



TEST REPORT

TEST OF A HYBRID WOOD STOVE FOR EMISSIONS AND EFFICIENCY

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

Client:

Hearthstone QHHP

317 Stafford ave.

Morrisville, Vt 05661

Model name: Green Mountain 80

Attention: Rafaël Sanchez

TESTED BY:

Services Polytests Inc.

695-B Gaudette

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

TEST DATES: September 19th to September 27th 2018

REPORT DATE: October 9th 2018

Project number: PI-20177

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Tested:

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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: September 19th to September 27th 2018
- Test methods used:
 - o Particulate emissions: ASTM E2780-10 ; ASTM E2515-11 methods 28R as referred into 40 CFR Part 60 Subpart AAA
 - o Efficiency: CSA B415.1-10

1.2 TEST UNIT INFORMATION

General

- Manufacturer: Hearthstone
- Product type: Hybrid wood stove
- Combustion system: catalytic, with post combustion
- Unit tested: Green Mountain 80
- Option: optional convection fan can be installed on the wood stove

1.3 RESULTS

Emission results obtained

- Average emission rate: 0.67 grams/hour
- Average Efficiency: 81.0 %

Conformity: NSPS Phase 2020

1.4 PRETEST INFORMATION

Unit condition: The unit was received by carrier first week of September 2018. The 50hrs of aging was done by the manufacturer (all data in Appendix 4).

Set up

- Venting system type: 8-inch diameter insulated chimney
- System height from floor: 15 feet
- Particularities: The unit was tested with the convection Fan ON for average numbers (Test #2,3,5 and 6), and one confirmation test is done without any convection fan (test #4). Test number 1 failed on Delta °T criteria

Break in period

- Duration: the unit was pre burned by the manufacturer and run for at least 50 hours, adequate documentation of fuel additions, flue and unit temperatures recorded.
- Fuel: BC FIR between 19% and 25%

2 SUMMARY OF TEST RESULTS

2.1 EMISSIONS

Run Number	Test Date (Y-MM-DD)	Emission Rate (g/hr)	Burn Rate (kg/hr)	1st hour Emission Rate (g/hr)	CSA B415.1 CO emission Gr/hr	CSA B415.1 CO emission Gr/Kg dry
1	2018-09-19	0,21	0,761	1,00	N.A.	N.A.
2	2018-09-20	0,71	1,002	2,66	13,97	14,01
3	2018-09-24	0,25	0,986	1,174	12,857	13,129
4	2018-09-25	0,67	1,068	2,886	27,080	25,523
5	2018-09-26	0,93	1,721	2,991	9,859	5,733
6	2018-09-27	0,65	2,281	1,023	17,943	7,946

2.2 AVERAGE CALCULATION

Test No.	Burn Rate (Kg/hr)	(E) Ave. Emission Rate g/hr	(OHE) %	Heat Output (BTU/HR)	CSA B415.1 CO emission g/min
2	1,00	0,706	82,3%	15 423	0,23
3	0,99	0,245	81,9%	15 069	0,21
5	1,72	0,932	79,7%	25 752	0,16
6	2,28	0,646	78,7%	33 396	0,30
Weighted particulate emission average of 4 test runs: 0.67 grams per hour.					
Weighted average HHV efficiency of 4 test runs: 81.0 %.					
Average Co 0.23 gr/min					

2.3 TEST FACILITY CONDITIONS

Run Number	Room Temperature		Barometric pressure		Relative humidity		Air Velocity	
	Before (F)	After (F)	Before (in.Hg)	After (in.Hg)	Before (%)	After (%)	Before (ft/min)	After (ft/min)
1	72	76	29,855	30,091	43	38,1	0	0
2	79	74	30,180	30,150	47,2	43	0	0
3	77	78	30,386	30,357	30	28,1	0	0
4	77	78	30,268	30,062	27,2	29	0	0
5	82	82	29,707	29,973	59,1	53	0	0
6	80	78	30,062	30,062	44	30,4	0	0

2.4 FUEL QUALITIES

Run Number	Pre-test Load			Test Load						
	Loading Weight Wet Basis (lbs)	Moisture Content Dry Basis (%)	Coal bed Weight (lbs)	Weight Wet Basis (lbs)	Density Wet Basis (lbs/cuft)	Moisture Content Dry Basis (%)	Piece Length (in.)	Number of 2X4's	Number of 4x4's	Number of Spacers
1	29,00	21,02	4,6	20,33	6,434	20,71	19,75	0	4	12
2	29,01	20,72	4,7	21,49	6,800	20,86	21	0	4	12
3	28,66	22,06	4,7	20,94	6,626	21,12	20,25	0	4	12
4	28,59	21,78	4,7	21,03	6,656	21,21	20,5	0	4	12
5	28,62	21,46	4,7	20,91	6,617	21,54	20,5	0	4	12
6	28,37	20,58	5.2	21,10	6,677	21,03	21,25	0	4	12

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

Average dilution tunnel measurements				Sample Data			
Run Number	Burn Rate (Min)	Volumetric Flow Rate (dscf/min)	Total Temperatures (°R)	Volume sampled (DSCF)		Particulate catch (mg)	
				1	2	1	2
1	602	173,40	544,37	93,878	92,207	1,99	1,80
2	483	174,76	552,52	76,037	74,958	5,70	5,10
3	477	170,73	550,51	76,333	74,761	1,80	1,70
4	442	174,68	548,52	74,901	74,446	4,80	4,70
5	272	170,01	562,77	43,282	42,434	3,80	3,80
6	208	177,51	567,70	32,486	32,128	1,90	1,90

2.6 DILUTION TUNNEL DUAL TRAIN PRECISION

Run Number	Sample Ratio		Total Emission (g)		
	Train 1	Train 2	Train 1	Train 2	% Deviation
1	1111,91	1132,07	2,21	2,04	4,12%
2	1110,11	1126,09	5,98	5,39	5,11%
3	1066,86	1089,29	1,98	1,92	1,70%
4	1030,83	1037,13	4,97	4,90	0,73%
5	1068,38	1089,73	4,18	4,27	1,01%
6	1136,54	1149,22	2,23	2,25	0,57%

2.7 GENERAL SUMMARY OF RESULTS

Run Number	Burn Rate (kg/hr)	Average Surface Temperature (F)	Change in surface Temperature (F)	Initial Draft (in. H ² O)	static pressure tunnel (in. H ² O)	Primary Air Setting	Run Time (min)
1	0,761	277,67	-141,8	0,047	0,210	Min setting	602
2	1,002	315,29	-102,0	0,053	0,240	min setting	483
3	0,986	310,25	-125,9	0,055	0,260	min setting	477
4	1,068	334,06	-74,3	0,056	0,250	Medium setting	442
5	1,721	394,71	-34,4	0,067	0,260	medium setting	272
6	2,281	431,50	-61,1	0,077	0,260	full open	208

3 PROCESS DESCRIPTION

3.1 DISCUSSION

The unit was delivered by the client and received in a good condition. Three Preliminary runs were done at the lab to ensure repeatability of testing done by manufacturer at his location before official test series. Four runs have been done for weighted average with the optional convection fan at "ON" position. One confirmation test was done without the optional convection fan.

3.2 UNIT DIMENSIONS

Baffle

- Location: between top of combustion chamber and hearth
- Restriction: 2.5-inch X 21-inch at the front of the unit
- Dimensions: cover the hearth area minus the restriction at the front
- Material: Vermiculite 1 inch thick.

Bricks

- Inside firebox refractory Soapstone 1¼ inch. thick cover all the back and sides. The bottom of the firebox is covered by ½ thick soapstone.

Flue gas exhaust

- Location: top flue
- Dimensions: 8 in. diameter
- Material: Cast Iron

Gasket

- Glass holder: miniglass
- Glass: ½ Fiberglass Gasket W/core
- Door gasket against facing: fiberglass 3/8 round inch diameter
- Refer to appendix 6 for complete list and location of each gaskets

Overall unit dimension

- Overall dimensions: 30-inch-wide x 20.5-inch-deep x 30.5 inch high
- Usable volume: 3.16 cuft

Convection fan

- Convection fan blower:
 - Free air : 150 CFM 110-120V (ref. : PT#90-57000)

Catalyst (appendix 6 for details):

- Applied Ceramics – P/N WF-4150001076
- Cell density: 50 CPSI
- Material: 16 Ga SS430 or 304
- Temperature probe location: refer appendix 6, p32

3.3 AIR SUPPLY SYSTEM

Description

- Primary air: Window wash design in cast iron channel fully gasketed on the top and bottom of the combustion chamber. Air intake on the bottom middle-left side of the unit (if facing door of stove)
- Secondary air: secondary tube design with air intake coming from the bottom rear of unit, then up through a steel riser tube to the secondary air tube.

Characterization

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

AIR INTRODUCTION SYSTEM		INLET (1) sq. in.			OUTLET (sq. in.)
Identification	Type	Imin	Imax	Controlled	
APPENDIX 14 SHARED and PA	Primary	(air control slide) 0.312	(air control slide) 5.440	yes	(Air wash) 6.450
APPENDIX 14 SHARED and SA	Secondary	(Riser opening) 1.400	(Riser opening) 1.400	No	(secondary tube Holes) 2.550
Appendix 14 TA	Pilot	(Orifice) 0.018	(Orifice) 0.018	No	(Orifice) 0.096

* 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

3.4 OPERATION DURING TEST

Run #1

This run was performed on September 19th 2018. It lasted 602 minutes and a 0.76 kg/hr burn rate was obtained & emission at 0.2 gr/hr. The optional convection fan Option was at on position during the test. The air inlet was at the minimum setting during the test, this test failed on delta °T criteria with a -142°F differential. This test will not count in the weighted average numbers.

Run #2

This run was performed on September 20th 2018. It lasted 483 minutes and a 1.0 kg/hr burn rate was obtained & emission at 0.71 gr/hr. The optional convection fan Option was at on position during the entire test. The air inlet was at the minimum setting during the test.

Run #3

This run was performed on September 24th 2018. It lasted 477 minutes and a 0.99 kg/hr burn rate was obtained & emission at 0.25 gr/hr. The optional convection fan Option was at on position during the entire test. The air inlet was at the minimum setting during the test, this is the second attempt to burn less than 0.8kg/hr. At the minimum air setting, the stove cannot burn below 0.8kg/hr

Run #4

This run was performed on September 25th 2018. It lasted 442 minutes and a 1.068 kg/hr burn rate was obtained & emission at 0.67 gr/hr. The optional convection fan Option was at OFF position during the entire test. The air inlet was at the medium setting during the test. Category 2 burn rate been achieved.

Run #5

This run was performed on September 26th 2018. It lasted 272 minutes and a 1.72 kg/hr burn rate was obtained & emission at 0.93 gr/hr. The optional convection fan Option was at on position during the entire test. The air inlet was at the medium setting during the test. Category 3 burn rate been achieved.

Run #6

This run was performed on September 27th 2018. It lasted 208 minutes and a 2.28 kg/hr burn rate was obtained & emission at 0.65 gr/hr. The optional convection fan Option was at on position during the entire test. The air inlet was at the maximum setting during the test. Category 4 burn rate been achieved.

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

Test fuel cribs

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

3.5 START-UP OPERATION

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

3.6 SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 15 feet from the tunnel entrance. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. The sampling section is a continuous 15 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.

3.7 DRAWINGS

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

3.8 EMISSIONS EFFICIENCY TESTING EQUIPMENT LIST

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

4 SAMPLING METHODS

4.1 PARTICULATE SAMPLING

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

5 QUALITY ASSURANCE

5.1 INSTRUMENT CALIBRATION

5.1.1 GAS METERS

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

5.1.2 SCALES

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

5.1.3 GAS ANALYZERS

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

5.2 TEST METHOD PROCEDURES

5.2.1 LEAK CHECK PROCEDURES

Before and after each test, each sample train is tested for leaks. Leakage rates are measured and must not exceed 0.02 CFM or 4% of the sampling rate. Leak checks are performed checking the entire sampling train. Pre-test and post-test leak checks are conducted with a vacuum of 5 inches of mercury. Vacuum is monitored during each test and the highest vacuum reached is then used for the post-test vacuum value. If leakage limits are not met, the test run is rejected. During these tests, the vacuum is typically less than 2 inches of mercury. Thus, leakage rates reported are expected to be much higher than actual leakage during the tests.

5.2.2 TUNNEL VELOCITY FLOW MEASUREMENT

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

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

5.2.3 PM SAMPLING PROPORTIONALITY (ASTM E2515)

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

APPENDIX 1: Raw data, forms and results

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	1
Date	19-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	Dimensionless
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	6	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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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	101,9
Barometer (in.Hg):	29,854819	30,09105867
Dry Bulb (F):	69,08	75,78
Humidity (%):	43	38,1
Air velocity (ft/min)	0	0

DGM #1	Final:	27390,839	cuft
	Initial:	27292,115	cuft
DGM #2	Final:	25734,623	cuft
	Initial:	25638,254	cuft

DGM room	
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	Final:	775622,160	Liter
	Initial:	772826,620	Liter
	Final:	728723,350	Liter
	Initial:	725994,480	Liter

	Final:	251,200	cuft
	Initial:	54,850	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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Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7535 cu. ft

Loading Density: 9,177 lbs./ft3

 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 38,486 lbs./ft3
 Dry Wood Density: 31,800814

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	1,058	21,6	21,6	21,8	21,9	22,2	23,08556	52,50
1,5	3,5	10	1,05	21,8	21,4	22	22,3	21	22,785	52,50
1,5	3,5	10	1,08	21,3	20,9	20,8	21	21	22,68	52,50
1,5	3,5	10	1,03	22,1	22,4	22,8	22,3	22,3	23,0514	52,50
1,5	3,5	10	1,04	21,9	21,8	21,6	21,9	21,3	22,568	52,50
1,5	3,5	10	1,052	21,9	22,4	22,6	22,8	22,4	23,58584	52,50
1,5	3,5	10	1,032	22,9	23	22,3	22	22	23,15808	52,50
1,5	3,5	10	1,018	21,9	21,8	21,9	21	19,9	21,6834	52,50
1,5	3,5	10	1,048	19,6	19,9	20,4	20,4	20,9	21,21152	52,50
1,5	3,5	10	1,078	20,6	20,4	20,8	20,9	20,8	22,3146	52,50
1,5	3,5	10	1,076	20,8	20,8	20,6	20,7	20,6	22,2732	52,50
1,5	3,5	14	1,5	19,9	19,1	19,2	19,8	19,4	29,22	73,50
1,5	3,5	14	1,484	20	20,1	20	20,1	20,2	29,79872	73,50
										0,00
1,5	3,5	10	1,05	21,4	21,4	21,3	21,3	21,8	22,512	52,50
1,5	3,5	10	1,024	21,9	21	21,1	21,1	21,3	21,79072	52,50
1,5	3,5	10	1,05	22	21,6	21,9	21	21,1	22,596	52,50
1,5	3,5	10	1,04	21,3	21,4	22	22	22,4	22,6928	52,50
1,5	3,5	10	1,08	21,8	21,9	21,7	21,9	21,6	23,5224	52,50
1,5	3,5	10	1,11	19,9	19,9	19,8	19,7	19,7	21,978	52,50
1,5	3,5	10	1,024	20	20,1	20,6	20,7	20,6	20,8896	52,50
1,5	3,5	10	1,002	21	21,3	21,4	21,2	21,8	21,38268	52,50
1,5	3,5	10	1,036	22	22,33	22,4	22,1	22	22,963976	52,50
1,5	3,5	10	1,026	21,8	21,6	21,9	21,4	21,7	22,24368	52,50
1,5	3,5	10	1,036	19,6	19,8	19,7	19,6	19,3	20,3056	52,50
1,5	3,5	14	1,478	20,4	20,6	20,8	20,8	20,6	30,50592	73,50
1,5	3,5	14	1,496	19	19,1	19,1	19,3	19,7	28,78304	73,50
										0,00
										0,00
										0,00
										0,00
										0,00

SUM MC: 609,58174

PreTest Load Weight: 29,00 lbs.

Dry Weight: 10,87 kg.

 Dry: 21,02
 Average Moisture Content: %
 21,02
 Must be 18-28

 Wet: 17,37
 must be 15,2-22

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FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
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19,9	22,1	24,3
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* 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): 31,9 lbs./ft3

Dry Wood Density: 26,4 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	19,75	4,81	20,10	20,60	20,50	20,20	20,60	98,0832	241,94	20,4
3,5	3,5	19,75	4,86	20,30	20,40	20,90	20,50	20,50	99,7272	241,94	20,5
3,5	3,5	19,75	4,93	20,40	20,30	20,40	20,40	20,10	100,1776	241,94	20,3
3,5	3,5	19,75	4,37	22,00	21,60	21,30	21,80	21,90	94,82952	241,94	21,7
1,5	0,75	5	0,10			20,00			2,08	5,63	20,0
1,5	0,75	5	0,10			20,30			2,0706	5,63	20,3
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	0,12			20,90			2,5498	5,63	20,9
1,5	0,75	5	0,12			20,80			2,4544	5,63	20,8
1,5	0,75	5	0,12			20,40			2,448	5,63	20,4
1,5	0,75	5	0,12			20,90			2,5916	5,63	20,9
1,5	0,75	5	0,11			20,80			2,3296	5,63	20,8
1,5	0,75	5	0,10			20,60			2,1424	5,63	20,6
1,5	0,75	5	0,10			20,40			2,0808	5,63	20,4
1,5	0,75	5	0,13			20,40			2,5704	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	
										0,00	
									SUM MCx	421,04312	20,7 %

Test Load Weight: 20,33 lbs.

Dry Weight: 7,64 kg.

Average Moisture Content: %

Dry:	20,71	Dry(EPA)	20,71
		Dry(B415)	20,71

20,71
Must be 19-25

Wet: 17,16
must be 15,2-22

Coal Bed Range: lbs. to

5,1 lbs.

TEST CHARGE:

Coal bed weight: 4,6

lbs.

Project nu.	PI 20177
Date	19-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

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

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

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

PITOT CONSTANT=
0,980

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,059	74,46	0,2429
B center	0,058	73,69	0,2408
A1	0,056	74,45	0,2366
A2	0,065	74,27	0,2550
A3	0,053	74,45	0,2302
A4	0,048	74,45	0,2191
B1	0,051	72,180	0,2258
B2	0,065	72,000	0,2550
B3	0,057	72,010	0,2387
B4	0,051	71,010	0,2258
AVERAGE	0,0563	73,2970	0,2370

Project nu.	PI 20177
Date	19-09-2018
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	2	505	506	28	20	507	508	38	34	509	510	40	511		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,0996	0,1266	0,1272	34,1270	108,8430	0,1270	0,1261	34,2712	110,1023	0,1277	0,1274	33,8860	0,1259	2018-09-18	17:00
Before (6)	61,0997	0,1267	0,1273	34,1269	108,8431	0,1271	0,1260	34,2713	110,1024	0,1278	0,1275	33,8859	0,1259	2018-09-19	11:00
After (1)	61,1003	0,1265	0,1272	34,1415	108,8443	0,1269	0,1260	34,2864	110,1035	0,1277	0,1274	33,8951	0,1259	2018-09-19	22:00
After (2)	61,1000	0,1265	0,1272	34,1279	108,8435	0,1269	0,1260	34,2724	110,1027	0,1275	0,1274	33,8875	0,1259	2018-10-05	08:00
After (3)	61,1000	0,1264	0,1272	34,1279	108,8435	0,1268	0,1260	34,2723	110,1028	0,1276	0,1274	33,8876	0,1259	2018-10-09	08:00
After (4)															
After (5)															
After (6)	61,1000	0,1264	0,1272	34,1279	108,8435	0,1268	0,1260	34,2723	110,1028	0,1276	0,1274	33,8876	0,1259	2018-10-09	08:00
Difference	0,0003	-0,0003	-0,0001	0,0010	0,0004	-0,0003	0,0000	0,0010	0,0004	-0,0002	-0,0001	0,0017	0,0000		
Total (mg)		0,9				1,99				1,8			0		
Total ajusté (mg)		0,90				1,99				1,80					

Project nu.	PI 20177
Date	19-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,2 g/hr
Burn Rate : 0,761 Dry kg/hr

Test Duration: 602 min

PRESSURE FACTOR: DGM 1 0,98102
 DGM 2 0,98421
 DGM 3 1,00177

BAROMETRIC PRESSURE
 Average: 29,9729387 in Hg
 Start: 29,8548188 in Hg
 End: 30,0910587 in Hg

TEMPERATURE FACTORS DGM 1 0,98062
 DGM 2 0,98060
 DGM 3 0,98886

DGM CONTROLLER VALUES

DGM 1 Final: 27390,839 Cuft
 Initial: 27292,115 Cuft

VOLUMES SAMPLED DGM 1 93,878 SCft
 DGM 2 92,207 SCft
 DGM 3 193,681 SCft

DGM 2 Final: 25734,623 Cuft
 Initial: 25638,254 Cuft

DGM #3 Final: 251,200 Cuft
 Initial: 54,850 Cuft

TOTAL TUNNEL VOLUME : 104384

SAMPLE RATIOS
 Sample Train 1: 1111,914
 Sample Train 2: 1132,066

TEMPERATURES
 DGM 1 538,434 °R
 DGM 2 538,448 °R

Particulate concentration
 Sample Train 1 0,000021 g/dscf
 Sample Train 2 0,000020 g/dscf
 Room 0,000000 g/dscf

CALIBRATION FACTORS
 DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

TUNNEL FLOW RATE: 173,396 Dscfm

TOTAL EMISSIONS
 Sample Train 1 2,21 g
 Sample Train 2 2,04 g

PARTICULATE CATCH
 Total Sample Train 1: 1,99 mg
 Total Sample Train 2: 1,80 mg
 Total Sample Train 1 1st hour: 0,90 mg

