290	0,1263	11,9580	110,2392	0,1270	0,1255	11,9076	109,2839	0,1292	0,1278	12,0559	0,1285	11/07/2017	17:00
Difference	0,0001	0,0013	-0,0007	0,0013	0,0002	-0,0002	-0,0001	0,0012	0,0004	0,0020	-0,0002	0,0007	0,0002		
Total (mg)		2				3,1				2,9			0,2		
Total ajusté (mg)		1,80				2,90				2,70					

Project nu.	PI 20144
Date	07-06-2017
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 1,7 g/hr

Burn Rate : 1,866 Dry kg/hr

Test Duration: 179 min

PRESSURE FACTOR: DGM 1 0,96936
 DGM 2 0,97317
 DGM 3 0,99289

BAROMETRIC PRESSURE
 Average: 29,707169 in Hg
 Start: 29,736699 in Hg
 End: 29,677639 in Hg

TEMPERATURE FACTORS DGM 1 0,97317
 DGM 2 0,97240
 DGM 3 0,97387

DGM CONTROLLER VALUES

DGM 1 Final: 18982,307 Cuft
 Initial: 18948,272 Cuft

VOLUMES SAMPLED DGM 1 31,689 SCft
 DGM 2 31,487 SCft
 DGM 3 37,469 SCft

DGM 2 Final: 16135,025 Cuft
 Initial: 16101,618 Cuft

DGM #3 Final: 206,200 Cuft
 Initial: 166,900 Cuft

TOTAL TUNNEL VOLUME : 55148

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1740,302
 Sample Train 2: 1751,475

DGM 1 542,557 °R
 DGM 2 542,987 °R

Paticulate concentration
 Sample Train 1 0,000098 g/dscf
 Sample Train 2 0,000092 g/dscf
 Room 0,000005 g/dscf

CALIBRATION FACTORS

DGM 1 0,9870
 DGM 2 0,9960
 DGM #3 0,9860

TUNNEL FLOW RATE: 308,092 Dscfm

TOTAL EMISSIONS
 Sample Train 1 5,10 g
 Sample Train 2 4,78 g

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

EMISSION RATES
 Sample Train 1 1,71 g/hr
 Sample Train 2 1,60 g/hr

1st hour emission rate 3,48 g/hr

DEVIATION: 3,19%

Cs Train 1 Train 2
 9,783E-05 9,2102E-05

Elapsed	Raw data row	Weight	CO	CO ₂	O ₂	Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit
Time		Remaining				Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom
min		lbs	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F
0,00	169,00	14,6	0,2	1,7	380,6	282,1	80,7	108,6	286,1	264,9	473,9	313,1	565,2
1,0	170,0	14,6	0,5	4,7	377,4	329,1	80,4	105,4	290,9	259,3	466,8	307,2	562,6
2,0	171,0	14,4	0,4	5,2	382,2	395,1	80,1	108,3	334,0	253,9	458,4	301,5	563,4
3,0	172,0	14,2	0,5	7,0	397,2	467,0	80,3	113,9	427,6	250,8	452,1	294,0	561,4
4,0	173,0	13,9	0,4	8,6	418,5	546,0	80,4	121,8	545,7	251,3	448,2	287,4	560,0
5,0	174,0	13,7	0,7	9,6	433,6	584,2	80,6	121,7	621,6	251,8	444,6	286,3	563,9
6,0	175,0	13,5	0,6	8,9	433,9	563,4	80,3	119,5	629,2	254,2	441,7	282,8	561,3
7,0	176,0	13,3	0,7	8,5	433,1	556,2	80,6	117,8	627,1	256,0	440,3	280,9	561,1
8,0	177,0	13,1	0,6	7,7	427,8	540,8	80,6	115,1	607,1	255,8	439,9	279,0	557,2
9,0	178,0	13,0	0,8	8,7	427,3	552,7	80,4	116,5	614,7	257,9	440,5	277,1	546,1
10,0	179,0	12,8	0,7	9,7	429,3	567,7	80,5	115,5	630,3	258,3	441,0	275,4	541,7
11,0	180,0	12,6	0,7	10,2	432,8	576,0	80,7	117,5	647,2	258,6	440,7	277,0	540,6
12,0	181,0	12,4	0,5	10,0	433,3	570,8	80,8	116,8	647,0	258,7	441,7	277,2	542,0
13,0	182,0	12,2	0,5	9,2	430,5	570,8	80,3	117,8	636,5	259,8	441,8	274,2	540,4
14,0	183,0	12,0	0,6	9,5	430,5	583,2	81,0	119,4	638,9	259,8	441,6	273,4	538,6
15,0	184,0	11,9	0,5	9,7	429,6	584,6	80,0	119,6	635,0	260,4	440,5	272,9	539,3
16,0	185,0	11,6	0,5	9,8	430,0	589,0	80,9	119,1	640,7	260,7	440,2	274,3	534,2
17,0	186,0	11,5	0,5	10,1	432,4	597,3	81,1	119,7	656,1	262,8	441,3	274,6	527,2
18,0	187,0	11,2	0,4	10,1	434,4	603,7	80,8	120,1	670,0	263,2	442,4	274,5	522,0
19,0	188,0	11,1	0,4	10,3	438,4	614,1	81,3	121,5	685,4	262,7	442,7	276,6	524,8
20,0	189,0	10,9	0,5	10,7	442,6	628,6	81,8	122,7	702,8	264,1	443,5	277,5	525,1
21,0	190,0	10,7	0,4	10,7	445,2	636,6	81,2	125,0	713,5	265,7	445,2	279,8	521,8
22,0	191,0	10,5	0,4	10,8	447,9	642,7	81,3	125,3	725,6	267,7	447,0	280,2	519,2
23,0	192,0	10,3	0,4	10,8	449,8	646,8	80,7	126,3	731,2	268,4	449,2	281,3	518,7
24,0	193,0	10,1	0,4	10,9	451,9	651,8	81,3	126,8	736,7	269,9	451,3	281,7	520,0
25,0	194,0	9,9	0,4	11,0	453,3	655,2	81,9	126,6	742,0	271,0	454,1	282,8	516,5
26,0	195,0	9,8	0,4	11,2	454,3	660,3	82,0	126,2	741,7	272,7	457,8	284,0	515,3
27,0	196,0	9,6	0,3	11,2	456,4	662,2	81,9	127,2	747,3	274,3	461,0	285,7	513,7
28,0	197,0	9,4	0,3	11,5	457,7	665,6	82,1	127,1	751,4	278,0	464,4	287,7	507,1
29,0	198,0	9,2	0,3	11,6	459,4	668,8	82,0	127,6	752,8	279,8	466,9	288,9	508,5
30,0	199,0	9,0	0,3	11,6	461,1	670,3	81,9	127,2	754,7	281,1	470,5	290,2	509,1
31,0	200,0	8,8	0,3	11,5	462,3	667,4	82,1	127,4	754,1	283,4	474,1	292,1	508,0
32,0	201,0	8,6	0,3	11,6	463,9	669,6	81,7	126,9	756,8	287,4	478,8	293,5	502,8
33,0	202,0	8,4	0,3	11,7	465,2	669,6	81,9	127,7	757,9	289,3	482,4	294,7	502,0
34,0	203,0	8,3	0,3	11,8	466,9	669,6	82,7	127,9	757,6	292,3	486,4	298,0	500,2
35,0	204,0	8,1	0,3	11,8	468,5	671,4	82,3	127,5	760,6	295,3	490,4	299,5	496,9
36,0	205,0	7,9	0,3	11,8	470,5	669,1	80,9	129,6	760,2	298,5	494,5	302,0	497,2
37,0	206,0	7,7	0,3	11,8	471,1	666,7	82,3	128,6	757,8	302,5	498,0	303,4	493,9
38,0	207,0	7,6	0,3	11,6	471,2	661,0	82,4	127,5	751,1	305,3	503,1	305,3	491,2
39,0	208,0	7,4	0,3	11,6	472,4	660,1	82,2	128,4	748,5	309,3	507,9	306,5	489,7
40,0	209,0	7,2	0,3	11,7	474,8	660,7	81,9	128,1	753,3	312,9	512,7	308,7	486,6
41,0	210,0	7,1	0,3	11,8	476,6	657,9	82,3	128,3	753,7	318,0	517,6	311,5	482,0
42,0	211,0	6,9	0,3	11,8	476,5	654,3	82,0	127,7	744,3	322,3	523,1	312,0	480,7
43,0	212,0	6,7	0,2	11,8	477,0	650,4	82,3	127,3	739,6	327,5	528,4	313,3	476,4
44,0	213,0	6,6	0,2	11,8	479,6	647,7	82,4	126,9	738,5	331,9	535,3	315,6	476,7
45,0	214,0	6,4	0,2	11,8	481,6	644,2	81,6	127,1	738,5	338,4	542,0	319,3	469,6
46,0	215,0	6,3	0,2	11,7	482,2	639,0	83,2	127,4	732,8	341,9	548,6	320,7	467,1
47,0	216,0	6,1	0,2	11,6	482,0	634,3	81,6	125,5	722,5	347,1	552,5	323,8	464,2
48,0	217,0	6,0	0,1	11,4	482,2	628,5	81,9	125,8	708,0	350,6	557,0	328,2	467,3
49,0	218,0	5,8	0,1	11,3	482,6	623,3	81,2	124,9	695,1	355,3	562,2	331,7	469,0
50,0	219,0	5,7	0,1	11,2	482,6	617,9	82,0	124,9	687,3	358,5	566,7	335,4	465,3
51,0	220,0	5,5	0,1	11,3	484,9	615,2	82,1	124,4	682,7	362,4	571,7	341,9	465,6
52,0	221,0	5,4	0,1	11,3	487,0	613,7	82,0	123,1	683,2	366,6	576,1	344,3	464,6
53,0	222,0	5,3	0,1	11,4	490,4	613,9	81,9	124,2	686,7	370,8	581,3	346,3	466,8
54,0	223,0	5,1	0,1	11,5	492,4	613,4	82,2	123,0	684,6	373,9	586,2	347,0	470,2
55,0	224,0	5,0	0,1	11,4	493,8	611,3	83,0	123,0	682,7	378,4	590,0	351,8	466,1
56,0	225,0	4,9	0,1	11,4	494,8	608,3	82,6	123,0	678,8	381,7	592,7	358,5	462,1
57,0	226,0	4,7	0,1	11,2	495,8	605,6	82,1	122,7	676,3	385,0	597,9	360,9	459,1
58,0	227,0	4,7	0,1	11,1	495,6	602,6	82,5	123,3	669,4	386,5	601,4	362,8	457,8
59,0	228,0	4,6	0,1	11,0	496,6	599,1	83,2	121,9	665,7	388,2	603,5	363,7	461,9
60,0	229,0	4,4	0,1	10,8	498,2	594,7	82,1	122,1	661,6	391,3	607,4	370,4	460,5
61,0	230,0	4,3	0,1	10,7	499,8	591,3	82,7	121,2	654,6	391,4	612,0	380,7	460,0
62,0	231,0	4,2	0,1	10,5	500,0	586,9	82,8	119,6	651,0	394,7	616,3	381,0	456,9
63,0	232,0	4,1	0,1	10,5	499,9	583,8	82,8	119,1	648,3	394,5	619,2	379,6	457,9
64,0	233,0	4,0	0,1	10,4	499,9	580,8	83,6	119,1	640,6	394,2	620,3	382,8	461,5
65,0	234,0	3,9	0,1	10,3	500,0	577,7	82,4	119,1	637,3	395,5	623,4	380,8	463,0
66,0	235,0	3,8	0,1	10,2	499,9	573,5	82,1	119,1	633,2	398,2	627,3	380,7	460,3
67,0	236,0	3,7	0,1	10,1	499,5	570,6	82,8	116,7	624,6	396,6	629,7	381,5	465,1
68,0	237,0	3,6	0,1	9,9	499,4	566,9	83,0	116,7	617,5	397,3	628,8	388,1	465,5
69,0	238,0	3,5	0,1	9,7	499,6	562,9	83,0	116,3	611,4	398,5	631,4	390,5	465,9
70,0	239,0	3,4	0,1	9,6	499,4	558,3	83,2	116,6	602,4	398,2	633,8	388,5	473,9
71,0	240,0	3,3	0,1	9,5	499,6	554,8	82,3	116,0	600,6	400,2	635,3	393,1	468,6
72,0	241,0	3,2	0,1	9,4	499,0	553,0	82,5	116,4	598,9	400,4	637,7	392,9	465,0
73,0	242,0	3,2	0,1	9,5	498,0	550,6	83,3	115,0	593,3	399,6	635,0	393,8	468,5
74,0	243,0	3,1	0,1	9,4	497,4	548,7	83,1	115,3	593,3	399,9	635,7	393,8	464,4
75,0	244,0	3,0	0,1	9,5	497,1	548,3	83,6	114,5	589,3	399,2	635,0	394,0	467,9
76,0	245,0	2,9	0,1	9,6	498,7	549,1	83,4	116,1	591,5	399,1	637,8	399,2	465,8
77,0	246,0	2,8	0,1	9,6	500,2	548,2	82,8	115,3	596,5	397,8	639,5	397,0	470,3
78,0	247,0	2,7	0,1	9,5	501,6	548,1	82,4	115,7	599,0	397,0	640,6	398,9	472,1
79,0	248,0	2,7	0,1	9,2	502,9	541,6	82,9	114,2	596,6	397,7	640,2	405,8	474,3
80,0	249,0	2,6	0,2	8,5	501,5	531,6	82,6	113,7	588,8	397,0	639,9	402,0	479,7
81,0	250,0	2,5	0,3	8,3	499,8	524,2	83,2	114,3	582,0	398,0	640,7	403,9	474,6
82,0	251,0	2,5	0,3	8,1	498,5	516,9	82,3	113,7	573,4	396,1	641,2	405,2	476,7
83,0	252,0	2,4	0,4	7,9	496,1	508,7	82,4	113,2	561,5	394,8	640,2	405,7	478,5
84,0	253,0	2,3	0,5	7,5	492,6	500,1	82,2	112,7	547,4	393,3	640,2	407,8	474,4
85,0	254,0	2,3	0,5	7,5	492,0	496,4	82,8	111,9	537,4	390,9	639,2	414,6	478,0
86,0	255,0	2,2	0,5	7,4	489,3	490,9	82,3	110,9	527,5	389,2	639,2	412,9	477,7
87,0	256,0	2,2	0										

103,0	272,0	1,7	0,3	5,3	449,6	390,5	82,5	101,3	408,5	329,8	587,3	387,9	534,3
104,0	273,0	1,6	0,3	5,1	450,3	386,9	83,0	100,5	402,4	325,8	584,0	396,8	542,3
105,0	274,0	1,6	0,3	5,1	452,8	383,1	82,8	100,7	399,6	323,7	578,7	406,9	555,1
106,0	275,0	1,6	0,3	5,2	458,7	379,6	82,4	100,8	395,2	321,5	577,5	411,3	587,9
107,0	276,0	1,5	0,3	5,2	459,7	377,1	82,9	100,7	394,7	318,8	574,2	408,0	602,9
108,0	277,0	1,5	0,3	5,0	460,0	374,3	82,3	100,9	393,5	317,5	572,3	413,9	602,7
109,0	278,0	1,5	0,3	4,9	458,3	371,1	82,3	100,7	391,3	316,0	566,7	418,2	599,4
110,0	279,0	1,5	0,3	4,9	457,7	368,4	82,7	100,0	391,3	313,0	564,8	419,1	600,2
111,0	280,0	1,4	0,3	4,8	456,8	364,5	82,6	100,1	386,7	308,6	563,4	416,6	608,7
112,0	281,0	1,4	0,3	4,8	454,8	362,1	82,8	99,4	382,4	307,4	559,6	413,9	610,8
113,0	282,0	1,4	0,3	4,8	452,3	359,4	82,6	99,8	379,8	304,9	556,8	409,8	610,2
114,0	283,0	1,4	0,3	4,9	452,0	359,1	81,9	99,7	379,0	303,2	554,8	416,7	606,4
115,0	284,0	1,3	0,3	4,9	453,1	357,8	81,5	99,3	378,0	301,6	552,4	429,0	604,7
116,0	285,0	1,4	0,3	4,8	451,0	357,0	82,1	99,1	375,8	299,1	549,6	425,1	605,6
117,0	286,0	1,3	0,3	4,8	449,0	355,5	82,1	99,1	372,9	296,9	547,0	423,0	605,1
118,0	287,0	1,3	0,3	4,9	448,3	354,0	81,7	98,9	374,4	295,5	545,4	424,7	601,8
119,0	288,0	1,3	0,3	4,9	447,7	352,8	82,3	98,7	375,0	293,4	544,3	426,2	599,8
120,0	289,0	1,3	0,3	4,8	445,8	351,9	82,3	98,2	374,2	290,9	540,8	425,0	598,3
121,0	290,0	1,2	0,3	4,8	444,2	350,8	81,6	98,4	371,9	289,3	537,3	421,9	600,5
122,0	291,0	1,2	0,3	4,8	443,5	349,0	81,6	98,7	372,7	288,3	535,6	424,3	596,5
123,0	292,0	1,2	0,3	4,7	442,3	348,1	82,5	97,6	372,6	286,2	534,7	422,7	595,3
124,0	293,0	1,2	0,3	4,7	442,8	347,1	82,2	98,0	373,5	285,3	532,8	430,2	592,4
125,0	294,0	1,2	0,3	4,7	441,0	346,5	82,4	97,9	372,6	284,0	532,0	430,5	585,7
126,0	295,0	1,1	0,3	4,8	439,5	345,6	82,0	97,5	371,5	282,3	529,8	426,9	587,0
127,0	296,0	1,1	0,3	4,7	438,6	343,9	81,7	97,3	370,2	280,3	527,0	423,9	591,6
128,0	297,0	1,1	0,3	4,7	436,7	342,7	82,3	97,9	368,7	279,1	524,6	420,0	591,2
129,0	298,0	1,0	0,4	4,6	434,8	341,3	82,4	97,6	366,6	278,3	523,0	417,6	588,5
130,0	299,0	1,0	0,4	4,6	433,1	339,4	82,3	97,5	364,9	276,5	521,2	413,0	589,9
131,0	300,0	1,0	0,4	22,2	431,3	338,1	82,5	96,5	362,1	275,1	519,3	411,6	588,6
132,0	301,0	1,0	0,4	22,4	428,6	337,0	81,9	96,8	362,0	274,9	516,3	403,7	586,4
133,0	302,0	1,0	0,4	22,2	427,6	335,5	82,3	96,8	360,6	272,3	516,3	401,1	587,9
134,0	303,0	0,9	0,4	21,5	425,2	333,8	82,0	96,6	359,0	271,9	514,2	399,7	581,1
135,0	304,0	0,9	0,4	21,6	423,2	332,5	81,8	96,8	356,2	270,9	511,4	396,2	581,4
136,0	305,0	0,9	0,4	22,0	421,1	331,9	82,6	96,1	352,9	268,9	509,0	392,0	582,8
137,0	306,0	0,9	0,4	22,1	419,3	330,0	82,5	96,6	351,8	267,8	508,3	388,0	580,7
138,0	307,0	0,9	0,4	21,9	418,5	328,3	82,0	97,0	350,3	268,0	507,3	385,6	581,4
139,0	308,0	0,8	0,4	21,9	417,0	327,3	82,5	96,6	348,4	266,7	504,6	383,8	581,5
140,0	309,0	0,9	0,4	21,5	416,2	326,5	82,6	96,0	347,8	265,3	502,9	383,7	581,1
141,0	310,0	0,8	0,4	21,3	414,8	325,2	81,8	96,1	346,7	264,2	501,2	381,8	579,9
142,0	311,0	0,8	0,4	20,5	412,8	323,1	82,5	96,2	345,6	263,7	500,2	376,0	578,6
143,0	312,0	0,8	0,4	20,1	411,8	321,3	82,5	95,7	344,1	262,6	497,9	374,8	579,7
144,0	313,0	0,8	0,4	19,7	409,8	320,1	82,6	95,7	341,6	261,7	496,8	372,8	576,1
145,0	314,0	0,7	0,4	19,5	407,9	318,6	82,4	95,4	339,9	260,8	495,0	370,5	573,3
146,0	315,0	0,7	0,4	19,4	406,5	317,7	82,4	95,3	339,5	259,6	492,0	367,9	573,7
147,0	316,0	0,7	0,4	19,3	404,3	315,3	82,1	95,5	339,1	258,8	490,3	364,4	568,7
148,0	317,0	0,7	0,4	18,8	402,3	313,9	82,4	95,3	336,4	258,3	488,8	359,2	569,0
149,0	318,0	0,7	0,4	18,2	399,6	313,0	82,4	95,6	335,7	257,4	487,3	355,1	562,6
150,0	319,0	0,6	0,4	17,9	397,4	310,8	82,3	95,7	333,9	256,4	484,8	353,7	558,3
151,0	320,0	0,6	0,4	17,7	394,9	308,8	82,4	95,2	330,1	255,3	482,9	349,2	557,0
152,0	321,0	0,6	0,4	17,2	392,9	306,1	82,4	94,8	328,7	253,8	481,3	346,6	554,1
153,0	322,0	0,6	0,4	17,0	391,9	304,6	82,5	94,7	326,6	252,0	479,9	344,2	556,6
154,0	323,0	0,6	0,4	17,1	389,8	302,3	82,5	94,9	323,4	251,2	477,7	343,4	553,3
155,0	324,0	0,6	0,4	17,0	387,5	300,8	82,5	93,9	320,9	250,1	474,1	342,6	549,5
156,0	325,0	0,5	0,4	16,8	385,3	300,3	82,4	94,4	318,2	248,4	472,6	340,5	546,7
157,0	326,0	0,5	0,3	5,5	383,5	303,4	82,4	94,2	321,7	248,5	470,1	338,3	538,9
158,0	327,0	0,5	0,2	5,6	383,7	305,8	82,5	94,0	324,6	248,0	468,3	336,3	541,6
159,0	328,0	0,4	0,2	5,3	382,7	308,2	82,1	93,9	327,5	247,3	467,4	329,5	541,8
160,0	329,0	0,4	0,2	5,3	383,3	309,6	82,2	94,4	329,5	246,8	466,6	325,8	547,9
161,0	330,0	0,4	0,2	5,2	382,9	311,6	82,5	94,3	330,3	246,7	464,8	324,2	548,5
162,0	331,0	0,3	0,2	5,2	382,9	313,4	82,5	94,2	332,1	246,4	463,8	323,2	549,0
163,0	332,0	0,3	0,2	5,1	383,3	314,3	82,5	94,5	334,7	245,4	462,6	322,6	551,4
164,0	333,0	0,3	0,2	5,1	383,6	315,2	82,6	94,3	335,3	244,6	460,9	323,4	554,0
165,0	334,0	0,3	0,2	5,1	383,9	316,1	82,7	94,7	336,3	244,3	460,3	324,5	554,1
166,0	335,0	0,3	0,2	5,1	384,0	315,9	82,7	94,3	337,1	243,8	459,0	323,6	556,4
167,0	336,0	0,2	0,2	5,0	382,7	315,5	82,2	94,9	335,0	244,5	458,0	319,4	556,7
168,0	337,0	0,2	0,2	5,0	381,7	315,5	82,3	94,5	334,3	243,9	458,2	315,9	556,1
169,0	338,0	0,2	0,2	4,9	382,4	315,2	82,4	94,2	332,9	242,5	457,2	315,2	564,3
170,0	339,0	0,2	0,2	4,8	382,9	315,3	82,7	93,8	332,8	242,4	456,5	315,0	567,7
171,0	340,0	0,2	0,2	4,8	383,2	314,8	82,6	94,2	333,7	242,4	455,8	314,6	569,4
172,0	341,0	0,1	0,3	4,7	382,7	314,3	82,8	94,5	332,3	241,0	454,9	313,6	571,9
173,0	342,0	0,1	0,3	4,7	382,2	313,5	82,7	94,4	333,7	241,0	453,9	313,3	569,3
174,0	343,0	0,1	0,3	4,7	381,7	313,1	82,6	93,9	332,0	240,9	453,5	311,3	570,9
175,0	344,0	0,1	0,3	4,7	380,0	312,1	82,5	94,3	332,0	240,7	452,4	305,5	569,3
176,0	345,0	0,1	0,2	4,6	378,8	311,2	82,3	94,7	331,9	240,8	451,4	304,9	564,9
177,0	346,0	0,1	0,2	4,5	378,8	310,1	82,4	94,5	330,8	240,2	450,3	302,8	570,0
178,0	347,0	0,1	0,3	4,5	379,5	309,0	82,3	94,2	330,7	239,4	449,8	304,7	572,8
179,0	348,0	0,0	0,3	22,3	380,8	307,2	82,4	94,6	328,7	238,4	450,0	303,8	582,8

Manufacturer: FOYER SUPREME
Model: 24 FSC

Run: 4
Project #: PI 20144
Test Duration: 179

	min	
	HHV	LHV
Eff	68,43%	73,96%
Comb Eff	97,38%	97,38%
HT Eff	70,27%	75,95%
Output	25 165	kJ/h
Burn Rate	1,86	kg/h
Grams CO	220	g
Input	36 775	kJ/h
MC wet	16,26	

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-ult} 19,64
F₀
1,062

Overall Heating Efficiency:	68,43%	Air Fuel Ratio (A/F)	
Combustion Efficiency:	97,38%	Dry Molecular Weight (M _d)	29,98
Heat Transfer Efficiency:	70,27%	Dry Moles Exhaust Gas (N _p):	372,53
		Air Fuel Ratio (A/F)	10,66

Heat Output:	23 872 Btu/h	25 165 kJ/h
Heat Input:	34 885 Btu/h	36 775 kJ/h
Burn Duration:	2,98 h	
Burn Rate:	4,09 lb/h	1,856 kg/h
Stack Temp:	466,7 Deg. F	241,5 Deg. C



Reviewer: NC

- D1 ~~38~~ LBS tapocher Fail channel
38 mm

PRE / POST CHECKS

 Date: 2017-07-06

 Manufacturer: Foghorn Scientific

 Model: 245FC

 Project #: PI 20144

 Run: 4

 Tech: mm

 Reviewer: BO

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.....

Pre-Test	Post-Test
3 (max 50 Fpm)	4 (max 50 Fpm)
ok	ok
4 sides	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%.....

2017-07-03
2017-07-03
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
9	30	35
12	231	237
16	232	241
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

 Date: 2017-07-06

 Manufacturer: Foghorn Supreme

 Model: 24 SL

 Project #: PI 20144

 Run: 4

 Tech: MR

 Reviewer: DP

Leakage Checks Tunnel Samplers

	System 1 st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	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)	536559.54	537520.01	536559.62	537520.42	455946.32	456894.01
Initial 1minute DGM (Liter)	536559.54	537520.01	536559.61	537520.61	455946.32	456894.01
Change @ (Liter)	0	0	0.01	0.02	0	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

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 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	5	3	4
Check OK (no change after 15 sec.)	OK	OK	OK	OK

PRE-TEST SCALE AUDIT

Date: 2013-07-06 Manufacturer: Boyer Supreme Model: 24 SFC
 Project #: P1 20144 Run: 4 Tech: mm Reviewer: DO

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	<u>EM 090</u>	<u>44</u> lbs, Class F	<u>44</u> lbs
Wood	<u>EM 090</u>	<u>44</u> lbs, Class F	<u>44</u> lbs
Analytical	<u>EM 128</u>	<u>100</u> mg, Class S	<u>100</u> mg
Analytical	<u>EM - 129</u>	<u>200</u> g, Class S	<u>200</u> 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%

CONTINUOUS ANALYZERS

Date: 2017-07-06 Manufacturer: Poyr Supreme Model: 24 SFC
 Project #: PT 20144 Run: 4 Tech: MR Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2.934	2.931	0.997	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17.77	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	0.007	2.953	1.005	0.004	0.02	0.019	0.15	0.008	0.05	✓	
CO ₂	0	17.87	9.75	0	0.02	0.10	0.5	0.03	0.5	✓	

TEST DATA LOG

Date: 2017-06-06 Manufacturer: Foyer Supreme Model: 34 SFC
 Project #: PI 20144 Run: 4 Tech: MM Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	537519,06	456893,02	206,20
Initial (Liter)	536555,31	455943,04	166,90

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	100,7	100,5
Dry Bulb (F):	80,5 80,06	83,40
Humidity (%):	50,5	49,5

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: 20170706 Manufacturer: foyer supreme Model: 24 SFC
 Project #: pJ 20144 Run: 4 Tech: mm Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*				
2	x 4 x 10 in.	1370 lbs.	196	193	192	196	198
2	x 4 x 10 in.	1384 lbs.	193	201	206	203	209
2	x 4 x 10 in.	1214 lbs.	201	203	204	209	203
2	x 4 x 10 in.	1202 lbs.	196	192	194	193	192
2	x 4 x 10 in.	1092 lbs.	201	200	200	211	216
2	x 4 x 10 in.	1186 lbs.	204	206	203	201	204
2	x 4 x 10 in.	1266 lbs.	211	216	208	207	206
2	x 4 x 10 in.	1190 lbs.	199	196	193	198	192
2	x 4 x 10 in.	1166 lbs.	206	203	207	209	200
2	x 4 x 10 in.	1304 lbs.	197	196	193	198	193
2	x 4 x 10 in/12 in	1294 lbs.	206	206	202	202	202
2	x 4 x 10 in/12 in	1404 lbs.	209	210	213	212	214
2	x 4 x 10 in/12 in	1428 lbs.	205	203	206	205	202
2	x 4 x 10 in/12 in	1508 lbs.	204	207	206	207	210
	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: 1801 lbs

FUEL DATA

Date: 2017 07 06 Manufacturer: Fogex Supreme Model: 24 SFC
 Project #: PT 20144 Run: 4 Tech: MR Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*					
1 1/2	x 3 1/2 x 18 1/2 in.	1938 lbs.	193	194	193	192	191	
1 1/2	x 3 1/2 x 18 1/2 in.	1804 lbs.	200	191	192	191	192	
3 1/2	x 3 1/2 x 18 1/2 in.	5044 lbs.	196	198	192	191	193	
3 1/2	x 3 1/2 x 18 1/2 in.	4498 lbs.	191	192	191	193	194	
1 1/2	x 3/4 x 5 in.	0112 lbs.			199			
1 1/2	x 3/4 x 5 in.	0112 lbs.			206			
1 1/2	x 3/4 x 5 in.	0110 lbs.			203			
1 1/2	x 3/4 x 5 in.	0118 lbs.			201			
1 1/2	x 3/4 x 5 in.	0114 lbs.			208			
1 1/2	x 3/4 x 5 in.	0114 lbs.			207			
1 1/2	x 3/4 x 5 in.	0112 lbs.			209			
1 1/2	x 3/4 x 5 in.	0114 lbs.			209			
1 1/2	x 3/4 x 5 in.	0114 lbs.			201			
1 1/2	x 3/4 x 5 in.	0112 lbs.			206			
1 1/2	x 3/4 x 5 in.	0108 lbs.			203			
1 1/2	x 3/4 x 5 in.	0112 lbs.			204			
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: 1966 lbs Min 20%: 293 Max 25%: 367

Date: 2017.07.06 Project #: PT 20144 Run: 4 Manufacturer: Fager Supreme Model: 34 SFC
Tech: MM Reviewer: NO

		SYSTEM 1 - 1 st hour				SYSTEM 1			
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time								
2017.07.06	17:30	614476	01276	01269	11,9567	231	232	4	243
2017.07.06	8:30	614476	01277	01270	11,9567	01271	01255	11,9063	01282
					11,9567	01272	01256	11,9064	01283

		SYSTEM 1 - 1 st hour				SYSTEM 1			
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time								
2017.07.06	14:00	614477	01291	01263	11,9599	231	232	4	243
2017.07.10	8:00	614477	01290	01263	11,9585	01272	01255	11,9074	01285
2017.07.11	8:00	614477	01290	01263	11,9580	01270	01255	11,9076	01285
2017.07.11	17:00	614477	01290	01263	11,9580	01270	01255	11,9076	01285

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2017-07-06 Project #: PI 20144 Run: 4 Manufacturer: Fager Supramk Model: 34 SFC
Tech: MR Reviewer: ND

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-05	17:30	109, 2834	0, 1271	0, 1280
2017-07-06	8:30	109, 2835	0, 1272	0, 1280

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2017-07-06	17:00	109, 2846	0, 1292	0, 1278
2017-07-10	8:00	109, 2839	0, 1290	0, 1278
2017-07-11	8:00	109, 2839	0, 1292	0, 1278
2017-07-11	17:00	109, 2839	0, 1292	0, 1278

APPENDIX 2: Proportionality results

Average	Average	Average						Average
16,14	Inlet +	Inlet +						0,248
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,54	98,73	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
16,060	535,1	535,4			0,172	0,170	0	0,2458411
16,031	535,1	535,4	102,01	99,91	0,172	0,170	1	0,2457683
16,075	535,1	535,4	102,39	100,30	0,173	0,170	2	0,2458401
16,160	535,1	535,5	102,18	100,46	0,172	0,170	3	0,2464594
16,154	535,1	535,5	102,98	101,27	0,172	0,170	4	0,245428
16,235	535,1	535,5	103,64	101,67	0,172	0,170	5	0,2454277
16,177	535,1	535,5	105,24	103,28	0,172	0,170	6	0,2429332
16,168	535,1	535,5	106,04	104,28	0,172	0,170	7	0,2418851
16,341	535,2	535,5	105,18	103,16	0,172	0,170	8	0,2443904
16,214	535,2	535,6	105,56	103,44	0,172	0,170	9	0,2429333
16,100	535,2	535,6	105,78	103,70	0,172	0,170	10	0,2418854
16,240	535,3	535,7	104,48	102,51	0,172	0,170	11	0,2443908
16,123	535,3	535,7	104,80	103,13	0,172	0,170	12	0,2429333
16,175	535,3	535,7	104,27	102,69	0,172	0,170	13	0,2439753
15,991	535,3	535,7	105,32	103,56	0,172	0,170	14	0,2414662
16,257	535,4	535,8	103,97	102,17	0,172	0,170	15	0,245013
16,231	535,4	535,8	104,70	102,96	0,172	0,170	16	0,2439751
16,248	535,4	535,9	104,58	102,64	0,172	0,170	17	0,2443912
16,227	535,5	535,9	104,38	102,26	0,172	0,170	18	0,244391
16,149	535,5	536,0	104,56	102,84	0,172	0,170	19	0,2433505
16,138	535,6	536,0	104,70	102,82	0,172	0,170	20	0,2433506
16,181	535,6	536,1	104,34	102,43	0,172	0,170	21	0,2439753
16,267	535,7	536,1	104,01	102,06	0,172	0,170	22	0,2450134
16,196	535,8	536,2	104,37	102,45	0,172	0,170	23	0,2439758
16,224	535,8	536,2	104,26	102,50	0,172	0,170	24	0,2443915
16,248	535,8	536,3	103,80	102,00	0,172	0,170	25	0,2450137
16,283	535,9	536,3	103,66	101,72	0,172	0,170	26	0,2454274
16,136	535,9	536,4	104,61	102,64	0,172	0,170	27	0,2433511
16,234	536,0	536,4	103,67	101,76	0,172	0,170	28	0,2450142
16,190	536,0	536,5	104,04	102,13	0,172	0,170	29	0,2443914
16,147	536,0	536,5	103,92	102,09	0,172	0,170	30	0,2439764
16,265	536,1	536,5	103,23	101,35	0,172	0,170	31	0,2458411
16,113	536,1	536,6	104,49	102,53	0,172	0,170	32	0,2433508
16,264	536,2	536,6	103,57	101,60	0,172	0,170	33	0,2454283
16,167	536,2	536,7	104,02	102,07	0,172	0,170	34	0,2439773
16,139	536,3	536,7	104,42	102,53	0,172	0,170	35	0,2433501
16,209	536,3	536,7	103,97	102,12	0,172	0,170	36	0,2443922
16,137	536,3	536,8	104,41	102,70	0,172	0,170	37	0,2433511
16,262	536,4	536,8	103,49	101,52	0,172	0,170	38	0,2454287
16,226	536,4	536,9	103,44	101,53	0,172	0,169	39	0,2450714
16,252	536,5	536,9	103,44	101,48	0,172	0,170	40	0,2454264
16,173	536,5	536,9	103,72	101,92	0,172	0,170	41	0,2443918
16,169	536,5	537,0	103,59	101,57	0,172	0,169	42	0,2443918
16,157	536,5	537,0	103,75	101,76	0,172	0,169	43	0,2443918
16,180	536,6	537,0	103,49	101,53	0,172	0,169	44	0,2445771
16,274	536,6	537,1	102,95	101,23	0,172	0,169	45	0,2458419
16,213	536,7	537,1	103,27	101,44	0,171	0,169	46	0,2450143
16,269	536,7	537,1	103,12	101,08	0,172	0,169	47	0,245842
16,245	536,7	537,1	103,39	101,20	0,172	0,169	48	0,2454294
16,164	536,7	537,2	103,50	101,63	0,172	0,169	49	0,2443927
16,131	536,7	537,2	103,52	101,60	0,171	0,169	50	0,2439772
16,154	536,8	537,2	103,53	101,23	0,171	0,169	51	0,2443922
16,383	536,8	537,2	101,85	100,29	0,172	0,169	52	0,2478986
16,190	536,8	537,2	103,10	101,30	0,171	0,169	53	0,2450146

16,211	536,8	537,3	102,94	100,97	0,171	0,169	54	0,2454297
16,274	536,9	537,3	102,54	100,62	0,172	0,169	55	0,2464613
16,208	536,9	537,3	103,04	101,03	0,172	0,169	56	0,2454297
16,214	536,9	537,4	102,90	101,14	0,172	0,169	57	0,2454294
16,206	537,0	537,4	102,96	101,08	0,172	0,169	58	0,2454292
16,238	537,0	537,4	102,65	100,82	0,171	0,169	59	0,2458422
16,243	537,1	537,5	102,73	100,94	0,171	0,169	60	0,2458428
16,137	537,1	537,5	103,29	101,47	0,171	0,169	61	0,2444105
16,174	537,0	537,5	102,94	101,17	0,171	0,169	62	0,2450157
16,174	537,1	537,5	103,20	101,15	0,172	0,169	63	0,2450148
16,265	537,1	537,5	102,30	100,53	0,172	0,169	64	0,2464616
16,217	537,1	537,5	102,65	100,74	0,171	0,169	65	0,2458424
16,259	537,1	537,6	102,37	100,37	0,172	0,169	66	0,2464619
16,191	537,1	537,6	102,86	100,99	0,172	0,169	67	0,24543
16,089	537,1	537,6	103,31	101,61	0,172	0,169	68	0,2439779
16,157	537,1	537,6	102,85	101,17	0,171	0,170	69	0,2450151
16,272	537,1	537,6	101,98	100,24	0,171	0,169	70	0,2468726
16,205	537,1	537,6	102,48	100,58	0,171	0,169	71	0,245843
16,244	537,1	537,6	102,27	100,31	0,171	0,169	72	0,2464625
16,245	537,1	537,6	102,16	100,51	0,171	0,169	73	0,2464622
16,371	537,1	537,6	101,33	99,39	0,171	0,169	74	0,2485124
16,140	537,2	537,6	102,77	100,93	0,171	0,169	75	0,2450153
16,231	537,2	537,7	102,27	100,53	0,172	0,169	76	0,2464616
16,229	537,2	537,7	102,10	100,45	0,172	0,170	77	0,2464624
16,155	537,2	537,7	102,60	100,59	0,171	0,169	78	0,2454299
16,173	537,2	537,7	102,14	100,37	0,171	0,169	79	0,2458429
16,225	537,2	537,7	102,03	100,22	0,171	0,169	80	0,2464626
16,251	537,3	537,8	101,87	99,99	0,171	0,169	81	0,2468733
16,176	537,3	537,8	102,22	100,40	0,171	0,169	82	0,2458428
16,150	537,3	537,8	102,42	100,76	0,171	0,169	83	0,24543
16,175	537,3	537,8	102,14	100,36	0,171	0,169	84	0,245843
16,215	537,3	537,8	101,90	100,13	0,171	0,169	85	0,2464623
16,167	537,3	537,8	102,12	100,14	0,171	0,169	86	0,2458431
16,208	537,3	537,8	101,94	100,23	0,171	0,169	87	0,246462
16,096	537,3	537,8	102,36	100,68	0,171	0,169	88	0,2450153
16,125	537,3	537,8	102,24	100,38	0,171	0,169	89	0,2454297
16,282	537,4	537,9	101,13	99,33	0,171	0,169	90	0,2478998
16,019	537,4	537,9	102,83	101,18	0,171	0,169	91	0,2439784
16,209	537,4	537,9	101,52	99,84	0,171	0,169	92	0,2468732
16,176	537,4	537,9	101,64	99,82	0,171	0,169	93	0,246462
16,137	537,4	537,9	101,93	100,26	0,171	0,169	94	0,2458426
16,164	537,4	538,0	101,62	99,84	0,171	0,169	95	0,2464625
16,102	537,5	538,0	102,07	100,26	0,171	0,169	96	0,2454304
16,128	537,5	538,0	101,90	100,23	0,171	0,169	97	0,2458433
16,265	537,5	538,0	101,21	99,22	0,171	0,169	98	0,2479004
16,160	537,5	538,0	101,44	99,80	0,171	0,169	99	0,2464626
16,179	537,5	538,0	101,31	99,41	0,171	0,169	100	0,2468742
16,168	537,5	538,0	101,32	99,53	0,171	0,169	101	0,2468736
16,142	537,6	538,1	101,48	99,59	0,171	0,169	102	0,2464639
16,132	537,6	538,1	101,59	99,55	0,171	0,169	103	0,246462
16,120	537,6	538,1	101,36	99,38	0,171	0,169	104	0,2464622
16,247	537,6	538,1	100,41	98,40	0,171	0,169	105	0,2485125
16,245	537,7	538,1	100,45	98,65	0,171	0,169	106	0,2485132
16,262	537,7	538,2	100,18	98,38	0,171	0,169	107	0,2489217
16,190	537,7	538,2	100,71	98,83	0,171	0,169	108	0,2478418
16,008	537,7	538,2	101,72	100,11	0,171	0,169	109	0,2450148
16,277	537,8	538,3	99,95	98,34	0,171	0,169	110	0,2493292
16,220	537,8	538,3	100,27	98,14	0,171	0,169	111	0,2485136
16,218	537,8	538,3	100,24	98,37	0,171	0,169	112	0,2485133
16,238	537,8	538,3	100,11	98,15	0,171	0,169	113	0,2489224
16,174	537,8	538,2	100,60	98,72	0,171	0,169	114	0,2479002

16,201	537,8	538,3	100,09	98,52	0,171	0,169	115	0,2485074
16,188	537,9	538,3	100,17	98,25	0,171	0,169	116	0,2485136
16,198	537,8	538,3	100,09	98,36	0,171	0,169	117	0,2485139
16,033	537,9	538,3	101,48	99,34	0,171	0,169	118	0,2458437
16,087	537,9	538,4	100,58	99,00	0,171	0,169	119	0,2468741
16,151	537,9	538,4	100,36	98,62	0,171	0,169	120	0,2479006
16,147	538,0	538,4	100,41	98,40	0,171	0,169	121	0,2479009
16,183	538,0	538,4	100,09	98,09	0,171	0,169	122	0,2485137
16,210	538,0	538,4	99,86	97,99	0,171	0,169	123	0,2489226
16,185	538,0	538,4	100,02	98,05	0,171	0,169	124	0,2485921
16,071	538,0	538,4	100,74	98,84	0,171	0,169	125	0,2468747
16,144	538,0	538,4	100,07	98,24	0,171	0,169	126	0,2482504
16,216	537,9	538,4	99,54	97,90	0,171	0,169	127	0,2493299
16,157	537,9	538,4	99,77	97,98	0,171	0,169	128	0,2485138
16,158	537,9	538,4	99,87	97,96	0,171	0,169	129	0,2485139
16,253	537,9	538,4	99,23	97,71	0,171	0,169	130	0,2499404
16,157	537,9	538,4	99,90	98,16	0,171	0,169	131	0,2485141
16,165	537,9	538,4	99,72	98,00	0,171	0,169	132	0,2485141
16,154	537,9	538,4	99,75	98,33	0,171	0,169	133	0,2485147
16,156	537,9	538,4	99,87	98,11	0,171	0,169	134	0,2485141
16,102	538,0	538,4	99,94	98,10	0,171	0,169	135	0,247901
16,169	538,0	538,5	99,67	97,74	0,171	0,169	136	0,248923
16,102	538,0	538,5	100,15	98,11	0,171	0,169	137	0,2479007
16,159	537,9	538,4	99,54	97,85	0,171	0,169	138	0,2489222
16,146	537,9	538,4	99,75	97,86	0,171	0,169	139	0,2485143
15,952	537,9	538,4	101,09	99,01	0,171	0,169	140	0,2454308
16,109	537,9	538,4	99,90	98,22	0,171	0,169	141	0,2479009
16,167	537,9	538,4	99,57	97,83	0,171	0,169	142	0,2489229
16,031	537,9	538,4	100,27	98,61	0,171	0,169	143	0,2468626
16,090	537,9	538,4	99,94	97,98	0,171	0,169	144	0,2479004
16,135	537,9	538,4	99,82	97,83	0,171	0,169	145	0,2485135
16,149	537,9	538,4	99,40	97,52	0,171	0,169	146	0,2489224
16,123	537,9	538,4	99,52	97,84	0,171	0,169	147	0,2485135
16,131	537,9	538,4	99,60	97,78	0,171	0,169	148	0,2485141
16,081	537,9	538,4	99,89	97,90	0,171	0,169	149	0,2479008
16,112	537,9	538,4	99,47	97,54	0,171	0,169	150	0,2485141
16,081	537,8	538,4	99,69	97,99	0,171	0,169	151	0,2479006
16,156	537,8	538,3	99,36	97,61	0,171	0,169	152	0,2489223
16,152	537,8	538,4	99,34	97,60	0,171	0,169	153	0,2489224
16,128	537,9	538,4	99,53	97,93	0,171	0,169	154	0,2485139
15,945	537,8	538,4	100,65	98,79	0,171	0,169	155	0,2458438
16,150	537,8	538,3	99,64	97,71	0,171	0,169	156	0,2489223
16,175	537,8	538,3	99,19	97,55	0,171	0,169	157	0,2493301
16,171	537,8	538,3	99,43	97,41	0,171	0,169	158	0,2493295
15,980	537,8	538,3	100,38	98,70	0,171	0,169	159	0,2464631
16,105	537,8	538,3	99,47	97,69	0,171	0,169	160	0,2485139
16,142	537,8	538,3	99,21	97,29	0,171	0,169	161	0,2489609
16,134	537,8	538,4	99,37	97,52	0,171	0,169	162	0,2489223
16,116	537,9	538,4	99,66	97,58	0,171	0,169	163	0,2485136
16,118	537,9	538,4	99,51	97,62	0,171	0,169	164	0,2485133
16,115	537,9	538,4	99,64	97,75	0,171	0,169	165	0,2485133
16,170	537,9	538,4	99,26	97,54	0,171	0,169	166	0,2493297
16,168	537,9	538,4	99,17	97,39	0,171	0,169	167	0,2493297
16,113	537,9	538,4	99,40	97,63	0,171	0,169	168	0,2485134
16,074	537,9	538,4	99,76	98,04	0,171	0,169	169	0,2479
15,981	537,9	538,4	100,44	98,53	0,171	0,169	170	0,2464627
16,068	537,9	538,4	99,69	97,85	0,171	0,169	171	0,2479004
16,126	537,9	538,4	99,33	97,31	0,171	0,169	172	0,2489221
16,202	537,9	538,3	98,88	97,07	0,171	0,169	173	0,2499392
16,110	537,9	538,4	99,41	97,89	0,171	0,169	174	0,2485138
16,135	537,9	538,4	99,35	97,39	0,171	0,169	175	0,2489219

16,137	537,9	538,4	99,29	97,52	0,171	0,169	176	0,2489217
16,095	537,9	538,4	99,43	97,63	0,171	0,169	177	0,2485133
16,129	537,9	538,4	99,23	97,30	0,171	0,169	178	0,2489207
16,162	537,9	538,4	99,08	97,59	0,171	0,169	179	0,249329
16,108	537,9	538,4	99,41	97,59	0,171	0,169	180	0,2485132
16,103	537,9	538,4	99,55	97,49	0,171	0,169	181	0,2485132
16,199	537,9	538,4	98,82	97,15	0,171	0,169	182	0,2499393
15,967	537,9	538,4	100,20	98,31	0,171	0,169	183	0,2464633
16,100	537,9	538,4	99,41	97,70	0,171	0,169	184	0,2485138
16,156	537,9	538,4	99,11	97,31	0,171	0,169	185	0,2493296
16,105	537,9	538,4	99,52	97,60	0,171	0,169	186	0,2485134
16,265	538,0	538,4	98,39	96,59	0,171	0,169	187	0,2509526
16,196	538,0	538,4	99,03	97,07	0,171	0,169	188	0,2499392
16,101	538,0	538,4	99,31	97,73	0,171	0,169	189	0,2485132
16,152	538,0	538,4	99,06	97,41	0,171	0,169	190	0,2493295
16,100	538,0	538,4	99,36	97,67	0,171	0,169	191	0,2485134
15,871	538,0	538,5	100,86	99,01	0,171	0,169	192	0,2450159
16,123	538,0	538,5	99,10	97,40	0,171	0,169	193	0,2489216
16,183	538,0	538,4	98,75	96,96	0,171	0,169	194	0,2499398
16,153	538,0	538,5	99,04	97,24	0,171	0,169	195	0,2493296
16,216	538,0	538,5	98,59	96,94	0,171	0,169	196	0,2503456
16,123	538,0	538,5	99,18	97,38	0,171	0,169	197	0,2489215
16,057	538,0	538,5	99,62	97,67	0,171	0,169	198	0,2479295
15,924	538,0	538,5	100,36	98,68	0,171	0,169	199	0,2458438
16,122	538,0	538,5	98,95	97,23	0,171	0,169	200	0,2489222
16,120	538,0	538,5	99,24	97,28	0,171	0,169	201	0,2489215
16,058	538,0	538,5	99,52	97,97	0,171	0,169	202	0,2479002
15,963	538,0	538,5	99,95	98,03	0,171	0,169	203	0,2464626
16,119	538,0	538,5	99,11	97,30	0,171	0,168	204	0,2489225
16,085	538,0	538,5	99,29	97,63	0,171	0,169	205	0,2485134
15,955	538,0	538,5	100,09	98,26	0,171	0,169	206	0,2464628
16,182	538,0	538,5	98,83	97,02	0,171	0,169	207	0,2499398
16,254	538,0	538,5	98,52	96,58	0,171	0,169	208	0,2509529
16,182	538,1	538,5	98,74	96,61	0,171	0,168	209	0,2499397
16,094	538,1	538,6	99,33	97,37	0,171	0,168	210	0,2485135
15,981	538,1	538,6	100,00	98,37	0,171	0,169	211	0,246874
16,185	538,1	538,6	98,75	96,96	0,171	0,169	212	0,2499388
16,096	538,1	538,6	99,25	97,55	0,171	0,169	213	0,248513
16,062	538,2	538,6	99,51	97,91	0,171	0,169	214	0,2479875
16,099	538,2	538,6	99,46	97,63	0,171	0,169	215	0,2485133
16,095	538,2	538,7	99,36	97,45	0,171	0,169	216	0,2485135
16,146	538,2	538,7	99,04	97,17	0,171	0,169	217	0,2493299
16,147	538,2	538,7	98,89	97,10	0,171	0,169	218	0,2493291
16,115	538,2	538,7	99,33	97,46	0,171	0,169	219	0,2488531
16,094	538,2	538,7	99,32	97,44	0,171	0,169	220	0,248514
15,916	538,2	538,7	100,26	98,72	0,171	0,169	221	0,2458438
16,185	538,2	538,7	98,83	96,99	0,171	0,169	222	0,2499391
16,142	538,2	538,7	98,96	97,03	0,171	0,169	223	0,2493296
16,184	538,2	538,7	98,71	96,96	0,171	0,169	224	0,2499399
16,205	538,2	538,7	98,58	96,73	0,171	0,169	225	0,2503456
16,143	538,3	538,7	98,91	97,24	0,171	0,169	226	0,2493299
16,217	538,3	538,8	98,70	96,86	0,171	0,169	227	0,2503465
16,148	538,3	538,8	99,04	97,07	0,171	0,169	228	0,24933
15,989	538,3	538,8	100,03	98,02	0,171	0,168	229	0,2468737
16,146	538,3	538,8	99,04	96,97	0,171	0,168	230	0,2493296
16,146	538,3	538,8	99,04	97,21	0,171	0,169	231	0,2493295
16,051	538,3	538,8	99,53	97,82	0,171	0,169	232	0,2479009
16,091	538,3	538,8	99,32	97,51	0,171	0,169	233	0,2485139
16,116	538,3	538,8	99,26	97,16	0,171	0,169	234	0,2489224
16,142	538,3	538,7	99,00	97,36	0,171	0,169	235	0,2493296
16,117	538,2	538,7	99,24	97,33	0,171	0,169	236	0,2489224

16,117	538,3	538,8	99,02	97,13	0,171	0,169	237	0,2489362
16,147	538,3	538,8	99,04	97,32	0,171	0,169	238	0,2493298
16,137	538,3	538,8	98,97	97,02	0,171	0,169	239	0,2493295
16,186	538,3	538,8	98,91	96,91	0,171	0,169	240	0,2499402
16,092	538,3	538,8	99,32	97,60	0,171	0,169	241	0,2485134
16,091	538,3	538,8	99,29	97,56	0,171	0,169	242	0,2484647
16,141	538,4	538,8	98,85	97,21	0,171	0,169	243	0,2493299
15,956	538,4	538,8	100,11	98,29	0,171	0,169	244	0,2464634
16,181	538,4	538,8	98,67	96,75	0,171	0,169	245	0,2499396
16,120	538,4	538,8	99,07	97,36	0,171	0,169	246	0,2489224
15,960	538,4	538,9	100,01	98,47	0,171	0,169	247	0,2464634
15,985	538,5	538,9	99,99	97,78	0,171	0,169	248	0,2468738
15,979	538,5	538,9	99,84	98,10	0,171	0,168	249	0,2468746
15,989	538,5	538,9	100,07	98,14	0,171	0,169	250	0,2469315
16,138	538,5	538,9	99,06	97,10	0,171	0,169	251	0,2492759
16,141	538,5	538,9	99,03	97,10	0,171	0,169	252	0,24933
16,092	538,5	538,9	99,18	97,52	0,171	0,169	253	0,2485137
16,086	538,5	538,9	99,19	97,68	0,171	0,169	254	0,2485139
16,139	538,5	539,0	98,96	97,20	0,171	0,169	255	0,2493298
16,083	538,5	539,0	99,26	97,51	0,171	0,169	256	0,2485057
15,982	538,6	539,0	99,84	98,13	0,171	0,169	257	0,2468744
15,952	538,6	539,0	100,12	98,35	0,171	0,169	258	0,2464639
16,080	538,6	539,0	99,22	97,39	0,171	0,169	259	0,2485145
16,178	538,6	539,0	98,72	96,96	0,171	0,169	260	0,2499406
16,048	538,6	539,0	99,50	97,84	0,171	0,169	261	0,2479017
16,117	538,6	539,0	99,05	97,40	0,171	0,169	262	0,2489229
16,121	538,6	539,0	99,09	97,41	0,171	0,169	263	0,248923
16,058	538,6	539,0	99,71	98,00	0,171	0,169	264	0,2479014
16,187	538,6	539,1	98,83	97,08	0,171	0,169	265	0,2499403
15,984	538,6	539,1	100,15	98,37	0,171	0,169	266	0,2468749
16,089	538,7	539,1	99,39	97,38	0,171	0,169	267	0,2485151
16,094	538,7	539,1	99,34	97,40	0,171	0,169	268	0,2485141
15,962	538,7	539,1	100,19	98,41	0,171	0,169	269	0,2464639
16,050	538,6	539,1	99,57	97,63	0,171	0,169	270	0,2479012
16,145	538,7	539,1	98,94	97,34	0,171	0,169	271	0,2493303
16,049	538,7	539,1	99,52	97,79	0,171	0,169	272	0,2479015
16,117	538,7	539,1	99,15	97,67	0,171	0,169	273	0,2489233
16,142	538,7	539,1	98,99	97,59	0,171	0,169	274	0,2493305
16,140	538,7	539,1	98,94	97,14	0,171	0,169	275	0,2493304
16,146	538,7	539,1	98,98	97,12	0,171	0,169	276	0,2493223
16,210	538,7	539,1	98,53	96,93	0,171	0,169	277	0,2503468
16,147	538,7	539,1	99,14	97,24	0,171	0,169	278	0,2493303
16,141	538,7	539,2	98,93	97,10	0,171	0,169	279	0,2493307
16,245	538,7	539,2	98,21	96,32	0,171	0,169	280	0,2509541
16,090	538,8	539,2	99,20	97,27	0,171	0,168	281	0,2485154
16,114	538,8	539,2	99,19	97,34	0,171	0,169	282	0,2489231
16,111	538,8	539,2	99,05	97,30	0,171	0,169	283	0,2489245
16,117	538,8	539,2	99,09	97,34	0,171	0,169	284	0,2489236
16,118	538,8	539,2	99,07	97,24	0,171	0,169	285	0,2489234
16,123	538,8	539,2	99,07	97,24	0,171	0,169	286	0,2489234
16,096	538,8	539,2	99,33	97,45	0,171	0,169	287	0,2485149
16,095	538,8	539,2	99,32	97,24	0,171	0,168	288	0,248515
16,121	538,8	539,3	99,11	97,28	0,171	0,168	289	0,2489675
16,121	538,8	539,3	99,01	97,22	0,171	0,169	290	0,2489239
16,120	538,9	539,3	99,02	97,15	0,171	0,168	291	0,2489233
16,116	538,8	539,3	99,10	97,16	0,171	0,168	292	0,2489234
15,826	538,8	539,3	100,83	99,22	0,171	0,169	293	0,2443958
16,095	538,9	539,3	99,17	97,49	0,171	0,169	294	0,2485155
16,148	538,9	539,3	98,78	97,22	0,171	0,169	295	0,2493314
16,142	538,9	539,3	98,96	97,24	0,171	0,169	296	0,2493316
16,143	538,9	539,3	98,98	97,13	0,171	0,169	297	0,2493312

16,123	538,9	539,3	99,00	97,18	0,171	0,169	298	0,2489243
16,122	538,9	539,3	99,04	97,43	0,171	0,169	299	0,248924
16,044	538,9	539,3	99,62	97,97	0,171	0,169	300	0,2476982
16,152	538,9	539,4	99,03	97,40	0,171	0,169	301	0,2493313
16,250	538,9	539,4	98,30	96,84	0,171	0,169	302	0,250955
15,984	539,0	539,4	99,84	98,12	0,171	0,169	303	0,2468759
16,188	539,0	539,4	98,73	97,16	0,171	0,169	304	0,2499413
16,146	539,0	539,4	98,86	97,37	0,171	0,169	305	0,2493312
16,122	539,0	539,4	99,11	97,43	0,171	0,169	306	0,2489241
16,119	539,0	539,4	99,07	97,64	0,171	0,169	307	0,2489242
16,153	539,0	539,4	98,93	97,28	0,171	0,169	308	0,2493315
16,125	539,0	539,4	99,22	97,47	0,171	0,169	309	0,2489241
16,056	539,0	539,4	99,57	97,80	0,171	0,169	310	0,2479022
16,126	539,0	539,4	99,19	97,50	0,171	0,169	311	0,2489239
16,123	539,0	539,5	99,07	97,43	0,171	0,169	312	0,2489243
16,096	539,0	539,5	99,27	97,65	0,171	0,169	313	0,2485149
15,968	539,0	539,5	100,14	98,50	0,171	0,169	314	0,246465
16,110	539,0	539,5	99,30	97,44	0,171	0,169	315	0,248652
16,191	539,0	539,5	98,63	96,95	0,171	0,169	316	0,2499414
16,126	539,0	539,5	98,98	97,58	0,171	0,169	317	0,2489243
16,124	539,1	539,5	99,02	97,32	0,171	0,169	318	0,2489246
16,189	539,0	539,5	98,76	96,76	0,171	0,168	319	0,2499416
16,062	539,0	539,5	99,61	97,72	0,171	0,168	320	0,2479024
16,120	539,1	539,5	99,20	97,31	0,171	0,169	321	0,2489245
16,191	539,1	539,5	98,63	96,77	0,171	0,169	322	0,2499414
16,156	539,1	539,5	98,98	97,20	0,171	0,168	323	0,2493311
16,190	539,1	539,5	98,78	96,93	0,171	0,169	324	0,2499417
16,059	539,1	539,6	99,61	97,68	0,171	0,169	325	0,2479022
16,060	539,1	539,6	99,60	97,80	0,171	0,169	326	0,2479025
16,123	539,2	539,6	99,32	97,38	0,171	0,169	327	0,2487948
15,971	539,2	539,6	99,97	98,34	0,171	0,169	328	0,2464656
16,162	539,2	539,6	99,08	97,06	0,171	0,169	329	0,2494164
16,196	539,2	539,6	98,70	96,97	0,171	0,169	330	0,249942
16,146	539,2	539,6	99,13	97,34	0,171	0,169	331	0,2491901
16,154	539,2	539,6	98,99	97,38	0,171	0,169	332	0,2493317
16,190	539,2	539,7	98,74	97,04	0,171	0,169	333	0,2499417
16,221	539,3	539,7	98,54	96,81	0,171	0,169	334	0,2503476
16,197	539,3	539,7	98,68	97,12	0,171	0,169	335	0,2499421
16,125	539,3	539,7	98,96	97,32	0,171	0,169	336	0,2489245
16,103	539,3	539,7	99,24	97,45	0,171	0,169	337	0,2485159
16,123	539,3	539,7	98,89	97,34	0,171	0,169	338	0,2489244
15,990	539,3	539,8	99,87	98,16	0,171	0,169	339	0,2468765
16,056	539,3	539,8	99,41	97,69	0,171	0,169	340	0,2479029
15,993	539,4	539,8	99,83	98,07	0,171	0,169	341	0,2468748
16,103	539,3	539,8	99,27	97,40	0,171	0,169	342	0,2485406
16,062	539,3	539,8	99,53	97,75	0,171	0,169	343	0,2479029