EMISSION RATES
 Sample Train 1 0,22 g/hr
 Sample Train 2 0,20 g/hr

1st hour emission rate 1,00 g/hr

DEVIATION: 4,12%

Cs Train 1 Train 2
 2,12E-05 1,9521E-05

*		*	*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	*	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2
Elapsed		Weight				Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Catalyst	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO ₂	O ₂	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom	up	°F	°F	°F	°F	cut/min	°F	°F	°F
min	lbs	%	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F	%F	cut/min	°F	°F	°F	cut/min	°F	°F	°F
0.00	289.00	20.2	0.1	15.2	357.6	233.4	72.1	118.0	333.6	277.8	373.8	366.0	436.5	477.7	0.16	75.30	75.65	76.56	0.15	75.81	75.78	76.03
1.0	290.0	20.1	0.3	11.8	357.1	234.4	71.7	87.9	333.0	284.7	367.4	361.8	428.7	545.3	0.16	75.40	75.74	76.51	0.15	75.85	75.86	76.01
2.0	291.0	20.0	0.0	5.1	357.2	250.9	71.3	93.7	335.0	293.4	370.8	363.9	422.8	641.6	0.16	75.51	75.79	76.40	0.15	75.89	75.95	75.98
3.0	292.0	19.9	0.0	5.9	358.3	264.7	71.7	92.6	341.9	298.5	369.2	362.9	419.1	679.1	0.16	75.54	75.81	76.38	0.15	75.89	76.02	75.99
4.0	293.0	19.7	0.0	7.1	359.3	277.7	71.9	93.1	349.5	302.5	367.7	361.5	415.2	727.9	0.16	75.64	75.86	76.40	0.15	75.98	76.09	76.02
5.0	294.0	19.7	0.0	7.6	360.8	263.2	72.2	89.4	351.8	305.7	365.9	360.1	420.4	741.0	0.16	75.85	75.94	76.33	0.15	76.15	76.15	75.96
6.0	295.0	19.7	0.0	6.2	360.2	245.2	72.1	87.1	348.8	308.2	364.0	358.3	421.7	722.2	0.16	75.98	76.00	76.30	0.15	76.24	76.20	75.96
7.0	296.0	19.6	0.0	21.3	359.2	232.9	72.2	86.1	346.1	310.1	362.0	356.4	421.5	677.3	0.16	76.07	76.06	76.29	0.15	76.34	76.27	75.98
8.0	297.0	19.6	0.0	20.3	358.3	224.2	72.6	85.0	343.8	311.5	360.1	354.3	421.5	655.7	0.16	76.18	76.10	76.29	0.15	76.39	76.31	76.01
9.0	298.0	19.5	0.0	20.2	356.9	218.3	72.4	84.6	340.9	312.5	358.4	351.6	420.8	650.4	0.16	76.22	76.14	76.31	0.15	76.42	76.35	76.02
10.0	299.0	19.4	0.0	20.5	355.3	214.2	72.0	84.0	338.0	313.1	355.8	349.0	420.5	650.1	0.16	76.24	76.17	76.29	0.15	76.43	76.38	76.03
11.0	300.0	19.4	0.0	21.0	355.5	211.3	71.8	83.8	335.0	313.4	353.2	346.0	419.6	651.9	0.16	76.28	76.21	76.28	0.15	76.49	76.41	76.02
12.0	301.0	19.4	0.0	21.9	352.0	209.4	71.9	83.4	332.9	313.4	351.1	343.6	418.8	658.5	0.16	76.29	76.26	76.26	0.15	76.51	76.44	76.05
13.0	302.0	19.3	0.0	22.9	350.2	208.6	71.7	83.4	330.9	313.3	348.7	340.8	417.5	666.6	0.16	76.36	76.27	76.26	0.15	76.53	76.48	76.05
14.0	303.0	19.3	0.0	23.6	348.6	207.8	71.7	83.4	328.6	313.0	346.5	338.4	416.7	673.2	0.16	76.44	76.33	76.25	0.15	76.60	76.52	76.08
15.0	304.0	19.2	0.0	24.4	346.9	208.0	71.9	83.5	326.7	312.5	343.9	335.8	415.3	680.9	0.16	76.55	76.34	76.25	0.15	76.68	76.53	76.09
16.0	305.0	19.1	0.0	5.0	345.1	208.2	71.6	83.7	325.0	311.9	341.5	333.1	413.8	686.0	0.16	76.65	76.37	76.25	0.15	76.74	76.54	76.10
17.0	306.0	19.1	0.0	5.1	343.4	208.3	71.6	83.6	323.4	311.2	339.1	330.6	412.6	690.1	0.16	76.73	76.40	76.23	0.15	76.79	76.57	76.10
18.0	307.0	19.0	0.0	5.2	341.7	208.4	72.0	83.8	322.0	310.3	336.8	328.1	411.4	692.4	0.16	76.87	76.43	76.26	0.15	76.89	76.60	76.14
19.0	308.0	19.0	0.0	5.2	340.0	208.3	72.2	83.5	320.5	309.5	334.1	325.4	410.2	695.1	0.16	77.03	76.46	76.28	0.15	76.96	76.63	76.16
20.0	309.0	18.9	0.0	5.3	338.3	209.6	72.0	83.4	319.0	308.6	331.9	323.4	408.7	697.8	0.16	77.21	76.50	76.27	0.15	77.07	76.70	76.16
21.0	310.0	18.9	0.0	5.4	336.6	210.3	72.1	83.1	317.3	307.6	329.5	321.3	407.1	701.1	0.16	77.36	76.57	76.29	0.15	77.22	76.74	76.20
22.0	311.0	18.8	0.0	5.5	335.2	211.4	72.2	84.1	317.1	306.4	328.5	318.9	405.7	703.9	0.16	77.54	76.62	76.32	0.15	77.34	76.84	76.24
23.0	312.0	18.8	0.0	5.6	333.6	210.7	72.4	84.2	316.3	305.6	325.0	316.5	404.5	710.0	0.16	77.73	76.69	76.32	0.15	77.50	76.85	76.25
24.0	313.0	18.7	0.0	5.7	331.9	211.9	72.4	84.4	314.8	304.6	322.7	314.4	403.1	716.7	0.16	77.94	76.73	76.35	0.15	77.63	76.89	76.29
25.0	314.0	18.6	0.0	5.8	330.4	212.8	72.4	84.5	314.1	303.6	320.7	312.4	401.5	722.2	0.16	78.16	76.78	76.35	0.15	77.76	76.95	76.31
26.0	315.0	18.6	0.0	5.8	329.1	213.2	72.6	84.5	314.0	302.6	318.7	310.1	400.0	726.1	0.16	78.35	76.87	76.40	0.15	77.91	77.00	76.34
27.0	316.0	18.5	0.0	5.8	327.7	213.8	72.7	84.6	313.2	301.5	316.9	308.0	398.8	728.4	0.16	78.45	76.89	76.42	0.15	77.98	77.03	76.35
28.0	317.0	18.4	0.0	6.0	326.3	214.4	72.4	84.8	312.8	300.4	314.9	306.1	397.3	730.1	0.16	78.49	76.91	76.42	0.15	78.00	77.03	76.36
29.0	318.0	18.4	0.0	6.1	325.2	215.3	72.3	84.8	313.2	299.5	313.0	304.2	395.9	736.5	0.16	78.54	76.95	76.43	0.15	78.08	77.08	76.38
30.0	319.0	18.3	0.0	6.2	323.4	216.7	72.1	84.7	312.0	297.2	310.9	302.4	394.8	743.8	0.16	78.63	77.01	76.45	0.15	78.17	77.08	76.39
31.0	320.0	18.3	0.0	6.3	319.3	217.8	71.8	85.4	309.4	294.6	308.8	300.3	393.3	750.1	0.16	78.66	77.01	76.49	0.15	78.18	77.08	76.40
32.0	321.0	18.1	0.0	6.7	316.7	220.3	72.3	85.7	306.3	292.7	303.9	298.8	392.2	758.9	0.16	78.79	77.08	76.54	0.15	78.26	77.10	76.45
33.0	322.0	18.1	0.0	8.6	314.9	222.3	72.2	86.2	313.4	268.0	305.3	296.8	391.0	692.7	0.16	78.91	77.13	76.56	0.15	78.37	77.15	76.48
34.0	323.0	18.0	0.0	8.3	313.6	221.8	71.6	86.0	316.5	262.3	303.5	295.3	390.3	657.3	0.16	79.06	77.20	76.60	0.15	78.47	77.22	76.52
35.0	324.0	17.9	0.0	7.6	312.6	221.1	71.7	85.6	319.7	257.5	302.3	293.9	389.5	653.6	0.16	79.08	77.22	76.62	0.15	78.48	77.26	76.47
36.0	325.0	17.9	0.0	7.4	311.1	219.7	71.3	85.7	321.8	253.1	301.2	291.9	387.8	663.2	0.16	78.95	77.25	76.64	0.15	78.47	77.28	76.47
37.0	326.0	17.8	0.0	6.9	309.9	218.2	71.0	85.4	321.5	249.6	300.1	290.9	387.4	686.9	0.16	78.92	77.29	76.62	0.15	78.52	77.31	76.46
38.0	327.0	17.7	0.0	6.7	308.2	218.4	71.2	85.3	321.0	246.1	299.4	289.2	385.3	722.6	0.16	78.92	77.30	76.63	0.15	78.52	77.35	76.47
39.0	328.0	17.6	0.0	6.4	306.3	219.2	71.4	85.4	318.5	243.0	298.5	287.4	383.8	759.0	0.16	78.94	77.31	76.63	0.15	78.56	77.38	76.48
40.0	329.0	17.6	0.0	6.4	304.7	220.4	71.2	85.7	316.0	240.5	297.6	286.2	383.5	790.3	0.16	79.01	77.34	76.68	0.15	78.58	77.37	76.47
41.0	330.0	17.6	0.0	6.6	303.2	221.2	71.4	85.6	314.1	238.1	296.5	284.8	382.5	808.2	0.16	79.06	77.37	76.69	0.15	78.63	77.36	76.48
42.0	331.0	17.5	0.0	6.8	301.7	223.0	71.5	85.7	312.6	236.0	295.2	283.7	380.8	822.0	0.16	79.16	77.42	76.72	0.15	78.67	77.38	76.48
43.0	332.0	17.4	0.0	7.0	299.9	225.2	71.4	85.7	310.3	233.9	293.9	281.8	378.7	835.6	0.16	79.17	77.44	76.74	0.15	78.66	77.37	76.49
44.0	333.0	17.3	0.0	7.3	298.6	228.0	71.8	86.3	310.1	232.0	293.3	280.4	377.2	848.8	0.16	79.20	77.48	76.74	0.15	78.75	77.39	76.50
45.0	334.0	17.3	0.0	7.4	297.5	230.2	72.0	86.6	309.6	230.5	292.1	279.0	376.3	857.9	0.16	79.26	77.52	76.80	0.15	78.78	77.41	76.54
46.0	335.0	17.2	0.0	7.5	296.6	231.8	71.8	86.5	308.9	229.1	291.3	277.8	375.9	865.3	0.16	79.33	77.57	76.83	0.15	78.82	77.45	76.59
47.0	336.0	17.1	0.0	7.7	295.5	233.6	72.2	86.6	308.7	227.8	290.0	276.6	374.2	872.6	0.16	79.36	77.60	76.88	0.15	78.84	77.47	76.59
48.0	337.0	17.1	0.0	7.8	294.5	235.1	71.7	86.5	307.8	227.0	288.4	275.5	373.8	878.8	0.16	79.41	77.63	76.90	0.15	78.85	77.48	76.59
49.0	338.0	17.0	0.0	7.8	293.6	236.6	71.8	86.5	307.7	226.2	287.6	274.4	372.3	884.6	0.16	79.40	77.67	76.95	0.15	78.91	77.54	76.63
50.0	339.0	17.0	0.0	7.9	292.8	237.7	71.3	86.8	307.9	225.3	286.3	273.2	371.4	890.7	0.16	79.36	77.71	76.95	0.15	78.89	77.55	76.61
51.0	340.0	16.9	0.0	8.0	292.0	240.1	71.7	86.9	308.8	224.4	285.5	271.4	369.8	896.7	0.16	79.37	77.74	76.99	0.15	78.93	77.56	76

89.0	378.0	14.0	0.0	10.5	291.5	274.7	72.0	89.5	350.7	232.4	269.5	254.4	350.3	1023.9	0.16	80.20	78.67	76.04	0.15	79.37	78.06	77.28
90.0	379.0	13.9	0.0	10.6	292.0	275.1	72.1	89.5	352.6	233.2	269.7	254.6	349.9	1025.5	0.16	80.11	78.70	76.07	0.15	79.36	78.08	77.30
91.0	380.0	13.8	0.0	10.6	292.5	275.4	72.0	89.6	354.0	234.0	269.9	254.6	350.0	1027.0	0.16	80.09	78.75	76.08	0.15	79.44	78.15	77.33
92.0	381.0	13.7	0.0	10.7	293.0	276.3	72.3	89.6	356.4	234.8	270.2	254.6	349.2	1029.3	0.16	80.20	78.79	76.16	0.15	79.53	78.22	77.38
93.0	382.0	13.6	0.0	10.8	293.7	277.9	72.0	89.6	357.9	235.7	270.5	254.8	349.5	1031.2	0.16	80.25	78.84	76.22	0.15	79.58	78.28	77.43
94.0	383.0	13.5	0.0	10.7	294.2	278.4	72.1	89.7	359.3	236.4	270.9	255.0	349.3	1032.8	0.16	80.27	78.85	76.24	0.15	79.57	78.32	77.44
95.0	384.0	13.5	0.0	10.8	294.7	277.7	72.5	90.1	360.9	237.3	271.1	255.2	348.9	1035.3	0.16	80.41	78.92	76.29	0.15	79.65	78.36	77.48
96.0	385.0	13.4	0.0	10.9	295.3	279.0	72.2	90.1	362.9	238.1	271.4	255.4	348.5	1037.5	0.16	80.54	78.97	76.36	0.15	79.72	78.41	77.54
97.0	386.0	13.3	0.0	10.9	296.0	279.9	71.7	90.1	364.3	239.2	271.9	256.0	348.8	1040.5	0.16	80.53	79.02	76.39	0.15	79.77	78.46	77.55
98.0	387.0	13.2	0.0	10.9	296.8	281.0	71.8	89.9	366.6	240.1	272.6	256.3	348.5	1043.2	0.16	80.51	79.05	76.42	0.15	79.72	78.47	77.58
99.0	388.0	13.1	0.0	10.9	297.5	281.8	71.6	90.1	368.3	241.1	272.5	256.7	348.8	1046.1	0.16	80.42	79.06	76.45	0.15	79.66	78.48	77.59
100.0	389.0	13.0	0.0	11.0	297.8	282.4	71.8	90.2	369.3	242.0	272.8	256.7	348.1	1048.6	0.16	80.31	79.06	76.44	0.15	79.64	78.47	77.58
101.0	390.0	12.9	0.0	11.0	298.5	283.2	71.8	90.1	371.0	243.0	273.4	257.0	348.1	1050.6	0.16	80.27	79.08	76.45	0.15	79.59	78.48	77.59
102.0	391.0	12.9	0.0	10.9	299.1	283.5	71.6	90.0	371.8	243.9	274.0	257.4	348.4	1052.0	0.16	80.27	79.09	76.43	0.15	79.60	78.49	77.61
103.0	392.0	12.8	0.0	10.9	299.8	284.3	71.9	90.2	373.8	244.7	274.5	257.7	348.1	1052.4	0.16	80.38	79.08	76.47	0.15	79.65	78.47	77.64
104.0	393.0	12.7	0.0	10.9	300.5	285.7	72.2	90.3	374.7	245.7	275.0	258.4	348.9	1054.0	0.16	80.54	79.11	76.56	0.15	79.75	78.50	77.66
105.0	394.0	12.6	0.0	10.9	301.1	285.7	72.2	90.5	376.5	246.7	275.5	258.6	348.4	1054.2	0.16	80.68	79.13	76.60	0.15	79.83	78.52	77.71
106.0	395.0	12.5	0.0	10.9	301.6	286.2	71.6	90.4	377.5	247.5	276.1	259.1	347.7	1055.2	0.16	80.71	79.19	76.64	0.15	79.91	78.58	77.74
107.0	396.0	12.4	0.0	10.8	301.9	286.7	71.7	90.4	378.2	248.2	276.5	259.4	347.4	1056.1	0.16	80.54	79.20	76.64	0.15	79.87	78.61	77.75
108.0	397.0	12.3	0.0	10.9	302.5	287.9	71.7	90.3	380.3	248.9	276.5	260.0	347.0	1057.7	0.16	80.40	79.25	76.65	0.15	79.83	78.65	77.75
109.0	398.0	12.2	0.0	10.9	303.1	287.4	71.9	90.7	381.3	249.8	277.3	260.4	346.8	1057.1	0.16	80.26	79.25	76.65	0.15	79.80	78.66	77.74
110.0	399.0	12.1	0.0	10.9	303.6	287.7	71.9	90.6	382.5	250.6	277.5	260.9	346.4	1057.4	0.16	80.05	79.28	76.67	0.15	79.74	78.71	77.75
111.0	400.0	12.1	0.0	11.0	304.0	288.2	71.8	90.6	383.3	251.4	278.5	260.9	345.9	1058.8	0.16	79.93	79.32	76.69	0.15	79.78	78.79	77.74
112.0	401.0	12.0	0.0	11.0	304.4	289.5	71.2	90.7	384.4	251.9	279.0	261.3	345.4	1060.5	0.16	79.82	79.35	76.67	0.15	79.72	78.83	77.75
113.0	402.0	11.9	0.0	11.1	304.9	289.5	71.4	90.7	385.2	252.7	279.6	261.9	345.1	1062.1	0.16	79.66	79.37	76.67	0.15	79.64	78.85	77.76
114.0	403.0	11.8	0.0	11.2	305.3	289.5	71.4	90.6	386.1	253.4	280.4	262.4	344.3	1063.8	0.16	79.54	79.42	76.70	0.15	79.53	78.83	77.78
115.0	404.0	11.7	0.0	11.2	305.8	289.5	71.6	90.6	386.8	254.2	280.9	262.9	344.2	1063.3	0.16	79.47	79.41	76.69	0.15	79.40	78.82	77.79
116.0	405.0	11.6	0.0	11.2	306.2	290.2	71.7	90.8	387.5	255.0	281.4	263.4	343.5	1063.4	0.16	79.44	79.41	76.71	0.15	79.28	78.78	77.79
117.0	406.0	11.5	0.0	11.2	306.7	289.6	71.4	90.8	388.1	255.7	282.0	264.0	343.8	1063.7	0.16	79.36	79.40	76.73	0.15	79.18	78.75	77.82
118.0	407.0	11.4	0.0	11.2	307.0	290.4	71.4	90.5	388.9	256.5	282.5	264.4	342.7	1063.0	0.16	79.38	79.39	76.75	0.15	79.18	78.73	77.83
119.0	408.0	11.3	0.0	11.3	307.5	291.6	71.7	90.7	389.9	257.2	283.3	264.9	342.3	1064.8	0.16	79.28	79.37	76.80	0.15	79.12	78.70	77.84
120.0	409.0	11.3	0.0	11.4	308.0	291.4	71.6	90.6	390.4	257.9	284.0	265.5	342.1	1068.2	0.16	79.09	79.37	76.85	0.15	79.04	78.67	77.85
121.0	410.0	11.2	0.0	11.5	308.4	291.8	71.8	90.5	391.4	258.7	284.6	266.0	341.3	1074.1	0.16	78.96	79.33	76.86	0.15	78.95	78.67	77.86
122.0	411.0	11.1	0.0	11.6	309.1	292.9	71.3	90.7	393.4	259.4	285.4	266.4	341.1	1079.0	0.16	78.95	79.32	76.88	0.15	78.96	78.63	77.87
123.0	412.0	11.0	0.0	11.8	309.4	293.9	71.6	90.6	393.7	259.2	286.2	267.1	340.3	1083.0	0.16	78.82	79.31	76.87	0.15	78.87	78.64	77.88
124.0	413.0	10.9	0.0	11.8	309.9	294.6	71.5	90.9	394.7	260.9	286.5	267.6	339.8	1086.6	0.16	78.71	79.30	76.89	0.15	78.64	78.61	77.85
125.0	414.0	10.8	0.0	12.0	310.6	294.6	71.4	90.5	396.3	261.7	287.2	268.3	339.4	1092.8	0.16	78.65	79.29	76.90	0.15	78.57	78.57	77.84
126.0	415.0	10.7	0.0	12.0	311.0	296.4	70.9	90.5	397.1	262.5	287.6	268.7	339.0	1097.4	0.16	78.58	79.26	76.87	0.15	78.53	78.56	77.81
127.0	416.0	10.6	0.0	12.2	311.7	297.2	70.7	90.7	398.5	263.4	288.4	269.6	338.7	1100.9	0.16	78.52	79.23	76.86	0.15	78.46	78.53	77.79
128.0	417.0	10.5	0.0	12.0	312.4	297.9	71.3	90.7	400.3	264.2	289.0	270.3	338.2	1093.3	0.16	78.42	79.21	76.87	0.15	78.33	78.46	77.81
129.0	418.0	10.5	0.1	11.6	312.9	298.1	71.2	91.0	400.9	265.2	289.5	271.0	337.9	1095.0	0.16	78.34	79.21	76.89	0.15	78.29	78.44	77.79
130.0	419.0	10.4	0.1	11.7	313.4	298.8	70.9	90.8	402.0	266.0	290.3	271.6	337.2	1096.1	0.16	78.30	79.19	76.90	0.15	78.26	78.43	77.78
131.0	420.0	10.2	0.1	11.5	314.1	299.2	70.9	90.8	403.4	266.8	290.9	272.5	337.1	1096.0	0.16	78.11	79.17	76.90	0.15	78.19	78.43	77.77
132.0	421.0	10.2	0.0	11.5	314.9	300.5	71.1	91.0	405.0	267.7	291.7	273.4	336.6	1095.4	0.16	78.05	79.14	76.91	0.15	78.10	78.43	77.77
133.0	422.0	10.1	0.0	11.5	315.5	301.1	71.1	91.1	406.4	268.5	292.5	274.1	336.1	1094.6	0.16	78.01	79.11	76.94	0.15	78.08	78.29	77.76
134.0	423.0	10.0	0.0	11.3	315.9	299.8	71.4	91.3	406.5	269.5	292.9	275.0	335.7	1091.8	0.16	78.08	79.14	76.93	0.15	78.15	78.42	77.80
135.0	424.0	9.9	0.0	11.5	316.5	299.9	71.1	91.4	407.8	270.3	293.4	275.7	335.5	1092.1	0.16	78.09	79.15	76.91	0.15	78.15	78.42	77.78
136.0	425.0	9.8	0.0	11.5	317.3	300.2	70.9	91.1	409.3	271.2	294.1	276.7	335.0	1095.0	0.16	78.06	79.13	76.94	0.15	78.11	78.41	77.77
137.0	426.0	9.7	0.0	11.6	317.8	300.3	71.2	91.1	410.7	271.9	294.7	277.4	334.3	1098.1	0.16	78.01	79.14	76.95	0.15	78.08	78.42	77.77
138.0	427.0	9.6	0.0	11.7	318.2	300.7	71.6	91.0	411.6	272.7	295.3	278.0	333.5	1102.3	0.16	77.95	79.12	76.92	0.15	78.04	78.37	77.75
139.0	428.0	9.5	0.0	11.8	318.7	301.8	71.5	91.1	412.7	273.4	296.0	278.6	332.9	1105.6	0.16	77.94	79.10	76.96	0.15	78.03	78.40	77.75
140.0	429.0	9.5	0.1	11.8	319.3	302.0	71.5	91.5	413.7	274.2	296.5	279.5	332.7	1109.3	0.16	77.94	79.11	76.98	0.15	78.03	78.39	77.76
141.0	430.0	9.4	0.1	11.9	319.6	302.4	71.2	91.7	414.4	274.7	296.9	280.1	332.0	1115.8	0.16	77.89	79.05	76.96	0.15	77.92	78.34	77.76
142.0	431.0	9.3	0.1	12.0	320.4	302.4	71.0	91.5	415.7	275.3	297.5	281.2	332.1	1122.1	0.16	77.89	79.04	76.97	0.15	77.93	78.33	77.73
14																						