Average	Average	Average						Average
15,82	Inlet +	Inlet +						0,245
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	99,73	98,49	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
16,134	535,4	535,8			0,172	0,170	0	0,2485038
16,017	535,5	535,8	99,33	97,92	0,172	0,170	1	0,2474822
16,055	535,5	535,9	100,08	98,72	0,172	0,170	2	0,2468658
16,143	535,5	535,9	100,52	99,38	0,172	0,170	3	0,2468653
16,212	535,6	535,9	101,30	100,18	0,172	0,170	4	0,2464544
16,229	535,6	535,9	102,23	101,13	0,172	0,170	5	0,245423
16,160	535,7	536,0	103,05	101,79	0,172	0,170	6	0,2439711
16,065	535,7	536,0	103,10	101,70	0,172	0,170	7	0,2433455
16,208	535,7	536,1	101,77	100,55	0,172	0,170	8	0,2458357
16,137	535,8	536,1	101,83	100,83	0,172	0,170	9	0,2450087
16,059	535,8	536,2	102,35	101,02	0,172	0,170	10	0,2439707
16,157	535,8	536,2	101,68	100,76	0,172	0,170	11	0,2454228
16,006	535,8	536,2	103,04	101,66	0,172	0,170	12	0,242929
16,161	535,8	536,3	101,74	100,59	0,172	0,170	13	0,2454225
16,020	535,9	536,3	102,56	101,52	0,172	0,170	14	0,2433453
16,161	535,9	536,3	101,88	100,81	0,172	0,170	15	0,2454224
16,143	536,0	536,4	101,88	100,81	0,172	0,170	16	0,2450083
16,082	536,0	536,4	102,47	101,21	0,172	0,170	17	0,243971
16,042	536,1	536,5	102,78	101,31	0,172	0,170	18	0,2433461
16,145	536,1	536,5	102,13	100,64	0,172	0,170	19	0,2450088
16,189	536,1	536,6	101,61	100,47	0,172	0,170	20	0,2458356
16,263	536,2	536,6	101,05	99,71	0,172	0,170	21	0,2468663
15,945	536,3	536,7	103,17	102,04	0,172	0,170	22	0,2418815
15,937	536,4	536,8	103,31	102,15	0,172	0,170	23	0,2418812
16,149	536,4	536,8	101,79	100,57	0,172	0,170	24	0,2450079
16,075	536,4	536,9	102,17	101,15	0,172	0,170	25	0,2439711
16,183	536,5	536,9	101,44	100,18	0,172	0,170	26	0,2458364
16,240	536,6	537,0	100,93	99,54	0,172	0,170	27	0,2468667
16,173	536,6	537,0	101,22	100,12	0,172	0,170	28	0,2458499
16,168	536,6	537,0	101,39	100,20	0,172	0,170	29	0,2458358
16,112	536,6	537,1	101,76	100,37	0,172	0,170	30	0,245009
16,141	536,7	537,1	101,39	100,28	0,172	0,170	31	0,2454244
16,197	536,7	537,2	100,97	99,66	0,172	0,170	32	0,2464552
16,122	536,8	537,2	101,22	100,10	0,172	0,170	33	0,2454236
16,192	536,9	537,3	100,85	99,78	0,172	0,170	34	0,2464555
16,190	536,9	537,3	100,91	99,66	0,172	0,170	35	0,2464556
16,094	537,0	537,4	101,40	100,05	0,172	0,169	36	0,245009
16,248	537,0	537,4	100,31	99,34	0,172	0,170	37	0,2474828
16,123	537,1	537,5	100,91	99,65	0,172	0,170	38	0,2458365
16,188	537,1	537,5	100,49	99,11	0,172	0,169	39	0,2468666
16,177	537,1	537,6	100,76	99,45	0,172	0,169	40	0,2464557
16,108	537,1	537,6	100,85	99,35	0,172	0,169	41	0,2458367
16,100	537,1	537,6	101,15	99,95	0,172	0,169	42	0,2454236
16,083	537,2	537,6	101,34	100,01	0,172	0,169	43	0,2450094
16,203	537,2	537,7	100,60	99,28	0,172	0,169	44	0,2468672
16,016	537,2	537,7	101,76	100,48	0,172	0,169	45	0,2439718
16,216	537,3	537,7	100,57	99,32	0,172	0,169	46	0,2468675
15,869	537,3	537,7	102,63	101,30	0,172	0,169	47	0,2418827
16,103	537,3	537,8	101,14	100,12	0,172	0,170	48	0,2454245
16,181	537,3	537,8	100,77	99,65	0,172	0,170	49	0,2464562
16,132	537,4	537,8	101,05	99,70	0,172	0,170	50	0,2458371
16,174	537,4	537,8	100,76	99,47	0,172	0,169	51	0,2464564
16,190	537,4	537,9	100,43	99,21	0,172	0,169	52	0,2468675
16,106	537,4	537,9	100,87	99,37	0,172	0,169	53	0,2458372

15,949	537,4	537,9	101,89	100,64	0,172	0,169	54	0,2433479
16,108	537,5	537,9	100,83	99,40	0,172	0,169	55	0,2458371
16,053	537,5	537,9	101,21	99,72	0,172	0,169	56	0,2450103
16,155	537,5	538,0	100,71	99,43	0,172	0,169	57	0,2464566
16,197	537,5	538,0	100,69	99,28	0,172	0,170	58	0,2468675
16,050	537,6	538,0	100,93	99,98	0,172	0,170	59	0,24501
16,191	537,6	538,1	100,41	99,04	0,171	0,169	60	0,246743
16,126	537,7	538,1	100,81	99,38	0,171	0,169	61	0,2458372
16,007	537,7	538,1	101,70	100,48	0,172	0,169	62	0,2439729
16,164	537,7	538,2	100,62	99,28	0,172	0,169	63	0,2464567
16,075	537,7	538,2	101,20	99,89	0,172	0,169	64	0,2450102
16,159	537,8	538,2	100,61	99,11	0,172	0,169	65	0,2464568
16,188	537,8	538,2	100,29	99,10	0,171	0,169	66	0,2468682
16,099	537,8	538,3	100,96	99,64	0,171	0,169	67	0,2454252
16,148	537,8	538,3	100,30	99,11	0,171	0,169	68	0,2464576
16,104	537,8	538,3	100,73	99,30	0,171	0,169	69	0,2458378
16,142	537,8	538,3	100,31	99,28	0,171	0,169	70	0,2464572
16,130	537,8	538,3	100,03	99,15	0,171	0,169	71	0,2464572
16,124	537,8	538,3	100,25	99,04	0,171	0,169	72	0,2464569
16,122	537,8	538,3	100,29	98,94	0,171	0,169	73	0,2464573
16,052	537,9	538,3	100,66	99,49	0,171	0,169	74	0,2454257
16,047	537,9	538,3	100,63	99,30	0,171	0,169	75	0,245426
16,007	537,9	538,3	100,67	99,34	0,171	0,169	76	0,2450101
15,935	537,8	538,3	100,92	99,81	0,171	0,169	77	0,2441095
16,090	537,9	538,4	100,00	98,70	0,171	0,169	78	0,2464572
16,166	537,9	538,4	99,66	98,54	0,171	0,169	79	0,2474844
16,089	537,9	538,4	99,98	98,84	0,171	0,169	80	0,2464576
16,098	537,9	538,4	99,65	98,48	0,171	0,169	81	0,246868
16,098	537,9	538,4	99,87	98,45	0,171	0,169	82	0,2468678
16,088	537,9	538,4	99,58	98,48	0,171	0,169	83	0,2468681
16,073	537,9	538,4	99,65	98,52	0,171	0,169	84	0,2468681
16,050	537,9	538,4	99,73	98,59	0,171	0,169	85	0,2464573
16,152	537,9	538,4	99,30	98,26	0,171	0,169	86	0,2478947
15,994	537,9	538,4	100,36	99,03	0,171	0,169	87	0,2454252
15,988	537,9	538,4	100,39	98,95	0,172	0,169	88	0,2454256
16,016	538,0	538,5	99,94	98,86	0,171	0,169	89	0,2459203
16,017	538,0	538,5	99,98	98,89	0,171	0,169	90	0,2458382
16,144	538,0	538,5	99,22	98,11	0,171	0,169	91	0,2478562
16,171	538,0	538,5	99,27	97,98	0,171	0,169	92	0,247895
16,078	538,1	538,5	99,98	98,70	0,171	0,169	93	0,2464575
16,102	538,1	538,5	99,85	98,46	0,171	0,169	94	0,2468682
16,138	538,0	538,5	99,61	98,50	0,172	0,169	95	0,2474844
15,987	538,0	538,5	100,41	99,03	0,172	0,169	96	0,2454255
15,974	538,0	538,5	100,35	98,98	0,172	0,169	97	0,2454256
16,065	538,1	538,6	99,50	98,43	0,172	0,169	98	0,2468688
15,949	538,1	538,6	100,40	99,03	0,171	0,169	99	0,2450152
16,097	538,1	538,6	99,34	98,13	0,172	0,169	100	0,2474847
15,954	538,1	538,6	100,05	98,88	0,171	0,169	101	0,2454256
16,030	538,1	538,6	99,49	98,10	0,172	0,169	102	0,2468689
16,156	538,1	538,7	98,59	97,51	0,172	0,169	103	0,2489167
16,149	538,2	538,7	98,59	97,29	0,172	0,169	104	0,2489171
16,141	538,2	538,7	98,37	97,37	0,171	0,169	105	0,2489171
15,966	538,2	538,8	99,33	98,10	0,171	0,169	106	0,2464571
16,050	538,3	538,8	98,67	97,47	0,171	0,169	107	0,2478953
15,980	538,3	538,8	99,01	97,70	0,171	0,169	108	0,2468689
16,036	538,3	538,8	98,93	97,50	0,171	0,169	109	0,2474851
15,956	538,3	538,8	99,32	98,05	0,172	0,169	110	0,2464575
16,046	538,3	538,8	98,68	97,57	0,172	0,169	111	0,2478947
16,079	538,2	538,8	98,34	97,20	0,171	0,169	112	0,2485085
16,168	538,2	538,8	97,86	96,79	0,172	0,169	113	0,2499338
15,953	538,2	538,7	98,90	97,66	0,172	0,169	114	0,2468689

16,017	538,2	538,8	98,49	97,53	0,171	0,169	115	0,2478951
16,136	538,2	538,8	97,67	96,43	0,172	0,170	116	0,2499342
16,028	538,2	538,8	98,07	96,92	0,172	0,169	117	0,248508
16,062	538,2	538,7	98,07	96,83	0,172	0,169	118	0,2489172
16,046	538,2	538,7	98,34	96,94	0,172	0,169	119	0,2485079
16,010	538,2	538,7	98,38	97,09	0,172	0,169	120	0,2478949
15,900	538,1	538,7	98,95	97,60	0,171	0,169	121	0,246458
16,063	538,1	538,7	98,02	96,84	0,172	0,169	122	0,2489175
16,040	538,1	538,7	98,24	96,92	0,172	0,169	123	0,2485082
15,993	538,1	538,7	98,40	97,31	0,172	0,169	124	0,2478957
16,077	538,1	538,7	97,78	96,68	0,172	0,170	125	0,2493239
16,053	538,1	538,7	97,98	96,55	0,172	0,169	126	0,248917
16,085	538,1	538,7	97,82	96,56	0,172	0,169	127	0,2493237
15,963	538,1	538,7	98,58	97,37	0,172	0,169	128	0,2474848
16,079	538,1	538,7	97,85	96,53	0,172	0,169	129	0,249324
15,818	538,1	538,7	99,37	98,14	0,172	0,169	130	0,2454256
16,042	538,1	538,7	98,01	96,62	0,172	0,169	131	0,248917
16,042	538,1	538,7	98,05	96,59	0,172	0,169	132	0,2489172
15,833	538,1	538,7	99,15	98,04	0,172	0,169	133	0,2458386
15,904	538,1	538,7	98,72	97,71	0,172	0,170	134	0,2468684
16,036	538,1	538,7	97,93	96,73	0,172	0,170	135	0,2489176
15,940	538,1	538,7	98,45	97,41	0,172	0,170	136	0,2474851
16,035	538,1	538,7	97,96	96,65	0,172	0,170	137	0,2489168
16,036	538,1	538,7	98,02	96,70	0,172	0,169	138	0,248917
16,030	538,1	538,7	98,04	96,74	0,172	0,170	139	0,2489166
16,096	538,1	538,7	97,54	96,33	0,172	0,170	140	0,249934
16,053	538,1	538,7	97,86	96,61	0,172	0,170	141	0,2493237
16,020	538,1	538,7	97,98	96,60	0,172	0,170	142	0,2489171
16,032	538,1	538,7	97,72	96,53	0,172	0,170	143	0,2493235
16,026	538,1	538,7	97,71	96,43	0,172	0,170	144	0,2493511
15,978	538,1	538,7	98,15	96,86	0,172	0,170	145	0,2485083
15,996	538,1	538,7	97,89	96,53	0,172	0,170	146	0,2489165
15,918	538,1	538,7	98,57	97,42	0,172	0,170	147	0,2474842
15,915	538,1	538,7	98,47	97,36	0,172	0,170	148	0,2475024
16,072	538,1	538,7	97,39	96,42	0,172	0,170	149	0,2499339
16,008	538,1	538,6	98,02	96,63	0,172	0,170	150	0,2489164
16,075	538,1	538,6	97,66	96,29	0,172	0,170	151	0,2499341
16,035	538,1	538,6	97,90	96,62	0,172	0,170	152	0,249324
16,071	538,1	538,6	97,67	96,18	0,172	0,170	153	0,2499342
15,978	538,0	538,6	98,08	96,88	0,172	0,170	154	0,2485085
16,005	538,0	538,6	98,15	96,72	0,172	0,170	155	0,2489165
15,875	538,0	538,6	98,81	97,59	0,172	0,170	156	0,2468684
16,034	538,0	538,6	97,87	96,41	0,172	0,170	157	0,2493221
16,003	538,0	538,6	97,91	96,75	0,172	0,170	158	0,2489159
16,134	538,0	538,6	97,16	96,01	0,172	0,170	159	0,2509475
15,974	538,0	538,6	98,17	96,84	0,172	0,170	160	0,2485082
15,973	538,0	538,6	97,91	96,75	0,172	0,170	161	0,2485074
16,003	538,0	538,6	97,98	96,82	0,172	0,170	162	0,2489163
16,022	538,0	538,6	97,72	96,59	0,172	0,170	163	0,2493233
16,056	538,0	538,6	97,41	96,39	0,172	0,170	164	0,2499344
15,987	538,0	538,6	97,89	96,49	0,172	0,170	165	0,2489169
16,012	538,0	538,6	97,73	96,72	0,172	0,170	166	0,249324
15,988	538,0	538,6	97,97	96,73	0,172	0,170	167	0,2489171
16,002	538,0	538,6	97,57	96,35	0,172	0,170	168	0,2493243
15,894	538,0	538,6	98,23	97,08	0,172	0,170	169	0,2474846
15,915	538,0	538,6	98,28	96,98	0,172	0,170	170	0,2478946
16,042	538,0	538,6	97,51	96,28	0,172	0,170	171	0,2498244
16,012	538,0	538,6	97,66	96,52	0,172	0,170	172	0,2493235
15,982	538,0	538,6	97,80	96,72	0,172	0,170	173	0,2489163
15,958	538,0	538,6	97,89	96,72	0,172	0,170	174	0,2485077
15,978	538,0	538,6	97,89	96,63	0,172	0,170	175	0,2489168

15,980	538,0	538,6	97,91	96,49	0,172	0,170	176	0,2489169
15,993	538,0	538,6	97,66	96,29	0,172	0,170	177	0,2493245
15,903	538,0	538,6	98,11	96,99	0,172	0,170	178	0,2478948
15,943	538,0	538,6	97,91	96,47	0,172	0,170	179	0,248508
16,021	538,0	538,6	97,14	95,79	0,172	0,169	180	0,2499341
15,864	538,0	538,6	98,25	96,86	0,172	0,170	181	0,2474848
15,930	538,0	538,6	97,84	96,65	0,172	0,170	182	0,2485082
16,120	538,0	538,6	96,63	95,50	0,172	0,170	183	0,2513526
15,982	538,1	538,6	97,40	96,16	0,172	0,170	184	0,2493247
15,979	538,1	538,7	97,43	96,01	0,172	0,170	185	0,2493243
15,962	538,1	538,7	97,55	96,43	0,172	0,170	186	0,2489899
16,116	538,2	538,7	96,81	95,54	0,172	0,170	187	0,2513529
15,946	538,2	538,7	97,77	96,57	0,172	0,170	188	0,2486041
15,992	538,2	538,7	97,52	96,10	0,172	0,170	189	0,2493242
15,939	538,1	538,7	97,83	96,68	0,172	0,170	190	0,2485086
15,991	538,1	538,7	97,47	96,29	0,172	0,170	191	0,2493238
15,993	538,1	538,7	97,44	96,29	0,172	0,170	192	0,2493243
15,987	538,1	538,7	97,42	96,21	0,172	0,170	193	0,2493239
15,482	538,1	538,7	100,62	99,19	0,172	0,170	194	0,241464
15,481	538,1	538,7	100,79	99,32	0,172	0,170	195	0,2414637
15,602	538,1	538,8	99,91	98,34	0,172	0,169	196	0,2433477
15,497	538,2	538,8	100,29	99,28	0,172	0,170	197	0,2418836
15,594	538,2	538,8	99,81	98,58	0,172	0,170	198	0,2433478
15,692	538,3	538,8	99,01	97,84	0,172	0,170	199	0,2450108
15,566	538,3	538,9	99,92	98,76	0,172	0,170	200	0,2429308
15,503	538,3	538,9	100,43	99,00	0,172	0,170	201	0,2418835
15,435	538,4	538,9	100,99	99,71	0,172	0,170	202	0,2408322
15,404	538,4	538,9	101,11	100,02	0,172	0,170	203	0,2404112
15,462	538,4	538,9	100,49	99,28	0,172	0,170	204	0,2414645
15,588	538,4	538,9	99,79	98,57	0,172	0,170	205	0,2433484
15,492	538,4	538,9	100,33	99,10	0,172	0,170	206	0,2418835
15,470	538,4	538,9	100,57	99,34	0,172	0,170	207	0,2414641
15,464	538,4	538,9	100,58	99,35	0,172	0,170	208	0,2414641
15,495	538,4	538,9	100,48	98,98	0,172	0,170	209	0,2418843
15,426	538,4	538,9	100,65	99,61	0,172	0,170	210	0,2408324
15,467	538,5	539,0	100,55	99,28	0,172	0,170	211	0,2414645
15,462	538,5	539,0	100,58	99,02	0,172	0,170	212	0,2414642
15,630	538,4	539,0	99,51	98,36	0,172	0,170	213	0,2439738
15,567	538,4	539,0	99,96	98,74	0,172	0,170	214	0,2429312
15,402	538,4	538,9	101,00	99,81	0,172	0,170	215	0,2404112
15,564	538,4	539,0	100,11	98,73	0,172	0,170	216	0,2429311
15,474	538,4	539,0	100,62	99,20	0,172	0,170	217	0,2414657
15,496	538,4	539,0	100,43	99,12	0,172	0,170	218	0,2418837
15,565	538,4	539,0	100,00	98,87	0,172	0,170	219	0,2429314
15,564	538,4	539,0	99,80	98,66	0,172	0,170	220	0,2429317
15,429	538,5	539,0	100,77	99,45	0,172	0,170	221	0,2408945
15,492	538,5	539,0	100,19	99,00	0,172	0,170	222	0,2418846
15,582	538,5	539,0	99,57	98,32	0,172	0,170	223	0,2433495
15,300	538,5	539,0	101,51	100,18	0,172	0,170	224	0,2389377
15,464	538,5	539,0	100,49	99,15	0,172	0,170	225	0,2414645
15,424	538,5	539,0	100,52	99,44	0,172	0,170	226	0,2408332
15,559	538,5	539,1	99,70	98,61	0,172	0,170	227	0,242932
15,459	538,6	539,1	100,41	99,18	0,172	0,170	228	0,2414651
15,578	538,6	539,1	99,42	98,40	0,172	0,170	229	0,243349
15,467	538,6	539,1	100,43	99,25	0,172	0,170	230	0,2414655
15,423	538,6	539,2	100,76	99,71	0,172	0,170	231	0,2408333
15,423	538,6	539,2	100,77	99,39	0,172	0,170	232	0,2408335
15,370	538,7	539,2	100,94	99,82	0,172	0,170	233	0,2399888
15,631	538,7	539,2	99,45	98,25	0,172	0,170	234	0,2439744
15,424	538,7	539,2	100,58	99,52	0,172	0,170	235	0,2408333
15,622	538,7	539,2	99,41	98,02	0,172	0,170	236	0,2439744

15,556	538,7	539,2	99,88	98,34	0,172	0,169	237	0,2429321
15,420	538,7	539,2	100,66	99,25	0,172	0,169	238	0,2408337
15,459	538,7	539,2	100,39	99,07	0,172	0,169	239	0,2414653
15,585	538,6	539,1	99,58	98,36	0,172	0,170	240	0,2433494
15,691	538,7	539,1	98,95	97,85	0,172	0,170	241	0,2450116
15,469	538,7	539,1	100,44	99,24	0,172	0,170	242	0,2414652
15,435	538,7	539,1	100,58	99,41	0,172	0,170	243	0,2410493
15,491	538,7	539,2	100,42	98,92	0,172	0,170	244	0,241885
15,556	538,8	539,2	99,75	98,35	0,172	0,169	245	0,2429332
15,388	538,8	539,2	100,95	99,52	0,172	0,169	246	0,2403354
15,556	538,8	539,2	99,75	98,62	0,172	0,170	247	0,2429333
15,581	538,8	539,3	99,63	98,21	0,172	0,169	248	0,2433436
15,584	538,9	539,3	99,56	98,36	0,172	0,169	249	0,2433498
15,623	538,9	539,3	99,34	98,40	0,172	0,170	250	0,2439758
15,693	538,9	539,3	98,89	97,77	0,172	0,170	251	0,2450128
15,582	538,9	539,4	99,61	98,44	0,172	0,170	252	0,2433498
15,689	538,9	539,4	98,87	97,80	0,172	0,170	253	0,2450135
15,561	538,9	539,3	99,77	98,70	0,172	0,170	254	0,2429331
15,568	538,8	539,3	100,01	98,67	0,172	0,170	255	0,2429329
15,631	538,9	539,3	99,47	98,43	0,172	0,170	256	0,2439748
15,564	538,9	539,4	99,79	98,85	0,172	0,170	257	0,242933
15,494	538,9	539,4	100,30	99,15	0,172	0,170	258	0,2418859
15,586	539,0	539,4	99,76	98,45	0,172	0,170	259	0,2433462
15,465	539,0	539,5	100,38	99,02	0,172	0,169	260	0,2414655
15,744	539,1	539,5	98,61	97,35	0,172	0,169	261	0,2458403
15,633	539,1	539,5	99,43	98,12	0,172	0,169	262	0,2439755
15,750	539,1	539,6	98,68	97,29	0,172	0,169	263	0,2458405
15,305	539,1	539,6	101,61	100,41	0,172	0,170	264	0,2389308
15,586	539,1	539,5	99,80	98,45	0,172	0,170	265	0,243351
15,558	539,2	539,6	99,87	98,86	0,172	0,170	266	0,2428519
15,628	539,2	539,6	99,51	98,35	0,172	0,170	267	0,2439761
15,594	539,2	539,6	99,79	98,66	0,172	0,170	268	0,2434292
15,590	539,2	539,6	99,84	98,68	0,172	0,170	269	0,2433504
15,335	539,2	539,7	101,57	100,09	0,172	0,170	270	0,2393555
15,469	539,3	539,7	100,52	98,92	0,172	0,169	271	0,2414672
15,567	539,3	539,7	100,03	98,65	0,172	0,169	272	0,2429345
15,594	539,4	539,8	99,65	98,48	0,172	0,170	273	0,2433515
15,497	539,4	539,8	100,30	98,95	0,172	0,170	274	0,2418871
15,632	539,4	539,8	99,53	98,11	0,172	0,169	275	0,2439761
15,595	539,5	539,9	99,84	98,71	0,172	0,170	276	0,2433514
15,597	539,5	539,9	99,72	98,52	0,172	0,170	277	0,243351
15,500	539,6	540,0	100,28	98,91	0,172	0,170	278	0,2418863
15,636	539,6	540,0	99,36	98,16	0,172	0,169	279	0,243983
15,501	539,6	540,0	100,27	98,96	0,172	0,169	280	0,2418873
15,571	539,6	540,0	99,98	98,68	0,172	0,170	281	0,242934
15,668	539,7	540,1	99,70	98,45	0,172	0,170	282	0,2439775
15,604	539,7	540,1	99,58	98,39	0,172	0,170	283	0,2433521
15,601	539,7	540,1	99,56	98,61	0,172	0,170	284	0,2433514
15,600	539,7	540,2	99,74	98,59	0,172	0,170	285	0,2433518
15,737	539,7	540,2	98,96	97,66	0,172	0,170	286	0,2454289
15,642	539,8	540,2	99,55	98,36	0,172	0,170	287	0,2439771
15,711	539,8	540,2	99,03	97,87	0,172	0,170	288	0,2450149
15,479	539,8	540,2	100,52	99,26	0,172	0,170	289	0,241468
15,641	539,8	540,3	99,40	98,49	0,172	0,170	290	0,2439774
15,638	539,8	540,2	99,65	98,21	0,172	0,170	291	0,2439772
15,438	539,8	540,2	100,77	99,25	0,172	0,169	292	0,2408369
15,639	539,8	540,2	99,54	98,40	0,172	0,169	293	0,2439521
15,480	539,8	540,2	100,63	99,33	0,172	0,170	294	0,2414678
15,506	539,8	540,2	100,35	99,06	0,172	0,170	295	0,2418878
15,761	539,8	540,2	98,84	97,30	0,172	0,169	296	0,2458425
15,710	539,9	540,3	99,14	97,95	0,172	0,169	297	0,2450151

15,604	539,9	540,3	99,89	98,40	0,172	0,170	298	0,2433521
15,486	539,9	540,3	100,66	99,31	0,172	0,169	299	0,2414659
15,645	539,9	540,3	99,59	98,20	0,172	0,170	300	0,243977
15,710	540,0	540,4	99,08	97,92	0,172	0,170	301	0,2450153
15,607	540,0	540,4	99,73	98,51	0,172	0,170	302	0,243352
15,645	540,0	540,4	99,57	98,35	0,172	0,170	303	0,243978
15,579	540,1	540,5	99,92	99,00	0,172	0,170	304	0,2429355
15,510	540,1	540,5	100,43	99,23	0,172	0,170	305	0,2418877
15,580	540,1	540,5	99,85	98,82	0,172	0,170	306	0,2429352
15,740	540,1	540,5	99,13	97,86	0,172	0,170	307	0,2454304
15,712	540,1	540,5	99,00	97,92	0,172	0,170	308	0,2450151
15,579	540,2	540,6	100,06	98,70	0,172	0,170	309	0,2429354
15,733	540,1	540,5	99,05	97,87	0,172	0,170	310	0,2453429
15,580	540,2	540,6	99,97	98,74	0,172	0,170	311	0,2429358
15,445	540,2	540,6	100,75	99,78	0,172	0,170	312	0,2408367
15,596	540,3	540,7	99,90	98,85	0,172	0,170	313	0,2431599
15,743	540,4	540,7	99,19	97,62	0,172	0,170	314	0,2454297
15,583	540,3	540,7	100,12	98,90	0,172	0,170	315	0,2429357
15,580	540,3	540,7	100,06	98,62	0,172	0,170	316	0,2429333
15,610	540,3	540,8	99,95	98,79	0,172	0,170	317	0,2433528
15,716	540,4	540,8	99,08	97,93	0,172	0,170	318	0,245016
15,744	540,5	540,8	98,93	97,83	0,172	0,170	319	0,2454304
15,600	540,5	540,9	99,82	98,47	0,172	0,170	320	0,2431467
15,655	540,5	540,9	99,64	98,36	0,172	0,169	321	0,2439779
15,589	540,5	540,9	99,86	98,85	0,172	0,170	322	0,2429357
15,721	540,5	540,9	99,12	97,86	0,172	0,170	323	0,2450156
15,654	540,5	540,9	99,64	98,44	0,172	0,170	324	0,243978
15,427	540,5	540,9	101,16	99,83	0,172	0,170	325	0,2404154
15,520	540,6	541,0	100,48	99,19	0,172	0,170	326	0,2418879
15,526	540,6	541,0	100,48	99,05	0,172	0,170	327	0,2419837
15,654	540,7	541,0	99,62	98,56	0,172	0,170	328	0,2439785
15,658	540,7	541,1	99,63	98,49	0,172	0,170	329	0,2439782
15,725	540,7	541,1	99,20	97,92	0,172	0,170	330	0,2450157
15,618	540,8	541,1	99,81	98,47	0,172	0,169	331	0,2433528
15,619	540,8	541,2	99,83	98,61	0,172	0,169	332	0,2433528
15,659	540,8	541,2	99,57	98,40	0,172	0,170	333	0,2439785
15,727	540,8	541,2	99,16	97,86	0,172	0,170	334	0,2450156
15,726	540,8	541,2	99,32	97,67	0,172	0,169	335	0,2450163
15,501	540,9	541,2	100,58	99,49	0,172	0,169	336	0,2414693
15,619	540,9	541,3	99,91	98,40	0,172	0,169	337	0,2433533
15,594	541,0	541,4	99,94	98,55	0,172	0,169	338	0,2429367
15,592	541,0	541,4	99,85	98,70	0,172	0,169	339	0,2429361
15,659	541,0	541,4	99,53	98,32	0,172	0,169	340	0,2439786
15,726	540,9	541,4	99,02	97,72	0,172	0,169	341	0,245016
15,592	540,9	541,4	99,74	98,52	0,171	0,169	342	0,2429364
15,590	540,9	541,4	99,71	98,64	0,171	0,169	343	0,2429361
15,455	540,9	541,4	100,71	99,53	0,171	0,169	344	0,2408377
15,620	540,9	541,4	99,77	98,47	0,172	0,169	345	0,2433541
15,618	541,0	541,4	99,74	98,59	0,172	0,169	346	0,2433536
15,727	541,0	541,5	98,95	97,89	0,172	0,170	347	0,2450163
15,660	541,0	541,4	99,42	98,33	0,171	0,170	348	0,243979
15,594	541,0	541,4	99,84	98,51	0,171	0,169	349	0,2429362
15,594	541,0	541,5	99,94	98,68	0,172	0,169	350	0,2429367
15,729	541,0	541,5	99,05	97,94	0,172	0,169	351	0,2450156
15,756	541,1	541,5	98,85	97,76	0,172	0,170	352	0,245431
15,625	541,1	541,6	99,65	98,46	0,171	0,169	353	0,2433535
15,625	541,2	541,6	99,74	98,64	0,171	0,169	354	0,243353
15,732	541,2	541,6	98,97	97,91	0,171	0,170	355	0,2450161
15,732	541,2	541,6	99,12	97,76	0,172	0,169	356	0,2450158
15,668	541,3	541,7	99,50	98,46	0,172	0,169	357	0,2439783
15,672	541,3	541,7	99,54	98,29	0,172	0,169	358	0,2439788

15,667	541,3	541,8	99,51	98,48	0,172	0,170	359	0,2439788
15,601	541,4	541,8	99,96	98,82	0,172	0,170	360	0,2429362
15,469	541,4	541,8	100,81	99,59	0,172	0,169	361	0,2408374
15,537	541,4	541,8	100,46	98,98	0,172	0,169	362	0,2418895
15,604	541,4	541,9	99,98	98,93	0,172	0,169	363	0,2429547
15,671	541,4	541,9	99,60	98,40	0,172	0,170	364	0,2439788
15,536	541,5	541,9	100,48	99,25	0,172	0,170	365	0,2418892
15,738	541,5	541,9	99,21	97,86	0,172	0,169	366	0,2450167
15,633	541,5	542,0	99,86	98,49	0,172	0,169	367	0,2433537
15,608	541,5	542,0	100,01	98,79	0,172	0,169	368	0,2429365
15,607	541,6	542,0	100,07	98,79	0,172	0,169	369	0,2429362
15,515	541,6	542,1	100,57	99,39	0,172	0,169	370	0,2414693
15,471	541,6	542,1	100,85	99,62	0,172	0,169	371	0,2408378
15,675	541,6	542,1	99,75	98,32	0,172	0,169	372	0,2439791
15,608	541,6	542,1	100,06	98,77	0,172	0,169	373	0,2429373
15,742	541,7	542,1	99,19	98,01	0,172	0,169	374	0,2450166
15,473	541,7	542,2	100,87	99,74	0,172	0,170	375	0,2408397
15,769	541,7	542,2	98,91	97,60	0,172	0,169	376	0,2454315
15,646	541,7	542,2	99,95	98,36	0,172	0,169	377	0,2435204
15,635	541,8	542,2	99,84	98,66	0,172	0,169	378	0,243354
15,635	541,8	542,3	99,98	98,86	0,172	0,170	379	0,2433536
15,539	541,8	542,3	100,45	99,52	0,172	0,170	380	0,2418904
15,635	541,8	542,3	99,91	98,58	0,172	0,170	381	0,2433546
15,607	541,8	542,3	100,05	98,72	0,172	0,169	382	0,2429375
15,634	541,8	542,3	99,79	98,59	0,172	0,169	383	0,2433546
15,795	541,9	542,4	98,81	97,44	0,172	0,169	384	0,245845
15,676	541,9	542,4	99,57	98,36	0,172	0,169	385	0,2439802

Average	Average	Average						Average
15,53	Inlet +	Inlet +						0,237
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,86	100,19	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
15,626	537,2	537,5			0,172	0,169	0	0,2458333
15,728	537,2	537,6	96,56	95,88	0,172	0,169	1	0,243969
16,110	537,2	537,6	97,05	96,38	0,172	0,169	2	0,2464523
16,068	537,2	537,6	97,73	97,06	0,172	0,169	3	0,2450058
15,846	537,2	537,6	99,21	98,44	0,171	0,169	4	0,2414593
15,899	537,2	537,6	100,08	99,30	0,171	0,169	5	0,2408271
16,159	537,3	537,7	99,55	98,81	0,171	0,169	6	0,2433436
15,984	537,3	537,7	101,32	100,65	0,171	0,169	7	0,2399826
16,302	537,3	537,7	99,07	98,66	0,171	0,169	8	0,2450063
15,905	537,3	537,8	100,77	100,10	0,171	0,169	9	0,2399828
16,135	537,4	537,8	99,59	99,13	0,171	0,169	10	0,243343
16,169	537,4	537,8	99,65	98,97	0,171	0,169	11	0,2433435
16,150	537,4	537,9	100,01	99,34	0,171	0,169	12	0,2429261
16,061	537,5	537,9	100,59	99,70	0,171	0,169	13	0,2414598
16,223	537,5	538,0	99,60	98,77	0,171	0,169	14	0,2439688
16,162	537,5	538,0	99,89	99,34	0,171	0,169	15	0,2429266
16,072	537,5	538,0	100,66	99,94	0,171	0,169	16	0,241459
16,364	537,6	538,1	98,75	98,15	0,171	0,169	17	0,2458336
16,201	537,6	538,1	99,87	99,23	0,171	0,169	18	0,2433439
16,217	537,7	538,2	99,79	99,20	0,171	0,169	19	0,2433433
16,264	537,8	538,2	99,79	99,07	0,171	0,169	20	0,2439633
16,347	537,8	538,2	99,12	98,79	0,171	0,169	21	0,2450068
16,308	537,9	538,3	100,03	99,27	0,171	0,169	22	0,2439689
16,260	537,9	538,3	100,57	100,01	0,171	0,169	23	0,2429274
16,332	538,0	538,4	99,97	99,22	0,171	0,169	24	0,243969
16,274	538,1	538,5	100,55	99,86	0,171	0,169	25	0,2428851
16,495	538,1	538,5	99,51	98,80	0,171	0,169	26	0,2458337
16,387	538,2	538,6	100,28	99,48	0,171	0,169	27	0,2439691
16,252	538,3	538,7	101,60	100,92	0,171	0,169	28	0,2414596
16,285	538,3	538,7	101,84	101,15	0,171	0,169	29	0,2414608
16,571	538,4	538,8	100,21	99,53	0,171	0,169	30	0,2454214
16,329	538,4	538,8	101,78	101,07	0,171	0,169	31	0,2416868
16,418	538,5	538,9	101,36	100,37	0,171	0,168	32	0,2429275
16,369	538,6	539,0	101,96	101,22	0,171	0,169	33	0,2418796
16,211	538,7	539,0	103,15	102,39	0,171	0,169	34	0,2393488
16,386	538,7	539,1	101,99	101,10	0,171	0,169	35	0,2418794
16,456	538,8	539,2	101,40	101,01	0,171	0,169	36	0,2429277
16,486	538,9	539,3	101,51	100,71	0,171	0,169	37	0,2433448
16,520	538,9	539,3	101,06	100,13	0,171	0,169	38	0,2439702
16,377	539,0	539,4	101,90	101,43	0,171	0,169	39	0,2418802
16,470	539,0	539,4	101,26	100,39	0,171	0,169	40	0,2433447
16,464	539,0	539,4	101,22	100,45	0,171	0,168	41	0,2433448
16,455	539,1	539,5	101,05	100,21	0,171	0,168	42	0,2433448
16,490	539,1	539,5	100,79	100,07	0,171	0,168	43	0,2439704
16,263	539,1	539,5	101,89	101,47	0,171	0,169	44	0,2408291
16,415	539,2	539,6	100,89	100,19	0,171	0,169	45	0,2433447
16,271	539,2	539,6	101,51	100,79	0,171	0,169	46	0,2414618
16,287	539,3	539,7	101,39	100,65	0,171	0,169	47	0,2418805
16,362	539,3	539,7	100,57	99,78	0,171	0,169	48	0,2433451
16,216	539,4	539,8	101,29	100,66	0,171	0,169	49	0,2414607
16,365	539,4	539,8	100,08	99,42	0,171	0,169	50	0,2439712
16,302	539,5	539,9	100,27	99,25	0,171	0,168	51	0,2433456
16,210	539,5	539,9	100,83	100,00	0,171	0,168	52	0,2420643
16,330	539,5	539,9	99,88	99,13	0,171	0,169	53	0,2439704

16,256	539,6	540,0	100,32	99,64	0,171	0,169	54	0,2429287
16,320	539,5	540,0	99,77	99,10	0,171	0,169	55	0,2439713
16,387	539,5	540,0	99,33	98,67	0,171	0,169	56	0,2450083
16,155	539,6	540,0	100,54	100,16	0,171	0,169	57	0,2415442
16,137	539,6	540,0	99,57	98,78	0,171	0,169	58	0,2429288
16,022	539,6	540,0	99,52	99,09	0,171	0,169	59	0,241881
16,153	539,6	540,0	98,70	98,02	0,171	0,169	60	0,2439706
16,147	539,6	540,1	98,69	98,18	0,171	0,169	61	0,2439712
16,243	539,6	540,1	98,05	97,56	0,171	0,169	62	0,2454237
15,999	539,7	540,1	99,40	98,73	0,171	0,169	63	0,2418809
16,223	539,7	540,1	98,08	97,31	0,171	0,168	64	0,2454233
16,050	539,8	540,2	99,00	98,05	0,171	0,168	65	0,242933
16,175	539,8	540,2	97,91	97,49	0,171	0,168	66	0,2450092
16,174	539,8	540,2	97,90	97,45	0,171	0,169	67	0,2450089
16,089	539,8	540,2	98,35	97,72	0,171	0,169	68	0,2439715
15,170	539,8	540,2	104,17	103,52	0,171	0,169	69	0,2300532
15,424	539,8	540,3	102,70	101,74	0,171	0,168	70	0,233773
15,393	539,8	540,3	103,09	102,55	0,171	0,169	71	0,2331194
15,070	539,9	540,3	104,91	104,25	0,171	0,169	72	0,2285036
15,300	539,9	540,3	103,22	102,56	0,171	0,168	73	0,2320297
15,274	540,0	540,3	103,59	102,96	0,171	0,169	74	0,2315914
15,280	540,0	540,4	103,43	102,75	0,171	0,168	75	0,2315919
15,182	540,0	540,4	103,99	103,28	0,170	0,168	76	0,2302719
15,244	540,0	540,4	103,73	103,12	0,171	0,168	77	0,231153
14,452	539,9	540,4	109,41	108,59	0,171	0,169	78	0,2192114
15,234	539,9	540,4	103,54	102,94	0,171	0,168	79	0,2311534
15,123	539,9	540,4	104,43	103,63	0,171	0,168	80	0,2293907
15,082	540,0	540,4	104,65	104,03	0,171	0,168	81	0,2289477
15,280	540,0	540,4	103,08	102,47	0,171	0,169	82	0,2320303
15,171	540,0	540,4	104,13	103,56	0,171	0,168	83	0,2300534
15,200	540,0	540,4	103,90	103,23	0,171	0,168	84	0,230494
15,280	540,0	540,4	103,46	102,65	0,170	0,168	85	0,2315918
15,243	540,0	540,5	103,72	103,08	0,171	0,168	86	0,2311534
15,058	540,0	540,5	104,62	104,07	0,170	0,168	87	0,228504
15,169	540,1	540,5	104,03	103,30	0,170	0,168	88	0,2300537
15,283	540,1	540,6	103,01	102,42	0,170	0,168	89	0,2320299
15,155	540,1	540,6	104,03	103,34	0,170	0,168	90	0,2300538
15,270	540,1	540,6	103,24	102,29	0,171	0,168	91	0,2319449
15,196	540,1	540,6	103,32	102,43	0,171	0,168	92	0,2311538
15,163	540,1	540,6	103,78	102,89	0,171	0,168	93	0,2304934
15,360	540,1	540,6	102,24	101,31	0,171	0,168	94	0,2337732
15,312	540,1	540,6	102,44	101,54	0,171	0,168	95	0,2331209
15,132	540,1	540,6	103,54	102,85	0,171	0,168	96	0,2304935
15,090	540,1	540,6	103,55	102,97	0,171	0,168	97	0,2300545
15,263	540,1	540,6	102,07	101,35	0,171	0,168	98	0,2331203
15,050	540,2	540,6	103,11	102,84	0,170	0,169	99	0,2300533
15,168	540,2	540,7	102,44	101,76	0,170	0,169	100	0,2320306
15,065	540,2	540,7	103,17	102,45	0,171	0,169	101	0,2304944
15,293	540,2	540,7	101,32	100,58	0,171	0,168	102	0,2342066
15,021	540,2	540,7	102,84	102,35	0,170	0,168	103	0,2300537
15,126	540,2	540,7	102,33	101,66	0,170	0,168	104	0,2316517
15,257	540,2	540,7	101,30	100,78	0,170	0,168	105	0,2337739
15,210	540,2	540,7	101,67	101,06	0,170	0,168	106	0,233121
15,081	540,3	540,8	102,52	101,89	0,171	0,168	107	0,2311545
15,247	540,2	540,7	101,46	100,91	0,171	0,169	108	0,2337738
15,000	540,2	540,8	102,98	102,14	0,171	0,168	109	0,2300545
15,262	540,2	540,8	100,96	100,50	0,170	0,168	110	0,2342077
15,223	540,2	540,8	101,26	100,38	0,171	0,168	111	0,2337744
15,221	540,2	540,8	101,16	100,52	0,171	0,168	112	0,2337737
15,046	540,2	540,8	102,11	101,41	0,170	0,168	113	0,2311542
15,073	540,3	540,8	102,12	101,37	0,170	0,168	114	0,2315927

15,161	540,3	540,8	101,04	100,52	0,170	0,168	115	0,2331215
15,281	540,3	540,8	100,65	99,85	0,170	0,168	116	0,2348564
15,235	540,3	540,9	100,90	100,14	0,171	0,168	117	0,2342074
15,239	540,3	540,9	100,73	99,89	0,170	0,168	118	0,2342073
15,197	540,3	540,8	100,94	100,24	0,170	0,168	119	0,2336442
15,199	540,3	540,9	101,03	100,05	0,170	0,168	120	0,2337754
15,266	540,3	540,9	100,47	99,94	0,170	0,168	121	0,2348572
15,291	540,3	540,9	100,27	99,63	0,170	0,168	122	0,2352893
15,042	540,4	540,9	101,82	101,26	0,170	0,168	123	0,2315932
15,177	540,4	540,9	100,72	99,98	0,170	0,168	124	0,2337747
14,992	540,4	540,9	101,83	101,11	0,170	0,168	125	0,2311552
15,253	540,5	541,0	100,25	99,58	0,170	0,168	126	0,2348568
15,251	540,5	541,0	100,11	99,52	0,170	0,168	127	0,2348566
15,287	540,6	541,0	100,19	99,50	0,170	0,168	128	0,2352894
15,171	540,6	541,1	100,58	99,94	0,170	0,168	129	0,2337749
15,000	540,6	541,1	101,87	101,30	0,170	0,168	130	0,2311553
15,129	540,6	541,1	100,94	100,36	0,170	0,168	131	0,2331223
14,883	540,6	541,1	102,55	101,89	0,170	0,168	132	0,2293925
15,246	540,7	541,2	99,89	99,16	0,170	0,168	133	0,2352897
15,221	540,7	541,2	99,93	99,51	0,170	0,168	134	0,2348574
15,291	540,8	541,2	99,70	99,06	0,170	0,168	135	0,2357203
15,027	540,9	541,3	101,62	100,89	0,170	0,168	136	0,2315939
15,121	540,9	541,3	100,80	100,21	0,170	0,168	137	0,2331221
15,154	540,9	541,4	100,55	99,88	0,170	0,168	138	0,233775
15,193	541,0	541,4	100,33	99,63	0,170	0,168	139	0,2342085
15,189	541,0	541,4	100,24	99,50	0,170	0,168	140	0,2342082
15,254	541,0	541,5	99,82	99,24	0,170	0,168	141	0,2352899
15,278	541,1	541,5	99,57	98,95	0,170	0,168	142	0,2357204
15,119	541,1	541,5	100,78	100,28	0,170	0,168	143	0,2331224
15,276	541,1	541,6	99,57	99,01	0,170	0,168	144	0,2357206
15,179	541,2	541,6	100,24	99,52	0,170	0,168	145	0,2342091
15,044	541,1	541,6	101,36	100,43	0,170	0,168	146	0,2320325
15,147	541,2	541,6	100,50	99,80	0,170	0,168	147	0,2337755
15,248	541,2	541,7	99,81	98,98	0,170	0,168	148	0,2352905
15,242	541,2	541,7	99,74	99,07	0,170	0,168	149	0,2352911
15,139	541,3	541,7	100,28	99,53	0,170	0,168	150	0,2337757
15,111	541,3	541,7	100,59	100,14	0,170	0,168	151	0,2331231
15,031	541,3	541,8	100,90	100,33	0,170	0,168	152	0,2320331
15,225	541,3	541,8	99,94	99,37	0,170	0,168	153	0,2348589
14,976	541,3	541,8	101,53	100,94	0,170	0,168	154	0,2311567
15,110	541,3	541,8	100,67	99,96	0,170	0,168	155	0,2331239
15,203	541,4	541,8	100,06	99,33	0,170	0,168	156	0,2346861
15,168	541,4	541,9	100,10	99,40	0,170	0,168	157	0,2342091
15,228	541,4	541,9	99,54	98,89	0,170	0,168	158	0,2352914
14,993	541,4	541,9	101,15	100,66	0,170	0,168	159	0,2315942
15,226	541,5	542,0	99,81	99,23	0,170	0,168	160	0,2350274
15,261	541,5	542,0	99,55	98,87	0,170	0,168	161	0,2357215
15,089	541,5	542,0	100,54	99,74	0,170	0,168	162	0,2331233
15,264	541,6	542,0	99,53	99,05	0,170	0,168	163	0,2357217
15,232	541,6	542,1	99,69	99,04	0,170	0,168	164	0,2352911
15,164	541,6	542,1	99,97	99,47	0,170	0,168	165	0,2342094
15,233	541,7	542,1	99,47	98,96	0,170	0,168	166	0,2352907
15,225	541,7	542,2	99,61	98,96	0,170	0,168	167	0,2352914
15,125	541,8	542,2	100,10	99,49	0,170	0,168	168	0,2337768
15,195	541,8	542,2	99,76	99,05	0,170	0,168	169	0,2348591
15,017	541,9	542,3	100,76	100,25	0,170	0,168	170	0,232034
15,195	541,9	542,3	99,57	98,91	0,170	0,168	171	0,2348593
15,195	542,0	542,4	99,61	98,92	0,170	0,168	172	0,2348593
15,235	542,0	542,4	99,55	98,83	0,170	0,168	173	0,2352919
15,159	542,0	542,4	99,95	99,09	0,170	0,167	174	0,2342104
15,260	542,0	542,5	99,29	98,40	0,170	0,167	175	0,2357226

15,197	542,0	542,4	99,50	98,86	0,170	0,167	176	0,2348593
14,981	542,0	542,5	101,00	100,40	0,170	0,168	177	0,2315959
15,147	542,1	542,5	100,00	99,29	0,170	0,168	178	0,2342109
15,121	542,0	542,5	99,95	99,40	0,170	0,168	179	0,2337773
15,243	542,1	542,5	99,22	98,60	0,170	0,168	180	0,2357222
15,126	542,1	542,6	100,03	99,26	0,170	0,167	181	0,2337771
15,250	542,1	542,6	99,23	98,64	0,170	0,167	182	0,2357228
15,088	542,1	542,6	100,42	99,57	0,170	0,168	183	0,233125
15,022	542,1	542,6	100,94	99,97	0,170	0,167	184	0,2320351
15,011	542,1	542,6	100,75	100,23	0,170	0,167	185	0,2320345
15,251	542,1	542,6	99,30	98,55	0,170	0,168	186	0,2357226
15,228	542,1	542,6	99,53	98,92	0,170	0,168	187	0,2352928
15,020	542,1	542,6	100,79	100,19	0,170	0,168	188	0,2320351
15,203	542,2	542,6	99,71	99,13	0,170	0,168	189	0,2348604
15,203	542,2	542,6	99,80	98,85	0,170	0,168	190	0,2348603
15,021	542,2	542,7	100,88	100,25	0,170	0,167	191	0,2320349
15,248	542,2	542,7	99,19	98,60	0,170	0,168	192	0,2356805
15,263	542,3	542,7	99,34	98,47	0,170	0,167	193	0,2357234
15,225	542,3	542,7	99,34	98,72	0,170	0,167	194	0,2352929
15,159	542,3	542,7	99,91	99,41	0,170	0,168	195	0,234211
15,126	542,4	542,8	99,92	99,40	0,170	0,168	196	0,233778
15,257	542,4	542,8	99,15	98,68	0,170	0,168	197	0,2357232
15,257	542,5	542,9	99,32	98,73	0,170	0,168	198	0,2357235
15,161	542,5	542,9	99,87	99,22	0,170	0,168	199	0,2342116
15,210	542,5	542,9	99,84	99,11	0,170	0,168	200	0,2348607
15,134	542,6	543,0	100,18	99,63	0,170	0,168	201	0,2337782

Average	Average	Average						Average
16,29	Inlet +	Inlet +						0,248
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,72	99,25	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
16,340	540,9	541,3			0,170	0,168	0	0,2489138
16,294	541,0	541,3	100,25	98,99	0,170	0,168	1	0,2489135
16,310	541,0	541,3	100,72	99,15	0,170	0,168	2	0,2485047
16,349	540,9	541,3	101,37	99,91	0,170	0,168	3	0,2478921
16,393	540,9	541,3	102,58	101,31	0,170	0,168	4	0,2468655
16,296	540,9	541,3	103,02	101,45	0,170	0,168	5	0,2454227
16,402	540,9	541,3	102,16	100,53	0,170	0,168	6	0,2474862
16,377	540,9	541,3	101,98	100,50	0,170	0,168	7	0,2474811
16,366	540,9	541,3	101,65	100,14	0,171	0,168	8	0,2478925
16,086	540,9	541,3	103,50	102,08	0,170	0,168	9	0,2433451
16,209	540,9	541,3	102,68	101,04	0,170	0,168	10	0,2454225
16,264	540,9	541,3	102,70	101,13	0,171	0,168	11	0,2458358
16,391	540,9	541,3	101,70	100,27	0,171	0,168	12	0,2478922
16,472	540,9	541,3	101,32	99,85	0,170	0,168	13	0,2489142
16,416	541,0	541,4	101,92	100,35	0,170	0,168	14	0,2477284
16,403	541,0	541,4	101,98	100,55	0,170	0,168	15	0,247482
16,191	541,1	541,5	103,25	102,12	0,170	0,168	16	0,2443858
16,473	541,1	541,5	101,67	100,41	0,170	0,169	17	0,248505
16,368	541,1	541,5	102,45	100,56	0,170	0,168	18	0,2468663
16,307	541,1	541,5	103,00	101,48	0,170	0,168	19	0,2456338
16,310	541,2	541,5	103,22	101,76	0,170	0,168	20	0,2454227
16,342	541,2	541,6	103,31	101,84	0,170	0,168	21	0,2454232
16,346	541,3	541,6	103,54	101,95	0,170	0,168	22	0,2454291
16,498	541,3	541,7	102,62	101,26	0,170	0,168	23	0,2474824
16,504	541,4	541,7	102,53	101,27	0,170	0,168	24	0,2474822
16,461	541,5	541,8	103,09	101,51	0,170	0,168	25	0,2468664
16,331	541,5	541,9	103,62	101,90	0,170	0,168	26	0,2450085
16,373	541,6	541,9	103,67	102,09	0,170	0,168	27	0,245423
16,399	541,6	542,0	103,29	101,97	0,170	0,168	28	0,2458356
16,474	541,7	542,0	103,15	101,47	0,170	0,168	29	0,2468662
16,510	541,7	542,0	102,56	101,05	0,170	0,168	30	0,2474826
16,376	541,7	542,1	103,37	101,79	0,170	0,168	31	0,2454232
16,341	541,8	542,1	103,45	102,28	0,170	0,168	32	0,245008
16,283	541,9	542,2	104,09	102,50	0,170	0,168	33	0,2439708
16,479	541,9	542,2	102,86	101,48	0,170	0,168	34	0,2468666
16,377	542,0	542,3	103,50	101,92	0,170	0,168	35	0,2454234
16,434	542,1	542,4	103,66	102,02	0,170	0,168	36	0,2458364
16,393	542,1	542,4	103,52	102,02	0,170	0,168	37	0,2454232
16,307	542,1	542,4	103,93	102,36	0,170	0,168	38	0,2443871
16,389	542,2	542,5	103,53	101,93	0,170	0,168	39	0,2454238
16,413	542,2	542,5	103,27	101,91	0,170	0,168	40	0,2458369
16,361	542,2	542,6	103,84	102,43	0,170	0,168	41	0,2450092
16,517	542,3	542,6	102,81	101,06	0,170	0,168	42	0,247483
16,512	542,3	542,6	102,47	101,06	0,170	0,168	43	0,2474836
16,396	542,3	542,7	103,39	101,62	0,170	0,168	44	0,2458366
16,467	542,3	542,7	102,77	101,32	0,170	0,168	45	0,2468673
16,376	542,4	542,7	103,32	101,84	0,170	0,168	46	0,2454247
16,281	542,4	542,8	103,63	102,23	0,170	0,168	47	0,2443873
16,187	542,4	542,8	104,37	103,07	0,170	0,168	48	0,2429298
16,437	542,5	542,8	102,55	101,02	0,170	0,168	49	0,2468676
16,313	542,5	542,8	103,32	101,90	0,170	0,168	50	0,2450096
16,334	542,5	542,9	103,35	101,87	0,170	0,168	51	0,2454246
16,315	542,5	542,9	102,97	101,68	0,170	0,168	52	0,2454243
16,262	542,6	542,9	103,66	101,97	0,170	0,168	53	0,244386

16,410	542,6	543,0	102,28	100,97	0,170	0,168	54	0,2468679
16,478	542,6	543,0	101,87	100,61	0,170	0,168	55	0,247894
16,411	542,6	543,0	102,49	101,19	0,170	0,168	56	0,2468681
16,309	542,6	543,0	102,96	101,52	0,170	0,168	57	0,2454244
16,318	542,7	543,1	103,02	101,61	0,170	0,168	58	0,2454246
16,271	542,7	543,1	103,14	101,44	0,170	0,168	59	0,2450099
16,397	542,7	543,1	102,38	101,06	0,170	0,168	60	0,246867
16,261	542,7	543,1	103,06	101,41	0,170	0,168	61	0,2450102
16,430	542,8	543,2	101,46	100,26	0,170	0,168	62	0,247894
16,396	542,8	543,2	101,87	100,28	0,170	0,168	63	0,2474839
16,355	542,8	543,2	101,98	100,24	0,170	0,168	64	0,2468686
16,355	542,8	543,2	102,07	100,55	0,170	0,168	65	0,246868
16,396	542,8	543,2	101,84	100,23	0,170	0,168	66	0,2474845
16,321	542,8	543,2	101,62	100,30	0,170	0,168	67	0,2468682
16,362	542,8	543,2	101,69	100,19	0,170	0,168	68	0,247484
16,220	542,8	543,2	102,33	100,76	0,170	0,168	69	0,2454247
16,320	542,8	543,3	101,80	100,34	0,170	0,168	70	0,2468681
16,148	542,9	543,3	102,65	101,22	0,170	0,168	71	0,2443894
16,316	542,9	543,3	101,85	100,16	0,170	0,168	72	0,2468715
16,338	542,9	543,3	101,34	99,89	0,170	0,168	73	0,2474846
16,377	542,9	543,3	101,08	99,71	0,170	0,168	74	0,2480126
16,331	542,8	543,3	101,41	99,85	0,170	0,168	75	0,2474844
16,421	542,8	543,3	101,14	99,75	0,170	0,168	76	0,2485083
16,410	542,8	543,3	100,87	99,45	0,170	0,168	77	0,2485081
16,348	542,8	543,3	101,53	100,03	0,170	0,168	78	0,2474846
16,354	542,9	543,3	101,21	99,84	0,170	0,168	79	0,2478945
16,386	542,9	543,3	100,89	99,42	0,170	0,168	80	0,2485081
16,355	542,9	543,3	101,17	99,55	0,170	0,168	81	0,2478949
16,347	542,9	543,3	101,04	99,53	0,170	0,168	82	0,2478952
16,340	542,8	543,3	101,19	99,69	0,170	0,168	83	0,2478954
16,305	542,9	543,3	101,19	99,99	0,170	0,168	84	0,2474845
16,320	542,9	543,3	100,79	99,25	0,170	0,168	85	0,2478954
16,171	542,9	543,3	101,82	100,18	0,170	0,168	86	0,2458361
16,439	542,9	543,4	100,00	98,75	0,170	0,168	87	0,2499339
16,282	542,9	543,4	100,78	99,30	0,170	0,168	88	0,2478948
16,292	542,9	543,4	100,91	99,35	0,170	0,168	89	0,247895
16,283	542,9	543,4	100,71	99,41	0,170	0,168	90	0,2478948
16,361	542,9	543,4	100,04	98,77	0,170	0,168	91	0,2493237
16,338	542,9	543,4	100,37	98,81	0,170	0,168	92	0,248917
16,465	543,0	543,4	99,39	97,98	0,170	0,168	93	0,2509474
16,290	542,9	543,4	100,37	98,79	0,170	0,168	94	0,2485081
16,321	542,9	543,4	100,13	98,59	0,170	0,168	95	0,2489348
16,368	542,9	543,4	99,61	98,01	0,170	0,168	96	0,249934
16,232	542,9	543,4	100,41	98,96	0,170	0,168	97	0,247895
16,089	543,0	543,4	101,16	99,85	0,170	0,168	98	0,2458389
16,275	543,0	543,5	99,74	98,44	0,170	0,168	99	0,2489169
16,258	543,0	543,4	99,76	98,34	0,170	0,168	100	0,2489166
16,309	543,0	543,4	99,29	97,96	0,170	0,168	101	0,2499341
16,375	543,0	543,5	98,62	97,30	0,170	0,168	102	0,2509477
16,209	542,9	543,4	99,81	98,06	0,170	0,167	103	0,2485087
16,317	542,9	543,4	99,00	97,42	0,170	0,167	104	0,250341
16,293	542,9	543,4	99,11	97,75	0,170	0,168	105	0,249934
16,254	542,9	543,4	99,30	97,91	0,170	0,168	106	0,2493239
16,253	542,8	543,4	99,31	97,81	0,170	0,168	107	0,2493237
16,163	542,9	543,4	100,04	98,52	0,170	0,168	108	0,2478957
16,350	542,9	543,4	98,73	97,38	0,170	0,168	109	0,2508094
16,310	542,9	543,4	98,88	97,55	0,170	0,168	110	0,2503408
16,218	542,9	543,4	99,46	98,05	0,170	0,168	111	0,2489167
16,341	543,0	543,4	98,67	96,98	0,170	0,168	112	0,2509475
16,280	543,0	543,4	99,02	97,81	0,170	0,168	113	0,2499348
16,278	542,9	543,4	99,00	97,46	0,170	0,168	114	0,2499346