182.0	471.0	6,5	0,0	12,0	326,7	288,4	72,0	89,9	414,8	278,4	316,5	302,9	321,0	1095,4	0,16	77,60	78,78	77,10	0,15	77,96	78,31	77,73
183,0	472,0	6,4	0,0	11,9	327,0	287,8	71,9	89,8	415,6	278,6	316,8	303,1	320,7	1091,8	0,16	77,53	78,78	77,08	0,15	77,95	78,29	77,71
184,0	473,0	6,3	0,0	11,5	327,2	287,2	72,3	89,5	415,7	279,0	317,2	303,6	320,6	1088,8	0,16	77,45	78,74	77,04	0,15	77,89	78,29	77,71
185,0	474,0	6,3	0,0	11,1	327,6	287,3	72,1	89,5	415,8	279,4	318,1	303,9	320,6	1084,4	0,16	77,50	78,72	77,04	0,15	77,87	78,26	77,71
186,0	475,0	6,2	0,0	11,0	327,7	286,4	72,3	89,5	415,7	279,9	318,3	304,0	320,5	1080,7	0,16	77,52	78,71	76,98	0,15	77,82	78,24	77,67
187,0	476,0	6,1	0,0	10,8	328,2	286,7	72,5	89,7	416,0	280,5	319,1	304,7	320,5	1073,3	0,16	77,63	78,71	76,97	0,15	77,90	78,25	77,70
188,0	477,0	6,1	0,0	10,7	328,4	285,4	72,4	89,8	416,1	280,9	319,6	305,1	320,6	1064,1	0,16	77,71	78,71	76,92	0,15	77,92	78,24	77,70
189,0	478,0	6,0	0,0	10,5	328,6	284,6	72,6	89,8	415,9	281,2	319,9	305,7	320,4	1054,3	0,16	77,77	78,69	76,90	0,15	77,94	78,20	77,69
190,0	479,0	6,0	0,0	10,3	328,8	283,7	72,3	89,5	415,7	281,8	320,3	305,9	320,3	1039,7	0,16	77,76	78,66	76,86	0,15	77,96	78,21	77,69
191,0	480,0	5,9	0,0	10,1	328,9	282,4	72,0	89,4	415,3	281,9	320,9	306,2	320,1	1028,9	0,16	77,72	78,65	76,85	0,15	77,95	78,21	77,68
192,0	481,0	5,9	0,0	9,9	328,9	280,8	72,2	89,2	414,6	282,1	321,2	306,7	320,2	1016,2	0,16	77,69	78,63	76,81	0,15	77,91	78,18	77,66
193,0	482,0	5,8	0,0	9,7	329,0	279,5	72,4	89,2	414,1	282,2	321,7	307,0	319,9	1004,8	0,16	77,63	78,61	76,76	0,15	77,90	78,15	77,63
194,0	483,0	5,8	0,0	9,7	329,1	278,0	72,2	88,9	413,6	282,3	322,3	307,5	319,7	990,2	0,16	77,61	78,61	76,74	0,15	77,91	78,15	77,64
195,0	484,0	5,7	0,0	9,6	328,9	276,9	72,0	88,9	412,4	282,3	322,3	307,7	319,8	978,9	0,16	77,63	78,61	76,69	0,15	77,92	78,14	77,64
196,0	485,0	5,7	0,0	9,4	328,8	275,6	72,2	88,7	411,2	282,2	322,8	307,9	319,8	971,1	0,16	77,65	78,58	76,64	0,15	77,90	78,14	77,61
197,0	486,0	5,6	0,0	9,4	328,7	273,2	72,1	88,7	410,5	282,1	322,8	308,3	319,7	965,9	0,16	77,64	78,56	76,61	0,15	77,86	78,11	77,60
198,0	487,0	5,6	0,0	9,4	328,4	271,5	72,3	88,7	408,8	281,9	323,0	308,8	319,7	958,4	0,16	77,59	78,55	76,57	0,15	77,89	78,13	77,58
199,0	488,0	5,5	0,0	9,3	328,3	270,2	72,2	88,3	407,9	281,5	323,2	309,1	319,7	949,7	0,16	77,63	78,50	76,56	0,15	77,84	78,10	77,59
200,0	489,0	5,5	0,0	9,0	328,0	268,3	72,3	87,8	406,2	281,2	323,4	309,5	319,6	938,3	0,16	77,62	78,48	76,56	0,15	77,85	78,10	77,56
201,0	490,0	5,4	0,0	8,6	327,6	265,7	72,4	87,9	404,4	281,0	323,3	309,6	319,5	921,4	0,16	77,66	78,48	76,55	0,15	77,84	78,06	77,57
202,0	491,0	5,4	0,0	8,5	327,1	263,6	72,2	87,7	402,3	280,7	323,3	309,8	319,4	904,3	0,16	77,69	78,48	76,50	0,15	77,86	78,06	77,54
203,0	492,0	5,3	0,0	8,3	326,9	261,2	71,7	87,5	401,0	280,1	323,7	310,3	319,3	895,2	0,16	77,67	78,46	76,46	0,15	77,81	78,03	77,51
204,0	493,0	5,3	0,0	8,1	326,3	258,9	71,7	87,3	399,1	279,8	323,5	310,2	319,2	886,3	0,16	77,58	78,44	76,41	0,15	77,77	78,02	77,48
205,0	494,0	5,3	0,0	8,0	325,8	257,0	72,0	87,2	396,9	279,5	323,4	310,3	319,2	877,8	0,16	77,49	78,41	76,37	0,15	77,69	77,99	77,44
206,0	495,0	5,3	0,0	7,9	325,3	255,2	71,7	86,7	394,6	279,2	323,3	310,4	319,3	869,7	0,16	77,53	78,38	76,32	0,15	77,70	77,95	77,41
207,0	496,0	5,2	0,0	7,7	324,8	252,6	71,7	86,7	392,4	278,7	323,2	310,4	319,1	860,7	0,16	77,23	78,36	76,27	0,15	77,55	77,94	77,39
208,0	497,0	5,2	0,0	7,8	324,3	250,9	71,7	86,3	390,3	278,0	323,3	310,9	319,1	864,1	0,16	77,22	78,32	76,23	0,15	77,48	77,90	77,36
209,0	498,0	5,2	0,0	7,7	323,7	249,4	71,6	86,2	387,8	277,4	323,2	310,9	319,1	858,2	0,16	77,20	78,28	76,16	0,15	77,39	77,85	77,32
210,0	499,0	5,1	0,0	7,9	323,1	247,5	71,7	85,8	386,3	276,8	322,8	311,0	318,7	855,4	0,16	77,08	78,26	76,12	0,15	77,34	77,81	77,27
211,0	500,0	5,1	0,0	8,1	322,5	245,5	71,7	86,0	383,9	276,2	322,7	310,9	318,7	855,2	0,16	77,00	78,23	76,09	0,15	77,29	77,78	77,25
212,0	501,0	5,1	0,0	8,0	322,0	243,4	71,8	85,6	382,2	275,6	322,7	311,0	318,6	854,7	0,16	76,99	78,19	76,01	0,15	77,24	77,73	77,18
213,0	502,0	5,0	0,0	8,0	321,3	241,0	71,8	85,6	379,5	274,9	322,5	311,0	318,8	851,1	0,16	77,00	78,19	75,97	0,15	77,28	77,70	77,15
214,0	503,0	5,0	0,0	8,0	320,7	239,7	72,1	85,2	377,2	274,2	322,4	311,1	318,6	847,2	0,16	77,02	78,20	75,94	0,15	77,35	77,74	77,11
215,0	504,0	4,9	0,0	7,8	320,0	238,5	71,8	85,5	375,3	273,6	321,9	310,7	318,6	843,1	0,16	77,00	78,18	75,92	0,15	77,34	77,74	77,06
216,0	505,0	4,9	0,0	7,9	319,7	236,8	71,6	85,1	373,5	273,2	321,9	310,8	318,9	839,9	0,16	76,90	78,17	75,89	0,15	77,30	77,70	77,06
217,0	506,0	4,9	0,0	7,8	318,8	234,5	71,3	84,9	371,5	272,5	321,4	309,9	318,6	805,2	0,16	76,85	78,14	75,85	0,15	77,31	77,76	77,00
218,0	507,0	4,9	0,0	7,9	318,3	232,8	71,4	84,8	369,7	271,7	321,3	309,9	318,8	782,6	0,16	76,89	78,12	75,83	0,15	77,30	77,78	76,97
219,0	508,0	4,8	0,0	8,1	317,7	230,6	71,4	84,8	367,7	271,2	321,1	309,6	318,8	773,7	0,16	76,95	78,10	75,77	0,15	77,31	77,76	76,93
220,0	509,0	4,8	0,0	8,4	317,0	227,9	71,4	84,9	365,6	270,4	321,1	309,3	318,8	769,5	0,16	76,96	78,07	75,70	0,15	77,32	77,78	76,87
221,0	510,0	4,8	0,0	8,4	316,5	225,7	71,5	84,4	363,7	269,6	320,9	309,2	318,9	766,9	0,16	76,96	78,07	75,66	0,15	77,35	77,83	76,83
222,0	511,0	4,7	0,0	8,5	316,3	223,9	71,5	84,4	363,1	269,1	321,0	309,0	319,2	763,4	0,16	77,02	78,06	75,66	0,15	77,38	77,86	76,81
223,0	512,0	4,7	0,0	8,6	315,6	222,2	71,4	84,2	360,4	268,4	321,3	308,9	319,2	760,7	0,16	77,03	78,05	75,61	0,15	77,40	77,85	76,77
224,0	513,0	4,7	0,0	8,6	315,3	220,5	71,4	84,1	359,1	267,8	321,4	308,6	319,4	757,9	0,16	77,08	78,02	75,56	0,15	77,40	77,86	76,71
225,0	514,0	4,6	0,0	8,6	314,9	219,3	71,2	84,0	357,1	267,1	321,9	308,9	319,7	755,2	0,16	77,06	78,00	75,50	0,15	77,38	77,84	76,70
226,0	515,0	4,6	0,0	8,6	314,4	217,8	71,4	83,7	355,0	266,5	321,6	308,5	320,1	752,5	0,16	77,11	77,98	75,45	0,15	77,39	77,81	76,64
227,0	516,0	4,6	0,0	8,6	313,8	216,5	71,0	83,6	353,6	265,8	321,5	308,1	320,2	750,4	0,16	77,14	77,96	75,42	0,15	77,40	77,83	76,60
228,0	517,0	4,6	0,0	8,6	313,7	215,5	70,9	83,3	352,3	265,2	321,8	308,2	320,9	749,1	0,16	77,15	77,96	75,39	0,15	77,37	77,79	76,55
229,0	518,0	4,5	0,0	8,6	313,2	213,4	70,9	83,5	350,7	264,5	321,9	307,7	321,3	745,9	0,16	77,10	77,97	75,35	0,15	77,36	77,79	76,52
230,0	519,0	4,5	0,0	8,6	312,9	213,1	70,6	83,1	349,4	263,8	322,0	307,6	321,7	748,6	0,16	77,04	77,95	75,28	0,15	77,36	77,80	76,47
231,0	520,0	4,4	0,0	8,5	312,6	212,1	70,4	83,0	348,0	263,1	322,1	307,6	322,3	754,0	0,16	76,95	77,94	75,25	0,15	77,36	77,80	76,40
232,0	521,0	4,4	0,0	8,4	312,3	211,1	70,4	82,9	346,3	262,3	322,5	307,8	322,6	757,3	0,16	76,81	77,91	75,21	0,15	77,28	77,76	76,35
233,0	522,0	4,4	0,0	8,5	312,5	211,0	70,5	82,7	346,1	261,8	322,8	307,9	323,8	751,5	0,16	76,79	77,89	75,19	0,15	77,27	77,77	76,30
234,0	523,0	4,4	0,0	8,4	311,9	209,9	70,3	82,6	343,6	261,1	323,3	307,7	323,7	748,9	0,16	76,76	77,86	75,14	0,15	77,22	77,72	76,24
235,0	524,0	4,3	0,0	8,4	311,6	209,2	70,4	82,5	343,0	260,4	323,0	307,4	324,3	744,2	0,16	76,72	77,85	75,10	0,15	77,17	77,68	76,17
236,0	525,0	4,3	0,0	8,4	311,2	208,1	70,3	82,5	341,4	260,1	323,0	307,1	3									

275.0	564.0	3,4	0,0	7,1	298,6	188,1	71,0	80,4	306,7	248,9	317,1	294,3	326,0	691,7	0,16	76,50	77,44	74,36	0,15	76,91	77,37	75,25
276.0	565.0	3,4	0,0	7,0	298,2	187,6	70,9	80,6	305,9	248,6	316,6	294,0	325,8	689,2	0,16	76,49	77,43	74,33	0,15	76,87	77,37	75,26
277.0	566.0	3,4	0,0	7,0	297,7	187,1	70,9	80,6	305,5	248,3	316,0	293,3	325,6	687,6	0,16	76,55	77,42	74,34	0,15	76,89	77,40	75,24
278.0	567.0	3,4	0,0	7,0	297,2	186,5	70,9	80,6	304,2	248,0	315,7	292,9	325,4	684,3	0,16	76,56	77,39	74,33	0,15	76,93	77,42	75,24
279.0	568.0	3,4	0,0	6,9	296,8	186,0	70,9	80,6	303,4	247,6	315,3	292,4	325,1	682,1	0,16	76,55	77,39	74,34	0,15	76,90	77,45	75,22
280.0	569.0	3,4	0,0	6,9	296,3	185,4	70,7	80,5	302,8	247,2	314,5	291,8	325,1	678,9	0,16	76,53	77,37	74,32	0,15	76,86	77,45	75,23
281.0	570.0	3,3	0,0	6,9	295,7	184,9	70,6	80,3	301,8	246,7	314,1	291,2	324,8	677,3	0,16	76,49	77,34	74,29	0,15	76,85	77,42	75,19
282.0	571.0	3,3	0,0	6,8	295,4	184,5	70,7	80,2	301,8	246,1	313,7	290,9	324,8	675,5	0,16	76,42	77,35	74,27	0,15	76,86	77,41	75,18
283.0	572.0	3,3	0,0	6,8	294,8	183,3	70,7	80,1	300,6	245,5	313,1	290,2	324,6	672,7	0,16	76,35	77,35	74,24	0,15	76,87	77,38	75,17
284.0	573.0	3,3	0,0	6,8	294,5	182,6	70,8	80,1	300,1	245,0	312,9	289,8	324,5	671,3	0,16	76,16	77,32	74,24	0,15	76,79	77,38	75,17
285.0	574.0	3,3	0,0	6,8	293,8	182,4	70,6	80,0	298,9	244,5	312,2	289,2	324,4	670,4	0,16	76,06	77,25	74,20	0,14	76,73	77,31	75,15
286.0	575.0	3,3	0,0	6,8	293,3	181,8	70,5	80,2	297,7	244,1	311,6	288,8	324,2	668,4	0,16	76,11	77,26	74,23	0,15	76,68	77,37	75,15
287.0	576.0	3,3	0,0	6,8	292,9	181,2	70,5	80,0	297,5	243,5	311,4	288,0	324,0	667,5	0,16	76,09	77,24	74,17	0,15	76,65	77,35	75,11
288.0	577.0	3,2	0,0	6,7	292,4	180,6	70,4	79,9	296,9	243,0	310,8	287,5	323,8	664,9	0,16	76,04	77,21	74,16	0,15	76,61	77,35	75,10
289.0	578.0	3,2	0,0	6,8	292,0	180,2	70,4	80,0	296,5	242,6	310,3	287,0	323,7	662,1	0,16	76,01	77,18	74,14	0,15	76,60	77,33	75,09
290.0	579.0	3,2	0,0	6,8	291,7	179,9	70,5	79,9	296,4	242,2	310,1	286,5	323,6	660,7	0,16	76,07	77,18	74,12	0,15	76,61	77,32	75,08
291.0	580.0	3,2	0,0	6,7	291,2	179,4	70,6	79,8	294,8	241,8	309,7	286,1	323,5	659,8	0,16	76,14	77,18	74,10	0,15	76,66	77,31	75,04
292.0	581.0	3,2	0,0	6,7	290,8	178,8	70,5	79,8	294,3	241,5	309,3	285,5	323,3	657,4	0,16	76,11	77,14	74,07	0,15	76,55	77,30	75,03
293.0	582.0	3,2	0,0	6,7	290,2	178,9	70,3	79,7	293,3	241,2	308,7	284,7	323,1	657,3	0,16	76,08	77,11	74,03	0,15	76,49	77,27	75,02
294.0	583.0	3,2	0,0	6,7	289,8	178,2	70,5	79,8	292,8	240,9	308,2	284,4	322,9	654,1	0,16	76,07	77,12	74,01	0,15	76,48	77,26	74,97
295.0	584.0	3,1	0,0	6,7	289,4	178,0	70,2	79,6	292,1	240,7	307,7	283,8	322,7	653,2	0,16	76,10	77,09	73,99	0,15	76,47	77,24	74,98
296.0	585.0	3,1	0,0	6,6	289,0	177,9	70,3	79,4	291,3	240,3	307,6	283,2	322,6	652,2	0,16	76,08	77,07	73,94	0,15	76,45	77,22	74,93
297.0	586.0	3,1	0,0	6,6	288,6	177,8	70,3	79,4	290,8	239,8	307,1	282,8	322,3	648,2	0,16	75,97	77,05	73,89	0,15	76,38	77,19	74,91
298.0	587.0	3,1	0,0	6,7	288,2	177,4	70,4	79,4	290,7	239,4	306,6	282,3	322,2	648,2	0,16	75,88	77,03	73,88	0,15	76,34	77,17	74,89
299.0	588.0	3,1	0,0	6,6	287,8	177,3	70,2	79,6	289,7	239,1	306,1	281,7	322,1	646,6	0,16	75,79	77,00	73,85	0,15	76,28	77,15	74,85
300.0	589.0	3,1	0,0	6,7	287,2	176,8	70,2	79,5	288,6	238,7	305,6	281,4	321,9	644,6	0,16	75,70	76,98	73,83	0,15	76,23	77,14	74,85
301.0	590.0	3,1	0,0	6,8	286,8	176,5	70,1	79,2	288,0	238,3	305,1	280,8	321,7	651,7	0,16	75,68	76,96	73,78	0,15	76,20	77,11	74,81
302.0	591.0	3,1	0,0	6,8	286,6	176,1	70,0	79,3	288,3	238,0	304,8	280,3	321,6	651,9	0,16	75,60	76,95	73,76	0,15	76,19	77,12	74,78
303.0	592.0	3,0	0,0	6,8	286,0	175,4	70,1	79,3	287,1	237,7	304,2	279,7	321,4	650,9	0,16	75,52	76,93	73,72	0,15	76,17	77,10	74,74
304.0	593.0	3,0	0,0	6,8	285,6	175,3	70,2	79,2	286,3	237,3	303,8	279,4	321,1	649,4	0,16	75,55	76,95	73,71	0,15	76,15	77,06	74,76
305.0	594.0	3,0	0,0	6,7	285,2	175,1	70,1	79,2	286,2	237,0	303,2	278,8	321,0	649,8	0,16	75,57	76,92	73,73	0,15	76,14	77,06	74,74
306.0	595.0	3,0	0,0	6,7	284,8	175,1	70,1	79,1	285,4	236,6	302,9	278,4	320,7	648,1	0,16	75,55	76,90	73,70	0,15	76,12	77,03	74,71
307.0	596.0	3,0	0,0	6,7	284,4	174,7	69,9	79,1	284,9	236,3	302,4	277,8	320,6	644,9	0,16	75,54	76,89	73,70	0,15	76,08	76,99	74,71
308.0	597.0	2,9	0,0	6,7	283,9	174,1	69,8	79,0	284,4	235,9	301,8	277,2	320,3	643,5	0,16	75,47	76,88	73,69	0,15	76,05	76,95	74,72
309.0	598.0	2,9	0,0	6,6	283,6	174,3	69,8	78,8	283,6	235,3	301,4	276,6	320,3	642,0	0,16	75,43	76,83	73,66	0,15	76,03	76,93	74,69
310.0	599.0	2,9	0,0	6,6	283,1	173,7	69,9	78,9	283,2	235,1	300,9	276,4	319,8	642,1	0,16	75,32	76,79	73,62	0,15	75,96	76,92	74,65
311.0	600.0	2,9	0,0	6,6	282,7	173,0	70,0	78,9	282,9	234,7	300,7	275,4	319,5	640,7	0,16	75,26	76,76	73,59	0,15	75,92	76,91	74,63
312.0	601.0	2,9	0,0	6,6	282,3	172,7	70,1	78,7	282,0	234,3	300,1	275,4	319,4	640,8	0,16	75,21	76,75	73,59	0,15	75,92	76,91	74,60
313.0	602.0	2,9	0,0	6,5	281,9	173,0	69,9	78,7	281,4	234,1	299,6	274,9	319,3	639,0	0,16	75,25	76,74	73,57	0,15	75,91	76,89	74,58
314.0	603.0	2,8	0,0	6,5	281,5	172,7	69,8	78,5	281,0	233,7	299,3	274,5	318,9	637,5	0,16	75,28	76,72	73,56	0,15	75,85	76,84	74,57
315.0	604.0	2,9	0,0	6,5	281,2	172,3	70,3	79,0	280,5	233,1	299,4	274,6	318,5	636,4	0,16	75,26	76,72	73,53	0,15	75,79	76,80	74,54
316.0	605.0	2,8	0,0	6,5	280,9	171,4	71,1	79,4	279,9	232,6	299,2	274,6	318,2	634,6	0,16	75,31	76,68	73,54	0,15	75,76	76,80	74,53
317.0	606.0	2,9	0,0	6,5	280,5	171,5	71,8	80,0	279,0	232,1	298,8	274,5	318,1	634,0	0,16	75,47	76,69	73,62	0,15	75,81	76,82	74,58
318.0	607.0	2,8	0,0	6,5	280,3	170,9	72,3	80,5	278,5	231,9	298,5	274,3	318,4	631,0	0,16	75,70	76,73	73,70	0,15	75,95	76,88	74,65
319.0	608.0	2,8	0,0	6,5	280,0	170,2	72,7	81,0	277,9	231,5	298,2	274,1	318,1	627,4	0,16	76,02	76,81	73,78	0,15	76,17	76,96	74,70
320.0	609.0	2,8	0,0	6,5	279,9	169,9	73,1	81,4	278,0	231,2	298,0	274,0	318,2	626,6	0,16	76,27	76,83	73,86	0,15	76,33	77,02	74,75
321.0	610.0	2,8	0,0	6,4	279,4	169,9	73,3	81,8	276,9	231,0	297,2	273,8	318,0	624,5	0,16	76,57	76,90	73,95	0,15	76,50	77,09	74,83
322.0	611.0	2,8	0,0	6,4	279,1	169,1	73,7	81,8	276,4	230,7	296,8	273,7	317,9	620,9	0,16	76,88	76,98	74,06	0,15	76,72	77,18	74,90
323.0	612.0	2,8	0,0	6,4	278,8	169,0	73,9	82,1	275,9	230,4	296,3	273,6	317,7	618,7	0,16	77,12	77,05	74,16	0,15	76,91	77,25	74,96
324.0	613.0	2,8	0,0	6,4	278,4	168,9	74,1	82,2	275,2	230,2	295,8	273,4	317,4	617,4	0,16	77,32	77,12	74,25	0,15	77,10	77,33	75,04
325.0	614.0	2,7	0,0	6,3	278,1	168,5	74,2	82,5	274,6	230,0	295,4	273,3	317,4	616,5	0,16	77,50	77,19	74,36	0,15	77,24	77,42	75,12
326.0	615.0	2,7	0,0	6,3	277,9	167,8	74,3	82,6	274,5	229,7	294,7	273,2	317,2	613,9	0,16	77,64	77,25	74,46	0,15	77,36	77,47	75,18
327.0	616.0	2,7	0,0	6,3	277,6	167,3	74,5	82,6	274,0	229,6	294,3	273,0	317,2	613,0	0,16	77,76	77,31	74,56	0,15	77,52	77,55	75,28
328.0	617.0	2,7	0,0	6,4	277,2	167,5	74,6	82,7	273,4	229,4	293,7	272,7	316,9	612,8	0,16	77,89	77,37	74,67	0,15	77,65	77,65	75,34
329.0	618.0	2,7	0,0	6,3	276,9	167,6	74,7	82,9	272,6	229,4	293,3	272,5	316,7	611,7	0,1							

368.0	657.0	2,3	0,0	5,7	264,0	158,7	76,5	83,2	254,9	220,8	277,3	260,1	307,0	570,4	0,16	79,26	78,57	77,59	0,15	79,26	78,94	77,89
369.0	658.0	2,2	0,0	5,7	263,6	157,9	76,4	83,1	254,3	220,5	276,9	259,8	306,7	565,8	0,16	79,28	78,59	77,65	0,15	79,27	78,97	77,93
370.0	659.0	2,3	0,0	5,5	263,3	157,4	76,5	83,2	253,9	220,4	276,6	259,4	306,5	563,2	0,16	79,28	78,61	77,68	0,15	79,29	78,97	77,98
371.0	660.0	2,2	0,0	5,6	262,9	157,3	76,4	83,2	253,2	220,1	276,0	259,1	306,0	560,9	0,16	79,30	78,63	77,70	0,15	79,29	78,99	78,01
372.0	661.0	2,3	0,0	5,6	262,7	157,0	76,4	83,3	253,0	219,9	275,6	258,8	306,0	558,8	0,16	79,32	78,64	77,73	0,15	79,31	79,00	78,03
373.0	662.0	2,2	0,0	5,6	262,4	156,5	76,5	83,1	252,7	219,6	275,2	258,5	305,9	558,0	0,16	79,32	78,64	77,78	0,15	79,32	79,00	78,07
374.0	663.0	2,2	0,0	5,6	262,0	156,4	76,4	83,2	251,9	219,3	274,9	258,1	305,8	556,0	0,16	79,34	78,66	77,83	0,15	79,35	79,02	78,12
375.0	664.0	2,2	0,0	5,6	261,7	156,1	76,5	83,2	251,7	218,9	274,5	257,8	305,7	552,8	0,16	79,38	78,69	77,85	0,15	79,40	79,06	78,15
376.0	665.0	2,2	0,0	5,5	261,3	156,1	76,5	83,2	251,0	218,6	273,9	257,5	305,7	551,6	0,16	79,40	78,73	77,88	0,15	79,41	79,08	78,16
377.0	666.0	2,2	0,0	5,5	261,1	156,1	76,6	83,1	250,7	218,3	273,5	257,1	305,8	549,4	0,16	79,41	78,73	77,90	0,15	79,41	79,08	78,19
378.0	667.0	2,2	0,0	5,5	260,8	156,3	76,6	83,1	250,2	218,1	273,1	256,7	305,9	549,5	0,16	79,40	78,74	77,95	0,15	79,41	79,09	78,21
379.0	668.0	2,2	0,0	5,4	260,5	155,6	76,7	83,1	249,6	217,8	272,7	256,3	306,0	548,8	0,16	79,43	78,76	77,98	0,15	79,42	79,11	78,24
380.0	669.0	2,2	0,0	5,4	260,2	155,2	76,5	83,0	249,1	217,5	272,4	256,0	306,1	544,3	0,16	79,43	78,77	78,01	0,15	79,42	79,14	78,28
381.0	670.0	2,2	0,0	5,4	260,0	154,9	76,6	83,1	249,0	217,1	272,1	255,7	306,3	544,8	0,16	79,43	78,77	78,03	0,15	79,42	79,13	78,31
382.0	671.0	2,2	0,0	5,3	259,8	154,9	76,5	83,0	248,9	216,7	271,6	255,3	306,5	542,5	0,16	79,44	78,80	78,06	0,15	79,43	79,15	78,34
383.0	672.0	2,2	0,0	5,3	259,4	154,4	76,6	83,0	248,1	216,3	271,3	255,1	306,5	541,4	0,16	79,45	78,82	78,09	0,15	79,44	79,16	78,37
384.0	673.0	2,2	0,0	5,2	259,1	154,7	76,6	83,2	247,4	215,9	270,9	254,7	306,6	540,5	0,16	79,45	78,83	78,11	0,15	79,45	79,18	78,38
385.0	674.0	2,1	0,0	5,3	258,7	154,0	76,7	83,1	246,8	215,5	270,4	254,3	306,6	535,7	0,16	79,47	78,84	78,12	0,15	79,47	79,18	78,41
386.0	675.0	2,1	0,0	5,3	258,4	153,8	76,7	83,1	246,2	215,2	270,0	254,0	306,6	534,8	0,16	79,47	78,85	78,17	0,15	79,46	79,19	78,41
387.0	676.0	2,1	0,0	5,3	258,2	153,6	76,7	83,1	246,5	214,7	269,6	253,6	306,7	532,7	0,16	79,48	78,86	78,18	0,15	79,45	79,20	78,43
388.0	677.0	2,1	0,0	5,3	257,7	152,9	76,7	82,9	245,5	214,3	269,2	253,2	306,6	535,7	0,16	79,49	78,87	78,22	0,15	79,46	79,20	78,46
389.0	678.0	2,1	0,0	5,2	257,5	152,9	76,7	83,0	245,0	214,0	268,9	253,0	306,7	531,8	0,16	79,48	78,88	78,23	0,15	79,46	79,22	78,47
390.0	679.0	2,1	0,0	5,2	257,2	152,6	76,7	83,0	244,6	213,6	268,6	252,5	306,8	533,1	0,16	79,51	78,90	78,23	0,15	79,49	79,23	78,49
391.0	680.0	2,1	0,0	5,2	256,9	152,6	76,8	83,0	244,5	213,3	268,0	252,2	306,5	529,4	0,16	79,55	78,93	78,28	0,15	79,53	79,25	78,52
392.0	681.0	2,1	0,0	5,2	256,6	152,3	76,8	83,1	244,3	213,8	267,7	251,9	306,6	529,7	0,16	79,54	78,93	78,28	0,15	79,52	79,24	78,54
393.0	682.0	2,1	0,0	5,2	256,3	152,3	76,7	83,1	244,0	212,5	267,4	251,5	306,6	524,9	0,16	79,54	78,94	78,29	0,15	79,52	79,27	78,53
394.0	683.0	2,1	0,0	5,2	255,9	152,2	76,8	83,0	242,9	212,1	266,8	251,2	306,3	526,5	0,16	79,55	78,96	78,32	0,15	79,53	79,29	78,58
395.0	684.0	2,1	0,0	5,2	255,6	151,8	76,8	83,1	242,6	211,7	266,5	250,8	306,2	527,2	0,16	79,56	78,97	78,35	0,15	79,55	79,29	78,60
396.0	685.0	2,0	0,0	5,2	255,2	151,5	76,9	83,1	241,9	211,3	266,0	250,5	306,2	526,9	0,16	79,55	78,99	78,37	0,15	79,54	79,30	78,60
397.0	686.0	2,0	0,0	5,2	255,0	151,4	76,8	83,0	241,8	211,0	265,8	250,1	306,1	528,7	0,16	79,58	79,01	78,38	0,15	79,55	79,31	78,62
398.0	687.0	2,0	0,0	5,2	254,6	150,6	76,9	83,1	241,5	210,5	265,3	249,8	306,0	525,3	0,16	79,59	79,02	78,41	0,15	79,57	79,33	78,64
399.0	688.0	2,0	0,0	5,2	254,3	150,8	77,0	83,0	241,1	210,1	264,8	249,4	305,9	524,5	0,16	79,60	79,02	78,42	0,15	79,57	79,34	78,64
400.0	689.0	2,0	0,0	5,2	253,8	150,7	77,0	83,1	240,3	209,7	264,4	249,1	305,7	526,9	0,16	79,59	79,03	78,43	0,15	79,55	79,34	78,65
401.0	690.0	2,0	0,0	5,2	253,5	150,3	76,9	83,0	240,0	209,3	264,0	248,8	305,5	522,5	0,16	79,60	79,05	78,44	0,15	79,56	79,34	78,66
402.0	691.0	2,0	0,0	5,2	253,2	150,2	77,0	83,0	239,6	208,9	263,6	248,5	305,4	522,5	0,16	79,60	79,03	78,45	0,15	79,56	79,35	78,68
403.0	692.0	2,0	0,0	5,1	252,9	149,8	76,9	82,9	239,3	208,6	263,2	248,1	305,3	522,6	0,16	79,61	79,07	78,47	0,15	79,58	79,38	78,71
404.0	693.0	2,0	0,0	5,1	252,5	149,8	76,9	82,8	238,7	208,3	262,9	247,7	305,1	524,1	0,16	79,60	79,04	78,46	0,15	79,57	79,36	78,69
405.0	694.0	2,0	0,0	5,1	252,3	149,6	76,9	82,8	238,6	207,9	262,5	247,4	305,0	523,9	0,16	79,60	79,06	78,48	0,15	79,57	79,37	78,73
406.0	695.0	1,9	0,0	5,1	251,9	149,7	76,9	82,9	237,9	207,5	262,0	247,0	304,9	524,0	0,16	79,63	79,08	78,50	0,15	79,61	79,39	78,73
407.0	696.0	1,9	0,0	5,2	251,6	149,6	76,9	82,9	237,6	207,1	261,7	246,7	304,7	523,7	0,16	79,65	79,11	78,51	0,15	79,62	79,42	78,74
408.0	697.0	1,9	0,0	5,2	251,3	149,3	76,9	82,7	237,5	206,8	261,2	246,3	304,6	520,8	0,16	79,62	79,10	78,51	0,15	79,59	79,42	78,74
409.0	698.0	2,0	0,0	5,1	250,9	149,4	77,0	82,7	237,0	206,4	260,7	246,0	304,3	521,4	0,16	79,62	79,09	78,53	0,15	79,59	79,41	78,76
410.0	699.0	1,9	0,0	5,1	250,5	148,8	76,9	82,8	236,4	206,1	260,4	245,6	304,3	519,2	0,16	79,61	79,12	78,55	0,15	79,59	79,41	78,76
411.0	700.0	1,9	0,0	5,1	250,3	148,9	76,9	82,7	236,2	205,7	260,0	245,3	304,1	519,2	0,16	79,62	79,13	78,57	0,15	79,58	79,43	78,78
412.0	701.0	1,9	0,0	5,1	249,9	148,8	77,0	82,8	235,9	205,3	259,6	244,9	304,0	519,5	0,16	79,62	79,14	78,58	0,15	79,58	79,45	78,79
413.0	702.0	1,9	0,0	5,2	249,7	149,0	77,0	82,8	235,6	205,0	259,3	244,5	303,9	518,0	0,16	79,61	79,14	78,58	0,15	79,58	79,44	78,79
414.0	703.0	1,9	0,0	5,1	249,4	148,6	76,9	82,7	235,7	204,7	258,8	244,2	303,7	518,9	0,16	79,62	79,15	78,59	0,15	79,56	79,45	78,80
415.0	704.0	1,9	0,0	5,1	249,1	148,1	77,0	82,7	234,8	204,4	258,6	244,0	303,5	520,3	0,16	79,62	79,15	78,60	0,15	79,59	79,45	78,82
416.0	705.0	1,9	0,0	5,1	248,7	148,3	76,9	82,7	234,6	204,2	258,0	243,6	303,2	522,7	0,16	79,65	79,15	78,62	0,15	79,60	79,47	78,83
417.0	706.0	1,9	0,0	5,2	248,4	147,9	77,1	82,7	234,1	203,9	257,7	243,3	303,2	520,5	0,16	79,65	79,16	78,62	0,15	79,61	79,47	78,84
418.0	707.0	1,9	0,0	5,2	248,3	147,7	77,0	82,6	234,7	203,6	257,3	243,0	303,1	518,2	0,16	79,65	79,16	78,63	0,15	79,63	79,50	78,84
419.0	708.0	1,8	0,0	5,2	247,9	147,7	77,1	82,6	233,7	203,3	256,9	242,7	303,1	519,4	0,16	79,66	79,19	78,63	0,15	79,63	79,50	78,85
420.0	709.0	1,8	0,0	5,2	247,6	147,6	77,1	82,7	233,3	203,0	256,4	242,2	302,9	516,3	0,16	79,68	79,20	78,63	0,15	79,63	79,52	78,87
421.0	710.0	1,8	0,0	5,1	247,3	147,7	77,1	82,7	233,2	202,8	256,2	241,8	302,8	515,8	0,16	79,68	79,19	78,64	0,15	79,65	79,50	78,88
422.0	711.0	1,8	0,0	5,1	247,1	147,5	77,0	82,6	233,0	202,4	255,8	241,7	302,7	513,7	0,1							

461.0	750.0	1,5	0,0	5,1	236,7	142,9	77,2	82,1	223,8	191,6	243,2	230,7	294,1	496,3	0,16	79,65	79,38	78,68	0,15	79,64	79,68	78,95
462.0	751.0	1,5	0,0	5,2	236,4	143,2	77,1	82,1	223,4	191,4	242,8	230,5	293,7	496,8	0,16	79,62	79,37	78,68	0,15	79,60	79,68	78,95
463.0	752.0	1,4	0,0	5,1	236,2	143,3	77,2	82,0	223,4	191,1	242,7	230,2	293,5	495,5	0,16	79,59	79,37	78,67	0,15	79,60	79,69	78,96
464.0	753.0	1,4	0,0	5,1	235,9	143,4	77,1	82,0	223,2	190,9	242,6	229,9	293,0	497,2	0,16	79,60	79,35	78,66	0,15	79,58	79,68	78,96
465.0	754.0	1,4	0,0	5,2	235,6	143,4	77,1	82,1	223,0	190,6	242,1	229,7	292,6	497,8	0,16	79,59	79,39	78,67	0,15	79,58	79,69	78,96
466.0	755.0	1,4	0,0	5,1	235,4	143,3	77,2	82,1	222,9	190,4	242,0	229,5	292,4	498,4	0,16	79,60	79,38	78,65	0,15	79,59	79,69	78,94
467.0	756.0	1,4	0,0	5,2	235,1	142,8	77,2	82,0	222,4	190,2	241,8	229,3	292,0	497,6	0,16	79,63	79,39	78,67	0,15	79,63	79,71	78,95
468.0	757.0	1,4	0,0	5,1	234,9	142,6	77,1	82,1	222,3	189,9	241,5	229,0	291,7	497,6	0,16	79,61	79,39	78,64	0,15	79,60	79,69	78,92
469.0	758.0	1,4	0,0	5,1	234,5	142,9	77,2	82,1	221,9	189,6	241,2	228,8	291,2	495,9	0,16	79,58	79,38	78,62	0,15	79,59	79,68	78,92
470.0	759.0	1,4	0,0	5,0	234,2	142,7	77,1	82,1	221,5	189,4	241,0	228,5	290,7	496,4	0,16	79,57	79,36	78,64	0,15	79,57	79,69	78,92
471.0	760.0	1,4	0,0	5,1	233,9	142,7	77,1	82,0	221,5	189,0	240,6	228,3	290,3	492,9	0,16	79,59	79,38	78,63	0,15	79,58	79,69	78,92
472.0	761.0	1,4	0,0	5,0	233,6	142,6	77,2	82,0	221,0	188,8	240,3	228,0	289,9	488,9	0,16	79,57	79,37	78,64	0,15	79,55	79,68	78,92
473.0	762.0	1,4	0,0	5,0	233,4	142,3	77,2	82,2	221,0	188,5	240,1	227,7	289,6	490,6	0,16	79,58	79,36	78,63	0,15	79,56	79,68	78,91
474.0	763.0	1,3	0,0	5,2	233,3	142,5	77,1	82,0	221,1	188,3	240,1	227,6	289,2	496,1	0,16	79,60	79,37	78,64	0,15	79,56	79,70	78,91
475.0	764.0	1,3	0,0	5,4	232,9	142,7	77,2	81,9	220,9	188,1	239,7	227,3	288,7	501,2	0,16	79,62	79,38	78,61	0,15	79,56	79,70	78,91
476.0	765.0	1,4	0,0	5,5	232,8	142,6	77,2	81,9	221,1	188,0	239,4	227,1	288,4	506,2	0,16	79,59	79,37	78,62	0,15	79,54	79,70	78,90
477.0	766.0	1,3	0,0	5,6	232,5	142,6	77,2	81,8	221,1	187,7	239,2	226,8	287,9	508,4	0,16	79,54	79,35	78,62	0,15	79,51	79,68	78,89
478.0	767.0	1,3	0,0	5,6	232,2	142,5	77,1	82,0	220,7	187,5	238,9	226,5	287,5	510,5	0,16	79,49	79,35	78,61	0,15	79,49	79,68	78,88
479.0	768.0	1,3	0,0	5,6	232,2	142,3	77,2	81,8	220,7	187,4	238,8	226,4	287,2	508,6	0,16	79,50	79,34	78,61	0,15	79,51	79,69	78,90
480.0	769.0	1,3	0,0	5,6	231,9	142,4	77,2	82,0	220,7	187,1	238,7	226,1	287,0	511,2	0,16	79,48	79,35	78,62	0,15	79,48	79,68	78,88
481.0	770.0	1,3	0,0	5,6	231,8	142,6	77,2	81,9	221,0	186,8	238,5	225,9	286,6	511,1	0,16	79,46	79,35	78,58	0,15	79,47	79,67	78,87
482.0	771.0	1,3	0,0	5,5	231,5	142,5	77,1	82,0	220,7	186,6	238,3	225,8	286,4	507,9	0,16	79,44	79,33	78,60	0,15	79,45	79,67	78,89
483.0	772.0	1,2	0,0	5,5	231,3	142,8	77,2	81,9	220,5	186,4	238,1	225,4	286,0	511,7	0,16	79,42	79,34	78,59	0,15	79,43	79,67	78,89
484.0	773.0	1,2	0,0	5,5	231,1	142,9	77,2	81,9	220,4	186,1	237,9	225,2	285,7	508,3	0,16	79,42	79,34	78,59	0,15	79,43	79,66	78,88
485.0	774.0	1,2	0,0	5,4	230,9	143,0	77,2	81,9	220,5	185,9	237,8	225,1	285,4	509,3	0,16	79,44	79,34	78,60	0,15	79,45	79,68	78,89
486.0	775.0	1,2	0,0	5,5	230,7	143,1	77,1	81,9	220,1	185,7	237,7	224,8	285,1	509,5	0,16	79,42	79,34	78,58	0,15	79,42	79,67	78,85
487.0	776.0	1,2	0,0	5,4	230,5	143,0	77,2	81,8	220,0	185,5	237,4	224,7	285,0	508,4	0,16	79,46	79,34	78,59	0,15	79,44	79,67	78,86
488.0	777.0	1,2	0,0	5,4	230,2	143,1	77,1	81,8	219,7	185,3	237,1	224,5	284,6	505,5	0,16	79,45	79,32	78,58	0,15	79,43	79,67	78,86
489.0	778.0	1,2	0,0	5,4	230,0	143,3	77,2	81,8	219,6	185,1	237,0	224,3	284,3	503,6	0,16	79,44	79,33	78,58	0,15	79,43	79,66	78,87
490.0	779.0	1,2	0,0	5,4	230,0	142,8	77,2	81,8	219,9	184,9	236,8	224,1	284,1	503,6	0,16	79,46	79,33	78,57	0,15	79,44	79,65	78,84
491.0	780.0	1,2	0,0	5,3	229,7	142,9	77,2	81,8	219,6	184,7	236,7	223,9	283,8	505,3	0,16	79,40	79,30	78,56	0,15	79,39	79,64	78,82
492.0	781.0	1,2	0,0	5,4	229,5	142,7	77,2	81,8	219,5	184,5	236,4	223,6	283,5	503,7	0,16	79,40	79,32	78,55	0,15	79,39	79,66	78,84
493.0	782.0	1,1	0,0	5,4	229,3	143,0	77,2	81,7	219,2	184,3	236,2	223,5	283,3	505,2	0,16	79,38	79,32	78,55	0,15	79,37	79,65	78,86
494.0	783.0	1,1	0,0	5,4	229,3	143,0	77,1	81,8	219,4	184,1	236,2	223,4	283,2	503,9	0,16	79,37	79,31	78,54	0,15	79,38	79,65	78,84
495.0	784.0	1,1	0,0	5,3	229,0	142,8	77,2	81,7	219,9	183,9	235,9	223,0	282,8	503,0	0,16	79,36	79,30	78,53	0,15	79,37	79,63	78,81
496.0	785.0	1,1	0,0	5,3	228,9	142,5	77,1	81,7	219,2	183,7	235,9	223,0	282,8	503,4	0,16	79,35	79,30	78,52	0,15	79,35	79,65	78,84
497.0	786.0	1,1	0,0	5,3	228,7	142,7	77,1	81,8	219,0	183,5	235,6	222,9	282,5	506,1	0,16	79,32	79,29	78,53	0,15	79,34	79,64	78,82
498.0	787.0	1,1	0,0	5,3	228,5	142,5	77,1	81,8	218,7	183,3	235,4	222,6	282,4	501,3	0,16	79,30	79,28	78,53	0,15	79,31	79,63	78,81
499.0	788.0	1,1	0,0	5,3	228,4	142,3	77,1	81,9	218,9	183,1	235,4	222,5	282,3	503,7	0,16	79,32	79,31	78,54	0,15	79,34	79,65	78,84
500.0	789.0	1,1	0,0	5,3	228,2	142,2	77,2	81,8	218,3	182,9	235,1	222,4	282,1	504,6	0,16	79,32	79,31	78,53	0,15	79,33	79,64	78,81
501.0	790.0	1,0	0,0	5,3	228,0	141,9	77,2	81,7	218,3	182,7	234,8	222,2	282,0	501,3	0,16	79,28	79,29	78,51	0,15	79,32	79,64	78,81
502.0	791.0	1,1	0,0	5,3	228,0	142,0	77,1	81,7	218,6	182,5	235,0	222,0	281,9	502,4	0,16	79,35	79,31	78,50	0,15	79,34	79,66	78,79
503.0	792.0	1,0	0,0	5,3	227,6	142,6	77,1	81,7	218,0	182,4	234,5	221,8	281,6	502,5	0,16	79,32	79,30	78,50	0,15	79,32	79,65	78,79
504.0	793.0	1,0	0,0	5,2	227,6	142,6	77,1	81,6	218,1	182,2	234,4	221,7	281,6	503,5	0,16	79,29	79,30	78,50	0,15	79,32	79,65	78,79
505.0	794.0	1,0	0,0	5,3	227,5	142,7	77,1	81,8	218,4	182,0	234,2	221,5	281,4	500,9	0,16	79,25	79,26	78,48	0,15	79,28	79,62	78,76
506.0	795.0	1,0	0,0	5,2	227,3	142,1	77,1	81,7	217,9	181,8	234,0	221,4	281,3	501,8	0,16	79,21	79,26	78,48	0,15	79,25	79,63	78,76
507.0	796.0	1,0	0,0	5,2	227,1	142,1	77,1	81,6	217,8	181,5	233,9	221,3	281,1	502,8	0,16	79,19	79,26	78,48	0,15	79,24	79,61	78,77
508.0	797.0	1,0	0,0	5,2	226,9	142,3	77,0	81,7	217,7	181,3	233,7	221,0	280,9	501,4	0,16	79,17	79,24	78,46	0,15	79,23	79,59	78,74
509.0	798.0	1,0	0,0	5,2	226,8	141,9	77,1	81,7	217,7	181,1	233,4	220,9	280,8	501,7	0,16	79,16	79,23	78,45	0,15	79,22	79,59	78,74
510.0	799.0	1,0	0,0	5,2	226,6	141,9	77,1	81,6	217,3	180,9	233,4	220,8	280,7	501,5	0,16	79,14	79,23	78,45	0,15	79,21	79,60	78,76
511.0	800.0	0,9	0,0	5,2	226,5	142,2	77,2	81,5	217,3	181,0	233,2	220,7	280,5	502,0	0,16	79,12	79,21	78,44	0,15	79,20	79,58	78,72
512.0	801.0	1,0	0,0	5,2	226,5	142,7	77,1	81,6	217,2	181,1	233,1	220,6	280,4	500,1	0,16	79,14	79,21	78,42	0,15	79,21	79,59	78,73
513.0	802.0	0,9	0,0	5,2	226,3	142,5	77,1	81,5	217,0	181,2	232,9	220,4	280,2	499,9	0,16	79,14	79,20	78,42	0,15	79,23	79,56	78,71
514.0	803.0	1,0	0,0	5,2	226,2	142,3	77,1	81,5	217,0	181,2	232,5	220,3	279,9	502,5	0,16	79,11	79,20	78,38	0,15	79,21	79,58	78,71
515.0	804.0	0,9	0,0	5,2	226,1	142,1	77,1	81,5	217,1	181,2	232,4	220,1	279,8	502,7	0,1							