16,234	542,9	543,4	99,11	97,74	0,170	0,168	115	0,2493245
16,230	542,9	543,4	99,13	97,69	0,170	0,168	116	0,2493243
16,336	542,9	543,4	98,63	97,04	0,170	0,168	117	0,2509484
16,332	542,9	543,4	98,54	97,19	0,170	0,168	118	0,2509482
16,132	542,9	543,4	99,78	98,17	0,170	0,168	119	0,2478956
16,256	542,9	543,4	98,90	97,41	0,170	0,168	120	0,2499347
16,259	542,9	543,4	98,84	97,72	0,170	0,168	121	0,2499344
16,104	542,9	543,4	99,87	98,42	0,170	0,168	122	0,2474851
16,182	542,9	543,5	99,14	97,67	0,170	0,168	123	0,2489174
16,281	543,0	543,4	98,70	97,16	0,170	0,167	124	0,2503415
16,094	543,0	543,5	99,74	98,42	0,170	0,168	125	0,2474852
16,273	543,0	543,5	98,65	96,98	0,170	0,168	126	0,2503407
16,310	543,0	543,5	98,42	96,93	0,170	0,167	127	0,2509481
16,252	543,0	543,4	99,10	97,47	0,170	0,168	128	0,2499344
16,248	543,0	543,4	98,89	97,71	0,170	0,168	129	0,2499346
16,272	543,0	543,5	98,61	97,23	0,170	0,168	130	0,2503404
16,100	542,9	543,4	99,74	98,52	0,170	0,168	131	0,2478955
16,236	543,0	543,4	98,85	97,38	0,170	0,168	132	0,2499343
16,104	543,0	543,4	99,63	97,96	0,170	0,168	133	0,2478958
16,193	543,0	543,4	98,96	97,60	0,170	0,168	134	0,2493246
16,262	543,0	543,5	98,53	97,17	0,170	0,168	135	0,2503409
16,067	543,0	543,5	99,57	98,00	0,170	0,168	136	0,247485
16,194	543,0	543,5	98,98	97,83	0,170	0,168	137	0,2493251
16,173	543,0	543,5	99,08	97,79	0,170	0,168	138	0,2489173
16,251	543,0	543,5	98,76	97,13	0,170	0,168	139	0,2502122
16,185	543,0	543,5	98,85	97,23	0,170	0,167	140	0,2493246
16,252	543,0	543,5	98,62	97,20	0,170	0,168	141	0,2503404
16,135	543,1	543,5	99,38	97,94	0,170	0,168	142	0,2485089
16,246	543,0	543,5	98,58	97,00	0,170	0,168	143	0,2503416
16,247	543,0	543,5	98,59	97,03	0,170	0,168	144	0,2503409
16,281	543,0	543,5	98,16	96,86	0,170	0,168	145	0,2509486
16,262	543,1	543,6	98,21	96,81	0,170	0,168	146	0,2506603
16,125	543,1	543,6	99,13	97,48	0,170	0,167	147	0,2485087
16,241	543,1	543,6	98,41	97,02	0,170	0,167	148	0,2503415
16,179	543,1	543,6	98,82	97,61	0,170	0,168	149	0,2493249
16,221	543,1	543,5	98,59	97,02	0,170	0,168	150	0,2499353
16,239	543,1	543,6	98,36	97,13	0,170	0,168	151	0,2503418
16,207	543,1	543,6	98,66	97,18	0,170	0,168	152	0,2499347
16,166	543,1	543,5	98,84	97,39	0,170	0,168	153	0,2493244
16,116	543,1	543,6	99,06	97,82	0,170	0,168	154	0,2485093
16,175	543,1	543,6	98,65	97,05	0,170	0,168	155	0,2496489
16,268	543,1	543,6	97,97	96,78	0,170	0,168	156	0,2509487
16,150	543,1	543,6	98,83	97,27	0,170	0,168	157	0,2492035
16,222	543,2	543,6	98,28	96,86	0,170	0,168	158	0,2503413
16,129	543,2	543,6	98,88	97,37	0,170	0,168	159	0,2489179
16,162	543,2	543,6	98,94	97,11	0,170	0,167	160	0,249325
16,160	543,2	543,6	98,75	97,39	0,170	0,168	161	0,2493251
16,199	543,2	543,7	98,49	97,11	0,170	0,168	162	0,2499353
15,938	543,2	543,6	100,15	98,71	0,170	0,168	163	0,2458591
16,200	543,2	543,7	98,44	97,04	0,170	0,168	164	0,2499351
16,271	543,2	543,7	98,14	96,51	0,170	0,167	165	0,2509482
16,068	543,2	543,7	99,35	97,88	0,170	0,167	166	0,2478958
16,143	543,2	543,7	98,91	97,48	0,170	0,168	167	0,2489176
15,911	543,2	543,7	100,35	98,68	0,170	0,167	168	0,2454265
16,225	543,2	543,7	98,28	96,77	0,170	0,167	169	0,2503411
16,061	543,2	543,7	99,29	97,73	0,170	0,167	170	0,2478955
16,106	543,2	543,7	98,95	97,59	0,170	0,168	171	0,2485092
16,136	543,2	543,7	98,93	97,70	0,170	0,168	172	0,2489172
16,069	543,2	543,7	99,27	97,80	0,170	0,168	173	0,2478964
16,172	543,2	543,7	98,57	97,17	0,170	0,168	174	0,2495976
16,226	543,2	543,7	98,40	96,82	0,170	0,168	175	0,2503415

16,232	543,2	543,7	98,42	96,93	0,170	0,168	176 0,2503414
16,203	543,2	543,7	98,57	97,01	0,170	0,168	177 0,2499347
16,316	543,2	543,7	97,67	96,39	0,170	0,168	178 0,2517564
16,164	543,2	543,7	98,79	97,33	0,170	0,168	179 0,2493071

APPENDIX 4: Unit pre burn

Product:	24SFC	Test Duration:	326	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	1.9095	HHV:	N/A
Test:	24SFC170605	Burn Rate [dry kg/hr]:	0.9265		
Date:	2017-06-05	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	240	345	205	359	361	187	79	77		181	79	1.409	1.079	18.108	15.210	302
10	0.41	291	320	189	319	316	172	78	79		265	79	4.608	0.250	15.836	14.796	287
20	1.72	755	328	213	325	320	308	79	80		527	78	8.163	0.413	12.141	13.079	388
30	2.15	772	335	251	372	357	354	80	81		589	79	8.750	0.277	11.702	10.933	417
40	2.05	817	351	292	432	405	399	80	81		599	79	9.554	0.295	10.893	8.881	459
50	1.79	827	374	324	476	450	413	80	81		611	78	10.141	0.132	10.309	7.087	490
60	1.47	689	500	354	518	491	398	80	81		500	79	11.913	0.336	8.495	5.612	510
70	1.09	668	452	364	534	519	385	80	81		452	79	11.973	0.159	8.461	4.522	507
80	0.87	636	450	362	551	533	374	81	81		418	78	10.915	0.259	9.355	3.655	506
90	0.66	593	451	352	552	538	361	81	81		380	79	9.481	0.648	10.498	2.998	497
100	0.67	642	450	350	544	541	369	81	82		383	79	10.558	0.372	9.567	2.328	505
110	0.36	454	446	323	531	519	310	81	82		312	80	5.871	1.503	13.171	1.965	455
120	0.20	381	421	291	500	489	267	82	83		261	80	4.807	2.214	13.640	1.767	416
130	0.13	348	417	270	470	457	245	82	83		234	80	5.220	2.042	13.504	1.641	392
140	0.09	329	434	253	449	433	237	82	81		221	80	5.073	2.101	13.663	1.548	380
150	0.40	450	456	251	448	428	242	82	78		363	78	4.843	0.933	14.980	1.148	407
160	0.40	454	502	264	473	442	252	81	78		386	73	4.136	1.151	15.570	0.747	427
170	0.37	438	503	269	484	449	246	80	78		390	74	3.912	1.246	15.767	0.372	428
180	0.34	433	497	270	486	452	243	80	78		381	73	3.416	1.241	16.259	0.029	428
190	0.00	402	492	266	478	446	232	81	78		363	74	2.871	1.268	16.811	0.028	417
200	0.00	405	465	264	468	439	229	81	78		358	74	3.010	0.734	16.872	0.025	408
210	0.00	381	480	256	455	430	224	80	78		345	75	2.509	0.974	17.364	0.025	400
220	0.00	353	472	246	435	412	213	80	78		322	74	2.019	1.002	17.855	0.024	383
230	0.00	315	456	230	410	388	198	79	77		299	75	1.941	0.959	16.853	0.027	360

Product:	24SFC	Test Duration:	330	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	1.9327	HHV:	N/A
Test:	24SFC170606	Burn Rate [dry kg/hr]:	0.9994		
Date:	2017-06-06	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	250	321	205	378	347	196	78	76		171	75	1.336	0.789	18.296	15.228	300
10	0.36	290	293	181	326	301	163	77	78		267	74	4.008	0.142	16.620	14.866	278
20	2.03	668	287	213	342	320	315	77	78		510	75	8.232	0.517	12.134	12.838	366
30	1.95	722	289	244	386	349	365	78	79		525	75	10.026	0.671	10.374	10.892	398
40	1.85	750	298	277	434	388	391	79	80		533	76	12.245	0.585	8.258	9.042	429
50	1.76	725	308	313	479	443	405	80	81		515	77	14.344	0.349	6.359	7.279	454
60	1.42	699	321	334	516	485	394	80	81		481	76	13.751	0.227	6.995	5.863	471
70	1.20	681	328	349	542	514	387	80	81		459	75	12.633	0.259	8.023	4.664	483
80	1.03	661	334	358	558	533	377	79	80		432	76	12.136	0.123	8.471	3.631	489
90	0.85	651	337	365	566	542	373	79	79		413	75	12.142	0.100	8.394	2.779	492
100	0.47	512	341	342	565	541	330	78	79		352	75	7.365	1.413	11.823	2.305	461
110	0.29	436	356	312	542	522	293	79	79		294	76	6.978	1.947	11.774	2.016	434
120	0.16	404	379	289	514	496	273	79	80		255	76	6.404	2.155	12.262	1.852	416
130	0.12	366	376	272	490	471	256	79	80		231	75	5.871	2.463	12.619	1.728	395
140	0.11	343	367	260	465	447	244	79	80		215	76	5.110	2.835	13.126	1.619	376
150	0.09	317	361	248	443	425	230	79	80		203	75	4.571	2.599	13.838	1.530	359
160	0.11	303	350	238	421	405	221	79	80		195	74	4.547	2.780	13.815	1.422	343
170	0.13	297	349	229	403	390	214	78	79		190	75	4.850	2.635	13.709	1.295	334
180	0.09	285	343	219	390	371	208	79	80		183	75	4.771	2.395	13.943	1.203	321
190	0.09	271	333	210	373	358	201	80	81		178	75	3.761	2.717	14.662	1.115	309
200	0.09	261	321	203	360	344	194	80	81		172	75	3.627	2.567	14.920	1.021	297
210	0.07	253	311	196	345	330	189	80	81		168	75	3.549	2.436	15.124	0.948	287
220	0.06	244	297	190	334	317	184	81	78		163	75	3.453	2.316	14.173	0.892	276
230	0.11	269	278	185	323	306	188	80	77		161	74	3.465	2.316	14.191	0.781	272
240	0.08	281	271	181	324	296	196	79	76		161	74	3.471	2.312	14.243	0.700	271
250	0.09	264	267	176	320	289	190	79	76		159	74	3.483	2.312	14.318	0.608	263
260	0.09	258	277	173	313	282	186	78	76		156	74	3.483	2.307	14.395	0.517	261

270	0.09	256	274	170	308	276	184	78	75	155	74	3.472	2.302	14.485	0.427	257
280	0.09	252	255	167	303	269	183	78	75	153	73	3.459	2.303	14.576	0.336	249
290	0.09	246	249	165	297	265	180	77	75	150	74	3.435	2.303	14.675	0.246	244
300	0.07	229	238	161	288	260	174	77	75	146	73	3.411	2.298	14.788	0.174	235
310	0.09	216	230	158	279	254	167	77	75	142	73	3.381	2.294	14.889	0.082	228
320	0.06	212	220	155	269	252	163	77	75	141	72	3.351	2.289	14.993	0.026	221
330	0.00	205	215	152	260	248	160	77	75	140	73	3.321	2.289	15.112	0.025	216

Product:	24SFC	Test Duration:	170	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	#NUM!	HHV:	N/A
Test:	24SFC170607	Burn Rate [dry kg/hr]:	1.8835		
Date:	2017-06-07	Category:	3		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	256	314	202	376	335	203	79	77		169	74	2.316	1.260	16.941	14.752	296
10	0.85	449	299	186	334	303	206	78	79		381	74	6.235	0.205	14.057	13.902	314
20	1.79	722	313	212	349	323	324	78	79		528	74	9.070	0.300	11.309	12.112	384
30	1.77	686	322	237	377	357	340	79	80		522	75	9.019	0.612	11.301	10.338	396
40	1.56	666	325	255	409	389	349	79	80		503	75	8.617	0.504	11.732	8.774	409
50	1.07	504	357	259	426	405	323	79	79		379	74	5.584	1.787	13.466	7.703	390
60	1.41	743	344	278	439	440	370	79	77		519	74	10.551	0.304	9.806	6.293	449
70	1.42	730	331	313	482	473	396	78	76		532	74	10.237	0.349	10.112	4.875	466
80	1.19	672	352	330	500	495	374	79	77		498	74	9.142	0.435	11.126	3.680	470
90	1.00	635	379	351	515	514	354	80	79		478	75	9.141	0.376	11.156	2.679	479
100	0.71	567	443	354	545	524	329	81	79		436	76	8.732	0.356	10.313	1.971	487
110	0.54	525	435	345	556	538	303	82	80		407	76	5.326	0.356	10.495	1.427	480
120	0.40	477	436	327	561	543	287	83	80		377	77	4.764	0.352	10.820	1.028	469
130	0.27	436	429	309	547	537	267	83	80		347	77	4.898	0.352	11.191	0.753	452
140	0.19	415	428	297	530	526	256	83	80		331	77	5.261	0.347	11.569	0.561	439
150	0.25	401	411	286	520	511	247	83	80		318	77	5.666	0.347	11.895	0.307	426
160	0.20	399	407	278	508	495	245	83	81		312	77	6.053	0.347	12.220	0.107	418
170	0.09	380	399	272	499	481	238	84	81		303	77	6.374	0.348	12.510	0.016	406

Product:	24SFC	Test Duration:	220	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	5.5723	HHV:	N/A
Test:	24SFC170608	Burn Rate [dry kg/hr]:	1.5345		
Date:	2017-06-08	Category:	3		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	238	307	205	360	343	194	77	76		172	75	1.547	0.997	17.958	15.603	291
10	0.89	480	289	195	325	309	217	77	77		377	75	6.077	0.255	14.178	14.712	319
20	1.76	608	294	224	342	322	300	78	78		484	75	7.329	0.332	12.823	12.957	358
30	1.78	698	312	252	361	342	349	78	78		517	75	9.166	0.548	11.028	11.175	393
40	1.90	727	328	287	386	391	384	79	79		519	75	11.253	0.820	8.932	9.270	424
50	1.66	695	353	320	415	437	390	80	80		502	75	11.972	0.548	8.295	7.613	444
60	1.45	723	367	344	454	477	403	80	80		492	76	12.934	0.154	7.562	6.163	473
70	1.24	693	410	357	489	512	405	80	80		447	76	12.239	0.268	8.136	4.928	492
80	0.91	599	408	356	498	514	372	81	81		392	76	11.017	0.752	8.984	4.019	475
90	0.72	579	406	353	500	507	359	81	81		347	75	10.799	0.919	9.105	3.299	469
100	0.65	568	400	341	496	508	357	81	81		328	75	11.035	0.620	8.657	2.645	463
110	0.33	488	408	329	485	494	332	81	81		283	76	7.607	1.236	11.360	2.318	441
120	0.11	367	404	306	461	466	273	81	81		233	76	6.354	1.838	12.185	2.209	401
130	0.09	328	382	277	440	441	252	81	81		206	75	5.804	2.051	12.618	2.119	374
140	0.07	323	365	255	422	419	245	81	81		188	75	5.846	2.082	12.512	2.048	357
150	0.07	305	343	240	407	402	235	81	81		177	75	5.574	2.291	12.686	1.976	339
160	0.07	302	339	228	392	384	231	80	80		169	75	5.823	2.426	12.414	1.902	329
170	0.07	292	330	221	379	369	225	80	79		164	76	5.496	2.589	12.664	1.828	318
180	0.07	278	321	214	367	356	218	80	79		159	75	5.337	2.490	12.913	1.754	307
190	0.05	262	311	209	354	343	210	79	79		155	76	4.951	2.744	13.141	1.702	296
200	0.07	258	305	203	344	332	204	79	79		153	76	4.450	3.119	13.397	1.629	289
210	0.07	255	297	199	334	321	201	79	79		149	75	4.365	3.054	13.571	1.556	281
220	0.53	251	295	195	326	310	200	79	79		162	76	4.353	3.038	13.586	1.029	275

Product:	24SFC	Test Duration:	348	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	#NUM!	HHV:	N/A
Test:	24SFC170609	Burn Rate [dry kg/hr]:	0.9541		
Date:	2017-06-09	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	255	358	216	377	350	206	85	83		159	79	2.138	1.635	16.785	15.327	311
10	0.85	574	347	201	342	318	221	85	85		385	82	6.800	0.245	13.488	14.474	356
20	1.67	665	355	230	370	332	342	86	86		477	82	7.925	0.525	12.124	12.806	390
30	1.67	692	367	252	395	358	367	88	88		480	83	8.784	0.878	11.162	11.132	413
40	1.34	650	380	262	422	367	358	87	88		433	82	8.300	0.788	11.641	9.790	416
50	1.64	758	373	295	464	406	416	87	88		487	83	11.820	0.371	8.476	8.152	459
60	1.42	695	379	307	484	442	394	87	88		448	83	11.130	0.348	8.793	6.734	461
70	1.13	694	373	319	511	464	396	87	88		434	81	1.190	1.055	18.323	5.608	472
80	0.89	664	373	321	528	474	381	86	87		404	81	1.117	0.988	18.550	4.717	472
90	0.78	633	393	322	537	479	371	86	87		380	82	2.163	0.318	18.247	3.940	473
100	0.67	625	394	325	532	488	372	86	87		367	82	7.915	0.630	12.109	3.268	473
110	0.46	510	396	308	524	488	324	87	87		324	82	6.951	0.752	12.965	2.810	445
120	0.37	447	401	287	507	473	295	87	87		285	82	8.329	0.702	11.677	2.443	423
130	0.29	398	400	271	490	455	277	87	87		260	82	10.187	1.060	9.915	2.156	403
140	0.15	351	400	254	469	435	252	87	87		228	82	10.206	1.028	9.800	2.011	382
150	0.13	338	401	240	448	412	240	86	87		211	82	10.581	1.019	9.414	1.885	368
160	0.11	323	384	232	432	393	231	86	86		200	82	10.701	0.851	9.324	1.776	353
170	0.09	310	376	223	418	378	225	86	86		192	82	10.847	0.670	9.188	1.688	341
180	0.07	297	366	217	401	363	216	86	86		185	82	11.306	0.534	8.695	1.614	329
190	0.09	290	361	210	387	350	213	86	86		180	82	11.456	0.417	8.423	1.522	320
200	0.09	286	361	205	376	339	209	86	84		177	81	10.436	0.293	8.010	1.432	313
210	0.18	315	418	343	395	368	229	86	83		181	81	10.394	0.297	8.094	1.249	368
220	0.07	322	433	360	390	366	236	85	83		191	81	10.316	0.293	8.284	1.176	374
230	0.07	320	443	370	386	364	237	85	82		193	81	10.243	0.293	8.542	1.106	377
240	0.07	316	447	379	383	360	236	84	82		193	81	10.147	0.288	8.821	1.034	377
250	0.09	314	450	385	379	358	234	84	82		192	81	10.056	0.288	9.116	0.942	377
260	0.09	315	447	389	376	355	234	84	82		191	81	9.984	0.284	9.412	0.848	377

270	0.09	312	443	391	373	353	233	83	81	188	81	9.906	0.279	9.692	0.758	374
280	0.10	311	440	390	368	350	231	83	81	187	81	9.839	0.279	9.949	0.657	372
290	0.09	308	438	387	365	347	229	83	81	186	80	9.773	0.280	10.207	0.566	369
300	0.09	305	438	381	361	345	228	83	81	186	80	9.724	0.280	10.449	0.476	366
310	0.11	297	437	377	357	343	225	82	81	184	80	9.658	0.275	10.661	0.365	362
320	0.09	291	435	375	351	339	220	82	81	182	80	9.609	0.275	10.873	0.274	358
330	0.09	285	432	373	345	335	216	82	80	179	80	9.543	0.271	11.066	0.182	354
340	0.07	279	427	370	339	328	212	82	80	177	80	9.495	0.271	11.251	0.112	349

Product:	24SFC	Test Duration:	150	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	5.9232	HHV:	N/A
Test:	24SFC170613	Burn Rate [dry kg/hr]:	1.9959		
Date:	2017-06-13	Category:	4		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	247	395	180	275	243	172	84	83		255	86	4.038	0.538	15.660	13.916	268
10	0.43	315	343	168	250	225	158	84	84		274	88	5.805	0.312	14.508	13.487	260
20	1.98	608	391	218	305	255	281	85	85		450	90	7.260	0.692	12.646	11.502	355
30	2.05	669	448	270	373	296	326	86	86		486	90	8.704	0.941	11.075	9.451	411
40	1.79	635	488	320	436	338	354	87	87		486	91	9.309	0.588	10.525	7.663	443
50	1.03	485	503	319	451	368	329	87	87		357	90	4.741	1.756	14.159	6.634	425
60	1.18	605	522	309	462	380	310	87	86		482	91	9.359	0.248	10.631	5.449	456
70	1.16	614	524	336	524	435	367	86	85		413	91	9.792	0.321	9.933	4.287	487
80	0.79	521	546	327	517	446	310	86	85		416	91	8.529	0.443	11.281	3.493	472
90	0.89	579	561	345	541	475	327	86	85		441	92	8.420	0.389	11.456	2.600	500
100	0.80	563	569	358	568	495	328	86	85		440	91	7.888	0.375	11.909	1.801	511
110	0.64	545	598	355	570	514	321	86	85		429	90	7.339	0.454	11.260	1.165	516
120	0.47	458	636	346	568	516	294	86	85		383	89	7.314	0.454	11.346	0.692	505
130	0.34	423	687	337	561	508	274	85	85		350	89	7.266	0.454	11.497	0.353	503
140	0.27	407	715	322	549	498	266	85	85		338	88	7.200	0.450	11.702	0.082	498
150	0.07	389	673	307	538	485	253	85	84		337	88	7.121	0.450	11.914	0.007	478

Product:	24SFC	Test Duration:	326	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	1.9095	HHV:	N/A
Test:	24SFC170614	Burn Rate [dry kg/hr]:	0.9265		
Date:	2017-06-14	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	256	382	233	411	382	205	80	79		206	81	1.111	0.856	18.233	14.047	333
10	1.28	711	370	237	375	353	256	80	80		520	82	9.730	0.305	10.459	12.765	409
20	2.14	692	392	270	433	386	363	81	81		542	82	9.676	0.652	10.489	10.622	435
30	1.89	701	415	294	467	419	374	82	81		539	82	10.793	0.499	9.528	8.734	459
40	1.61	716	418	318	495	469	388	82	82		523	83	11.576	0.271	8.824	7.125	483
50	1.53	713	428	349	535	524	403	82	82		514	82	12.359	0.239	8.074	5.597	510
60	1.18	659	435	366	559	560	387	82	83		473	82	11.071	0.135	9.217	4.415	516
70	0.86	597	443	364	574	564	360	82	83		428	82	9.540	0.257	10.626	3.550	508
80	0.63	545	443	350	576	558	338	83	83		390	83	7.950	0.710	11.808	2.916	494
90	0.55	543	440	334	562	544	336	82	83		373	82	9.105	0.515	10.851	2.370	484
100	0.42	421	444	323	543	532	291	82	83		319	82	7.013	1.348	12.176	1.953	453
110	0.27	382	450	307	522	510	268	82	82		283	82	5.084	1.611	13.872	1.683	434
120	0.13	354	436	277	494	473	249	82	82		252	82	4.480	1.779	14.380	1.557	407
130	0.09	334	424	257	469	444	236	82	82		234	82	4.431	1.882	14.395	1.469	385
140	0.11	320	414	244	448	421	229	82	82		224	82	4.274	2.081	14.448	1.362	369
150	0.11	313	406	233	429	401	224	82	82		215	82	4.014	2.050	14.744	1.254	356
160	0.09	296	397	224	410	384	214	82	82		207	81	3.511	2.014	15.265	1.161	342
170	0.09	282	379	215	392	364	205	82	82		199	81	3.571	1.860	15.340	1.073	326
180	0.07	258	368	206	375	348	197	81	82		192	81	2.743	2.100	15.985	1.001	311
190	0.06	246	354	199	357	333	188	81	82		186	81	2.840	1.973	16.045	0.945	298
200	0.06	236	346	193	341	321	182	81	82		181	81	2.671	2.113	16.174	0.890	287
210	0.07	231	329	191	325	306	178	82	82		177	82	2.713	2.218	16.112	0.815	276
220	0.07	226	323	188	314	297	175	82	82		173	82	2.628	2.009	16.310	0.748	269
230	0.09	221	316	185	301	288	172	82	82		170	82	2.659	2.222	16.243	0.659	262
240	0.09	221	302	184	291	283	170	82	82		168	82	3.173	1.760	16.051	0.569	256
250	0.07	221	293	181	283	280	169	82	82		167	83	2.907	1.724	16.280	0.494	252
260	0.09	221	282	179	274	276	167	82	82		165	82	3.306	1.534	16.126	0.404	246

270	0.06	217	284	178	267	271	166	82	81	163	83	2.793	1.631	15.382	0.347	243
280	0.09	214	279	177	259	266	164	81	80	163	82	2.787	1.631	15.389	0.256	239
290	0.05	209	277	175	254	265	162	81	80	161	81	2.787	1.627	15.458	0.202	236
300	0.07	204	269	171	248	259	160	81	80	159	82	2.787	1.627	15.541	0.129	230
310	0.05	196	255	168	244	251	156	81	80	155	83	2.769	1.622	15.632	0.075	223
320	0.04	191	240	165	239	241	153	81	80	150	83	2.751	1.622	15.715	0.034	215

Product:	24SFC	Test Duration:	210	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	2.4936	HHV:	N/A
Test:	24SFC170615	Burn Rate [dry kg/hr]:	1.4995		
Date:	2017-06-15	Category:	3		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	247	368	212	370	359	200	80	79		197	82	1.378	1.186	17.786	14.531	311
10	1.39	689	376	225	349	341	275	80	80		525	85	8.377	0.306	11.960	13.142	396
20	2.09	675	433	265	407	370	366	81	81		536	85	9.130	0.756	10.959	11.054	430
30	1.85	677	455	297	442	415	394	82	82		528	86	10.455	0.792	9.558	9.204	457
40	1.62	705	474	327	471	469	402	82	82		524	85	12.420	0.248	7.974	7.588	489
50	1.41	668	491	345	507	513	395	83	82		497	85	10.968	0.230	9.338	6.176	505
60	1.14	656	494	360	534	534	385	82	83		471	84	11.059	0.154	9.278	5.032	515
70	1.02	649	489	364	565	548	386	82	82		455	85	10.767	0.149	9.482	4.017	523
80	0.76	597	485	359	582	556	365	82	82		421	84	8.609	0.421	11.374	3.260	516
90	0.62	557	481	349	574	549	339	83	82		392	85	9.582	0.307	10.564	2.643	502
100	0.53	481	476	346	566	538	315	83	83		352	85	6.687	0.995	12.776	2.116	481
110	0.25	416	462	319	541	511	283	83	83		306	86	5.871	1.534	13.108	1.863	450
120	0.18	379	460	294	518	489	266	83	83		279	85	5.520	1.774	13.358	1.685	428
130	0.18	359	453	276	494	465	255	83	83		260	85	5.320	1.878	13.495	1.504	409
140	0.14	343	444	264	473	445	245	82	83		248	85	5.084	1.986	13.698	1.359	394
150	0.13	331	425	254	456	427	238	83	83		239	85	4.359	2.104	14.319	1.232	379
160	0.12	318	418	244	439	411	229	82	82		229	83	4.147	2.249	14.486	1.108	366
170	0.11	307	404	236	423	394	221	82	82		222	84	4.117	2.227	14.592	0.998	353
180	0.11	309	410	230	413	377	218	82	82		216	83	4.208	1.946	14.819	0.888	348
190	0.13	303	414	225	406	365	216	82	82		212	84	4.032	2.122	14.812	0.760	343
200	0.08	285	399	217	394	351	212	82	82		191	85	3.584	2.050	14.993	0.678	329
210	0.07	265	380	207	376	339	204	82	82		175	84	3.742	2.005	14.970	0.603	313

Product:	24SFC	Test Duration:	156	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	5.1669	HHV:	N/A
Test:	24SFC170616	Burn Rate [dry kg/hr]:	1.9725		
Date:	2017-06-16	Category:	4		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	239	415	218	386	366	186	80	79		213	83	2.211	0.996	17.060	14.267	325
10	1.19	655	414	218	349	337	247	80	80		489	83	9.063	0.326	11.140	13.073	395
20	1.89	641	513	257	390	356	334	81	81		528	83	9.825	0.434	10.193	11.182	431
30	1.78	670	563	293	414	407	366	82	81		518	84	10.866	0.529	9.263	9.405	469
40	1.49	630	577	320	438	445	356	82	82		494	84	11.917	0.321	8.362	7.912	482
50	1.34	641	580	331	473	476	375	82	82		470	84	11.120	0.339	9.013	6.571	500
60	1.06	607	577	329	493	489	357	83	82		426	84	11.222	0.366	8.922	5.516	499
70	0.93	586	570	328	513	497	353	82	82		408	84	10.745	0.398	9.293	4.588	499
80	0.70	540	563	323	523	494	335	83	83		378	83	8.295	0.891	11.237	3.886	489
90	0.49	465	550	307	512	483	303	82	83		331	84	6.409	1.602	12.647	3.396	463
100	0.40	433	531	291	489	463	281	82	82		298	84	6.457	1.543	12.632	2.994	441
110	0.44	473	511	282	476	448	289	82	82		294	84	8.724	0.855	10.989	2.559	438
120	0.53	482	523	293	480	449	312	82	82		313	84	8.162	1.045	11.435	2.033	445
130	0.31	410	529	280	470	450	278	82	82		286	84	5.949	1.756	12.927	1.725	428
140	0.18	365	531	263	455	432	253	82	82		252	84	5.568	2.032	13.132	1.544	409
150	0.14	350	527	252	440	417	242	82	82		237	84	5.375	2.064	13.329	1.399	397

Product:	24SFC	Test Duration:	254	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	3.9797	HHV:	N/A
Test:	24SFC170619	Burn Rate [dry kg/hr]:	1.3506		
Date:	2017-06-19	Category:	3		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	247	368	204	360	340	196	81	81		170	86	1.964	1.218	17.295	15.846	304
10	1.16	550	378	203	328	315	217	81	82		436	81	8.416	0.466	11.648	14.684	355
20	2.07	644	420	243	349	340	328	82	82		509	81	8.241	0.670	11.745	12.618	399
30	1.85	702	436	271	379	371	362	83	83		522	81	10.243	0.887	9.641	10.764	432
40	1.52	623	467	292	414	395	362	84	84		477	81	10.152	0.919	9.770	9.244	438
50	1.44	636	495	321	443	439	368	84	84		493	81	11.531	0.380	8.650	7.808	467
60	1.18	596	504	332	469	472	354	84	84		457	85	10.709	0.344	9.384	6.631	475
70	1.09	590	486	342	492	500	351	85	85		446	86	10.860	0.303	9.240	5.541	482
80	0.93	588	487	352	514	520	351	85	85		433	87	9.801	0.330	10.191	4.615	492
90	0.74	566	486	351	531	521	340	85	85		413	87	8.912	0.371	10.981	3.877	491
100	0.62	542	478	347	533	521	327	85	85		395	86	8.978	0.398	10.912	3.260	484
110	0.69	554	473	351	537	532	333	85	85		401	86	9.340	0.375	10.564	2.569	489
120	0.56	498	477	349	543	543	318	85	85		380	86	6.971	0.733	12.458	2.007	482
130	0.27	430	495	330	524	523	285	85	85		324	86	5.713	1.281	13.385	1.735	460
140	0.20	386	504	312	498	499	265	85	85		292	86	5.362	1.516	13.638	1.536	440
150	0.14	366	498	296	477	480	252	84	85		273	86	5.145	1.742	13.752	1.392	423
160	0.16	354	515	284	459	461	246	84	85		261	87	5.580	1.502	13.456	1.228	415
170	0.14	348	539	274	447	447	242	84	85		251	86	5.918	1.339	13.245	1.085	411
180	0.20	360	547	272	445	434	242	85	85		252	86	6.046	1.226	13.131	0.884	411
190	0.18	358	558	271	443	428	243	85	85		251	87	5.743	1.339	13.404	0.701	412
200	0.14	334	538	260	432	411	233	84	85		242	86	4.498	1.398	14.652	0.563	395
210	0.11	325	514	251	420	396	227	85	85		235	87	4.347	1.525	14.759	0.453	381
220	0.13	315	497	242	408	381	221	85	85		230	87	4.008	1.548	15.091	0.324	369
230	0.11	248	333	183	328	307	187	79	78		155	73	3.81	2.63	14.74	0.215	280
240	0.09	243	312	180	318	295	182	78	77		152	73	3.57	2.54	14.98	0.125	270
250	0.11	231	296	176	308	286	176	77	76		149	73	3.46	2.44	15.17	0.016	259