554.0	843.0	0,6	-0,2	-6,2	220,9	141,8	77,3	81,6	214,2	176,1	226,1	216,9	271,4	504,0	0,16	78,97	79,06	78,30	0,15	78,97	79,45	78,51
555.0	844.0	0,6	-0,2	-6,2	220,8	141,7	77,2	81,5	214,2	176,0	226,0	216,7	271,3	508,5	0,16	78,98	79,06	78,31	0,15	78,98	79,44	78,48
556.0	845.0	0,5	-0,2	-6,2	220,7	141,7	77,3	81,6	214,0	175,9	225,7	216,9	271,3	508,0	0,16	78,96	79,04	78,31	0,15	78,97	79,43	78,48
557.0	846.0	0,5	-0,2	-6,2	220,5	141,7	77,3	81,5	213,7	175,7	225,6	216,6	271,0	509,1	0,16	78,95	79,03	78,32	0,15	78,96	79,42	78,48
558.0	847.0	0,5	-0,2	-6,2	220,5	141,8	77,3	81,5	213,9	175,7	225,5	216,7	270,9	511,9	0,16	78,95	79,03	78,33	0,15	78,96	79,42	78,46
559.0	848.0	0,5	-0,2	-6,2	220,5	142,0	77,3	81,5	214,0	175,6	225,3	216,7	270,9	509,0	0,16	78,96	79,04	78,31	0,15	78,97	79,42	78,46
560.0	849.0	0,5	-0,2	-6,2	220,3	142,2	77,3	81,5	213,7	175,4	225,2	216,6	270,6	509,7	0,16	78,96	79,03	78,32	0,15	78,97	79,42	78,47
561.0	850.0	0,5	-0,2	-6,2	220,3	142,0	77,3	81,5	213,9	175,3	225,0	216,6	270,5	509,3	0,16	78,94	79,03	78,30	0,15	78,96	79,41	78,45
562.0	851.0	0,5	-0,2	-6,2	220,2	142,2	77,3	81,5	213,9	175,1	224,8	216,7	270,4	508,3	0,16	78,92	79,00	78,30	0,15	78,93	79,39	78,46
563.0	852.0	0,5	-0,2	-6,2	220,1	142,2	77,3	81,4	213,7	174,9	224,8	216,6	270,3	510,5	0,16	78,92	79,01	78,30	0,15	78,94	79,38	78,45
564.0	853.0	0,4	-0,2	-6,2	219,9	142,3	77,2	81,5	213,4	174,9	224,6	216,6	270,2	510,2	0,16	78,89	78,99	78,31	0,15	78,91	79,37	78,45
565.0	854.0	0,4	-0,2	-6,2	219,9	142,2	77,2	81,5	213,8	174,8	224,4	216,5	270,0	510,1	0,16	78,86	78,98	78,31	0,15	78,88	79,35	78,45
566.0	855.0	0,5	-0,2	-6,2	219,8	142,2	77,2	81,4	213,5	174,7	224,2	216,7	269,9	504,8	0,16	78,85	78,97	78,31	0,15	78,86	79,35	78,44
567.0	856.0	0,4	-0,2	-6,2	219,6	142,4	77,2	81,5	213,2	174,5	224,0	216,7	269,7	505,9	0,16	78,82	78,95	78,31	0,15	78,85	79,35	78,43
568.0	857.0	0,4	-0,2	-6,2	219,6	142,9	77,2	81,4	213,5	174,3	223,9	216,6	269,6	505,5	0,16	78,83	78,96	78,32	0,15	78,87	79,34	78,44
569.0	858.0	0,4	-0,2	-6,2	219,4	142,6	77,2	81,3	213,2	174,3	223,7	216,6	269,4	508,3	0,16	78,82	78,94	78,29	0,15	78,85	79,33	78,43
570.0	859.0	0,4	-0,2	-6,2	219,5	142,6	77,2	81,4	213,7	174,1	223,6	216,8	269,3	511,2	0,16	78,82	78,94	78,30	0,15	78,87	79,32	78,42
571.0	860.0	0,3	-0,2	-6,2	219,2	142,9	77,3	81,3	213,2	174,0	223,2	216,7	269,0	508,8	0,16	78,78	78,92	78,29	0,15	78,82	79,31	78,41
572.0	861.0	0,4	-0,2	-6,2	219,2	142,8	77,2	81,5	213,3	173,8	223,1	216,7	268,9	508,4	0,16	78,76	78,90	78,29	0,15	78,82	79,29	78,42
573.0	862.0	0,4	-0,2	-6,2	219,1	142,8	77,2	81,4	213,1	173,7	223,1	216,8	268,8	506,4	0,16	78,74	78,91	78,27	0,15	78,82	79,29	78,38
574.0	863.0	0,4	-0,2	-6,2	218,9	142,9	77,2	81,3	213,0	173,5	222,8	216,8	268,6	503,5	0,16	78,72	78,88	78,27	0,15	78,80	79,28	78,38
575.0	864.0	0,4	-0,2	-6,2	218,9	143,1	77,2	81,3	213,1	173,5	222,8	216,8	268,4	506,8	0,16	78,70	78,88	78,31	0,15	78,79	79,27	78,40
576.0	865.0	0,3	-0,2	-6,2	218,8	143,0	77,2	81,3	212,7	173,4	222,5	217,0	268,3	506,1	0,16	78,68	78,86	78,29	0,15	78,77	79,27	78,38
577.0	866.0	0,3	-0,2	-6,2	218,7	142,6	77,2	81,2	212,7	173,2	222,4	217,0	268,2	506,8	0,16	78,69	78,85	78,26	0,15	78,76	79,25	78,37
578.0	867.0	0,3	-0,2	-6,2	218,6	142,5	77,1	81,4	212,4	173,1	222,1	217,3	268,0	509,8	0,16	78,69	78,86	78,27	0,15	78,77	79,24	78,37
579.0	868.0	0,3	-0,2	-6,2	218,5	142,4	77,1	81,4	212,6	173,0	222,0	217,1	267,9	507,5	0,16	78,70	78,86	78,28	0,15	78,78	79,23	78,36
580.0	869.0	0,3	-0,2	-6,2	218,4	142,3	77,0	81,3	212,3	172,9	221,7	217,3	267,7	506,4	0,16	78,69	78,85	78,28	0,15	78,76	79,23	78,35
581.0	870.0	0,3	-0,2	-6,2	218,3	142,1	77,1	81,2	212,2	172,8	221,5	217,4	267,7	505,8	0,16	78,67	78,85	78,25	0,15	78,76	79,24	78,36
582.0	871.0	0,2	-0,2	-6,2	218,2	142,3	77,1	81,2	212,1	172,7	221,4	217,5	267,3	503,7	0,16	78,61	78,83	78,27	0,15	78,71	79,22	78,36
583.0	872.0	0,3	-0,2	-6,2	218,2	142,6	77,2	81,2	211,8	172,8	221,1	217,8	267,3	505,9	0,16	78,60	78,84	78,28	0,15	78,70	79,20	78,35
584.0	873.0	0,2	-0,2	-6,2	218,1	142,3	77,1	81,2	211,9	172,8	220,9	217,8	267,0	503,9	0,16	78,65	78,83	78,26	0,15	78,74	79,20	78,34
585.0	874.0	0,2	-0,2	-6,2	218,0	142,1	77,1	81,2	212,0	172,8	220,9	217,9	266,7	502,5	0,16	78,66	78,84	78,27	0,15	78,73	79,20	78,33
586.0	875.0	0,2	-0,2	-6,2	217,9	142,3	77,0	81,1	211,6	172,7	220,6	218,0	266,6	500,1	0,16	78,61	78,82	78,25	0,15	78,70	79,19	78,34
587.0	876.0	0,2	-0,2	-6,2	217,7	141,7	77,2	81,1	211,4	172,8	220,4	217,9	266,2	497,3	0,16	78,59	78,81	78,24	0,15	78,70	79,17	78,32
588.0	877.0	0,2	-0,2	-6,2	217,7	141,6	77,1	81,2	211,3	172,8	220,2	218,1	266,1	497,0	0,16	78,59	78,80	78,25	0,15	78,70	79,17	78,33
589.0	878.0	0,2	-0,2	-6,2	217,6	141,9	77,0	81,2	211,3	172,8	220,0	218,2	265,7	496,6	0,16	78,57	78,79	78,24	0,15	78,68	79,16	78,29
590.0	879.0	0,2	-0,2	-6,2	217,4	141,7	77,1	81,1	211,0	172,7	219,6	218,3	265,6	489,9	0,16	78,56	78,78	78,24	0,15	78,68	79,14	78,30
591.0	880.0	0,2	-0,2	-6,2	217,3	141,6	77,0	81,0	210,8	172,7	219,4	218,4	265,4	494,1	0,16	78,54	78,79	78,24	0,15	78,67	79,14	78,30
592.0	881.0	0,2	-0,2	-6,2	217,3	141,2	77,1	81,1	210,9	172,6	219,2	218,5	265,1	496,0	0,16	78,51	78,77	78,20	0,15	78,65	79,14	78,28
593.0	882.0	0,2	-0,2	-6,2	217,2	141,1	77,1	81,1	210,7	172,6	219,1	218,6	265,0	493,4	0,16	78,49	78,77	78,22	0,15	78,64	79,12	78,29
594.0	883.0	0,2	-0,2	-6,2	217,0	140,6	77,1	80,9	210,6	172,4	218,8	218,6	264,6	492,3	0,16	78,45	78,75	78,22	0,15	78,60	79,11	78,27
595.0	884.0	0,2	-0,2	-6,2	216,9	140,8	77,1	80,9	210,7	172,2	218,6	218,6	264,3	493,5	0,16	78,41	78,71	78,23	0,15	78,57	79,08	78,24
596.0	885.0	0,1	-0,2	-6,2	216,8	140,7	77,0	81,0	210,4	172,0	218,5	218,8	264,3	493,9	0,00	78,36	78,68	78,18	0,00	78,53	78,99	78,24
597.0	886.0	0,1	-0,2	-6,2	216,6	140,9	77,0	81,0	210,0	171,9	218,1	218,9	263,9	496,2	0,00	78,30	78,63	78,18	0,00	78,52	78,93	78,23
598.0	887.0	0,1	-0,2	-6,2	216,4	141,0	77,0	80,9	210,0	171,6	217,9	219,0	263,6	493,4	0,00	78,26	78,59	78,17	0,00	78,53	78,91	78,22
599.0	888.0	0,1	-0,2	-6,2	216,2	141,0	77,0	80,8	209,5	171,5	217,8	219,1	263,3	495,1	0,00	78,23	78,55	78,18	0,00	78,50	78,88	78,21
600.0	889.0	0,1	-0,2	-6,2	216,1	140,3	77,1	80,9	209,4	171,3	217,5	219,2	263,2	494,0	0,00	78,19	78,50	78,16	0,00	78,47	78,83	78,18
601.0	890.0	0,1	-0,2	-6,2	216,0	140,4	77,1	80,7	209,4	171,2	217,1	219,3	263,0	493,0	0,00	78,17	78,48	78,14	0,00	78,46	78,81	78,18
602.0	891.0	0,0	#VALEUR!	-6,2	215,8	140,8	77,1	80,8	209,4	171,0	216,9	219,3	262,4	492,8	0,00	78,13	78,45	78,14	0,00	78,44	78,77	78,16

Date: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
Project #: PT 20177 Run: 1 Tech: MR Reviewer: SP

- Kindling 400 LBS START FINE

- Fan ON low

- bypass OPEN

- AJ 32 LBS close Door

- AJ 116 LBS instl 1st pre load

- AJ 127 LBS close Door

- AJ 200 LBS instl 2nd pre load

- AJ 1200 LBS close bypass

- AJ 72 LBS close air nhl (Drill bit 1/16)

- AJ 46 LBS open Door open bypass

Rak coal close Door and close bypass

After 2 minutes open Door open bypass

open air nhl instl load close Door

close bypass

After 5 minutes close air nhl (Drill bit 1/16)

TEST LOAD CONFIGURATION

21 21

PRE / POST CHECKS

Date: 2018-09-19 Manufacturer: Heathstone Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: DR

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

0 (max50 Fpm)	0 (max50 Fpm)
ok	ok
4 sides	ok

Smoke Capture Check.....

Picture.....

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

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

Traverse before ignition.....

2018-09-19
2018-09-19
ok
ok

Flow Rate 140 cfm $\pm$ 10%.....

ok

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface ($\pm$ 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
002	020	34
505	507	509
506	508	510
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

 Date: 20 18-09-19

 Manufacturer: Hearthstone

 Model: GM 80

 Project #: PT 20177

 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)	772825.83	775622.84	772825.92	775622.84	725999.06	718764.30
Initial 1minute DGM (Liter)	772825.83	775622.84	772825.92	775622.84	725999.06	718764.30
Change © (Liter)	0	0	0	0	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	.4	3	.4
Check OK (no change after 15 sec.)	OK	OK	OK	OK

PRE-TEST SCALE AUDIT

Date: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: BE

Scale Type	Equipment #	Audit Weight	Measured 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: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 1 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 10.1 (KPa.) Static pressure (P_q) 0.21 (inches w.c.)
 Inside diameter: Port A _____ Port B _____
 Tunnel cross sectional area: .1963Ft²
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H ₂ O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.059	74.46
B - Centroid	3.00	3.50	4	0.058	73.69
A-1	0.40	0.50	0.50	0.056	74.45
A-2	1.50	1.75	2	0.065	74.27
A-3	4.50	5.25	6	0.053	74.45
A-4	5.60	6.5	7.5	0.048	74.45
B-1	0.40	0.50	0.50	0.051	72.18
B-2	1.50	1.75	2	0.065	72.00
B-3	4.50	5.25	6	0.057	72.01
B-4	5.60	6.5	7.5	0.051	71.01
				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: 2018-09-19 Manufacturer: Hearthsong Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2982	3000	1004	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	1798	1800	974	1000
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	0.001	2988	9926	0.001	0.02	0.006	0.15	0.008	0.05	✓	
CO ₂	0	1792	977	0	0.02	0.06	0.5	0.03	0.5	✓	

TEST DATA LOG

Date: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 1 Tech: mm Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	775622.16	728703.35	251.20
Initial (Liter)	772826.62	725994.48	054.85

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101.1	101.9
Dry Bulb (F):	67.08	75.78
Humidity (%):	43.0	38.1

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

Date: 2018-09-19 Manufacturer: Hearthstone Model: 5m80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1058 lbs.	216	216	218	217	220
1 1/2 x 3 1/2 x 10 in.	1050 lbs.	218	217	220	223	210
1 1/2 x 3 1/2 x 10 in.	1080 lbs.	213	209	208	210	210
1 1/2 x 3 1/2 x 10 in.	1030 lbs.	221	224	228	223	220
1 1/2 x 3 1/2 x 10 in.	1040 lbs.	219	218	216	217	213
1 1/2 x 3 1/2 x 10 in.	1052 lbs.	219	217	226	228	224
1 1/2 x 3 1/2 x 10 in.	1032 lbs.	229	230	223	220	220
1 1/2 x 3 1/2 x 10 in.	1018 lbs.	219	218	219	210	199
1 1/2 x 3 1/2 x 10 in.	1048 lbs.	196	199	204	204	209
1 1/2 x 3 1/2 x 10 in.	1078 lbs.	206	205	208	209	208
1 1/2 x 3 1/2 x 10 in.	1076 lbs.	208	208	206	207	206
1 1/2 x 3 1/2 x 10 in.	1044 lbs.	208	205	208	205	208
1 1/2 x 3 1/2 x 14 in.	1500 lbs.	179	191	192	198	194
1 1/2 x 3 1/2 x 14 in.	1484 lbs.	20	20	200	20	203
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: 1558 lbs

~ 14554

FUEL DATA

Date: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 1 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size Weight Meter Moisture Content (% dry)*

1 1/2 x 3 1/2 x 10 in.	1050	lbs.	214	214	23	23	28
1 1/2 x 3 1/2 x 10 in.	1024	lbs.	25	20	21	21	21.3
1 1/2 x 3 1/2 x 10 in.	1050	lbs.	220	216	24	20	21
1 1/2 x 3 1/2 x 10 in.	1040	lbs.	213	214	220	220	224
1 1/2 x 3 1/2 x 10 in.	1080	lbs.	218	219	217	22	26
1 1/2 x 3 1/2 x 10 in.	1110	lbs.	199	199	19.8	197	197
1 1/2 x 3 1/2 x 10 in.	1024	lbs.	200	211	206	27	206
1 1/2 x 3 1/2 x 10 in.	1002	lbs.	210	213	214	21.2	218
1 1/2 x 3 1/2 x 10 in.	1036	lbs.	220	223	224	22.1	220
1 1/2 x 3 1/2 x 10 in.	1026	lbs.	218	216	21	214	217
1 1/2 x 3 1/2 x 10 in.	1036	lbs.	196	198	197	196	193
1 1/2 x 3 1/2 x 10 in.	1022	lbs.	203	208	207	205	203
1 1/2 x 3 1/2 x 14 in.	1478	lbs.	204	206	208	209	206
1 1/2 x 3 1/2 x 14 in.	1496	lbs.	190	191	191	192	197
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: ~~1552~~ lbs
 14462 mm

FUEL DATA

Date: 2018-09-19 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: DS

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size		Weight		Meter Moisture Content (% dry)*				
3 1/2	x 3 1/2 x 19 3/4 in.	4 808	lbs.	20.1	20.6	20.5	20.2	20.6
3 1/2	x 3 1/2 x 19 3/4 in.	4 860	lbs.	20.3	20.4	20.9	20.5	20.5
3 1/2	x 3 1/2 x 19 3/4 in.	4 930	lbs.	20.4	20.3	20.4	20.4	20.1
3 1/2	x 3 1/2 x 19 3/4 in.	4 860	lbs.	22.0	21.6	21.3	21.8	21.9
1 1/2	x 3/4 x 5 in.	0 104	lbs.			20		
1 1/2	x 3/4 x 5 in.	0 106	lbs.			20.3		
1 1/2	x 3/4 x 5 in.	0 112	lbs.			21.0		
1 1/2	x 3/4 x 5 in.	0 120	lbs.			21.3		
1 1/2	x 3/4 x 5 in.	0 122	lbs.			20.7		
1 1/2	x 3/4 x 5 in.	0 118	lbs.			20.8		
1 1/2	x 3/4 x 5 in.	0 120	lbs.			20.4		
1 1/2	x 3/4 x 5 in.	0 124	lbs.			20.9		
1 1/2	x 3/4 x 5 in.	0 112	lbs.			20.8		
1 1/2	x 3/4 x 5 in.	0 104	lbs.			20.6		
1 1/2	x 3/4 x 5 in.	0 102	lbs.			20.4		
1 1/2	x 3/4 x 5 in.	0 76	lbs.			20.4		
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					
	x x in.		lbs.					

TEST LOAD WEIGHT: 2933 lbs Min 20%: 442 Max 25%: 508
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DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-18 Manufacturer: Heathston Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: DO

		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										
2018-09-18	17:00	002	505	28	506	507	508	38	511		
2018-09-19	11:00	00996	01266	34 1270	01272	01273	01261	34 2712	01259		
		010997	01267	34 1269	01273	01271	01260	34 2713	01259		

		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										
2018-09-19	20:00	005	605	28	506	507	508	38	511		
2018-10-05	8:00	011003	01265	34 1415	01272	01269	01260	34 2864	01259		
2018-10-09	8:00	011000	01265	34 1279	01272	01269	01260	34 2724	01259		
		011000	01264	34 1279	01272	01268	01260	34 2723	01259		

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-18 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 1 Tech: MM Reviewer: BO

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2018-09-18	17:00	110 1023	01277	01274	33 8860
2018-09-19	11:00	110 1024	01278	01275	33 8859

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2018-09-19	22:00	110 1035	01277	01274	33 8951
2018-10-05	8:00	110 1027	01275	01274	33 8875
2018-10-09	8:00	110 1028	01276	01274	33 8876

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	2
Date	20-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	Dimensionless
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	6	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 20177
Date	20-09-2018
Technicien	M.M

Fuel data

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

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

	Start	End
Barometer (kPa):	102,2	102,1
Barometer (in.Hg):	30,179649	30,15011865
Dry Bulb (F):	70,16	73,77
Humidity (%):	47,2	43
Air velocity (ft/min)	0	0

DGM #1	Final:	27470,979	cuft
	Initial:	27390,896	cuft
DGM #2	Final:	25813,263	cuft
	Initial:	25734,730	cuft

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

	Final:	777891,490	Liter
	Initial:	775623,790	Liter
	Final:	730950,200	Liter
	Initial:	728726,390	Liter

	Final:	281,260	cuft
	Initial:	251,200	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 20177
Date	20-09-2018
Technicien	M.M

Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7352 cu. ft

Loading Density: 9,182 lbs./ft3

 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 39,462 lbs./ft3
 Dry Wood Density: 32,688976

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	1,114	22,3	22,6	22,9	21,8	22	24,86448	52,50
1,5	3,5	10	1,188	22	22,6	22,8	21,9	21,9	26,42112	52,50
1,5	3,5	10	1,09	21,6	21,9	21,3	21,8	21,9	23,653	52,50
1,5	3,5	10	1,092	22	22,1	22,3	22	22	24,11136	52,50
1,5	3,5	10	1,13	21,8	21,4	21,9	21,8	21,6	24,521	52,50
1,5	3,5	10	1,104	22	21	20,8	20,6	20,3	23,11776	52,50
1,5	3,5	10	1,138	20,1	20,3	20,8	20,3	20,6	23,23796	52,50
1,5	3,5	10	1,122	20,9	20,8	20,6	20,9	20,3	23,2254	52,50
1,5	3,5	10	1,114	20,8	20,9	20,3	20,6	20,9	23,0598	52,50
1,5	3,5	10	1,14	20,6	20,8	20,9	20,7	20,7	23,6436	52,50
1,5	3,5	14	1,57	19,1	19,6	19,4	19,3	19,4	30,3952	73,50
1,5	3,5	14	1,526	20	20,1	20,4	20,8	20,4	31,03884	73,50
										0,00
										0,00
1,5	3,5	10	1,14	20,1	20	19,1	19,6	19,9	22,5036	52,50
1,5	3,5	10	1,178	21,3	20,9	20,8	20,9	20,9	24,69088	52,50
1,5	3,5	10	1,192	21	21,3	21,4	21,6	21,8	25,53264	52,50
1,5	3,5	10	1,218	19,6	19,9	19,3	19,8	19,2	23,82408	52,50
1,5	3,5	10	1,124	20	21	19,6	19,8	19,3	22,41256	52,50
1,5	3,5	10	1,182	21,3	21,6	21,2	21,9	21,3	25,36572	52,50
1,5	3,5	10	1,156	19,3	19,2	19,2	19,6	19,5	22,38016	52,50
1,5	3,5	10	1,17	20,1	20,3	20,6	20,9	20,8	24,0318	52,50
1,5	3,5	10	1,146	20,3	20,6	20,8	20,4	20,5	23,51592	52,50
1,5	3,5	10	1,18	20,3	20,9	20,3	20,8	20,8	24,3316	52,50
1,5	3,5	14	1,502	20,9	20,1	20,4	20,4	20,8	30,82104	73,50
1,5	3,5	14	1,498	20	20,1	20,4	20,8	20,3	30,43936	73,50
										0,00
										0,00
										0,00
										0,00
										0,00
										0,00

SUM MC: 601,13888

PreTest Load Weight: 29,01 lbs.

Dry Weight: 10,90 kg.

 Dry: 20,72
 Average Moisture Content: %
 20,72
 Must be 18-28

 Wet: 17,16
 must be 15,2-22

Project nu.	PI 20177
Date	20-09-2018
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

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

19,9	22,1	24,3
------	------	------

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

Load Volume: cu. ft

Loading Density: 6,8 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	31,9	lbs./ft3
Dry Wood Density:	26,4	lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	21	5,26	20,30	20,20	20,90	21,00	21,10	108,882	257,25	20,7
3,5	3,5	21	4,96	20,30	20,40	20,50	20,90	21,00	102,35768	257,25	20,6
3,5	3,5	21	4,72	20,60	20,80	20,50	20,50	20,30	96,98988	257,25	20,5
3,5	3,5	21	5,22	22,10	21,60	21,80	21,10	21,30	112,69076	257,25	21,6
1,5	0,75	5	0,11			20,30			2,1518	5,63	20,3
1,5	0,75	5	0,12			20,90			2,508	5,63	20,9
1,5	0,75	5	0,11			20,60			2,3072	5,63	20,6
1,5	0,75	5	0,10			20,80			2,0384	5,63	20,8
1,5	0,75	5	0,11			20,90			2,2154	5,63	20,9
1,5	0,75	5	0,10			20,60			2,1012	5,63	20,6
1,5	0,75	5	0,11			20,80			2,288	5,63	20,8
1,5	0,75	5	0,10			20,30			2,1112	5,63	20,3
1,5	0,75	5	0,10			20,90			2,1736	5,63	20,9
1,5	0,75	5	0,12			21,00			2,52	5,63	21,0
1,5	0,75	5	0,12			21,10			2,532	5,63	21,1
1,5	0,75	5	0,12			20,00			2,36	5,63	20,0
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
									SUM MCx	448,22712	20,7 %

Test Load Weight: 21,49 lbs.

Dry Weight: 8,06 kg.

Average Moisture Content: %

Dry:	20,86	Dry(EPA)	20,86
		Dry(B415)	20,86

20,86
Must be 19-25

Wet:
must be 15,2-22

Coal Bed Range: lbs. to

5,4 lbs.

TEST CHARGE:

Coal bed weight: 4,7

lbs.

Project nu.	PI 20177
Date	20-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,24 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=
0,974

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,061	70,1	0,2470
B center	0,062	68,27	0,2490
A1	0,050	70,09	0,2236
A2	0,068	70,2	0,2608
A3	0,060	69,98	0,2449
A4	0,055	69,98	0,2345
B1	0,051	70,180	0,2258
B2	0,071	70,480	0,2665
B3	0,058	70,510	0,2408
B4	0,050	70,550	0,2236
AVERAGE	0,0586	70,0340	0,2417

Project nu.	PI 20177
Date	20-09-2018
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	514	515	5	15	516	517	24	50	518	519	41	520		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,4468	0,1242	0,1245	34,6310	108,7833	0,1271	0,1257	34,4328	107,6464	0,1251	0,1277	35,0581	0,1277	2018-09-19	19:00
Before (6)	61,4468	0,1242	0,1246	34,6309	108,7833	0,1270	0,1257	34,4327	107,6464	0,1250	0,1278	35,0582	0,1277	2018-09-20	11:45
After (1)	61,4471	0,1255	0,1245	34,6356	108,7842	0,1286	0,1255	34,4373	107,6472	0,1280	0,1275	35,0628	0,1282	2018-09-20	22:00
After (2)	61,4470	0,1253	0,1244	34,6323	108,7837	0,1286	0,1255	34,4344	107,6469	0,1278	0,1274	35,0605	0,1279	2018-10-05	08:00
After (3)	61,4470	0,1252	0,1244	34,6323	108,7837	0,1286	0,1255	34,4344	107,6469	0,1279	0,1274	35,0605	0,1279	2018-10-09	08:00
After (4)															
After (5)															
After (6)	61,4470	0,1252	0,1244	34,6323	108,7837	0,1286	0,1255	34,4344	107,6469	0,1279	0,1274	35,0605	0,1279	2018-10-09	08:00
Difference	0,0002	0,0010	-0,0002	0,0014	0,0004	0,0016	-0,0002	0,0017	0,0005	0,0029	-0,0004	0,0023	0,0002		
Total (mg)		2,4				5,9				5,3			0,2		
Total ajusté (mg)		2,20				5,70				5,10					

Project nu.	PI 20177
Date	20-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,7 g/hr
Burn Rate : 1,002 Dry kg/hr

Test Duration: 483 min

PRESSURE FACTOR: DGM 1 0,99000
 DGM 2 0,99269
 DGM 3 1,00818

BAROMETRIC PRESSURE
 Average: 30,164884 in Hg
 Start: 30,179649 in Hg
 End: 30,150119 in Hg

TEMPERATURE FACTORS DGM 1 0,97026
 DGM 2 0,96984
 DGM 3 0,97530

DGM CONTROLLER VALUES

DGM 1 Final: 27470,979 Cuft
 Initial: 27390,896 Cuft

VOLUMES SAMPLED DGM 1 76,037 SCft
 DGM 2 74,958 SCft
 DGM 3 29,432 SCft

DGM 2 Final: 25813,263 Cuft
 Initial: 25734,730 Cuft

DGM #3 Final: 281,260 Cuft
 Initial: 251,200 Cuft

TOTAL TUNNEL VOLUME : 84409

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1110,109
 Sample Train 2: 1126,089

DGM 1 544,186 °R
 DGM 2 544,419 °R

Paticulate concentration
 Sample Train 1 0,000078 g/dscf
 Sample Train 2 0,000071 g/dscf
 Room 0,000007 g/dscf

CALIBRATION FACTORS

DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

TUNNEL FLOW RATE: 174,761 Dscfm

TOTAL EMISSIONS
 Sample Train 1 5,98 g
 Sample Train 2 5,39 g

PARTICULATE CATCH
 Total Sample Train 1: 5,90 mg
 Total Sample Train 2: 5,30 mg
 Total Sample Train 1 1st hour: 2,40 mg

EMISSION RATES
 Sample Train 1 0,74 g/hr
 Sample Train 2 0,67 g/hr

1st hour emission rate 2,66 g/hr

DEVIATION: 5,11%

Cs Train 1 Train 2
 7,759E-05 7,07062E-05

* Elapsed Time min	* Raw data row	* Weight Remaining lbs	* CO %	* CO ₂ %	* O ₂ %	*1 Flue Gas °F	*2 Room Temp °F	*3 Tunnel Dry Bulb °F	*4 Unit Top °F	*5 Unit Back °F	*6 Unit R.Side °F	*7 Unit L.Side °F	*8 Unit Bottom °F	* Catalyst up	Mass flow 1 Reading °F	DGM 1 Inlet T	DGM 1 Outlet T	Filter 1 Temp	Mass flow 2 Reading °F	DGM 2 Inlet T	DGM 2 Outlet T	Filter 2 Temp
															°F	°F	°F	°F	°F	°F	°F	°F
0.00	282.00	21.4	0.1	2.5	0.0	232.4	78.6	127.2	341.8	301.9	373.9	364.3	460.1	476.3	0.16	80.03	79.67	82.37	0.15	80.29	80.03	81.82
1.0	283.0	21.3	0.3	2.0	0.0	228.0	78.4	101.6	341.0	308.4	372.3	362.2	452.7	521.7	0.16	80.22	79.68	82.24	0.15	80.36	80.05	81.79
2.0	284.0	21.3	0.0	4.5	0.0	238.6	79.1	97.4	341.8	313.4	370.7	362.3	447.5	627.4	0.16	80.36	79.68	82.15	0.15	80.44	80.06	81.74
3.0	285.0	21.2	0.0	5.1	0.0	249.4	79.0	96.3	342.7	317.3	369.3	361.0	442.8	657.5	0.16	80.44	79.67	82.08	0.16	80.49	80.07	81.69
4.0	286.0	21.1	0.0	4.9	0.0	266.3	79.2	97.2	345.3	320.2	367.3	359.6	439.8	700.4	0.16	80.50	79.67	82.03	0.15	80.53	80.08	81.67
5.0	287.0	21.0	0.0	5.6	0.0	249.0	79.2	92.8	344.9	322.4	365.2	357.9	444.9	699.0	0.16	80.53	79.67	81.99	0.16	80.55	80.10	81.65
6.0	288.0	21.0	0.0	4.7	0.0	235.0	78.9	90.8	342.1	323.9	363.2	355.4	445.2	674.2	0.16	80.54	79.68	81.95	0.15	80.57	80.10	81.63
7.0	289.0	21.0	0.0	3.7	0.0	225.5	79.2	90.1	339.3	324.8	361.2	353.6	446.0	650.2	0.16	80.53	79.68	81.94	0.15	80.58	80.10	81.64
8.0	290.0	20.9	0.0	3.6	0.0	219.0	78.5	89.7	336.6	325.4	358.9	351.4	445.8	639.6	0.16	80.54	79.72	81.92	0.15	80.64	80.16	81.62
9.0	291.0	20.9	0.0	3.7	0.0	214.4	78.7	89.6	334.5	325.6	356.6	349.1	445.5	636.7	0.16	80.53	79.74	81.92	0.15	80.65	80.18	81.61
10.0	292.0	20.9	0.0	3.8	0.0	211.3	78.8	89.6	331.7	325.5	354.0	346.5	445.0	638.4	0.16	80.51	79.74	81.93	0.16	80.64	80.19	81.61
11.0	293.0	20.8	0.0	4.0	0.0	209.7	78.8	89.6	329.7	325.0	351.6	343.9	444.5	646.1	0.16	80.54	79.77	81.93	0.16	80.69	80.22	81.61
12.0	294.0	20.8	0.0	4.2	0.0	209.0	79.0	89.4	327.7	324.5	348.9	341.3	444.2	657.1	0.16	80.49	79.77	81.90	0.15	80.64	80.23	81.60
13.0	295.0	20.7	0.0	4.4	0.0	208.1	78.7	89.5	325.9	323.7	346.3	338.7	442.4	666.1	0.16	80.50	79.79	81.92	0.16	80.65	80.25	81.58
14.0	296.0	20.7	0.0	4.6	0.0	208.2	78.5	89.4	324.3	322.7	343.9	336.1	440.9	673.6	0.16	80.51	79.81	81.91	0.15	80.66	80.25	81.57
15.0	297.0	20.6	0.0	4.7	0.0	207.7	79.0	89.4	322.8	321.7	341.4	333.3	438.8	683.5	0.16	80.52	79.83	81.90	0.15	80.69	80.27	81.56
16.0	298.0	20.6	0.0	4.9	0.0	208.6	78.9	89.1	321.2	320.6	338.6	331.0	438.2	692.3	0.16	80.50	79.83	81.91	0.15	80.66	80.29	81.57
17.0	299.0	20.5	0.0	5.0	0.0	209.2	78.5	89.3	320.6	319.4	336.0	328.3	436.6	698.4	0.16	80.51	79.87	81.90	0.16	80.66	80.31	81.55
18.0	300.0	20.5	0.0	5.2	0.0	209.9	78.9	89.4	319.7	318.1	333.7	325.4	434.3	703.1	0.16	80.52	79.86	81.90	0.16	80.68	80.34	81.56
19.0	301.0	20.4	0.0	5.3	0.0	210.1	78.5	89.1	318.4	316.7	331.3	322.9	432.6	712.1	0.16	80.55	79.90	81.88	0.15	80.74	80.35	81.53
20.0	302.0	20.4	0.1	5.3	0.0	211.0	78.6	88.8	317.4	315.3	328.5	320.4	430.7	716.6	0.16	80.55	79.92	81.89	0.15	80.75	80.38	81.53
21.0	303.0	20.3	0.1	5.4	0.0	211.9	78.9	89.3	316.6	313.9	326.2	318.0	429.4	722.1	0.16	80.53	79.93	81.85	0.16	80.74	80.38	81.51
22.0	304.0	20.2	0.1	5.5	0.0	212.2	78.6	89.5	313.2	316.7	323.3	315.6	427.4	727.7	0.16	80.53	79.94	81.85	0.16	80.78	80.41	81.53
23.0	305.0	20.2	0.1	5.6	0.0	214.1	78.6	89.3	315.9	311.0	321.3	313.6	426.2	727.4	0.16	80.54	79.98	81.85	0.16	80.76	80.43	81.54
24.0	306.0	20.1	0.1	5.6	0.0	214.7	78.5	89.1	315.0	309.6	319.0	311.1	424.9	721.7	0.16	80.57	79.99	81.83	0.16	80.77	80.46	81.55
25.0	307.0	20.0	0.1	5.5	0.0	215.3	78.6	89.4	315.0	308.2	316.9	308.8	429.9	722.3	0.16	80.56	80.01	81.81	0.16	80.80	80.48	81.54
26.0	308.0	20.0	0.1	5.5	0.0	215.7	78.7	89.4	314.8	306.6	314.8	308.8	421.8	722.5	0.16	80.61	80.02	81.80	0.16	80.80	80.48	81.52
27.0	309.0	19.9	0.1	5.6	0.0	216.2	78.7	89.8	314.1	305.2	312.6	304.7	420.5	726.6	0.16	80.70	80.04	81.79	0.16	80.84	80.51	81.51
28.0	310.0	19.9	0.1	5.7	0.0	216.8	78.7	90.0	313.6	303.8	310.6	302.5	418.8	730.4	0.16	80.73	80.05	81.81	0.16	80.89	80.53	81.53
29.0	311.0	19.8	0.1	5.9	0.0	217.8	78.6	90.1	312.2	300.7	308.7	300.7	417.6	739.0	0.16	80.79	80.08	81.80	0.16	80.92	80.54	81.52
30.0	312.0	19.8	0.1	6.0	0.0	218.3	78.8	90.1	309.0	288.2	306.5	298.7	416.0	743.5	0.16	80.82	80.10	81.76	0.16	80.90	80.56	81.52
31.0	313.0	19.7	0.1	6.2	0.0	219.0	78.2	90.2	307.8	278.7	304.8	296.7	414.7	756.3	0.16	80.88	80.13	81.80	0.16	80.98	80.60	81.52
32.0	314.0	19.6	0.1	6.4	0.0	220.1	78.4	90.4	307.9	271.3	303.8	295.0	413.5	768.3	0.16	80.90	80.16	81.78	0.16	81.00	80.63	81.51
33.0	315.0	19.5	0.1	6.9	0.0	220.9	78.4	90.5	307.9	265.1	301.0	293.1	412.0	797.8	0.16	80.94	80.17	81.78	0.16	81.03	80.63	81.52
34.0	316.0	19.5	0.1	7.0	0.0	223.2	78.7	90.5	307.7	259.9	299.4	291.5	410.9	810.8	0.16	80.91	80.18	81.76	0.16	81.02	80.65	81.52
35.0	317.0	19.4	0.1	7.1	0.0	224.4	78.8	90.6	308.4	255.5	297.7	289.7	409.7	821.0	0.16	80.98	80.20	81.73	0.16	81.06	80.66	81.54
36.0	318.0	19.3	0.1	7.3	0.0	226.4	78.5	91.0	308.1	251.6	296.1	288.2	408.6	832.8	0.16	81.09	80.23	81.74	0.16	81.13	80.67	81.54
37.0	319.0	19.2	0.1	7.6	0.0	227.6	78.9	91.1	308.6	248.2	294.6	286.5	407.5	856.7	0.16	81.22	80.26	81.74	0.16	81.18	80.71	81.55
38.0	320.0	19.1	0.1	7.9	0.0	230.8	78.9	91.5	308.5	245.1	293.2	285.1	406.2	870.7	0.16	81.41	80.30	81.77	0.15	81.27	80.74	81.56
39.0	321.0	19.1	0.1	8.1	0.0	232.8	79.1	91.5	309.6	242.4	291.5	283.6	405.1	878.1	0.16	81.52	80.35	81.77	0.15	81.36	80.76	81.56
40.0	322.0	19.0	0.1	8.2	0.0	234.9	78.8	91.8	310.7	239.9	290.0	282.2	404.2	886.9	0.16	81.62	80.40	81.78	0.15	81.44	80.82	81.57
41.0	323.0	18.9	0.1	8.5	0.0	237.5	78.9	91.9	311.7	237.7	289.0	280.9	402.8	887.0	0.16	81.69	80.45	81.80	0.15	81.52	80.87	81.61
42.0	324.0	18.8	0.1	8.5	0.0	240.8	79.2	92.2	313.5	235.7	287.6	279.6	401.4	871.1	0.16	81.77	80.47	81.79	0.15	81.58	80.89	81.62
43.0	325.0	18.6	0.1	8.3	0.0	243.4	78.8	92.3	314.4	233.9	286.5	278.2	400.3	866.3	0.16	81.80	80.49	81.78	0.15	81.60	80.94	81.61
44.0	326.0	18.5	0.1	11.4	0.0	244.7	79.3	92.6	325.0	232.2	285.5	276.9	399.2	825.5	0.16	81.82	80.49	81.84	0.15	81.60	80.95	81.66
45.0	327.0	18.5	0.1	10.3	0.0	243.7	79.1	92.7	332.4	230.8	284.7	275.9	398.2	772.8	0.16	81.98	80.53	81.85	0.15	81.70	80.99	81.69
46.0	328.0	18.4	0.0	9.3	0.0	240.4	78.9	92.5	336.6	229.5	284.1	275.1	397.5	727.9	0.16	82.17	80.61	81.87	0.15	81.84	81.05	81.74
47.0	329.0	18.3	0.0	8.7	0.0	236.6	78.9	92.4	338.9	228.3	283.6	274.3	396.5	702.2	0.16	82.23	80.65	81.90	0.15	81.89	81.09	81.76
48.0	330.0	18.2	0.0	8.0	0.0	232.4	79.3	91.9	338.7	227.2	283.2	273.5	395.1	691.4	0.16	82.23	80.66	81.93	0.15	81.92	81.11	81.79
49.0	331.0	18.2	0.1	7.1	0.0	229.5	78.7	91.8	336.5	226.2	282.9	272.7	394.1	697.5	0.16	82.25	80.67	81.93	0.15	81.96	81.14	81.81
50.0	332.0	18.1	0.1	6.3	0.0	228.2	78.8	91.9	334.3	225.2	282.6	272.0	393.3	729.2	0.16	82.26	80.71	81.95	0.15	81.99	81.19	81.87
51.0	333.0	18.0	0.1	5.9	0.0	228.3	79.2	91.5	332.5	224.1	282.5	271.0	391.8	748.9	0.16	82.30	80.74	81.97	0.15	82.01	81.19	81.86
52.0	334.0	18.0	0.1	5.9	0.0	227.3	79.3	91.5	329.5	223.1	282.3	270.3	390.6	761.9	0.16	82.40	80.77	81.97	0.15	82.09	81.23	81.88
53.0	335.																					

89.0	371.0	15.3	0.1	10.2	0.0	273.8	81.5	96.8	343.5	221.4	262.8	246.6	363.8	1013.1	0.16	86.04	82.87	83.37	0.15	85.46	83.46	82.31
90.0	372.0	15.2	0.1	10.2	0.0	275.1	81.6	96.9	345.8	222.2	262.7	246.3	363.8	1016.9	0.16	86.15	82.92	83.44	0.15	85.55	83.53	82.39
91.0	373.0	15.1	0.1	10.3	0.0	276.6	81.2	97.2	347.9	223.0	262.5	246.3	363.3	1021.1	0.16	86.28	82.97	83.50	0.15	85.64	83.59	82.47
92.0	374.0	15.0	0.1	10.3	0.0	278.6	81.7	97.0	349.7	223.9	262.5	246.4	362.7	1025.0	0.16	86.51	83.06	83.59	0.15	85.85	83.67	82.54
93.0	375.0	14.9	0.1	10.3	0.0	279.5	82.0	97.3	351.5	224.7	262.5	246.1	362.5	1029.4	0.16	86.78	83.12	83.64	0.16	85.97	83.73	82.64
94.0	376.0	14.9	0.1	10.4	0.0	281.2	81.5	97.7	353.5	225.5	262.5	246.2	361.8	1032.2	0.16	86.99	83.23	83.67	0.15	86.13	83.83	82.71
95.0	377.0	14.8	0.1	10.5	0.0	282.7	81.7	97.6	355.9	226.3	262.5	246.1	361.5	1036.1	0.16	87.13	83.33	83.78	0.16	86.31	83.94	82.81
96.0	378.0	14.7	0.1	10.5	0.0	284.2	81.5	97.9	357.2	227.2	262.7	246.1	361.1	1040.6	0.16	87.13	83.36	83.82	0.15	86.30	84.00	82.87
97.0	379.0	14.6	0.1	10.7	0.0	285.5	81.9	97.9	359.6	228.0	262.8	246.1	360.4	1047.0	0.16	87.18	83.44	83.88	0.16	86.37	84.06	82.93
98.0	380.0	14.5	0.1	10.8	0.0	286.3	82.0	98.4	361.2	228.9	262.9	246.3	360.4	1054.4	0.16	87.33	83.53	83.93	0.16	86.50	84.14	83.01
99.0	381.0	14.4	0.1	11.0	0.0	287.8	81.7	98.6	362.9	229.7	263.0	246.0	359.6	1060.8	0.16	87.49	83.63	84.01	0.16	86.67	84.25	83.10
100.0	382.0	14.3	0.1	11.1	0.0	288.6	82.1	98.3	365.6	230.7	263.2	246.5	359.5	1067.0	0.16	87.61	83.72	84.10	0.16	86.80	84.34	83.19
101.0	383.0	14.2	0.1	11.1	0.0	290.1	82.2	98.6	367.7	231.5	263.4	246.4	359.0	1072.7	0.16	87.70	83.80	84.14	0.16	86.91	84.42	83.26
102.0	384.0	14.1	0.1	11.3	0.0	291.5	81.9	98.9	369.5	232.5	263.5	246.5	358.3	1077.1	0.16	87.73	83.88	84.22	0.16	87.00	84.50	83.32
103.0	385.0	14.0	0.1	11.4	0.0	292.6	82.3	99.4	372.0	233.5	263.9	246.7	358.1	1081.1	0.16	87.84	83.96	84.31	0.16	87.08	84.61	83.40
104.0	386.0	13.9	0.1	11.5	0.0	293.6	82.7	99.4	374.1	234.6	264.3	246.7	358.0	1085.2	0.16	87.95	84.04	84.40	0.16	87.16	84.69	83.47
105.0	387.0	13.8	0.1	11.6	0.0	295.6	82.7	99.8	376.1	235.6	264.5	247.0	357.3	1089.0	0.16	88.09	84.14	84.46	0.16	87.28	84.77	83.57
106.0	388.0	13.7	0.1	11.7	0.0	297.4	82.1	99.4	378.4	236.8	265.0	247.1	356.9	1092.8	0.16	87.97	84.19	84.54	0.15	87.23	84.84	83.64
107.0	389.0	13.6	0.1	11.6	0.0	297.7	82.3	99.7	380.7	237.9	265.5	247.2	356.6	1096.5	0.16	87.96	84.26	84.61	0.16	87.30	84.92	83.71
108.0	390.0	13.5	0.1	11.8	0.0	299.5	82.7	100.1	382.7	239.0	266.0	247.5	356.4	1099.8	0.16	87.95	84.31	84.70	0.16	87.25	84.97	83.79
109.0	391.0	13.4	0.1	11.8	0.0	300.5	82.6	100.3	384.9	240.2	266.4	247.7	356.0	1103.9	0.16	88.01	84.36	84.77	0.16	87.33	85.02	83.85
110.0	392.0	13.3	0.1	11.9	0.0	302.1	82.7	100.5	386.8	241.4	267.0	247.8	355.6	1107.0	0.16	88.17	84.44	84.86	0.16	87.43	85.10	83.93
111.0	393.0	13.2	0.1	11.9	0.0	302.5	82.8	101.0	389.8	242.5	267.5	248.0	355.4	1110.6	0.16	88.35	84.54	84.93	0.16	87.58	85.21	84.00
112.0	394.0	13.1	0.1	12.1	0.0	304.2	82.8	100.8	391.5	243.8	267.9	248.3	354.9	1116.1	0.16	88.52	84.64	85.00	0.16	87.70	85.30	84.07
113.0	395.0	13.0	0.1	12.2	0.0	305.2	82.4	100.9	394.3	245.1	268.6	248.6	354.5	1121.2	0.16	88.59	84.73	85.07	0.16	87.78	85.40	84.17
114.0	396.0	13.0	0.1	12.3	0.0	306.3	82.6	101.1	396.6	246.4	269.2	249.0	354.4	1126.0	0.16	88.70	84.83	85.11	0.15	87.88	85.49	84.25
115.0	397.0	12.8	0.1	12.4	0.0	308.2	82.9	101.2	398.8	247.8	270.0	249.2	354.1	1132.9	0.16	88.79	84.95	85.21	0.15	87.97	85.57	84.32
116.0	398.0	12.7	0.1	12.6	0.0	309.7	83.2	101.5	401.5	249.0	270.5	249.6	353.8	1136.9	0.16	88.81	85.01	85.28	0.16	88.04	85.67	84.41
117.0	399.0	12.6	0.1	12.7	0.0	310.6	83.0	101.5	404.1	250.5	271.2	250.1	353.6	1142.2	0.16	88.87	85.09	85.35	0.16	88.12	85.74	84.49
118.0	400.0	12.5	0.1	12.8	0.0	311.8	83.1	101.7	405.9	251.8	271.7	250.2	353.2	1146.1	0.16	89.01	85.20	85.43	0.16	88.24	85.80	84.57
119.0	401.0	12.4	0.1	12.9	0.0	313.3	83.2	102.0	408.8	253.2	272.6	250.8	352.8	1149.9	0.16	89.01	85.25	85.50	0.16	88.28	85.87	84.65
120.0	402.0	12.3	0.1	13.0	0.0	314.7	83.2	102.3	411.5	254.6	273.3	251.1	352.9	1152.9	0.16	89.06	85.33	85.55	0.16	88.34	85.96	84.71
121.0	403.0	12.2	0.1	13.1	0.0	316.4	83.4	102.4	413.6	256.2	273.9	251.7	352.6	1157.0	0.16	89.10	85.39	85.65	0.16	88.39	86.04	84.77
122.0	404.0	12.1	0.1	13.2	0.0	317.8	83.4	102.8	416.0	257.7	274.9	252.0	352.4	1159.7	0.16	89.13	85.45	85.75	0.16	88.43	86.11	84.86
123.0	405.0	12.0	0.1	13.2	0.0	318.2	83.2	102.7	418.7	259.2	275.6	252.6	352.1	1161.4	0.16	89.16	85.51	85.82	0.16	88.48	86.20	84.93
124.0	406.0	11.9	0.1	13.1	0.0	318.4	83.7	103.0	421.1	260.8	276.4	253.0	351.9	1163.3	0.16	89.24	85.59	85.91	0.16	88.61	86.25	85.03
125.0	407.0	11.8	0.1	13.2	0.0	319.4	83.5	103.1	423.2	262.2	277.1	253.4	351.8	1165.1	0.16	89.35	85.70	85.99	0.16	88.70	86.34	85.10
126.0	408.0	11.7	0.1	13.1	0.0	320.2	83.5	103.2	425.2	263.5	277.9	253.8	351.4	1166.1	0.16	89.47	85.79	86.05	0.16	88.82	86.42	85.19
127.0	409.0	11.6	0.1	13.1	0.0	320.7	83.6	103.4	427.2	264.9	278.7	254.4	351.3	1168.3	0.16	89.56	85.87	86.14	0.16	88.91	86.51	85.25
128.0	410.0	11.5	0.1	13.2	0.0	321.5	83.8	103.3	429.5	266.2	279.5	254.9	351.1	1170.5	0.16	89.62	85.94	86.19	0.16	88.98	86.57	85.32
129.0	411.0	11.4	0.1	13.3	0.0	321.5	83.5	103.4	431.8	267.6	280.3	255.6	350.9	1173.5	0.16	89.79	86.02	86.29	0.15	89.07	86.66	85.39
130.0	412.0	11.3	0.1	13.4	0.0	325.6	83.6	104.0	436.1	268.9	281.2	256.1	350.8	1162.1	0.16	89.90	86.10	86.37	0.16	89.12	86.72	85.45
131.0	413.0	11.1	0.2	13.5	0.0	323.8	83.8	104.0	438.5	270.2	282.1	256.7	350.7	1162.7	0.16	90.05	86.21	86.45	0.16	89.27	86.80	85.52
132.0	414.0	11.0	0.2	13.3	0.0	325.9	83.9	104.0	442.4	271.6	283.2	257.3	350.5	1148.1	0.16	90.10	86.29	86.52	0.16	89.33	86.86	85.60
133.0	415.0	10.9	0.2	13.4	0.0	328.0	83.9	104.1	445.9	272.8	284.2	258.0	350.5	1153.8	0.16	90.15	86.36	86.59	0.16	89.40	86.92	85.68
134.0	416.0	10.8	0.2	13.5	0.0	328.2	83.9	104.4	449.1	273.8	285.2	258.8	350.5	1153.7	0.16	90.18	86.45	86.69	0.15	89.43	86.97	85.76
135.0	417.0	10.7	0.3	13.6	0.0	331.2	83.7	105.0	452.1	275.1	286.4	259.4	350.3	1160.0	0.16	90.21	86.52	86.75	0.16	89.47	87.03	85.80
136.0	418.0	10.6	0.4	13.7	0.0	327.0	83.5	104.6	451.9	276.2	287.2	260.4	349.8	1164.7	0.16	90.28	86.63	86.80	0.16	89.59	87.13	85.88
137.0	419.0	10.5	0.3	13.5	0.0	328.1	83.9	104.4	455.8	277.1	288.4	261.5	350.1	1155.1	0.16	90.02	86.71	86.89	0.15	89.52	87.19	85.94
138.0	420.0	10.3	0.3	13.5	0.0	331.0	84.0	105.3	457.3	278.2	289.4	261.9	349.8	1167.2	0.16	89.91	86.75	86.99	0.16	89.56	87.26	86.01
139.0	421.0	10.2	0.4	13.7	0.0	327.9	84.1	104.5	457.9	279.3	290.4	262.7	349.6	1166.3	0.16	89.69	86.75	87.01	0.16	89.41	87.30	86.06
140.0	422.0	10.1	0.4	13.7	0.0	328.2	83.6	105.1	460.6	280.2	291.3	263.7	349.5	1160.0	0.16	89.55	86.78	87.07	0.16	89.33	87.33	86.14
141.0	423.0	10.0	0.4	13.5	0.0	330.9	83.7	105.7	473.1	281.4	292.5	264.4	349.0	1069.6	0.16	89.51	86.82	87.15	0.16	89.33	87.36	86.20
142.0	424.0	9.9	0.4	14.0	0.0	326.6	84.4	105.5	487.4	282.1	293.7	265.3	348.7	929.2	0.16	89.58	86.86	87.21	0.16	89.33	87.43	86.26
143.0	425.0	9.8	0.2	13.8	0.0	322.4	84.0															