Product:	24SFC	Test Duration:	348	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	2.4247	HHV:	N/A
Test:	24SFC170623	Burn Rate [dry kg/hr]:	0.852		
Date:	2017-06-23	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	311	439	227	414	409	230	80	79		264	78	2.205	1.558	16.546	13.738	360
10	1.26	687	400	239	380	370	294	80	80		521	78	8.011	0.702	11.996	12.475	415
20	1.89	674	416	261	391	376	363	81	80		546	78	11.338	0.734	8.636	10.586	424
30	1.69	745	422	284	406	403	375	81	81		553	78	13.454	0.439	6.941	8.900	452
40	1.56	715	420	317	431	433	395	82	82		520	78	13.212	0.444	7.138	7.338	463
50	1.38	726	409	342	463	463	412	82	82		513	78	12.765	0.430	7.553	5.961	481
60	1.22	715	410	360	492	494	407	82	82		495	78	12.414	0.349	7.780	4.743	494
70	0.88	673	416	371	517	520	385	82	82		454	78	10.883	0.285	9.165	3.859	499
80	0.69	617	413	357	535	523	355	82	82		412	78	9.898	0.489	9.952	3.169	489
90	0.60	611	423	348	530	524	353	82	83		403	78	10.491	0.362	9.483	2.570	487
100	0.51	497	429	352	525	534	322	82	82		365	78	8.327	1.068	10.951	2.061	467
110	0.27	427	444	334	513	525	288	82	82		302	78	7.098	1.376	11.912	1.789	448
120	0.16	380	441	311	493	503	268	82	82		262	78	6.499	1.797	12.230	1.629	426
130	0.13	352	431	291	471	474	254	82	82		234	77	5.882	2.150	12.519	1.503	404
140	0.07	331	420	272	453	450	243	82	82		214	77	4.909	2.417	13.283	1.432	385
150	0.07	308	402	249	433	421	232	82	82		194	78	3.899	2.603	14.085	1.359	363
160	0.04	298	385	232	412	395	223	82	82		177	78	3.754	2.331	14.356	1.322	345
170	0.03	281	376	217	389	368	214	82	82		164	77	3.572	2.141	14.622	1.288	326
180	0.00	267	359	204	369	346	206	82	82		155	77	3.548	2.091	14.706	1.288	309
190	0.02	257	345	194	353	326	199	82	82		147	77	3.572	2.060	14.782	1.270	295
200	0.02	249	332	186	338	309	193	82	82		143	77	3.530	2.037	14.888	1.252	283
210	0.02	245	318	179	325	294	190	82	82		139	78	3.578	2.186	14.804	1.233	272
220	0.04	238	311	173	311	279	185	82	83		136	78	3.505	2.254	14.880	1.197	262
230	0.02	248	333	183	328	307	187	79	78		155	73	3.81	2.63	14.74	1.177	280
240	0.03	243	312	180	318	295	182	78	77		152	73	3.57	2.54	14.98	1.144	270
250	0.05	231	296	176	308	286	176	77	76		149	73	3.46	2.44	15.17	1.089	259
260	0.05	230	286	172	300	277	174	77	76		147	73	3.32	2.34	15.43	1.035	253

270	0.04	229	268	169	292	270	170	77	76	144	73	3.38	2.30	15.53	0.996	246
280	0.02	221	257	165	285	260	168	77	76	141	73	3.07	2.17	15.80	0.977	238
290	0.04	215	248	163	276	253	164	77	76	138	73	2.98	2.16	15.93	0.939	231
300	0.04	208	241	159	268	246	160	77	76	135	73	2.83	1.96	16.18	0.900	225
310	0.04	200	229	156	260	242	156	77	76	132	73	2.76	1.89	16.28	0.863	217
320	0.04	194	223	153	253	237	152	77	76	129	73	2.74	1.94	16.33	0.827	212
330	0.09	208	204	147	245	192	162	83	83	120	79	3.66	2.75	14.83	0.737	199
340	0.04	202	209	146	245	188	160	83	83	119	79	3.12	2.41	15.53	0.693	198

Product:	24SFC	Test Duration:	188	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	2.4811	HHV:	N/A
Test:	24SFC170627	Burn Rate [dry kg/hr]:	1.6878		
Date:	2017-06-27	Category:	3		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	300	363	228	423	403	218	77	77		270	76	0.032	0.045	19.745	14.610	344
10	1.03	748	352	213	368	350	238	77	78		638	76	12.348	0.349	7.798	13.582	406
20	1.84	750	368	252	396	367	362	78	78		591	83	11.525	0.426	8.553	11.746	427
30	1.90	802	391	287	420	403	420	79	79		635	77	11.736	0.426	8.348	9.843	461
40	1.82	817	405	327	452	438	442	80	79		656	77	13.152	0.308	6.882	8.025	488
50	1.54	753	413	343	487	472	416	80	80		593	77	10.528	0.091	9.695	6.484	494
60	1.31	750	402	347	527	490	401	80	80		572	77	11.277	0.204	8.817	5.175	503
70	1.25	746	408	371	562	521	420	80	80		584	77	12.444	0.086	7.386	3.927	522
80	1.00	698	407	393	585	557	402	81	80		539	77	10.381	0.109	9.353	2.928	528
90	0.80	648	437	406	598	583	383	81	80		503	77	9.673	0.082	10.172	2.128	534
100	0.58	547	451	392	608	588	340	81	80		439	77	6.970	0.706	12.648	1.548	517
110	0.31	472	476	358	594	568	303	81	81		377	83	5.743	1.349	13.525	1.241	493
120	0.21	431	530	327	565	541	278	81	81		335	86	5.508	1.657	13.592	1.026	479
130	0.19	404	544	305	541	515	263	81	81		307	86	4.987	2.055	13.859	0.841	462
140	0.15	372	527	285	515	489	249	81	81		282	86	4.461	2.073	14.373	0.687	438
150	0.13	351	508	268	490	465	238	81	81		266	83	4.256	2.082	14.600	0.560	416
160	0.16	335	489	256	468	446	232	81	81		254	86	4.207	2.204	14.593	0.397	399
170	0.14	320	460	245	448	428	224	80	80		245	86	4.274	2.249	14.510	0.252	380
180	0.14	313	478	236	434	416	223	80	80		240	85	4.226	1.820	14.797	0.107	376

Product:	24SFC	Test Duration:	328	LHV:	N/A
Manufacturer	Foyers Suprême Inc.	Emission Rate [g/hr]:	1.942	HHV:	N/A
Test:	24SFC170628	Burn Rate [dry kg/hr]:	0.9825		
Date:	2017-06-28	Category:	2		

ET [min]	BR	FB Temp. [°F]						DGM Temp. [°F]		Filt. 1 Temp. [°F]	Flue Gas Temp. [°F]	Amb. Room Temp. [°F]	Gas Analyzer [%]			Weight [lbs]	Avg. FB Temp. [°F]
		Top	Bot.	Back	RH	LH	BM	1_IN	1_OUT				CO ₂	CO	O ₂		
0	0.00	323	432	255	439	437	240	76	76		279	73	1.868	1.331	17.024	14.810	377
10	1.39	686	475	244	394	388	285	76	77		528	73	9.523	0.408	10.657	13.421	437
20	2.02	726	512	269	409	397	351	77	77		555	73	11.610	0.806	8.614	11.404	463
30	1.58	606	518	281	411	411	338	78	77		467	73	9.614	0.842	10.464	9.828	445
40	1.55	689	505	297	422	429	374	78	78		515	73	10.902	0.394	9.612	8.283	468
50	1.54	719	521	319	446	457	402	78	78		534	73	11.538	0.267	9.051	6.743	492
60	1.25	692	517	324	464	486	382	78	78		503	73	10.818	0.204	9.687	5.490	496
70	1.24	717	572	343	496	504	403	79	79		518	73	12.202	0.176	8.135	4.253	527
80	1.01	666	597	359	527	524	382	79	79		486	74	11.287	0.154	8.991	3.242	534
90	0.75	602	611	370	548	541	357	79	79		441	74	9.686	0.190	10.345	2.496	534
100	0.49	557	620	370	554	550	332	79	79		395	74	7.805	0.751	11.747	2.007	530
110	0.31	454	588	337	539	536	295	79	79		329	74	5.858	1.738	12.951	1.699	491
120	0.16	391	573	304	515	509	265	79	79		279	73	5.169	2.204	13.357	1.538	458
130	0.11	350	526	278	489	484	247	78	79		246	73	4.661	2.498	13.669	1.431	425
140	0.11	323	495	259	465	461	233	78	78		223	73	4.607	2.458	13.753	1.322	401
150	0.07	308	466	244	442	439	224	78	78		208	73	4.407	2.453	13.964	1.251	380
160	0.09	291	445	231	423	419	216	78	78		197	73	4.293	2.666	13.978	1.160	362
170	0.10	288	423	223	407	396	212	78	78		191	73	5.097	2.286	13.495	1.055	347
180	0.09	292	391	216	395	379	212	77	78		186	73	4.553	2.657	13.775	0.963	335
190	0.09	282	394	208	384	367	209	78	78		179	73	4.547	2.403	13.911	0.869	327
200	0.07	281	392	201	373	353	204	78	78		173	73	4.039	2.635	14.320	0.796	320
210	0.05	271	361	195	360	338	198	77	77		168	73	3.978	2.679	14.464	0.742	305
220	0.06	262	364	190	348	326	193	78	78		163	73	3.778	2.553	14.698	0.678	298
230	0.13	248	333	183	328	307	187	79	78		155	73	3.81	2.63	14.74	0.55	280
240	0.07	243	312	180	318	295	182	78	77		152	73	3.57	2.54	14.98	0.48	270
250	0.07	231	296	176	308	286	176	77	76		149	73	3.46	2.44	15.17	0.40	259
260	0.07	230	286	172	300	277	174	77	76		147	73	3.32	2.34	15.43	0.34	253

270	0.06	229	268	169	292	270	170	77	76	144	73	3.38	2.30	15.53	0.27	246
280	0.05	221	257	165	285	260	168	77	76	141	73	3.07	2.17	15.80	0.22	238
290	0.05	215	248	163	276	253	164	77	76	138	73	2.98	2.16	15.93	0.17	231
300	0.05	208	241	159	268	246	160	77	76	135	73	2.83	1.96	16.18	0.11	225
310	0.04	200	229	156	260	242	156	77	76	132	73	2.76	1.89	16.28	0.08	217
320	0.04	194	223	153	253	237	152	77	76	129	73	2.74	1.94	16.33	0.04	212

APPENDIX 5: Participants

Danick Power ing.
v-p operation
Services Polytests inc.
450.741.3636
www.polytests.com

Alexander Markakis
Foyers Supreme inc.

Maxime Martin
Technicien
Services Polytests inc.
450.741.3636
www.polytests.com

1 Electrical Components

The following table is the information of the electrical components for the 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:

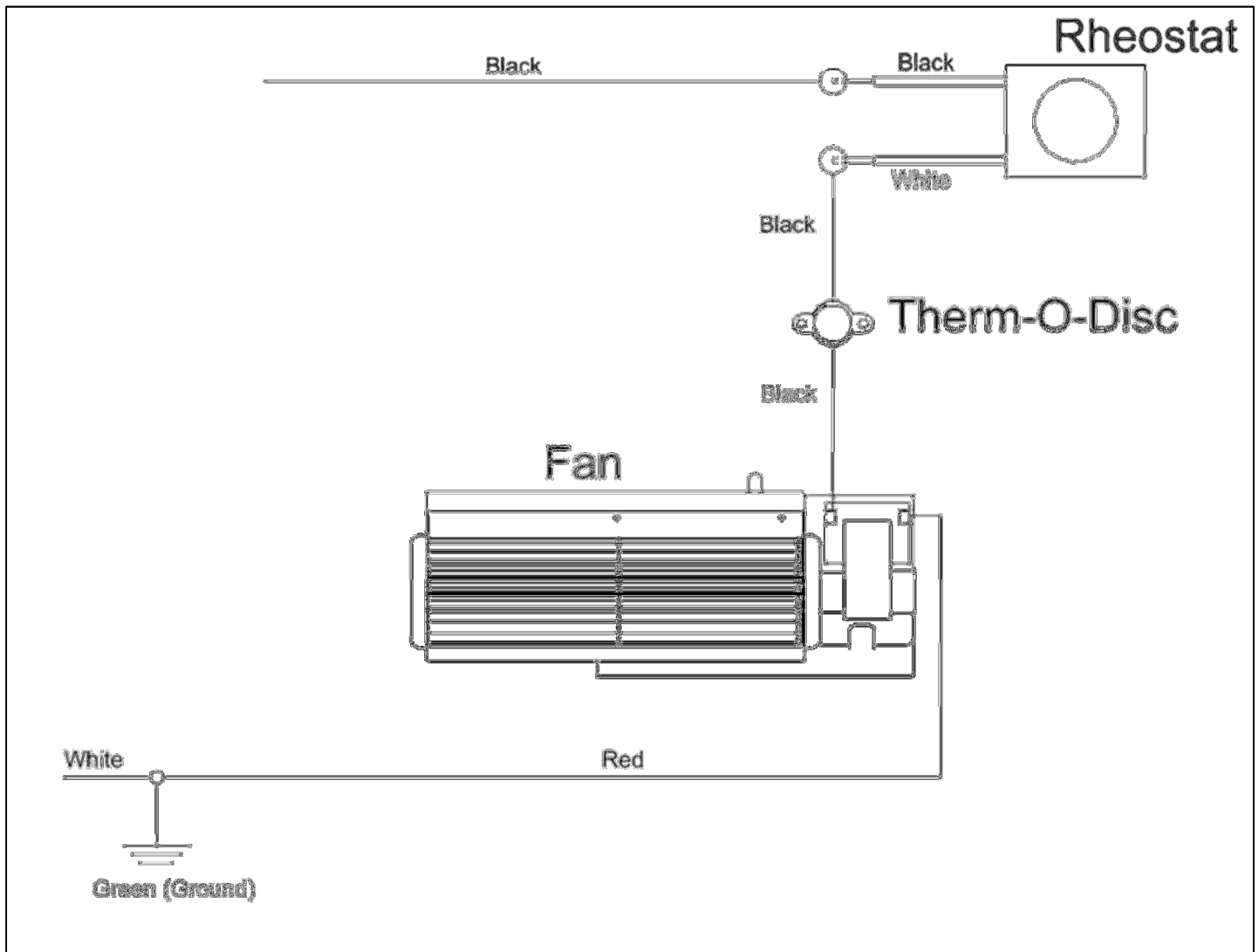


Figure 1: Electrical Connection for Optional Blower Kit

2 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 52 of 24SFC_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 3 of 24SFC_TECH_DRAW.pdf (5) for information on dimensions, materials, and assembly.

3 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 24SFC 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 45 of 24SFC_TECH_DRAW.pdf for details on the Primary Air Control assembly.



Technical Data Sheet

Description:

Knitted ropes are constructed of high quality type E glass that will not burn and will withstand continuous exposure to temperatures of 540°C/1000°F. This material resists most acids and alkalis; is unaffected by most bleaches and solvents; and is highly flexible and conformable.

Applications:

Applications include boiler, coke oven, industrial oven, and wood stove doors; crucible packing and pollution control equipment; high temp tying and lacing cords; tadpole tape core ropes; and pipe wrap.

Technical Data:

Physical Properties:

Product	½" 06
Feet per box	1000
Yarn Used	E-glass 1.75
ROHS Compliant	ASTM D-578, ASTM committee D13, and subcommittee D13.18
Density	800 g/m ²
Yarn Tension	Tight
Continuous Operating Temperature	540°C
Design Build	Knit Braid
Coating	Graphite
Resistance	Resists most acids & bases Unaffected by solvents & oils
Design Capabilities	Excellent thermal protection; very flexible



Toronto • Montreal
www.specialtygaskets.com

DISCLAIMER: The information in this Technical Data Sheet is believed to be correct as of the date issued. Specialty Gaskets Inc. MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the Specialty Gaskets Inc. product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a Specialty Gaskets Inc. Product it is essential that the user evaluate the Specialty Gaskets Inc. product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.



ISO 9001

Glass Technical Specs

PYROCERAM®III Clear Glass-Ceramic

You can trust PYROCERAM®III for the very best in high-temperature performance. Made from a special composition of clear glass-ceramic, PYROCERAM®III withstands even the highest heat conditions (up to 1300°F, or 700°C), due to its low coefficient of expansion ($0 \pm 3.0 \times 10^{-7} \text{K}^{-1}$).

PYROCERAM®III creates a tranquil, warm atmosphere in front of your fireplace or stove due to its excellent transmission of visible light and its light amber tint.

PHYSICAL PROPERTIES

The physical and chemical properties of EuroKera glass-ceramic sheets are tested in our laboratories in accordance with relevant DIN, NF, ISO or EN specifications or additional proprietary specifications if necessary. Nevertheless, slight variations from the figures given in this section remain possible but will not affect the capacity of the product.

EuroKera glass-ceramic is UL Component registered, a mark of quality indicating that EuroKera products have passed the stringent testing requirements of the Underwriters Laboratories.

Dimensional Information

Glass Thickness

Maximum Size (sheet)

Cut Sizes

Available In

3mm, 4mm or 5mm

2005mm by 1100mm

Custom as requested

THERMAL PROPERTIES

PYROCERAM®III glass-ceramic remains unchanged after being subjected to the following conditions:

Condition

Continuous Use

Time limited peak use

Maximum Temperature

1,292°F (700°C)

1,472°F (800°C)

Property

Coefficient of expansion (20° to 700°C)

Mean specific heat (20° to 100°C)

Resistance to thermal gradients

Thermal shock resistance

Value

$0 \pm 3.0 \times 10^{-7} \text{K}^{-1}$

0.8 (J/g. K)

$\Delta T \text{ max.} = 700\text{K}$

$\Delta T \text{ max.} = 700\text{K}$

MECHANICAL PROPERTIES

Property	Value
Specific mass	2.55
Young's Elasticity modulus (E=)	94.3 (GPa)
Torsion modulus (G=)	37.8 (GPa)
Poisson ratio (μ)	0.25
Minimal bending strength	>110 (MPa)
Knoop hardness (load 1 N)	705

OPTICAL PROPERTIES

Property	Value
Refractive Index	1.55 (Approx.)
ABBE Number	55.4 (Approx.)
UV Transmission for 3mm thickness	< 1% (Wavelength < 355 μm)
Photo elastic coefficient	3.11 (Brewster)

ELECTRICAL PROPERTIES

Electrical resistivity (where ρ is in (ohm • cm))

$\log_{10} \rho$ 6.8 at 482°F (250° C)

$\log_{10} \rho$ 5.4 at 662°F (350° C)

$\log_{10} \rho$ 2.7 at 1,292°F (700° C (Estimated))

Dielectric constant

8.1 at 102 Hz

7.5 at 104 Hz

7.3 at 106 Hz

Dissipation factor

40×10^{-3} at 102 Hz

17×10^{-3} at 104 Hz

12×10^{-3} at 106 Hz

CHEMICAL PROPERTIES

Property	Class
Water resistance (ISO 719)	Class 1
Acid resistance (DIN 12 116)	Class 1
Alkali resistance (ISO 695)	Class 1

APPENDIX 7: Operator's manual



Astra 24

Owner's Manual

Model Number: 24SFC

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: July 2017

IMPORTANT: Keep the owner's manual for future use.

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1 SAFETY

SUPREME FIREPLACES INC. congratulates you on purchasing an Astra 24 wood burning fireplace. This manual describes the installation and operation of the Astra 24 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."

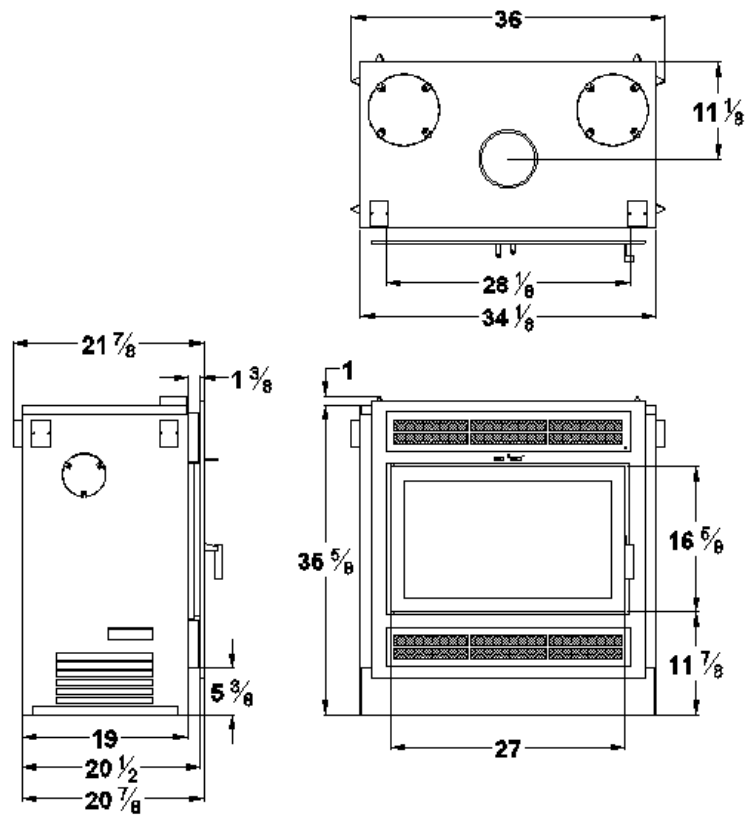
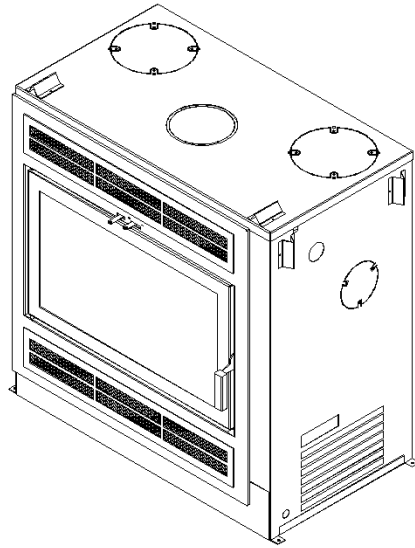


WARRANTY REGISTRATION

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 (6.09 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 :	1.91 g/hr
Average CO Emissions Rate ³ :	1.71 g/min
EPA Protocol:	Method 28R, ASTM2780-10, and ASTM2515-11
Efficiency (Crib Wood):	HHV ⁴ : 67.9% LHV ⁵ : ***
Heat Output (Crib Wood):	12,237 to 23,872 BTU/hr (3,586 to 6,996 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 Astra 24 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 Astra 24 is in operation. Use the Cold Hand Key (see Section 2.4) to adjust the Combustion Air Control.

¹ Depending on combustion air control setting (see Section 5.3 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 Astra 24 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 Astra 24 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 Astra 24 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 Astra 24 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 Astra 24 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 Astra 24 must remain closed at all times during operation.

2.9 Blower Kit

An AC tangential blower (electrical rating: 115V, 60Hz, and 56W) with a variable speed control can be installed into the Astra 24 wood burning fireplace to maximize efficiency. Refer to Section 4.1 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: 115 V and 60 Hz) 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 4.2 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 4.3 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...) for any local codes and whether a permit is required. In the absence of local codes, refer to the CSA B365 Installation Code for Solid Burning Appliances and Equipment (Canada) or the ANSI NFPA 211 Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances (USA). **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 Astra 24.

3.1 Location

Determine the location of the Astra 24 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

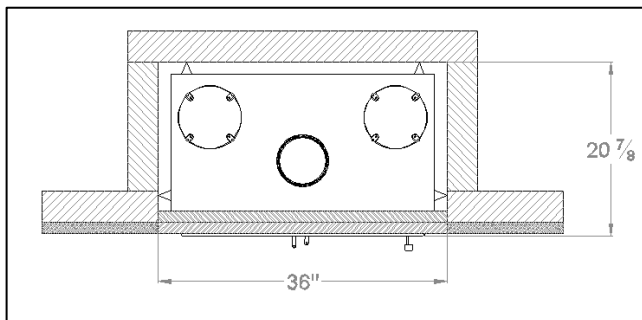


Figure 3-1: Straight Wall Installation

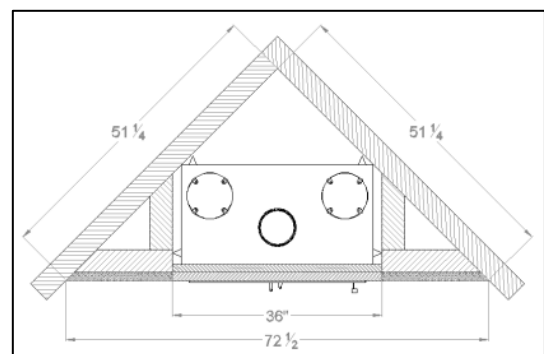


Figure 3-2: Corner Installation

3.2 Chimney Installation

The Astra 24 is approved with a 6" chimney that is listed under the UL 103 / ULC S629 standards (refer to Table). Note that when connecting a 7" chimney, a 6" to 7" anchor plate adaptor from the same chimney manufacturer must be installed onto the unit. **WARNING: Mixing chimney components from different brands is a safety hazard and will void the warranty on the unit.** When connecting the unit to an existing chimney, thoroughly inspect the condition of the chimney and that the installation conforms with the requirements of the chimney manufacturer and the building codes. **Note that to avoid any unnecessary risk, it is often recommended to replace the chimney system.** Always respect the clearances to combustibles from the chimney manufacturers; 2" is usually required for prefabricated chimneys.

3.2.1 General Rules and Guidelines

1. Carefully read the instructions from the chimney manufacturer prior to installation (manuals can be obtained from the chimney manufacturer's website or from the vendor). Unless specified, follow the chimney manufacturer's instructions for proper installation.
2. For optimal performance of the unit, it is recommended to install the chimney system in an interior setting. To prevent drafting issues and creosote buildups, avoid exterior installations of the chimney system in regions that experience extreme cold conditions.
3. The minimum and the maximum height of the chimney from the base of the unit are 15' and 35' respectively.
4. Only chimneys approved under the UL 103 / ULC S629 standards can be installed onto the unit (refer to Table).
5. A 6" anchor plate is required to connect the fireplace to the chimney system. The anchor plate can be secured onto the unit with 4 self-tapping screws.
6. The chimney installed onto the unit cannot be connected to another appliance.
7. Enclose any portion of the chimney that extends to accessible spaces.
8. The clearance of the chimney to any combustible material cannot be less than 2"; the 2" clearance cannot be filled with insulation or any non-combustible material.
9. At least one support is to be incorporated in any chimney installation.
10. A firestop is required in the joists/frames where the chimney goes through (ceilings, floors, walls, and roof).
11. To prevent drafting issues, avoid deviations wherever possible.
12. The chimney shall extend at least 3' above its point of contact with the roof and at least 2' higher than wall, roof, or adjacent building within a 10' radius.
13. A secure brace is to be installed if the chimney extends a minimum of 5' above the contact point with the roof.
14. A rain cap must be installed on top of the chimney to avoid internal damage and/or corrosion.
15. Consult the chimney manufacturer for clearances to combustibles when installing a combustible chimney enclosure above the roof.

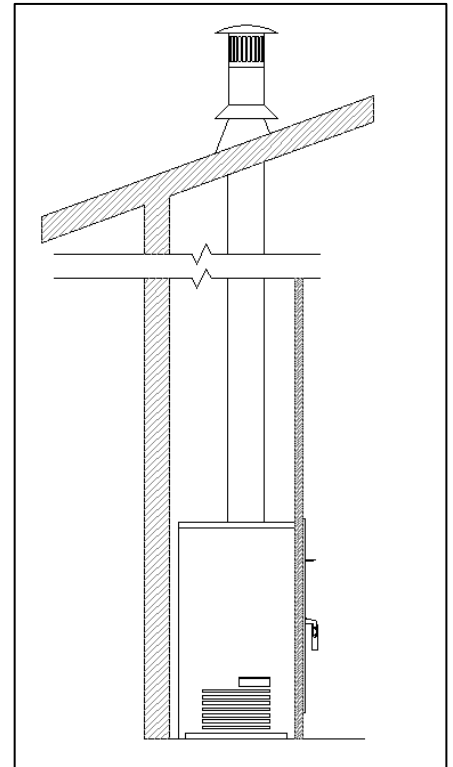


Figure 3-3: Straight Interior Installation

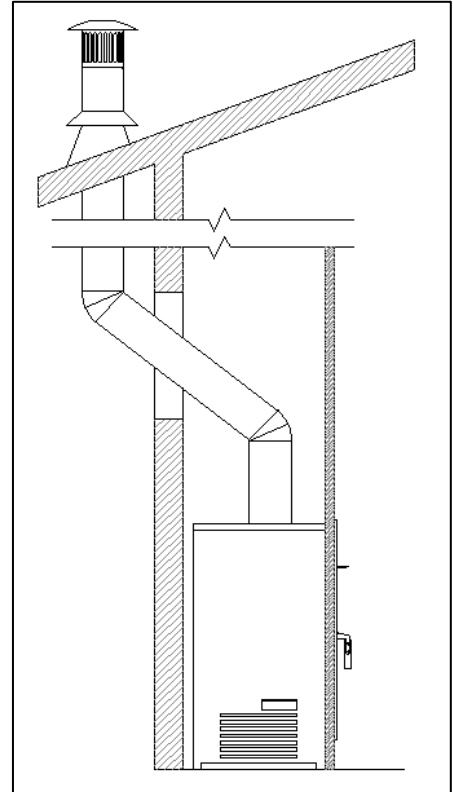


Figure 3-4: Exterior Installation

3.2.2 Listed UL 103 / ULC S629 Approved Chimney Models (Reference Table)

Note that the only chimney models certified under the UL 103 / ULC S629 standards can be installed on Astra 24. The table below serves as a reference for approved chimney models.

Manufacturer	Models
American Metal	• HS, AC Triple Wall, 6" inner diameter • HSS, AC Triple Wall, 6" inner diameter
FMI (US only)	• AC, AC Triple Wall, 6" inner diameter
ICC	• Excel 2100, 1" Solid Pack, 6" inner diameter
Metal Fab	• Temp Guard, 1" Solid Pack, 6" inner diameter
Olympia Chimney	• Ventis, 1" Solid Pack, 6" inner diameter
Security Chimney	• ASHT+, 1" Solid Pack, 6" inner diameter • S-2100+, 2" Solid Pack, 6" inner diameter
Selkirk	• Super Pro (SPR), 1" Solid Pack, 6" inner diameter • Super Pro 2100 (ALT), 2" Solid Pack, 6" inner diameter • Hart & Cooley (TLC), 1" Solid Pack, 6" inner diameter • Sure-Temp (ST), 1" Solid Pack, 6" inner diameter • Super Vent (JSC), 1" Solid Pack, 6" inner diameter • Super Vent 2100 (JM), 2" Solid Pack, 6" inner diameter • Ultra-Temp (UT), 1" Solid Pack, 6" inner diameter • UltimateOne, 1" Solid Pack, 6" inner diameter • CF Sentinel (CF), 2" Solid Pack, 6" inner diameter
Simpson Dura-Vent	• Dura Tech, 1" Solid Pack, 6" inner diameter • Dura Plus HTC, 2" Solid Pack, 6" inner diameter • Dura Plus, AC Triple Wall, 6" inner diameter

3.2.3 Chimney Installation Instructions

1. Cut and frame square openings in the floors, ceilings, and roof where the chimney will pass through while taking into consideration the minimum clearance to combustibles.
2. In the ceiling/floor openings, install a chimney manufacturer's firestop from below. Install the chimney manufacturer's attic radiation shield from above in the chimney opening to the attic. Ensure to install the appropriate firestop for ceilings and walls.
3. Install the chimney manufacture's anchor plate onto the unit.
4. Install the chimney lengths according the manufacturer's instructions and ensure proper fastening/locking of the joints.
5. Install the roof support once the desired height has been reached.
6. Position the roof flashing. Note that for sloping roofs, position the upper portion of the flashing under the shingles and position the lower portion of the flashing above the shingles. Seal the joint between the roof and the flashing with roofing cement or silicone. Secure the flashing to the roof with roofing nails.
7. Install the storm collar over the flashing by tightening the supplied bolt or through the flange mechanism (depends on chimney brand). Seal the joint between the storm collar and the chimney using a silicone caulking. **WARNING: Do not seal, caulk, or obstruct the ventilation openings when installing a ventilated flashing.**
8. Install the chimney rain cap.