182.0	464.0	6,1	0,2	13,1	0,0	241,5	81,5	96,9	504,5	256,3	355,8	330,6	323,0	760,4	0,16	87,13	87,37	87,16	0,16	87,49	87,77	86,29
183.0	465.0	6,0	0,3	13,1	0,0	241,4	81,8	96,5	498,2	256,6	356,5	331,9	323,1	785,7	0,16	87,03	87,35	87,05	0,16	87,44	87,71	86,24
184.0	466.0	5,9	0,2	12,8	0,0	245,7	81,4	96,8	487,6	256,6	357,3	332,9	323,1	960,3	0,16	86,86	87,28	86,96	0,16	87,35	87,63	86,17
185.0	467.0	5,8	0,4	13,0	0,0	251,7	81,2	96,7	479,2	256,8	358,1	334,0	323,0	1025,8	0,16	86,70	87,21	86,86	0,16	87,28	87,58	86,09
186.0	468.0	5,7	0,5	13,1	0,0	258,5	81,1	97,3	472,8	257,2	358,5	335,1	323,6	1045,4	0,16	86,55	87,16	86,79	0,16	87,17	87,54	86,04
187.0	469.0	5,7	0,5	13,0	0,0	263,5	81,0	97,4	468,0	257,6	359,0	335,8	323,8	1055,9	0,16	86,44	87,11	86,75	0,16	87,02	87,48	85,98
188.0	470.0	5,6	0,5	12,9	0,0	268,0	80,6	97,7	463,5	258,2	359,3	336,6	324,5	1062,8	0,16	86,35	87,06	86,66	0,15	86,93	87,42	85,92
189.0	471.0	5,5	0,5	12,8	0,0	270,6	80,8	97,7	460,5	259,2	359,6	337,2	325,3	1067,5	0,16	86,25	87,04	86,56	0,16	86,86	87,37	85,88
190.0	472.0	5,4	0,5	12,8	0,0	273,2	80,7	98,0	457,7	260,3	359,7	337,7	326,2	1073,7	0,16	86,13	86,98	86,50	0,16	86,75	87,32	85,83
191.0	473.0	5,3	0,5	12,7	0,0	276,0	80,2	98,0	455,7	261,6	359,8	337,9	327,4	1074,7	0,16	86,05	86,95	86,39	0,15	86,68	87,28	85,75
192.0	474.0	5,2	0,4	12,7	0,0	278,1	80,3	97,9	454,4	263,0	359,9	338,3	328,5	1074,9	0,16	85,97	86,91	86,32	0,16	86,64	87,23	85,69
193.0	475.0	5,2	0,4	12,7	0,0	279,4	80,6	98,3	453,4	264,5	360,1	338,5	329,9	1073,4	0,16	85,89	86,88	86,27	0,15	86,55	87,19	85,64
194.0	476.0	5,1	0,4	12,7	0,0	280,5	80,5	98,1	452,1	266,5	359,8	338,8	331,5	1072,8	0,16	85,81	86,85	86,21	0,15	86,51	87,16	85,59
195.0	477.0	5,0	0,3	12,6	0,0	280,6	80,2	98,0	451,4	268,1	360,0	338,9	332,6	1071,9	0,16	85,74	86,80	86,10	0,16	86,44	87,12	85,54
196.0	478.0	5,0	0,3	12,7	0,0	281,3	80,3	98,0	450,9	269,9	360,0	338,8	333,9	1068,3	0,16	85,71	86,77	86,08	0,16	86,35	87,09	85,52
197.0	479.0	4,9	0,3	12,5	0,0	281,9	80,0	97,9	450,6	271,8	360,0	339,1	335,7	1059,8	0,16	85,63	86,72	86,00	0,16	86,25	87,04	85,43
198.0	480.0	4,8	0,2	12,5	0,0	281,2	79,9	97,8	450,5	273,8	359,9	339,2	337,1	1052,2	0,16	85,51	86,66	85,92	0,16	86,12	87,00	85,37
199.0	481.0	4,8	1,0	12,3	0,0	280,9	79,9	97,7	450,3	275,6	360,2	339,2	338,9	1045,9	0,16	85,44	86,62	85,85	0,15	86,04	86,95	85,32
200.0	482.0	4,7	0,9	12,2	0,0	280,5	80,1	97,6	449,5	277,4	360,4	339,3	340,2	1038,1	0,16	85,37	86,57	85,80	0,15	85,94	86,93	85,26
201.0	483.0	4,7	0,8	12,2	0,0	280,2	79,8	97,5	449,0	279,4	360,5	339,4	341,5	1026,4	0,16	85,30	86,53	85,75	0,16	85,88	86,91	85,22
202.0	484.0	4,6	0,7	12,0	0,0	279,3	79,7	97,6	448,2	281,7	360,4	339,5	343,1	1016,3	0,16	85,22	86,49	85,70	0,16	85,80	86,86	85,17
203.0	485.0	4,6	0,6	11,8	0,0	277,9	80,1	97,6	447,2	283,7	360,4	339,5	344,6	1006,0	0,16	85,16	86,44	85,65	0,16	85,72	86,82	85,12
204.0	486.0	4,5	0,4	11,7	0,0	276,8	80,0	97,4	446,4	285,5	360,5	339,8	346,2	992,2	0,16	85,10	86,40	85,59	0,15	85,71	86,78	85,07
205.0	487.0	4,5	0,3	11,4	0,0	275,7	79,9	97,4	445,5	286,9	360,5	339,9	347,4	982,4	0,16	85,08	86,37	85,52	0,15	85,67	86,75	85,03
206.0	488.0	4,4	0,2	11,3	0,0	274,5	80,1	97,1	444,3	288,0	360,3	340,0	348,9	971,8	0,16	85,04	86,31	85,47	0,15	85,67	86,71	85,00
207.0	489.0	4,4	0,1	11,0	0,0	272,5	80,3	96,8	443,4	289,2	360,1	340,1	350,4	961,8	0,16	85,01	86,30	85,43	0,15	85,52	86,67	84,88
208.0	490.0	4,4	0,1	10,8	0,0	271,2	80,4	97,0	441,7	290,1	360,1	340,4	351,9	952,1	0,16	85,03	86,26	85,38	0,15	85,53	86,66	84,86
209.0	491.0	4,3	0,1	10,6	0,0	268,7	80,4	96,8	439,9	290,8	359,9	340,5	353,0	943,2	0,16	85,07	86,26	85,36	0,15	85,51	86,64	84,79
210.0	492.0	4,3	0,1	10,3	0,0	268,3	80,1	96,8	441,1	291,7	359,7	340,6	354,5	903,6	0,16	85,09	86,25	85,34	0,16	85,55	86,59	84,77
211.0	493.0	4,2	0,0	9,8	0,0	263,4	80,4	96,4	439,7	292,2	359,5	340,9	356,0	829,7	0,16	85,14	86,26	85,29	0,15	85,56	86,57	84,71
212.0	494.0	4,2	0,0	9,5	0,0	258,2	80,2	96,1	439,1	292,5	359,3	341,2	357,3	792,4	0,16	85,10	86,24	85,25	0,15	85,53	86,53	84,66
213.0	495.0	4,2	0,0	9,4	0,0	254,9	80,6	95,8	437,8	292,8	359,1	341,5	358,9	774,9	0,16	85,05	86,21	85,20	0,16	85,50	86,52	84,60
214.0	496.0	4,2	0,0	9,3	0,0	250,4	80,6	95,7	435,0	292,7	358,9	341,6	359,8	763,6	0,16	84,96	86,17	85,21	0,16	85,40	86,49	84,55
215.0	497.0	4,1	0,0	9,4	0,0	246,2	80,4	95,3	432,4	292,5	358,8	341,8	361,0	754,5	0,16	84,96	86,15	85,14	0,15	85,36	86,46	84,52
216.0	498.0	4,1	0,0	9,2	0,0	242,1	80,5	95,1	429,2	292,3	358,5	342,2	362,7	745,3	0,16	84,92	86,12	85,11	0,15	85,35	86,44	84,49
217.0	499.0	4,1	0,0	9,3	0,0	238,2	79,7	94,6	426,4	291,7	358,2	342,3	364,0	738,2	0,16	84,94	86,14	85,06	0,15	85,37	86,41	84,44
218.0	500.0	4,1	0,0	9,1	0,0	234,5	80,1	94,4	423,2	291,4	358,4	342,8	364,5	736,3	0,16	84,93	86,13	85,01	0,15	85,38	86,36	84,41
219.0	501.0	4,1	0,0	9,2	0,0	231,8	80,1	94,2	420,4	290,8	358,4	343,1	366,7	734,6	0,16	84,82	86,11	84,97	0,16	85,31	86,34	84,36
220.0	502.0	4,0	0,0	9,1	0,0	228,7	79,9	93,7	416,3	290,1	358,2	343,6	367,8	732,6	0,16	84,73	86,05	84,90	0,15	85,20	86,29	84,32
221.0	503.0	4,0	0,0	9,1	0,0	226,5	80,0	93,6	413,2	289,3	358,2	343,6	369,0	729,5	0,16	84,61	86,00	84,86	0,15	85,15	86,25	84,29
222.0	504.0	4,0	0,0	9,0	0,0	224,6	79,9	93,3	409,6	288,4	358,2	344,0	369,9	726,0	0,16	84,52	85,95	84,81	0,16	85,07	86,20	84,25
223.0	505.0	3,9	0,0	9,1	0,0	222,8	80,0	93,0	406,3	287,6	358,0	344,2	370,9	722,2	0,16	84,48	85,92	84,75	0,16	85,04	86,18	84,21
224.0	506.0	4,0	0,0	9,1	0,0	219,9	80,1	92,7	403,1	286,8	357,8	344,4	371,9	719,2	0,16	84,43	85,88	84,70	0,15	84,97	86,15	84,16
225.0	507.0	3,9	0,0	9,0	0,0	218,0	80,0	92,7	400,0	285,8	357,7	344,4	372,8	714,3	0,16	84,38	85,87	84,65	0,16	84,92	86,10	84,14
226.0	508.0	3,9	0,0	9,0	0,0	216,1	80,0	92,5	396,5	284,7	357,3	344,9	373,5	710,0	0,16	84,36	85,85	84,60	0,15	84,90	86,06	84,09
227.0	509.0	3,9	0,0	9,0	0,0	214,2	79,8	92,1	393,4	283,6	356,9	344,9	374,4	705,5	0,16	84,31	85,80	84,54	0,15	84,83	86,00	84,06
228.0	510.0	3,9	0,0	9,0	0,0	212,1	79,7	92,0	390,6	282,9	357,0	344,9	374,9	700,0	0,16	84,21	85,80	84,49	0,15	84,77	85,99	84,01
229.0	511.0	3,8	0,0	9,0	0,0	210,7	79,7	92,0	388,3	282,3	356,9	345,1	375,7	697,9	0,16	84,12	85,75	84,44	0,15	84,73	85,94	83,98
230.0	512.0	3,8	0,0	8,9	0,0	209,4	79,7	91,7	385,1	281,4	356,7	345,3	376,3	695,4	0,16	84,07	85,72	84,38	0,15	84,66	85,89	83,91
231.0	513.0	3,8	0,0	8,9	0,0	207,2	79,6	91,8	382,4	280,2	356,5	345,3	377,1	695,6	0,16	84,02	85,71	84,32	0,15	84,62	85,83	83,88
232.0	514.0	3,8	0,0	8,9	0,0	205,8	79,5	91,4	379,9	279,4	356,1	345,3	377,9	694,1	0,16	84,06	85,70	84,25	0,15	84,66	85,83	83,82
233.0	515.0	3,7	0,0	9,0	0,0	204,6	79,2	91,3	378,4	279,1	355,8	345,3	378,4	695,5	0,16	84,03	85,65	84,19	0,15	84,60	85,78	83,76
234.0	516.0	3,7	0,0	8,9	0,0	203,9	79,4	91,4	375,2	278,3	355,8	345,3	378,8	691,8	0,16	84,06	85,63	84,13	0,15	84,60	85,73	83,75
235.0	517.0	3,7	0,0	8,9	0,0	202,4	79,6	91,2	373,0	277,5	355,5	345,4	379,5	687,4	0,16	84,09	85,60	84,10	0,16	84,59	85,67	83,69
236.0	518.0	3,7	0,0	8,8	0,0	202,0	79,5	90,9	371,0	277,0	355,3	345,1	379,7	683,5	0,16	84,11	85,59	84,02	0,15	84,59	85,59	

275.0	557.0	3.0	0.0	8.8	0.0	180.2	81.9	90.1	319.3	260.9	343.7	336.6	388.7	655.7	0.16	84.40	85.23	83.80	0.15	84.58	85.46	83.11
276.0	558.0	3.0	0.0	8.7	0.0	179.7	82.1	90.2	318.6	260.7	343.0	336.2	388.9	651.8	0.16	84.39	85.20	83.83	0.15	84.56	85.44	83.11
277.0	559.0	3.0	0.0	8.7	0.0	179.9	82.0	90.1	318.0	260.5	342.7	335.9	388.6	655.5	0.16	84.39	85.20	83.85	0.16	84.56	85.44	83.12
278.0	560.0	3.0	0.0	8.6	0.0	180.1	82.1	90.0	317.1	260.2	342.5	335.5	388.8	660.5	0.16	84.38	85.18	83.85	0.16	84.55	85.43	83.14
279.0	561.0	2.9	0.0	8.6	0.0	180.0	82.1	90.0	316.2	259.8	342.1	335.2	388.3	660.4	0.16	84.34	85.16	83.88	0.15	84.54	85.41	83.13
280.0	562.0	2.9	0.0	8.6	0.0	179.8	82.0	90.0	315.6	259.6	341.6	334.8	388.5	658.9	0.16	84.32	85.13	83.87	0.16	84.50	85.39	83.15
281.0	563.0	2.9	0.0	8.6	0.0	179.8	82.0	90.0	314.7	259.5	341.2	334.5	388.4	661.4	0.16	84.32	85.13	83.89	0.16	84.53	85.39	83.18
282.0	564.0	2.9	0.1	8.6	0.0	179.9	82.1	90.1	314.2	259.1	340.9	334.1	388.2	664.6	0.16	84.30	85.10	83.88	0.15	84.51	85.37	83.16
283.0	565.0	2.9	0.1	8.7	0.0	179.7	82.1	90.0	313.5	259.0	340.3	333.8	388.2	665.6	0.16	84.29	85.10	83.86	0.15	84.50	85.37	83.15
284.0	566.0	2.8	0.1	8.6	0.0	179.9	82.2	90.0	313.0	258.7	340.0	333.3	387.9	667.8	0.16	84.28	85.06	83.87	0.16	84.47	85.35	83.17
285.0	567.0	2.9	0.1	8.6	0.0	179.8	82.0	89.8	312.6	258.5	339.5	332.9	387.5	666.7	0.16	84.25	85.05	83.87	0.15	84.48	85.34	83.16
286.0	568.0	2.8	0.1	8.6	0.0	179.7	82.0	89.9	311.7	258.3	339.0	332.6	387.7	667.6	0.16	84.23	85.03	83.88	0.15	84.44	85.32	83.17
287.0	569.0	2.8	0.1	8.5	0.0	179.6	82.4	89.9	311.6	258.0	338.6	332.1	387.3	666.8	0.16	84.23	85.00	83.88	0.15	84.40	85.30	83.19
288.0	570.0	2.8	0.1	8.6	0.0	179.8	82.0	90.0	310.9	258.0	338.3	331.7	387.2	664.3	0.16	84.22	85.00	83.87	0.16	84.40	85.28	83.19
289.0	571.0	2.8	0.1	8.6	0.0	179.9	82.0	89.8	310.4	257.7	337.9	331.4	386.9	664.4	0.16	84.19	84.98	83.87	0.16	84.39	85.27	83.20
290.0	572.0	2.7	0.1	8.5	0.0	179.6	82.1	89.9	310.0	257.4	337.5	330.9	386.8	666.8	0.16	84.17	84.95	83.85	0.15	84.37	85.24	83.20
291.0	573.0	2.7	0.1	8.6	0.0	179.5	81.8	89.8	309.6	257.1	337.1	330.5	386.3	666.2	0.16	84.16	84.93	83.86	0.15	84.34	85.21	83.19
292.0	574.0	2.7	0.1	8.6	0.0	179.8	82.1	89.8	309.5	256.9	336.7	330.1	386.4	665.3	0.16	84.15	84.93	83.84	0.15	84.34	85.23	83.19
293.0	575.0	2.7	0.1	8.6	0.0	179.8	82.0	89.7	309.2	256.6	336.3	329.8	386.1	662.3	0.16	84.13	84.90	83.83	0.15	84.32	85.19	83.18
294.0	576.0	2.7	0.1	8.6	0.0	179.5	81.9	89.8	309.3	256.3	336.0	329.4	385.8	664.4	0.16	84.12	84.90	83.82	0.15	84.32	85.19	83.20
295.0	577.0	2.7	0.1	8.5	0.0	179.5	82.0	89.7	308.5	256.0	335.4	328.9	385.9	665.6	0.16	84.09	84.87	83.80	0.15	84.31	85.18	83.18
296.0	578.0	2.7	0.1	8.5	0.0	179.6	82.1	89.8	308.1	255.7	335.1	328.6	385.9	665.7	0.16	84.07	84.87	83.80	0.15	84.31	85.17	83.18
297.0	579.0	2.7	0.1	8.6	0.0	179.6	81.9	89.8	307.9	255.4	334.6	328.3	385.8	663.2	0.16	84.09	84.85	83.78	0.15	84.30	85.15	83.19
298.0	580.0	2.6	0.1	8.6	0.0	179.7	82.1	89.8	307.3	255.2	334.2	327.9	385.6	664.3	0.16	84.06	84.84	83.79	0.16	84.28	85.13	83.18
299.0	581.0	2.6	0.1	8.6	0.0	179.7	82.0	89.7	307.2	254.7	334.0	327.4	385.4	664.1	0.16	84.05	84.83	83.78	0.16	84.27	85.12	83.18
300.0	582.0	2.6	0.1	8.5	0.0	179.5	82.0	89.7	307.1	254.4	333.4	327.0	385.6	661.1	0.16	84.03	84.80	83.79	0.15	84.25	85.11	83.18
301.0	583.0	2.6	0.1	8.5	0.0	179.2	82.1	89.6	306.6	254.2	333.0	326.7	385.4	660.0	0.16	84.02	84.78	83.79	0.15	84.23	85.09	83.17
302.0	584.0	2.6	0.1	8.5	0.0	178.8	82.0	89.4	306.4	253.7	332.6	326.3	385.1	661.6	0.16	84.00	84.74	83.80	0.15	84.21	85.07	83.15
303.0	585.0	2.5	0.1	8.5	0.0	178.7	82.0	89.4	306.5	253.7	332.2	326.0	385.4	655.0	0.16	83.96	84.74	83.78	0.15	84.19	85.05	83.17
304.0	586.0	2.5	0.0	8.4	0.0	178.4	82.0	89.4	306.0	253.3	331.9	325.7	385.2	648.4	0.16	83.97	84.73	83.77	0.15	84.18	85.05	83.17
305.0	587.0	2.5	0.1	8.3	0.0	178.5	82.1	89.4	305.7	253.0	331.6	325.2	385.1	653.1	0.16	83.96	84.72	83.77	0.15	84.17	85.04	83.13
306.0	588.0	2.5	0.1	8.2	0.0	178.5	81.9	89.5	305.2	252.7	331.2	325.0	384.9	656.3	0.16	83.94	84.71	83.76	0.15	84.15	85.01	83.13
307.0	589.0	2.5	0.1	8.2	0.0	178.6	82.0	89.5	304.9	252.3	330.9	324.6	384.9	656.8	0.16	83.95	84.69	83.75	0.15	84.13	85.02	83.15
308.0	590.0	2.5	0.1	8.2	0.0	178.5	81.9	89.5	304.8	252.0	330.4	324.2	384.9	656.9	0.16	83.94	84.68	83.75	0.16	84.12	85.00	83.16
309.0	591.0	2.5	0.1	8.3	0.0	178.8	81.9	89.6	304.8	251.9	330.1	323.8	384.8	659.8	0.16	83.91	84.67	83.74	0.16	84.10	84.99	83.15
310.0	592.0	2.5	0.1	8.2	0.0	178.9	81.9	89.5	303.8	251.5	329.7	323.5	384.6	660.1	0.16	83.90	84.65	83.72	0.15	84.09	84.99	83.15
311.0	593.0	2.4	0.1	8.2	0.0	178.7	81.9	89.4	303.3	251.3	329.2	323.2	384.6	658.8	0.16	83.90	84.65	83.70	0.15	84.08	84.96	83.15
312.0	594.0	2.4	0.1	8.2	0.0	178.3	81.9	89.4	303.0	251.1	328.7	322.8	384.4	659.2	0.16	83.86	84.63	83.72	0.15	84.06	84.95	83.15
313.0	595.0	2.4	0.1	8.2	0.0	178.5	81.9	89.4	302.4	250.8	328.3	322.4	384.2	657.2	0.16	83.87	84.62	83.71	0.15	84.08	84.94	83.17
314.0	596.0	2.4	0.1	8.2	0.0	178.5	81.9	89.3	302.2	250.5	327.9	322.2	384.1	656.1	0.16	83.84	84.60	83.69	0.16	84.04	84.92	83.16
315.0	597.0	2.4	0.1	8.2	0.0	178.4	81.9	89.4	301.8	250.3	327.5	321.8	383.6	657.1	0.16	83.82	84.58	83.67	0.15	84.03	84.91	83.14
316.0	598.0	2.3	0.1	8.2	0.0	178.8	81.7	89.4	301.3	250.1	326.9	321.5	383.5	656.6	0.16	83.82	84.57	83.67	0.15	84.02	84.90	83.15
317.0	599.0	2.4	0.1	8.1	0.0	177.9	81.9	89.2	301.1	249.9	326.6	321.1	383.3	654.9	0.16	83.82	84.57	83.68	0.15	84.02	84.89	83.16
318.0	600.0	2.3	0.1	8.1	0.0	177.6	81.9	89.3	300.9	249.6	326.0	320.9	383.1	654.4	0.16	83.79	84.54	83.66	0.15	83.99	84.86	83.12
319.0	601.0	2.3	0.1	8.2	0.0	177.6	81.8	89.2	300.3	249.4	325.6	320.5	382.8	656.7	0.16	83.79	84.55	83.67	0.15	84.00	84.87	83.13
320.0	602.0	2.3	0.1	8.3	0.0	177.8	81.8	89.2	300.2	249.1	325.2	320.2	382.3	656.2	0.16	83.77	84.51	83.64	0.15	83.96	84.85	83.11
321.0	603.0	2.3	0.1	8.3	0.0	177.9	81.9	89.2	299.9	249.0	324.5	319.9	382.1	662.5	0.16	83.74	84.49	83.63	0.15	83.95	84.82	83.11
322.0	604.0	2.3	0.1	8.3	0.0	177.8	82.0	89.2	299.3	248.9	324.1	319.6	382.0	664.9	0.16	83.75	84.49	83.67	0.15	83.96	84.82	83.10
323.0	605.0	2.2	0.1	8.2	0.0	178.7	81.7	89.3	299.1	248.7	323.6	319.3	381.6	667.8	0.16	83.73	84.47	83.65	0.15	83.92	84.78	83.10
324.0	606.0	2.2	0.1	8.2	0.0	178.7	81.9	89.3	298.8	248.5	323.1	318.9	381.1	667.8	0.16	83.72	84.44	83.64	0.15	83.91	84.78	83.09
325.0	607.0	2.2	0.1	8.1	0.0	178.8	81.8	89.2	298.9	248.2	322.8	318.6	380.5	667.3	0.16	83.70	84.43	83.65	0.16	83.91	84.77	83.06
326.0	608.0	2.2	0.1	8.1	0.0	179.3	81.9	89.2	298.5	248.0	322.3	318.2	380.3	666.3	0.16	83.69	84.42	83.61	0.15	83.89	84.76	83.05
327.0	609.0	2.2	0.1	8.0	0.0	179.6	81.9	89.2	298.3	248.0	321.9	317.9	379.6	665.9	0.16	83.65	84.37	83.60	0.15	83.87	84.73	83.04
328.0	610.0	2.2	0.1	8.0	0.0	179.5	81.7	89.2	298.0	247.8	321.5	317.6	379.2	666.6	0.16	83.66	84.37	83.61	0.15	83.85	84.72	83.04
329.0	611.0	2.2	0.1	8.0	0.0	179.7	81.8	89.3	297.6	247.6	321.0	317.3	378.6	662.2	0.16	83.66	84.37	83.60	0.16	83.84	84.70	83.05
330.0	612.0	2.1	0.																			