Refer to Figure 3-3 and Figure 3-4 for typical chimney installations.

3.2.4 Offset Installation

An offset installation (Figure 3-7) consists of the use of elbows to deviate from unavoidable obstacles or to extend the chimney outside. The following list is a few general rules to take note when installing offsets:

- A maximum of 2 offsets (2 elbows per offset) is permitted per installation.
- The maximum deviation is 45° in Canada and 30° in the US.
- Secure the elbows and the chimney components according to the instructions from the chimney manufacturer.
- A support strap, a wall support, or a roof support must be installed above each offset to allow adequate support to the vertical chimney lengths.
- **Never install an elbow in an opening of a floor, wall, ceiling, or roof.** In addition, only vertical chimney sections can be installed within ceiling/floor openings.
- Install a support for the first 15' of chimney.

The following are instructions for offset installations:

1. Rotate the elbow in the required direction and secure it to the adjacent chimney section according to the chimney manufacturer's instructions.
2. Follow to the chimney manufacturer's instructions to install the chimney length(s) necessary for the offset.
3. Once the desired offset length has been achieved, install the second elbow to redirect the venting to the vertical position.
4. Cut an opening in the floor/ceiling to allow the chimney to pass through.
5. Install the appropriate firestop.

CAUTION: For offset installations, always install a ventilated flashing and a roof firestop unless otherwise specified by the chimney manufacturer.

3.2.5 Angled Wall Radiation Shield

For chimney installations requiring to pass through a combustible wall at a 30°

(Canada) or 45° (Canada and US) angle, an angled firestop or an angled wall radiation shield from the chimney manufacturer must be installed within the wall opening. Install the angled firestop and angled wall radiation shield according to the manufacturer's instructions. It is recommended to use an insulated angled wall radiation shield in areas that experience cold climates.

3.2.6 Connecting to a Masonry Chimney

The Astra 24 fireplace can be connected to a masonry chimney that complies with current national and municipal building codes. A 6" chimney liner that complies with ULC S635 M2000 (Canada) or UL 1777 (US) standards must be installed within the existing masonry chimney. Note that the 6CON connector (manufactured by SUPREME FIREPLACES INC.) must be installed to connect the prefabricated chimney to the liner (6CON sold separately).

Note that prior to installation, an inspection from an authority having jurisdiction is required to determine whether the masonry chimney:

- Is constructed in accordance with national and municipal building codes.
- Is in good condition. Note that repairs must be performed on any cracked or missing bricks.
- Is thoroughly cleaned of any soot or creosote.
- Is not connected to another appliance such as a furnace, hot water heater, or another fireplace.
- Has a flue of adequate size for proper installation of the venting.
- Respects minimum clearances to combustibles.

It is recommended to position the fireplace as close as possible to the masonry chimney to ensure proper venting. The prefabricated chimney must penetrate at least 3" within the masonry chimney before connecting

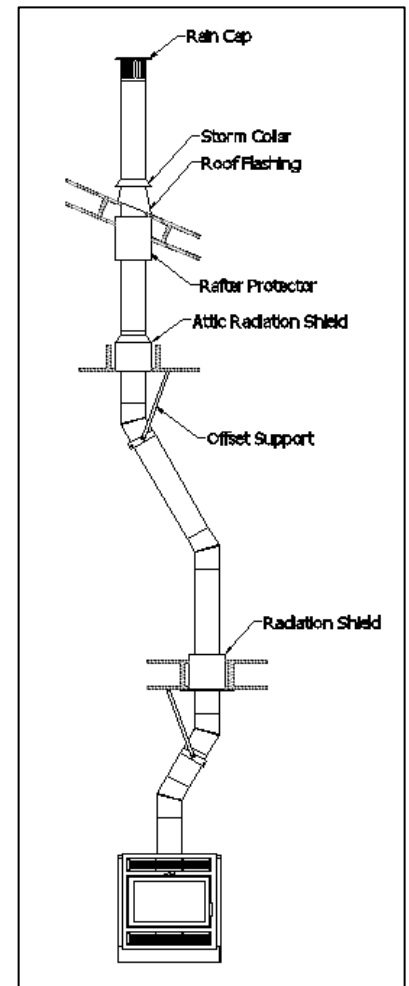


Figure 3-7: Offset Installation

the liner. Elbows can be used within the masonry chimney, with a maximum deviation of 30° in US and 45° in the Canada.

The installation of the prefabricated chimney and the liner must comply with the manufacturer's instructions. The following are instructions in installing the venting of the Astra 24 running through a masonry chimney:

1. Install the anchor plate onto the unit.
2. Position the fireplace to the recommended location.
3. Install the initial prefabricated chimney lengths and elbows.
4. Mark the area where the prefabricated chimney will penetrate the masonry chimney.
5. Remove the fireplace to allow for sufficient space to work.
6. Make a hole to the required size to allow for the prefabricated chimney to be inserted freely in the masonry chimney. Note that the appropriate firestops need to be installed if running the prefabricated chimney through a combustible wall.
7. Install the remaining prefabricated chimney components center with the masonry chimney.
8. Align the flange holder of the 6CON connector with the studs facing upwards to the center of the prefabricated chimney section (elbow or tee) and secure it with three self-tapping screws.
9. Reposition the fireplace to its initial position.
10. Overlap by 1" the lower end of the liner in the expanded portion of the 6CON connector and secure the joint with 3 #8 stainless steel self-tapping screws.
11. From the roof, slide the liner down the masonry chimney until it reaches the upper end of the prefabricated chimney.
12. Install the upper portion of the 6CON liner connector to the flange holder by aligning the threaded studs to the holes and complete the connection by tightening the wing nuts.
13. Seal any openings around the prefabricated chimney and the 6CON connector with refractory cement resistant to high temperatures.

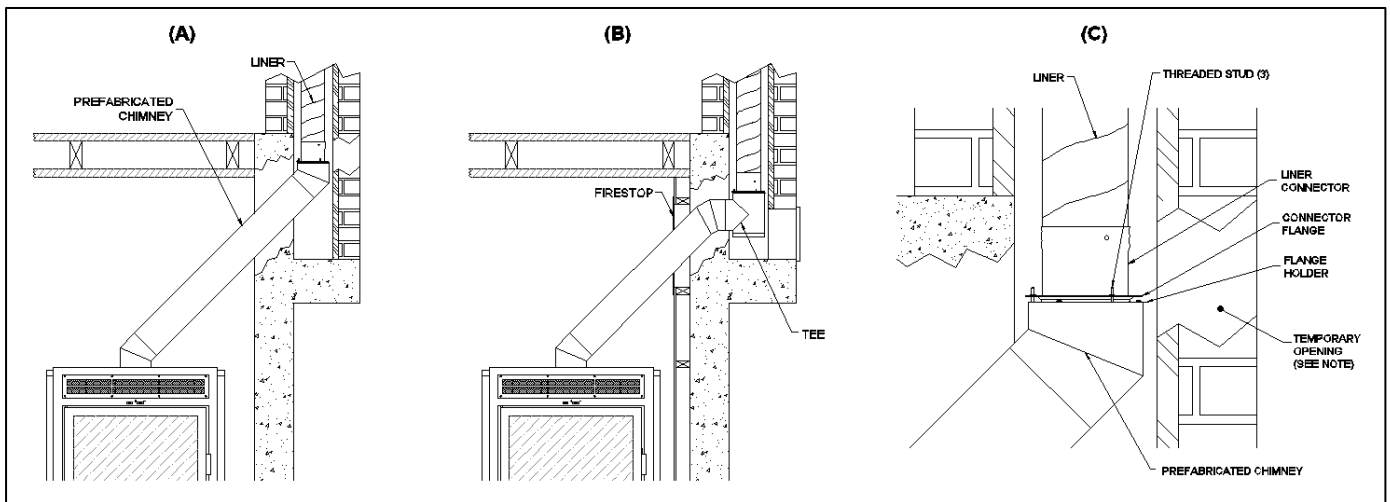


Figure 3-8: (A) Connection into a masonry chimney through an elbow/liner; (B) connection into a masonry chimney through a tee/liner; (C) detailed drawing of masonry chimney connection.

3.3 Façade Installation

The Astra 24 can be installed with either the traditional façade or the contemporary façade.

3.3.1 Traditional Façade

The traditional façade comprises louvers below (intake) and above (outtake) the door. All components and fasteners are included in the façade kit.

1. Remove the door of the unit and place it on a soft surface, such as a carpet or cardboard, to avoid any scratches or damages.
2. Align the bottom bracket to the intake opening and fasten it in place.
3. Align the upper bracket to the outtake opening and fasten it in place.
4. Place the façade within the door holder and secure it in place with 4 black screws (one on each corner). Make sure that the handles of the Primary Air Control pass through the slots of the façade.
5. Place back the door.

3.3.2 Contemporary Façade

The contemporary façade comprises no louvers; however, an intake into the chase and outtake through gravity ducts is required for this façade configuration. The instructions below describe the installation of the contemporary façade, the intake openings, and the gravity ducts/outtakes. Note that in order to connect the gravity ducts, the sides of the chase need to be constructed and the front of the chase needs to remain open (Refer to Figure 3-11).

1. Remove the door of the unit and place it on a soft surface, such as a carpet or cardboard, to avoid any scratches or damages.
2. Align the bottom bracket and fasten it in place.
3. Align the upper bracket and fasten it in place.
4. Place the façade within the door holder and secure it in place with 4 black screws (one on each corner). Make sure that the handles of the Primary Air Control pass through the slots of the façade.
5. Place back the door.
6. Remove the two 8" knockouts (2) at the top of the unit using a flat head screwdriver.
7. Using the knockout as a template, cut the exposed insulation. Make sure to remove any pieces of insulation that has fallen into the unit.
8. Install the 8" flange adaptors through the newly cut knockouts and fasten them to the top of the unit. Make sure to bend the tabs of the adaptors before installation.
9. Determine the two locations of the air intakes on the chase and cut a rectangular opening 10.5" (W) X 9.5" (H). Note that a distance of 3" is required from the floor.
10. Determine the two locations of the air outtakes on the chase and cut a rectangular opening 10.5" (W) X 9.5" (H). Note that a minimum distance of 68" is required from the floor.
11. From the exterior of the chase, place the duct/louver adaptor into the air outtake hole and secure it onto the wall with screws. Repeat for the other outtake.
12. Within the chase, place the grooved end of the adjustable 45° elbow into the flange of the duct/louver adaptor and secure it using an aluminum tape. Repeat for the other outtake.
13. Measure the distance between the flange on top of the unit and the flange of the duct/louver adaptor and cut the 8" semi-rigid insulated duct (SUPREME part number UCAC8) to the necessary length. Repeat for the other outtake.
14. Complete the connection by sliding the ducts over the flanges and tighten the joints with the worm gear clamps.
15. From the exterior of the chase, fasten the grills over the intake and outtake openings with the white screws.

3.4 Framing

The Astra 24 can be placed directly onto or against normal, combustible construction materials such as lumber, plywood, millboard, particleboard, drywall and decorative wood paneling. The fireplace should NOT be placed directly against or be in contact with an insulation material. A portion of the framing on the face of the chase must be constructed with nominal 2" x 3" metal studs and the remainder can be constructed with nominal 2" X 3" lumber. Refer to Figure 3-9 for framing design. The framing must be nailed or screwed onto the floor and to the ceiling.

CAUTION: Do not construct the framing with combustible material in front of the chimney; respect the framing design outlined in Figure 3-9.

WARNING: Do not nail or screw framing components onto the fireplace.

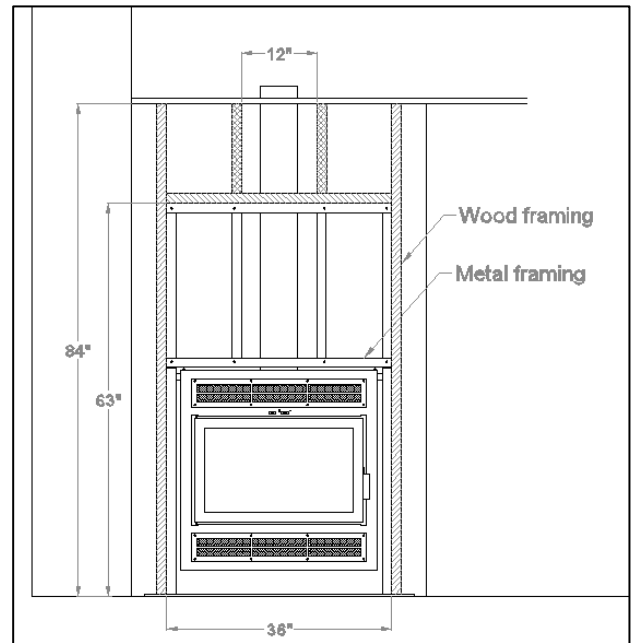


Figure 3-9: Framing Design of Astra 24

3.5 Hearth Extension

The hearth extension of the Astra 24 must comprise of a non-combustible material, such as steel, cement or mortar, bricks, or ceramic tiles. Note that unidentified materials may be combustible; verify product specifications prior to installation. In addition, the non-combustible hearth extension must be constructed of materials having a **minimum R-Value of 0.390**. The hearth extension must extend a minimum of 18" from the front of the door, 8" from side of the outer frame of the door, and extended all the way to the back of the unit (see Figure 3-10 for dimensions).

CAUTION: Make sure to remove any carpet or fabric under the hearth extension.

3.5.1 Calculating R-Value

The R-Value is a dimensionless measurement of a material's insulating properties with respect to a referenced thickness (see Table 3-1). The total R-Value of the hearth extension constructed out of different materials can be calculated by summing the R-Value of each material with respect to the thickness (see equation below).

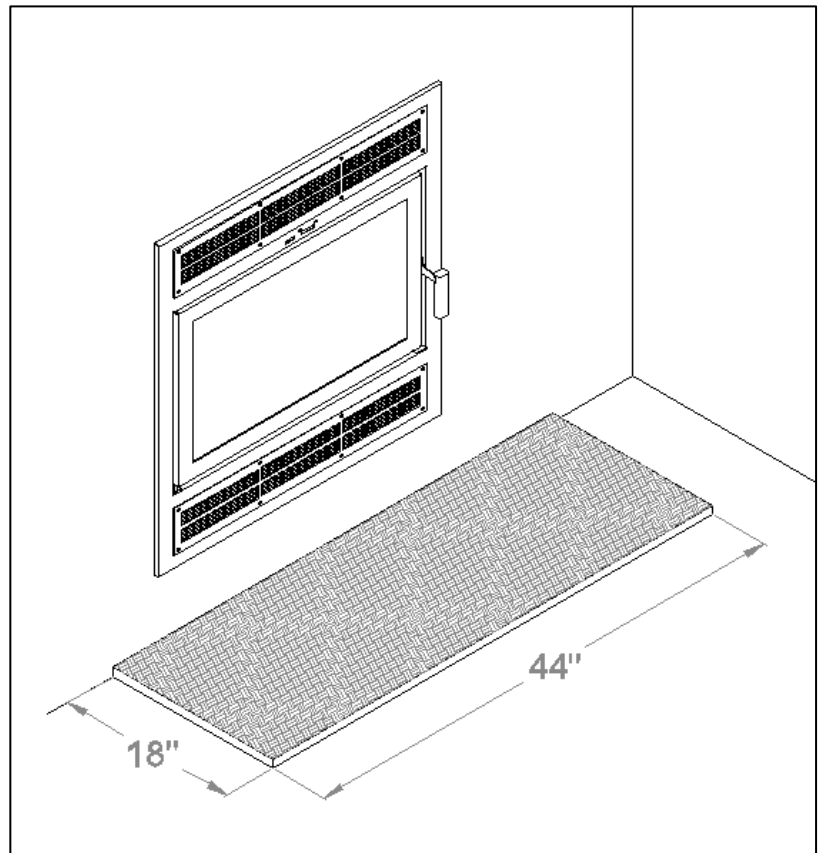


Figure 3-10: Hearth Extension

Table 3-1: Thermal Properties of Materials

Material	Thermal Resistance [R-Value] per Inch	Thermal Conductivity [k-Value] per Inch
Cement Board (Durock)	0.780	1.282
Brick	0.200	5.000
Limestone	0.153	6.536
Slate	0.100	10.000
Concrete	0.095	10.526
Marble	0.090	11.111
Granite	0.083	12.048
Ceramic Tile	0.080	12.500

$$R_{\text{Total}} = (R_1 \times T_1) + (R_2 \times T_2) + (R_3 \times T_3) + \dots$$

Note the k-Value per inch can be converted to an R-Value per inch using the following formula:

$$R = \frac{1}{k}$$

Example:

A hearth extension is constructed out of 4" of concrete with ¼" ceramic tiling. The total R-Value is:

$$R_{\text{Total}} = (R_{\text{con}} \times T_{\text{con}}) + (R_{\text{cer}} \times T_{\text{cer}}) = (0.095 \times 4") + (0.080 \times 0.25") = 0.400$$

As 0.400 is greater than 0.390, this hearth extension meets the requirements for the Astra 24.

3.6 Chase Installation

A portion of the front of the chase must be constructed out non-combustible material. Refer to Figure 3-11 for dimensions. Note the chase must be properly fastened onto the framing structure.

WARNING: Do not nail or screw the chase onto the fireplace.

For the contemporary façade option, two intake and two outtake openings must be constructed onto the chase. Refer to Figure 3-12 for minimum clearances.

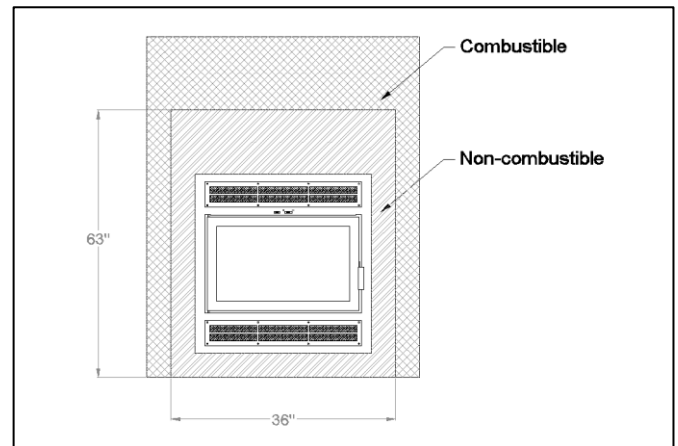


Figure 3-11: Front Face of Chase

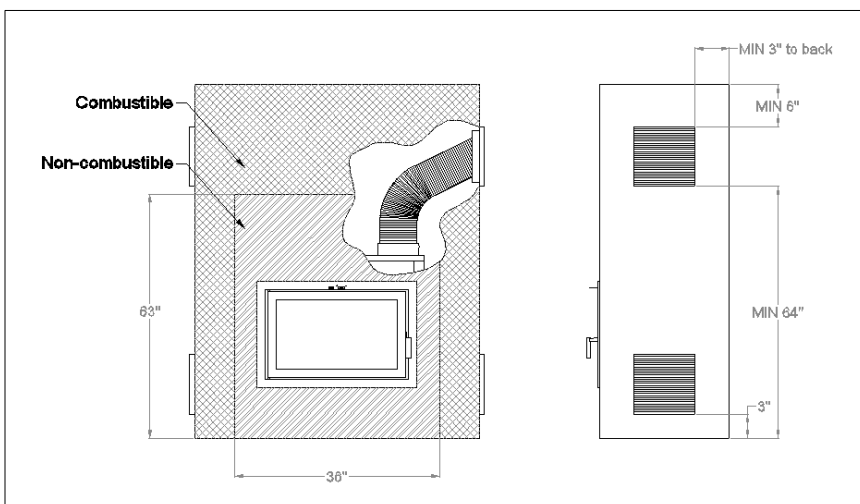


Figure 3-12: Contemporary Facade Chase

3.7 Clearances to Combustibles

The clearances below must be respected to ensure safe operation of the unit under normal and extreme conditions. Failure to follow the information below is a safety hazard and may result in property damage.

Table 3-2: Overall Clearances

Combustible	Clearance	Reference
Side Wall	16" (406 mm)	Outer edge of fuel door
Side Trim	3" (76 mm)	Outer edge of fuel door
Ceiling	84" (2133 mm)	Base of unit

Table 3-3: Mantel Clearances

Maximum Mantle Depth	Distance from the Base of the Astra 24 to the Bottom of the Mantle
3" (76 mm)	51.5" (1308 mm)
5" (127 mm)	53.5" (1359 mm)
7" (178 mm)	55.5" (1410 mm)

The depth of the mantle is measured from the face of the fireplace door. When the non-combustible wall is recessed, the depth of the mantle can be increased by the amount of the recess (see Figure 3-13). Note that a mantle cannot be installed below the minimum clearance of 51.5" (from the bottom of the mantle to the base of the unit).

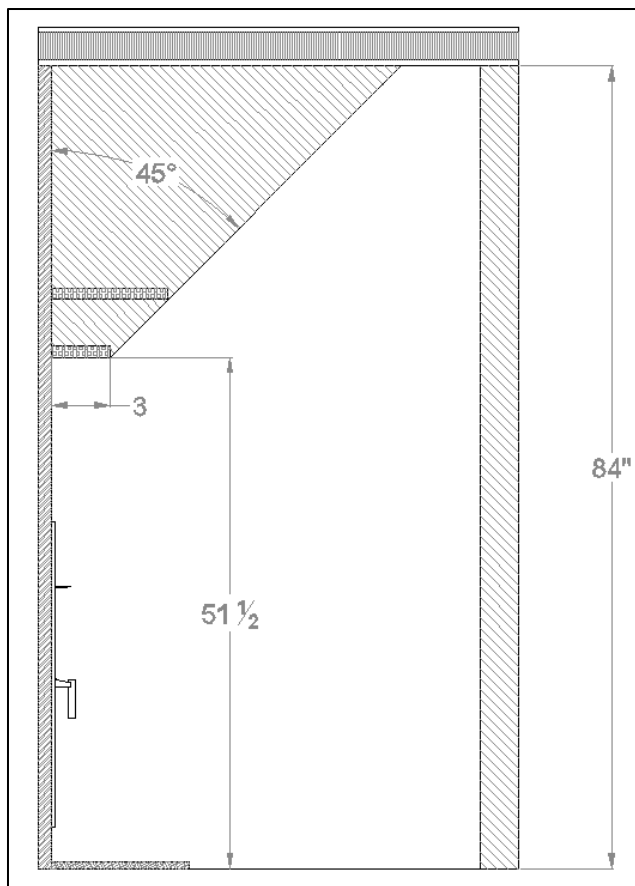


Figure 3-13: Mantle Clearances

3.8 Blower Kit

The Astra 24 comes with a high performance 250 CFM blower kit, which has an electrical rating of 115 V, 60 Hz, and 56 W. A variable speed control (rheostat) and a heat sensor (therm-o-disc) are included with the kit. **WARNING: Do not install a substitute blower.** The electrical connection of the fans is to be performed by a certified electrician. Note that it is recommended that the wiring of the fans be done before the installation of the façade kit. The fan and the electric box are located respectively at the back/bottom and at the front/bottom of the unit (Figure 3-14).

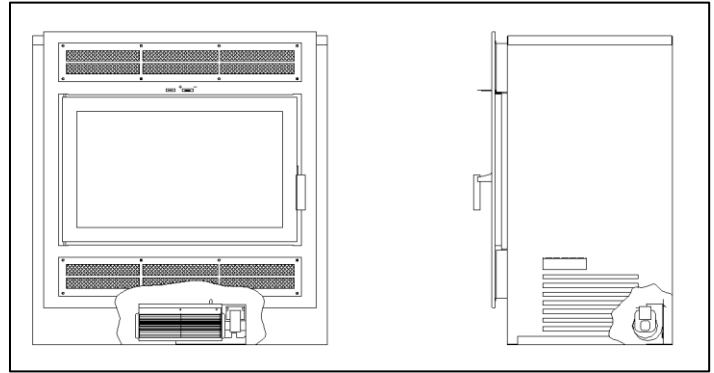


Figure 3-14: Location of Blower

For maintenance or replacement purposes, the fan and the electrical box are accessible from within the bottom of the firebox (Figure 3-15). 1) Remove the floor plate. 2) Disassemble and remove the stainless steel cover on the bottom of the firebox by unscrewing it. Take caution to the therm-o-disc and wiring assembled onto the stainless steel bracket.

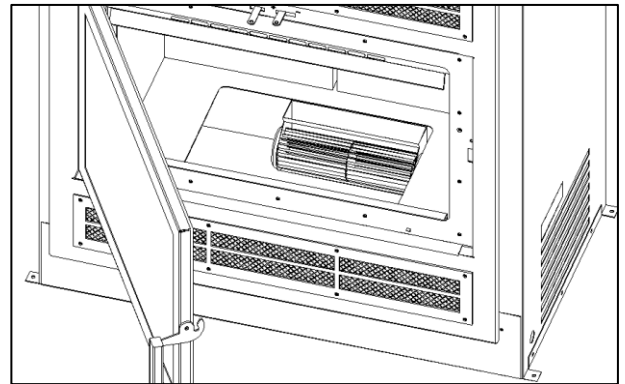


Figure 3-15: Access to Blower

The following are instructions on installing the blower kit into the Astra 24 (refer to Figure 3-16 for the electrical diagram):

1. Using two screws, install the therm-o-disc onto the L bracket located under the firebox.
2. Connect the black wire of the power supply to the therm-o-disc.
3. Connect the therm-o-disc to the black wire of the rheostat (install/mount the rheostat at a convenient location).
4. Connect the white wire of the rheostat to the blower.
5. Connect the blower to the white wire (neutral) of the power supply.
6. Ground the connection with the green wire in the electric box.

Once the electrical connections are completed, the fans will turn on and turn off automatically during the operation of the unit. As the temperature of the fireplace increases and the therm-o-disc reaches 95°F, the fans will turn on. Note that the average time it takes for the fans to activate is between 30 to 45 minutes after starting a fire. The fans will turn off once the fireplace has cooled down and the therm-o-disc is 85°F. The speed of the fans can be adjusted with the variable speed control (rheostat) mounted on the wall. It is safe to operate the Astra 24 in the event of a power failure (fans not powered).

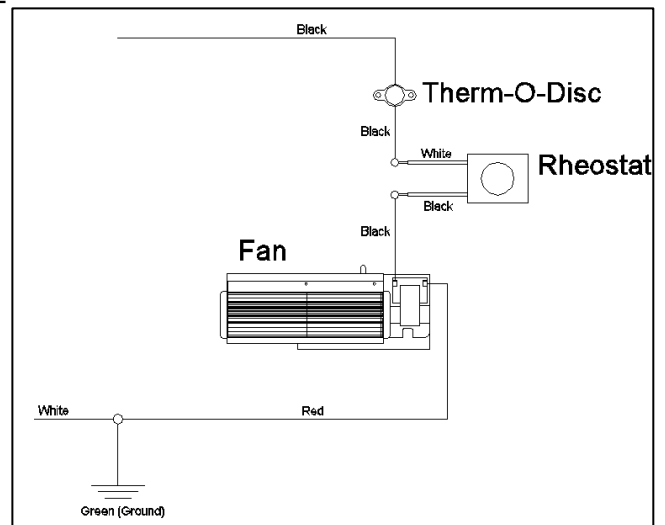


Figure 3-16: Electrical Diagram

4 OPTIONS

4.1 Hot Air Kit

The hot air system is an optional kit intended to bring hot air from the fireplace to a remote area using a 250 CFM blower. The system is designed to distribute heat with ducting lengths up to 25'. Note that only an insulated flexible duct capable of withstanding a maximum temperature of 210°F can be installed with this kit.

WARNINGS

- Do not install within the casing of the fireplace.
- Respect the minimum distances to combustible materials when the hot air duct passes through the chase of the fireplace. Properly secure the duct to avoid accidental displacement.
- Install the blower a minimum distance of 3 feet away from the fireplace.
- Do not use a speed control for the blower.

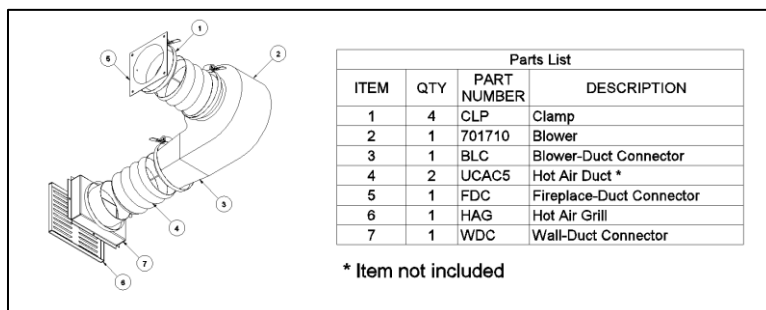


Figure 4-1: Hot Air Kit Parts List

Installation:

1. Remove the 5" knockout on the exterior casing of the fireplace using a flat head screwdriver.
2. Install the fireplace duct connector (FDC - #5) on the opening using four screws.
3. In the room where the heat will be distributed, cut an opening of 6" X 7.5".
4. Find a suitable location to install the blower (701710 - #2).
5. Install the wall-duct connector (WDC - #7).
6. Install the air duct (UCAC5 - #4)* and secure it with a clamp (CLP - #1).
7. Install the wall grill (HAG - #6).
8. Make the electrical connections (Figures 4-5 and 4-6). Note that the power supply to the blower is 115V.

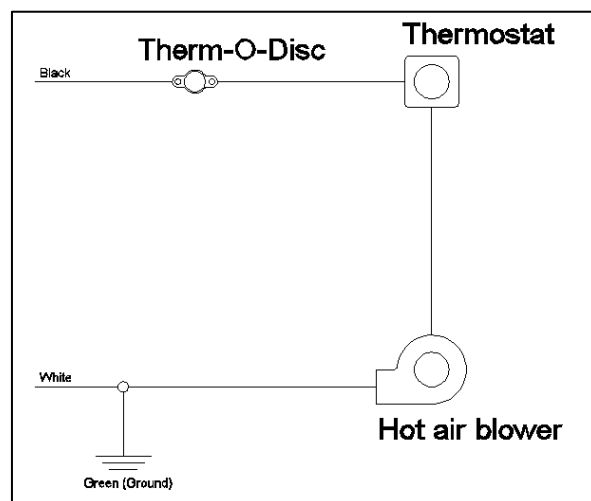


Figure 4-2: Electrical Diagram for Hot Air Kit

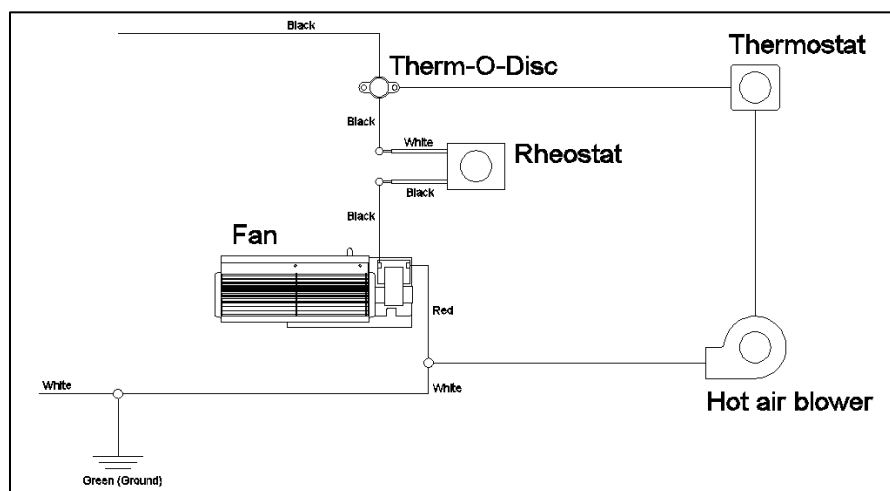


Figure 4-3: Electrical Diagram for Parallel Connection of Hot Air Kit and Blower Kit

4.2 Fresh Air Kit

Sufficient air exchange is necessary for the fireplace to operate properly and to maintain a good combustion. In an airtight household, the fireplace may not function as designed due to a lack of air; it is therefore recommended to install the fresh air kit in such cases. The fresh air system is an optional kit intended to bring combustion air into the fireplace from an exterior source.

Note that the Astra 24 is designed to use a minimum amount of air during operation. Using an air exchanger or simply opening a nearby window/door during the ignition of the unit will achieve a similar result as the fresh air kit. When the fireplace is idle, there is no air escaping from the house through chimney. **Consult a local authority having jurisdiction (such as the fire department, the municipal building department, the fire prevention bureau...) to determine if it is mandatory to install a fresh air kit in your area.**

General Notes:

The outside air kit should be installed according to the following guidelines:

- The air duct must be insulated, wrapped with a vapor barrier, and have an inner diameter of 4".
- The length of the air duct should be as short as possible.
- Fresh air must come from the outside and not from another room or the attic.
- The outside register must be away from automobile exhaust fumes, gas meters, or other vents.
- Avoid installing the air register where it will likely be covered by snow or exposed to strong winds.
- The air register can be installed above or below the level where the fireplace.
- Use the SUPREME FIREPLACES INC. Fresh Air Adaptor (ADP4)
- Use the SUPREME FIREPLACES INC. Fresh Air Kit (UPEA4) or any other fresh air kit with the same specifications and intended for fireplace use.

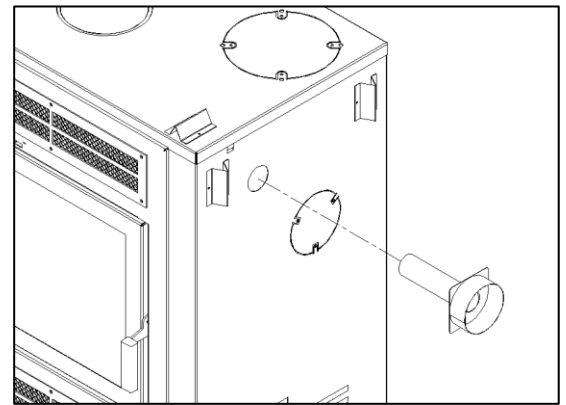


Figure 4-4: ADP4 Installation in Fireplace

Installation:

1. Cut a 4 ½" diameter hole on the exterior wall of an ideal location.
2. Install the air register on the exterior wall.
3. Insert the fresh air adaptor (ADP4) into the fireplace from the exterior casing. Make sure that the adaptor is properly inserted into the combustion air box on top of the firebox.
4. Secure the fresh air adaptor to the side of the fireplace using two screws.
5. Install the air duct and secure it with worm gear clamps.

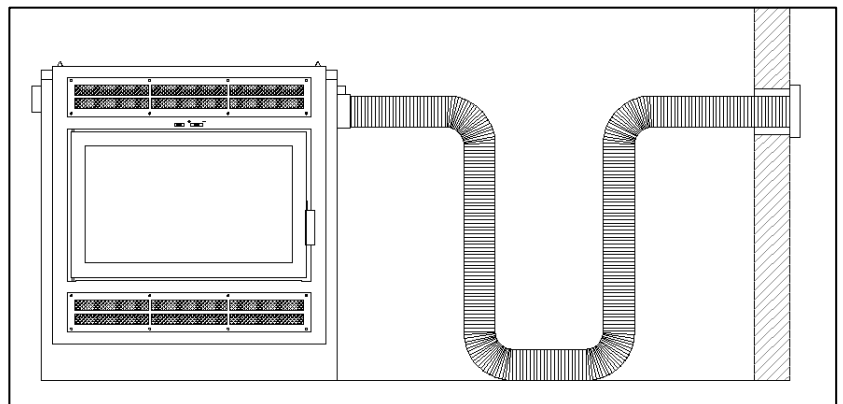


Figure 4-5: Installation of Fresh Air Kit

5 OPERATION INSTRUCTIONS

5.1 Fuel

The Astra 24 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 Astra 24 fireplace. Over firing will damage the fireplace, is hazardous and will void the warranty. NOTE: Gas logs cannot be installed in the Astra 24 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 Astra 24. 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 Astra 24. 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.

5.2 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 Astra 24. Open a window or a door near the fireplace insert to ventilate the house during the first fires. Oil residues may cause light smoking.

5.3 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 Astra 24 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 Astra 24 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.

5.4 Starting a Fire

The Astra 24 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 Astra 24 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.

5.5 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 Astra 24 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 Astra 24 slightly unlatched until you see a flame in the firebox. Never leave the Astra 24 door unlatched without constant supervision.
- f) Completely latch the Astra 24 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.

5.6 Blower Operation (Optional)

The optional blower kit for the Astra 24 consists of a blower mounted at the back/bottom of the unit and a heat sensory therm-o-disc; 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 4.1 for the installation instructions of the optional blower kit.

When the fireplace gets hot and the therm-o-disc 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 5.4). The fans will turn off once the insert has cooled down and the therm-o-disc reaches 85°F. The speed of the blower can be adjusted with the variable speed control.

6 TROUBLESHOOTING

6.1 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 Astra 24 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 Astra 24.
- Heat the chimney by burning newspaper near the exhaust of the baffle system.

6.2 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 Astra 24 door is properly closed.
- b) Manually close the Combustion Air Control by pulling the Activator (left lever).
- c) If possible, turn on the blower to the maximum speed. The red glow on the exterior of the firebox and/or the flue 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 Astra 24 and will void the warranty.

7 MAINTENANCE

7.1 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.

7.2 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 5.3); 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 an Astra 24 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.

7.3 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.

7.4 Replacing Soapstone Slab

Four 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 Astra 24 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.

7.5 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 Astra 24 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 ¾" 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.

7.6 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:

- Order the replacement kit for the Astra 24 glass.
- Remove, clean, and dispose any broken glass from the door and the surroundings.
- Remove the door from the firebox and place it face down on a soft surface. NOTE: Rotate the handle to permit proper placing.
- Using a wedging tool or flat head screwdriver, gently remove the $\frac{3}{4}$ " gasket (along with the silicone) from the door framing.
- Using a wrench, remove the 8 nuts fastened around the door framing.
- Remove the first row of metal brackets (2 small and 2 big) and thin gasket.
- Remove the damage glass and clean thoroughly the door framing from loose glass fragments.
- Place the new glass onto the second row of thin gasket, centered with the door framing.
- Place back the first row of metal brackets (2 small and 2 big) and thin gasket.
- Using a wrench, fasten the 8 nuts around the door framing (do not over-tighten).
- Apply a bead of high temperature silicone along the groove of the metal brackets.
- Place the $\frac{3}{4}$ " gasket back into position.

Table 7-1: Parts List of Door Assembly

Item	Code	Description	Qty
1		Door frame assembly	1
2	DR_21375	Horizontal metallic bracket	4
2	DR_1325	Vertical metallic bracket	4
3	PYRO_20.25X12	Pyroceram glass	1
4	GSK_19_6	Thin gasket	2
5	GSK_25_6	Thick gasket	1
6		Door latch	1
7		Wood pull handle	1

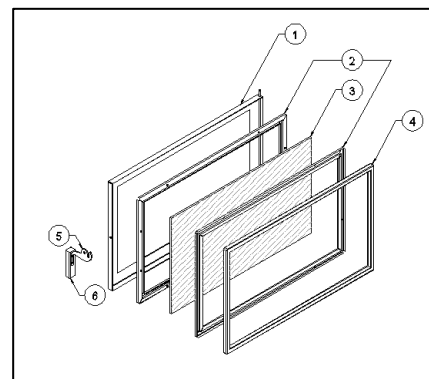


Figure 7-2: Exploded View of Door Assembly

Give significant amount of time to allow the silicone to cure before reinstalling the door onto the firebox.

7.7 Door Latch Lubrication

Lightly lubricate the hook of door latch (CM0031) on a yearly basis to prevent abrasive wear.

7.8 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.**

8 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

CERTIFIED TO: ULC S610 : UL 127



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 1.91 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. Certification tests were performed by POLYTESTS SERVICES INC. with DIRIGO LABORATORIES, INC. as the third-party-certifier.

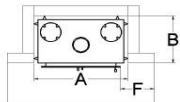
WH-24SFC

supreme 3594 Jarry E., Montreal, QC
H1Z 2G4, Canada

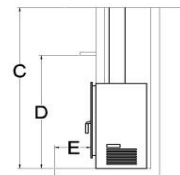
DATE OF FABRICATION / DATE DE FABRICATION

JA	FE	MR	AR	MA	JN	JL	AU	SE	OC	NO	DI
2017		2018		2019		2020		2021		2022	

MINIMUM CLEARANCES TO COMBUSTIBLES
DÉGAGEMENTS MINIMUMS AUX COMBUSTIBLES



ADJACENT SIDEWALL / MUR LATERAL	16"
A) CHASE WIDTH / LARGEUR DE L'ENCEINTE	36"
B) CHASE DEPTH / PROFONDEUR DE L'ENCEINTE	21.5"
C) CEILING / PLAFOND	84"
D) MANTEL FROM FLOOR / MANTEAUX DU PLANCHER	51.5"
E) HEARTH DEPTH / PROFONDEUR DE L'ÂTRE	18"
F) HEARTH FROM SIDE DOOR/ ÂTRE DE LA PORTE	8"



ELECTRICAL RATING - OPTIONAL
ALIMENTATION ÉLECTRIQUE - OPTIONNEL

VOLTAGE / TENSION:	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.

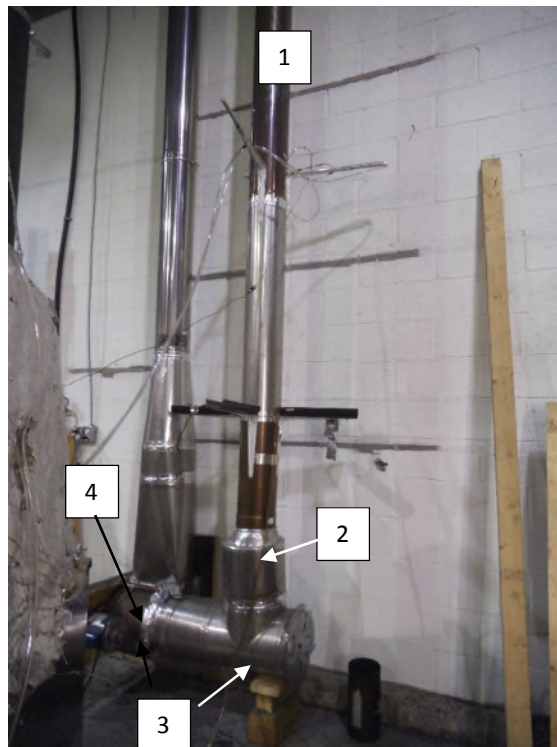
- FOR USE WITH WOOD ONLY, DO NOT USE OTHER FUELS
- USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION AND OPERATING INSTRUCTIONS.
- NOT SUITABLE FOR MANUFACTURED OR MOBILE HOMES.
- A NON-COMBUSTIBLE HEARTH EXTENSION OF MINIMUM THICKNESS 8 MM (5/16 IN.) WITH AN R-VALUE EQUIVALENT TO 0.39, EXCEEDING 457 MM (18 IN.) FROM THE DOOR FACE AND OF 200 MM (8 IN.) FROM EACH SIDE OF THE DOOR MUST BE INSTALLED.
- USE ONLY WITH 6 IN. (152 MM) DIAMETER CHIMNEY LISTED UL 103/ULC S629
- MINIMUM/MAXIMUM CHIMNEY HEIGHT 15/35 FEET MEASURED FROM THE BASE OF THE FIREPLACE.
- CAN BE CONNECTED TO A MASONRY CHIMNEY. SEE OWNER'S MANUAL FOR INSTALLATION INSTRUCTIONS.
- DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.
- DO NOT INSTALL A FIREPLACE INSERT OR OTHER COMPONENTS NOT LISTED FOR USE WITH THIS PRODUCT.
- FOR CLOSED DOOR OPERATION ONLY
- DO NOT OVERFIRE THE UNIT. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING.
- REPLACE GALLS ONLY WITH CERAMIC 5 MM THICK ONLY.
- CAUTION: AIR IS NECESSARY FOR FIREPLACE OPERATION. PRIMARY AND SECONDARY COMBUSTION AIR OPENINGS MUST NOT BE OBSTRUCTED.
- WARNING: THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- CONTACT LOCAL BUILDING CODE OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.
- THE FIREPLACE AND CHIMNEY MUST BE INSPECTED AND CLEANED REGULARLY.

- POUR UTILISATION AVEC BOIS SEULEMENT, NE PAS UTILISER AVEC D'AUTRES COMBUSTIBLES.
- INSTALLER ET UTILISER CONFORMÉMENT AU MANUEL D'UTILISATION DU FABRIQUANT.
- NE CONVIENT PAS AUX MAISONS MOBILES
- PROLONGEMENT DE L'ÂTRE AYANT UNE ÉPaisseur DE 8 MM (5/16 PO.) MINIMUM AVEC UNE VALEUR R DE 0,39, EXCÉDANT 450 MM (18 PO.) DU DEVANT DE LA PORTE ET DE 200 MM (8 PO.) DE CHAQUE CÔTÉ DE LA PORTE DOIT ÊTRE INSTALLÉ.
- UTILISER SEULEMENT AVEC UNE CHEMINÉE HOMOLOGUÉE SELON UL 103/ULC S629 DE 6 PO. (152 MM) PARMIS LA LISTE DANS LE MANUEL DU PROPRIÉTAIRE.
- PEUT ÊTRE CONNECTÉ À UNE CHEMINÉE DE MAÇONNERIE. VOIR LE MANUEL DU PROPRIÉTAIRE POUR INSTRUCTIONS.
- NE PAS RACCORDER CET APPAREIL À UNE CHEMINÉE DESSERVANT UN AUTRE APPAREIL.
- NE PAS UTILISER UN FOYER ENCASTRABLE OU D'AUTRES COMPOSANTES NON-HOMOLOGUÉES POUR UTILISATION AVEC CE FOYER.
- POUR OPÉRATION AVEC PORTE FERMÉE SEULEMENT.
- NE PAS SURCHAUFFER L'UNITÉ. SI L'APPAREIL OU LE TUYAU ROUGIT, IL Y A UN SURCHAUFFEMENT.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5 MM D'ÉPaisseur.
- ATTENTION : L'AIR EST NÉCESSAIRE AU FONCTIONNEMENT DU FOYER. LES ENTRÉES D'AIR DE COMBUSTION PRIMAIRE ET SECONDAIRE NE PEUVENT PAS ÊTRE OBSTRUÉES
- ATTENTION : CE FOYER N'A PAS ÉTÉ TESTÉ AVEC UN BRÛLEUR AU GAZ. POUR RÉDUIRE LES RISQUES D'INCENDIES OU DE ÉLÉMENTS, NE PAS INSTALLER UN BRÛLEUR DE GAZ DANS CE FOYER.
- CONTACTER LES AUTORITÉS DE VOTRE LOCALITÉ AYANT JURIDICTION CONCERNANT LES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- LE FOYER ET LA CHEMINÉE DOIVENT ÊTRE INSPECTÉS ET NETTOYÉS RÉGULIÈREMENT.

APPENDIX 8: Photographs of test set up

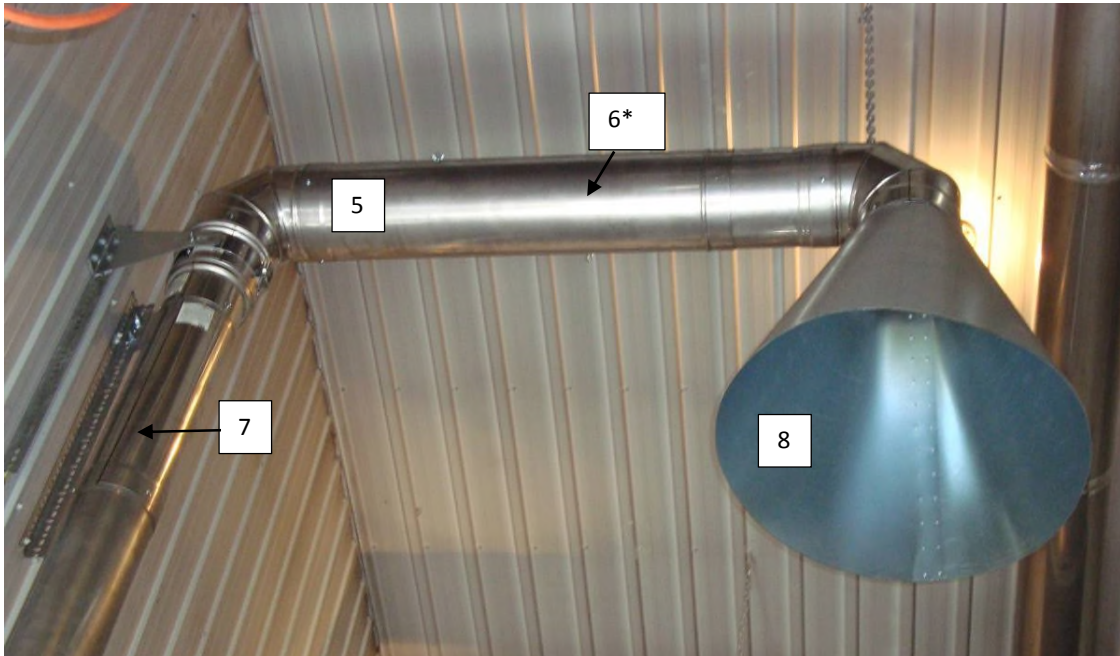
Dilution picture Dia 8

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 and mixing baffle



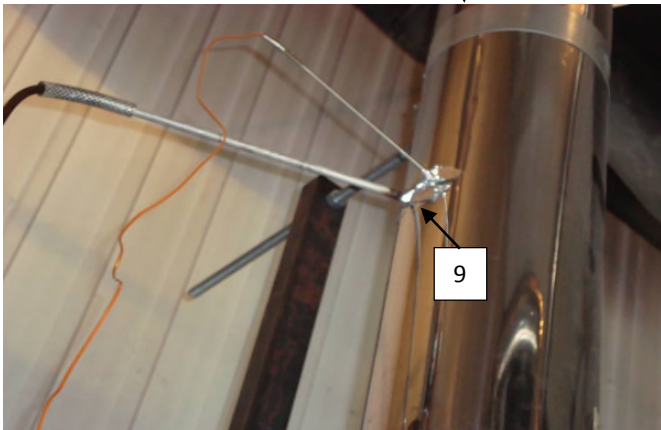
*The arrow point the deflectors inside of the pipe

- 5 : 8 in. dia. Stainless steel pipe
- 6 : Mixing baffle (2) location 1 foot between baffles
- 7 : 10 feet long between velocity port and upper elbow
- 8 : 48 in. dia. Galvanized steel smoke captures hood

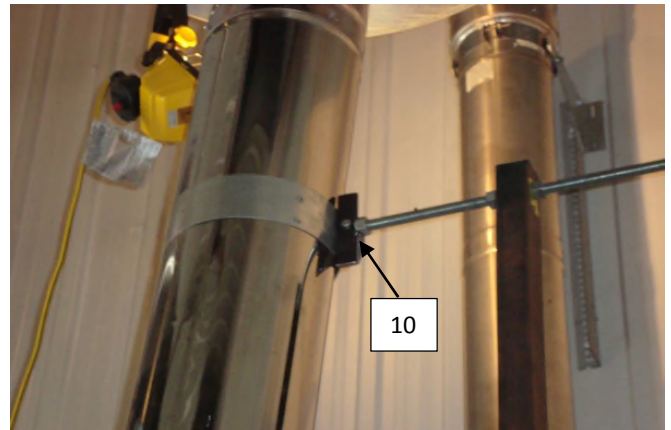
Picture 3: Stack sampling



Picture 3.1: Gas analysis and temperature probe



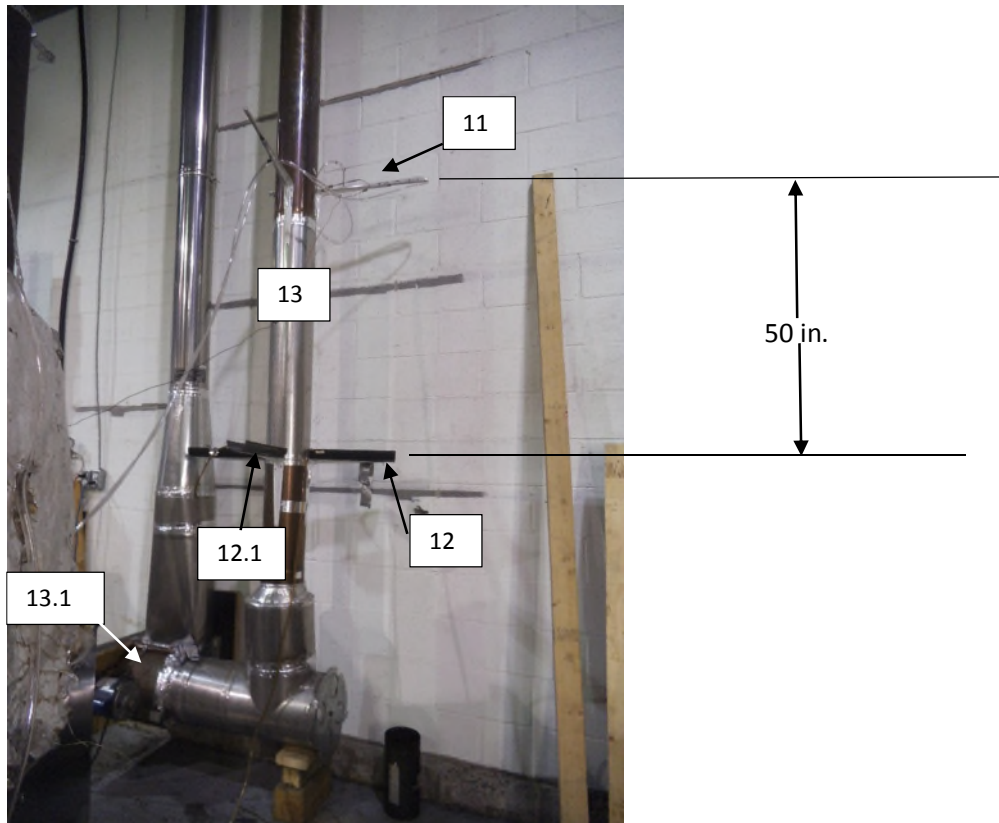
Picture 3.2: chimney support



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 2x48 mm. dia.filter each. Filter used:
Millipore AP4004700

12.1 : Sampling port, sampling probes with 2x48 mm. dia.filter each. Filter used:
Millipore AP4004700, for first hour sampling

13 : 18 feet long dilution tunnel

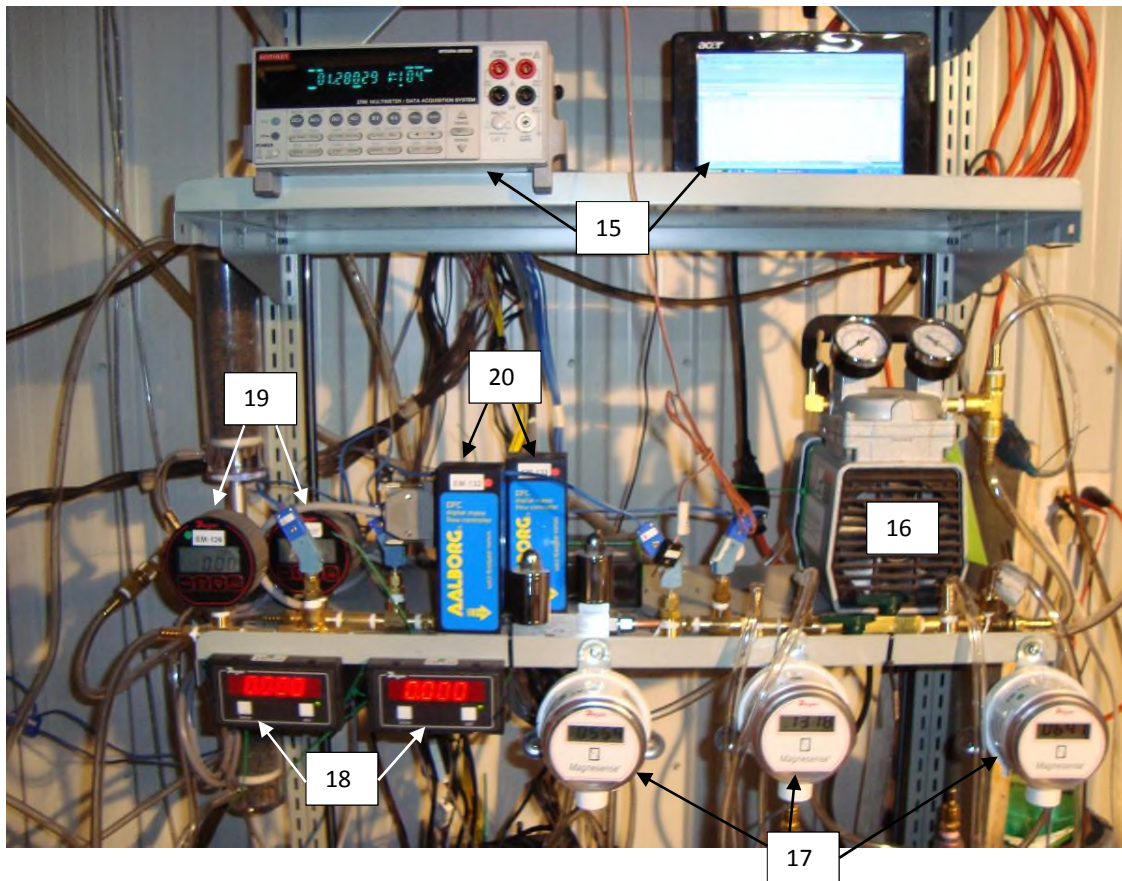
13.1 : Extraction blower

Picture 5: Draft sampling



14 : Draft sampling port located 6 in. from the flue outlet

Picture 6: Equipments

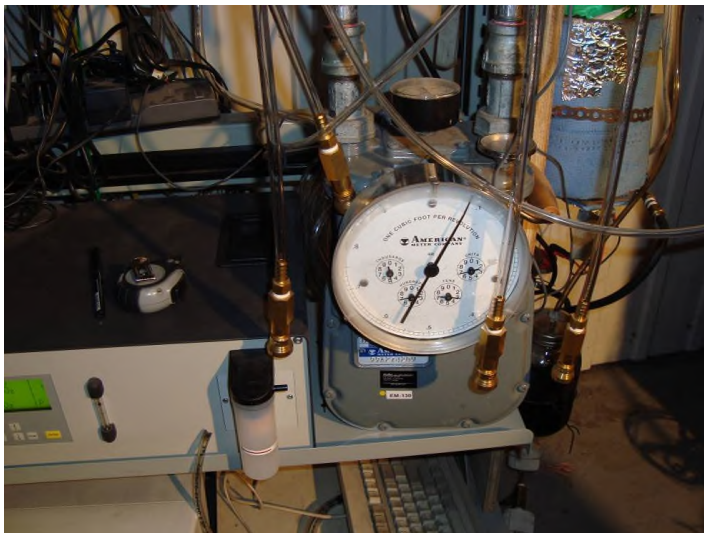


- 15 : Acquisition system
- 16 : Vacuum pump
- 17 : Digital manometer
- 18 : Digital read out for mass flow meter
- 19 : Digital vacuum gage
- 20 : Mass flow meter

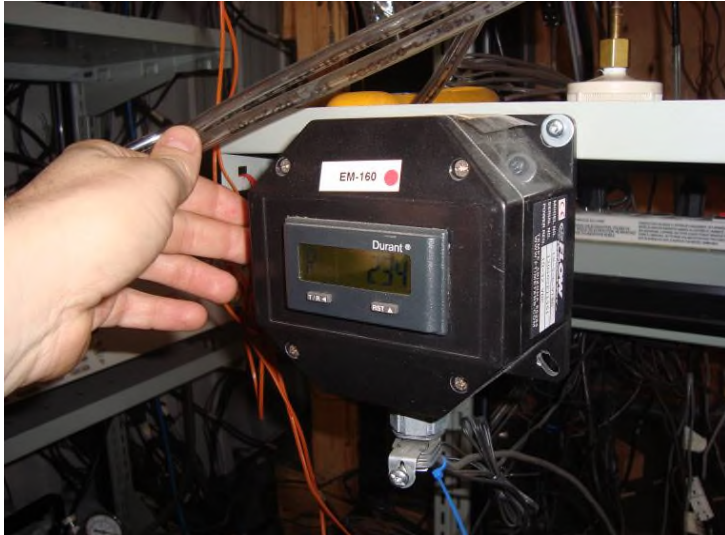
Picture 7: Gaz analyser



Picture 8: Reference dry gas meter



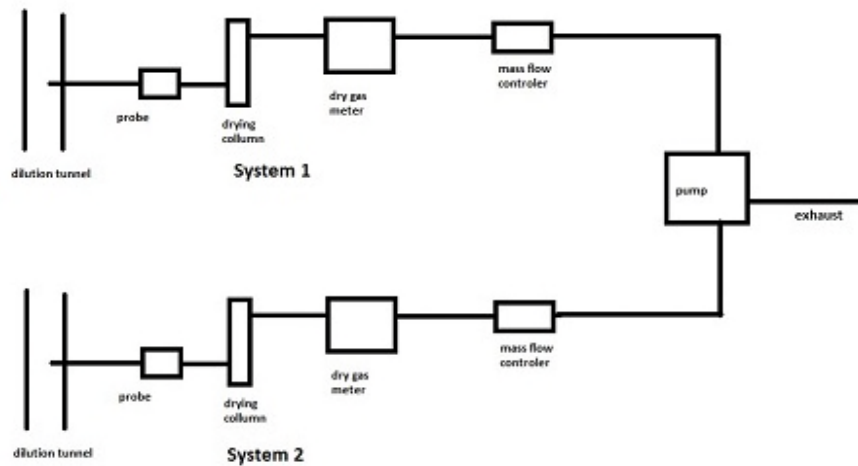
Picture 10: Water flow meter



Picture 11: Dry gas meter



Picture 12: Dilution tunnel sample system



Picture 13: Dilution tunnel