368.0	650.0	1,6	0,0	7,1	0,0	174,2	81,8	88,3	282,1	240,7	304,8	300,0	358,1	630,4	0,16	83,12	83,79	83,35	0,16	83,36	84,15	82,72
369.0	651.0	1,6	0,0	7,1	0,0	174,1	81,7	88,4	281,8	240,4	304,5	299,6	357,9	630,3	0,16	83,10	83,78	83,35	0,16	83,35	84,13	82,71
370.0	652.0	1,6	0,0	7,0	0,0	174,0	81,7	88,3	281,6	240,2	304,1	299,2	357,6	630,7	0,16	83,09	83,77	83,34	0,16	83,34	84,13	82,71
371.0	653.0	1,6	0,0	7,0	0,0	174,0	81,8	88,3	281,0	240,0	303,8	298,8	357,2	630,3	0,16	83,07	83,74	83,34	0,15	83,32	84,10	82,69
372.0	654.0	1,6	0,0	7,0	0,0	173,6	81,8	88,3	280,6	239,7	303,3	298,4	356,7	629,2	0,16	83,05	83,72	83,33	0,16	83,32	84,09	82,69
373.0	655.0	1,6	0,0	7,0	0,0	173,8	81,8	88,3	280,6	239,4	303,0	298,1	356,5	627,9	0,16	83,04	83,71	83,34	0,15	83,29	84,07	82,69
374.0	656.0	1,5	0,0	7,0	0,0	173,4	81,9	88,2	280,4	239,3	302,7	297,7	355,7	627,8	0,16	83,03	83,71	83,33	0,15	83,28	84,06	82,68
375.0	657.0	1,5	0,0	7,0	0,0	173,5	81,8	88,2	279,8	238,9	302,4	297,3	355,7	627,0	0,16	83,02	83,69	83,34	0,15	83,28	84,03	82,67
376.0	658.0	1,5	0,0	7,0	0,0	173,1	81,9	88,1	279,7	238,7	301,9	296,9	355,2	624,3	0,16	83,01	83,69	83,34	0,16	83,27	84,04	82,67
377.0	659.0	1,5	0,0	7,0	0,0	172,9	81,7	88,2	278,9	238,5	301,6	296,6	354,8	624,9	0,16	82,98	83,65	83,33	0,16	83,25	84,02	82,66
378.0	660.0	1,5	0,0	7,0	0,0	173,0	81,8	88,2	278,8	238,4	301,3	296,3	354,5	621,5	0,16	82,97	83,64	83,33	0,16	83,24	84,00	82,65
379.0	661.0	1,5	0,0	7,0	0,0	172,8	81,7	88,2	278,6	238,2	300,8	295,9	354,3	622,7	0,16	82,97	83,66	83,33	0,15	83,23	84,00	82,66
380.0	662.0	1,4	0,0	7,0	0,0	172,8	81,7	88,1	278,1	238,1	300,5	295,6	354,0	623,2	0,16	82,96	83,63	83,32	0,16	83,22	83,98	82,66
381.0	663.0	1,5	0,0	7,0	0,0	172,6	81,7	88,1	277,9	237,9	300,1	295,2	353,5	623,7	0,16	82,94	83,62	83,31	0,16	83,20	83,96	82,68
382.0	664.0	1,4	0,0	7,1	0,0	172,5	81,7	88,0	277,4	237,8	299,8	294,7	353,1	624,3	0,16	82,93	83,59	83,29	0,15	83,18	83,94	82,64
383.0	665.0	1,4	0,0	7,1	0,0	172,1	81,7	88,2	277,4	237,5	299,4	294,3	352,7	624,3	0,16	82,93	83,59	83,29	0,16	83,16	83,94	82,65
384.0	666.0	1,4	0,0	7,0	0,0	171,9	81,6	88,1	277,4	237,2	299,1	294,0	352,7	622,5	0,16	82,91	83,57	83,30	0,16	83,16	83,93	82,66
385.0	667.0	1,4	0,0	7,0	0,0	171,8	81,5	88,1	276,6	237,0	298,7	293,7	352,3	621,5	0,16	82,89	83,56	83,29	0,15	83,15	83,92	82,66
386.0	668.0	1,4	0,0	7,2	0,0	172,4	81,7	88,0	276,5	236,8	298,3	293,3	351,9	621,3	0,16	82,89	83,55	83,31	0,15	83,15	83,90	82,64
387.0	669.0	1,3	0,1	7,5	0,0	172,3	81,8	88,0	276,6	236,6	297,9	293,0	351,5	620,4	0,16	82,88	83,54	83,26	0,16	83,12	83,89	82,64
388.0	670.0	1,4	0,0	7,8	0,0	172,2	81,6	88,0	276,5	236,3	297,7	292,7	351,5	621,0	0,16	82,86	83,52	83,26	0,15	83,13	83,87	82,61
389.0	671.0	1,3	0,0	7,9	0,0	172,1	81,6	87,9	276,2	236,1	297,3	292,3	351,1	623,3	0,16	82,85	83,51	83,28	0,15	83,11	83,86	82,62
390.0	672.0	1,3	0,0	7,9	0,0	172,1	81,7	88,0	276,2	235,8	296,9	292,1	351,2	620,8	0,16	82,84	83,49	83,24	0,16	83,09	83,85	82,61
391.0	673.0	1,3	0,0	7,9	0,0	172,0	81,8	88,0	276,1	235,5	296,8	291,8	351,0	621,4	0,16	82,82	83,47	83,24	0,16	83,08	83,84	82,62
392.0	674.0	1,3	0,0	7,8	0,0	171,8	81,8	87,8	275,5	235,4	296,3	291,5	350,7	621,7	0,16	82,83	83,47	83,24	0,16	83,07	83,83	82,63
393.0	675.0	1,3	0,1	7,8	0,0	171,5	81,9	87,9	275,2	235,1	296,2	291,2	350,9	626,8	0,16	82,81	83,47	83,23	0,15	83,06	83,83	82,59
394.0	676.0	1,2	0,1	7,8	0,0	171,2	81,8	87,9	275,4	234,6	295,8	291,0	351,2	629,7	0,16	82,76	83,44	83,22	0,15	83,04	83,80	82,56
395.0	677.0	1,2	0,1	7,8	0,0	171,1	81,6	87,8	275,0	234,3	295,5	290,6	351,0	631,9	0,16	82,76	83,44	83,21	0,16	83,02	83,78	82,56
396.0	678.0	1,2	0,1	7,6	0,0	171,1	81,6	87,8	274,8	234,0	295,1	290,5	351,3	634,5	0,16	82,73	83,41	83,19	0,15	83,02	83,77	82,55
397.0	679.0	1,2	0,1	7,6	0,0	171,7	81,6	87,9	274,7	233,8	294,9	290,2	351,6	633,9	0,16	82,73	83,38	83,18	0,16	83,00	83,75	82,53
398.0	680.0	1,2	0,1	7,5	0,0	171,8	81,7	87,8	274,9	233,5	294,6	290,1	351,5	633,3	0,16	82,72	83,39	83,19	0,16	83,01	83,75	82,52
399.0	681.0	1,2	0,1	7,5	0,0	171,7	81,7	87,8	274,6	233,2	294,4	289,8	351,5	631,4	0,16	82,71	83,37	83,20	0,16	82,99	83,74	82,51
400.0	682.0	1,1	0,1	7,4	0,0	172,1	81,7	87,8	274,5	232,9	294,2	289,6	351,8	632,2	0,16	82,70	83,35	83,19	0,15	82,98	83,73	82,53
401.0	683.0	1,1	0,1	7,4	0,0	172,1	81,6	87,9	274,7	232,7	293,8	289,2	352,1	630,0	0,16	82,70	83,35	83,18	0,15	82,97	83,71	82,52
402.0	684.0	1,1	0,1	7,3	0,0	171,8	81,7	87,9	274,1	232,5	293,6	289,0	352,0	630,0	0,16	82,69	83,34	83,16	0,15	82,96	83,69	82,51
403.0	685.0	1,1	0,1	7,2	0,0	171,8	81,6	87,9	274,4	232,1	293,4	288,7	352,3	627,6	0,16	82,69	83,34	83,16	0,15	82,97	83,70	82,51
404.0	686.0	1,1	0,1	7,2	0,0	172,0	81,6	87,8	274,7	231,8	293,0	288,5	352,5	627,1	0,16	82,67	83,31	83,14	0,15	82,95	83,68	82,51
405.0	687.0	1,1	0,1	7,2	0,0	172,2	81,7	87,7	273,9	231,6	292,7	288,2	352,7	625,5	0,16	82,67	83,30	83,15	0,16	82,93	83,66	82,51
406.0	688.0	1,1	0,1	7,2	0,0	171,8	81,7	87,8	274,1	231,1	292,5	288,0	352,8	624,8	0,16	82,67	83,28	83,15	0,15	82,93	83,66	82,52
407.0	689.0	1,0	0,0	7,1	0,0	172,0	81,6	87,6	274,0	230,8	292,2	287,7	352,9	623,4	0,16	82,67	83,29	83,14	0,15	82,94	83,65	82,52
408.0	690.0	1,0	0,0	7,1	0,0	172,1	81,4	87,6	273,8	230,6	291,8	287,3	352,9	620,9	0,16	82,66	83,27	83,14	0,15	82,93	83,65	82,50
409.0	691.0	1,0	0,1	7,1	0,0	171,7	81,6	87,7	273,3	230,3	291,6	287,1	352,9	619,0	0,16	82,65	83,25	83,12	0,15	82,92	83,63	82,48
410.0	692.0	1,0	0,1	7,2	0,0	171,3	81,5	87,7	273,5	230,0	291,2	286,8	353,1	620,5	0,16	82,63	83,24	83,11	0,15	82,91	83,63	82,47
411.0	693.0	1,0	0,1	7,2	0,0	171,6	81,4	87,6	273,2	229,7	291,0	286,5	353,1	620,4	0,16	82,62	83,24	83,11	0,16	82,92	83,61	82,47
412.0	694.0	1,0	0,0	7,1	0,0	171,6	81,3	87,8	273,1	229,5	290,7	286,2	353,2	618,7	0,16	82,65	83,24	83,11	0,15	82,93	83,61	82,47
413.0	695.0	1,0	0,1	7,1	0,0	171,7	81,4	87,7	272,9	229,0	290,4	285,9	353,1	618,0	0,16	82,65	83,23	83,10	0,15	82,94	83,61	82,45
414.0	696.0	0,9	0,1	7,1	0,0	171,5	81,4	87,6	272,8	228,7	290,0	285,6	353,2	615,2	0,16	82,63	83,22	83,10	0,15	82,91	83,59	82,44
415.0	697.0	0,9	0,1	7,0	0,0	171,2	81,5	87,6	272,7	228,4	289,8	285,3	352,9	615,8	0,16	82,62	83,22	83,08	0,16	82,91	83,59	82,44
416.0	698.0	0,9	0,1	7,1	0,0	171,0	81,5	87,6	272,4	228,1	289,4	285,1	352,9	616,6	0,16	82,61	83,20	83,08	0,15	82,90	83,57	82,41
417.0	699.0	0,9	0,1	7,0	0,0	170,9	81,5	87,4	272,2	227,8	289,1	284,9	353,0	617,0	0,16	82,58	83,17	83,07	0,16	82,88	83,55	82,41
418.0	700.0	0,9	0,0	7,0	0,0	170,5	81,5	87,6	272,1	227,5	288,9	284,6	352,6	616,1	0,16	82,58	83,17	83,07	0,15	82,88	83,56	82,42
419.0	701.0	0,9	0,0	7,0	0,0	170,9	81,5	87,7	271,9	227,1	288,5	284,3	352,6	614,5	0,16	82,56	83,14	83,05	0,15	82,87	83,55	82,39
420.0	702.0	0,9	0,0	6,9	0,0	171,2	81,4	87,6	271,8	226,7	288,3	284,1	352,1	613,5	0,16	82,54	83,13	83,05	0,15	82,86	83,53	82,40
421.0	703.0	0,9	0,0	7,0	0,0	170,8	81,4	87,6	271,6	226,4	288,1	283,8	352,2	612,6	0,16	82,52	83,13	83,08	0,15	82,85	83,52	82,41
422.0	704.0	0,8	0,0	7,0	0,0	171,1	81,4	87,6	271,0	226,2	287,6	283,6	352,2	612,8	0,16	82,53	83,12	83,05	0,15	82,86	83,52	82,41
423.0	705.0	0,8	0,																			

461,0	743,0	0,3	0,0	6,7	0,0	165,5	81,0	86,6	259,8	214,9	275,9	274,4	343,6	589,2	0,16	82,00	82,60	82,75	0,15	82,37	83,08	82,18
462,0	744,0	0,3	0,0	6,6	0,0	165,5	80,9	86,7	259,3	214,6	275,5	274,1	342,7	589,3	0,16	82,00	82,57	82,75	0,15	82,35	83,07	82,17
463,0	745,0	0,3	0,0	6,6	0,0	164,8	80,9	86,7	259,1	214,3	275,2	273,9	342,0	590,1	0,16	81,98	82,55	82,72	0,15	82,34	83,07	82,14
464,0	746,0	0,3	0,0	6,7	0,0	165,5	80,9	86,7	258,8	214,2	274,8	273,7	341,5	591,1	0,16	81,97	82,54	82,73	0,15	82,34	83,05	82,14
465,0	747,0	0,3	0,0	6,7	0,0	165,3	80,9	86,8	258,4	214,0	274,4	273,4	340,7	592,4	0,16	81,94	82,52	82,73	0,15	82,32	83,04	82,14
466,0	748,0	0,2	0,0	6,7	0,0	165,1	81,0	86,7	258,4	213,8	274,2	273,1	340,1	593,7	0,16	81,92	82,52	82,71	0,15	82,31	83,03	82,14
467,0	749,0	0,2	0,0	6,7	0,0	165,6	80,9	86,7	258,3	213,5	273,9	272,9	339,3	594,2	0,16	81,88	82,48	82,71	0,15	82,25	83,03	82,14
468,0	750,0	0,2	0,0	6,6	0,0	165,3	80,9	86,6	258,0	213,3	273,6	272,7	338,6	591,7	0,16	81,86	82,47	82,70	0,15	82,23	83,01	82,13
469,0	751,0	0,2	0,0	6,6	0,0	165,1	81,0	86,7	257,8	213,0	273,3	272,4	337,8	592,7	0,16	81,86	82,47	82,67	0,15	82,21	82,98	82,12
470,0	752,0	0,2	0,0	6,6	0,0	164,8	81,0	86,7	257,9	212,9	273,0	272,2	337,4	592,7	0,16	81,86	82,45	82,68	0,15	82,22	82,98	82,12
471,0	753,0	0,2	0,0	6,7	0,0	164,3	81,0	86,6	257,6	212,6	272,7	272,0	336,5	592,7	0,16	81,86	82,44	82,68	0,15	82,22	82,98	82,10
472,0	754,0	0,1	0,0	6,6	0,0	164,1	80,9	86,6	257,3	212,4	272,4	271,8	335,8	595,0	0,16	81,83	82,42	82,66	0,15	82,17	82,95	82,08
473,0	755,0	0,1	0,0	6,5	0,0	164,2	80,8	86,5	256,9	212,2	272,0	271,5	335,2	593,4	0,16	81,83	82,38	82,65	0,15	82,19	82,93	82,08
474,0	756,0	0,1	0,0	6,6	0,0	164,1	80,8	86,5	256,7	211,9	271,8	271,4	334,9	593,2	0,16	81,84	82,39	82,65	0,16	82,20	82,94	82,06
475,0	757,0	0,1	0,0	6,5	0,0	163,9	80,9	86,4	256,7	211,7	271,5	271,1	334,0	593,0	0,16	81,82	82,38	82,62	0,15	82,16	82,92	82,08
476,0	758,0	0,1	0,0	6,5	0,0	164,1	80,8	86,4	256,3	211,5	271,2	271,0	333,5	592,8	0,16	81,79	82,36	82,63	0,15	82,16	82,93	82,08
477,0	759,0	0,1	0,0	6,5	0,0	164,3	80,7	86,3	256,4	210,9	270,8	270,7	332,5	590,8	0,16	81,76	82,35	82,61	0,15	82,13	82,91	82,05
478,0	760,0	0,1	0,0	6,4	0,0	164,4	80,8	86,2	256,1	211,1	270,2	270,6	332,3	593,1	0,16	81,75	82,33	82,60	0,15	82,11	82,90	82,04
479,0	761,0	0,1	0,0	6,4	0,0	164,2	80,7	86,2	255,6	210,9	270,0	270,2	331,5	591,2	0,16	81,72	82,31	82,59	0,15	82,08	82,87	82,00
480,0	762,0	0,1	0,0	6,4	0,0	164,1	80,9	86,2	255,4	210,8	269,7	270,0	330,8	589,7	0,16	81,69	82,29	82,57	0,15	82,05	82,86	82,00
481,0	763,0	0,1	0,0	6,4	0,0	164,2	80,7	86,3	255,1	210,6	269,3	269,7	330,6	589,9	0,16	81,72	82,31	82,58	0,15	82,07	82,88	81,99
482,0	764,0	0,1	0,0	6,4	0,0	163,8	80,8	86,4	255,0	210,3	269,2	269,5	329,6	589,9	0,16	81,74	82,30	82,56	0,15	82,08	82,86	81,98
483,0	765,0	0,0	0,0	6,4	0,0	163,6	80,8	86,5	254,8	210,0	268,9	269,2	328,9	589,4	0,16	81,74	82,30	82,54	0,15	82,09	82,86	81,96

Manufacturer: HEARTHSTONE
Model: GM 80

Run: 2
Project #: PI 20177
Test Duration: 483

	min	
	HHV	LHV
Eff	82,30%	88,95%
Comb Eff	99,32%	99,32%
HT Eff	82,86%	89,56%
Output	16 258	kJ/h
Burn Rate	1,00	kg/h
Grams CO	112	g
Input	19 755	kJ/h
MC wet	17,26	

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

		Air Fuel Ratio (A/F)	
Overall Heating Efficiency:	82,30%	Dry Molecular Weight (M _d)	29,87
Combustion Efficiency:	99,32%	Dry Moles Exhaust Gas (N _e):	435,86
Heat Transfer Efficiency:	82,86%	Air Fuel Ratio (A/F)	12,51

Heat Output:	15 423 Btu/h	16 258 kJ/h
Heat Input:	18 740 Btu/h	19 755 kJ/h
Burn Duration:	8,05 h	
Burn Rate:	2,20 lb/h	0,997 kg/h
Stack Temp:	217,0 Deg. F	102,8 Deg. C

Date: 10/18/09 Manufacturer: Heathstone Model: GM 80
Project #: PI 20173 Run: 2 Tech: MM Reviewer: BP

400 LBS	kindling	START Fan
FAN	ON	low
by pass	open	
Aft 300	close	Door
Aft 11 LBS	install	1 st pre load
Aft 134 LBS	close	Door
Aft 200	install	second pre load
Aft 150 LBS	close	Door
Aft 1200 LBS	close	by pass
Aft 77 LBS	close	air in (Drill bit 1/16)
- Aft 47 LBS	open	Door open by pass
back coal	close	Door close by pass
Aft 2 min	open	Door open by pass
open air in	install	load close Door
close	bypass	and stop Fan
TEST LOAD CONFIGURATION		
Aft 5 minutes	close	air in (Drill bit 1/16)
Aft 30 minutes	open	Fan low

74

23 LBS

PRE / POST CHECKS

Date: 2018-09-20 Manufacturer: Hearlthstork Model: GM80
 Project #: p[2017] Run: 2 Tech: mm Reviewer: DP

Moisture Meter Calibration Check:

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

Pre-Test

Post-Test

Facility Conditions:

Air Velocity from less than 2 feet

Smoke Capture Check.....

Picture.....

	0 (max50 Fpm)	0 (max50 Fpm)
	ok	ok
4 sides	ok	ok

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

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

Traverse before ignition.....

Flow Rate 140 cfm $\pm$ 10%.....

2018-09-19
2018-09-19
ok
ok

ok

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface ($\pm$ 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
009	015	50
514	516 518 _{mm}	518
515	517	519
11	11	12
016	016	016

SAMPLING EQUIPMENT CHECK OUT

Date: 2018-09-20 Manufacturer: Heathstone Model: GM 80
 Project #: PI 20177 Run: 2 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)	775622.99	777892.44	775623.13	777892.57	728725.20	730951.22
Initial 1minute DGM (Liter)	775622.95	777892.44	775623.11	777892.56	728725.10	730951.20
Change @ (Liter)	0.04	0	0.02	0.01	0.10	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 (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

PRE-TEST SCALE AUDIT

Date: 2018-09-20 Manufacturer: Hearlstone Model: GM 86
 Project #: PJ 20177 Run: 2 Tech: MM Reviewer: DP

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

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: 2018-09-20 Manufacturer: Heath Stark Model: GM 80
 Project #: PI 20177 Run: _____ Tech: MR Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 10³ 2 (KPa.) Static pressure (P_q) 0.24 (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	0061	70 10
B - Centroid	3.00	3.50	4	0062	68 27
A-1	0.40	0.50	0.50	0050	70 09
A-2	1.50	1.75	2	0068	70 20
A-3	4.50	5.25	6	0060	69 98
A-4	5.60	6.5	7.5	0055	69 98
B-1	0.40	0.50	0.50	0051	70 18
B-2	1.50	1.75	2	0071	70 48
B-3	4.50	5.25	6	0058	70 51
B-4	5.60	6.5	7.5	0050	70 55
AVERAGE					

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

Where,

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

Δ_p = manometer reading (inches H₂O)

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

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

P_q = static pressure in. H₂O
{ 13.6 }

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

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

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

CONTINUOUS ANALYZERS

Date: 2-18-09-20 Manufacturer: Hearshstone Model: GM 80
 Project #: PI 20177 Run: 2 Tech: _____ Reviewer: SP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2968	3000	1003	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	1790	1800	973	1000
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	0003	2978	1001	0003	0.02	0010	0.15	0002	0.05	✓	
CO ₂	0	1783	977	0	0.02	007	0.5	004	0.5	✓	

TEST DATA LOG

Date: 2018-09-20 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 2 Tech: MM Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	777891.99	730950.20	281.26 ^{DP}
Initial (Liter)	775623.79	728726.39	251.20

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102.2	102.1
Dry Bulb (F):	70.16	73.77
Humidity (%):	47.2	43.0

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

Date: 2018-09-20 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 2 Tech: Mr Reviewer: DL

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1114 lbs.	223	226	229	215	220
1 1/2 x 3 1/2 x 10 in.	1188 lbs.	220	226	228	217	219
1 1/2 x 3 1/2 x 10 in.	1090 lbs.	216	219	213	218	219
1 1/2 x 3 1/2 x 10 in.	1092 lbs.	220	221	223	220	220
1 1/2 x 3 1/2 x 10 in.	1130 lbs.	218	219	219	218	216
1 1/2 x 3 1/2 x 10 in.	1104 lbs.	220	210	208	206	203
1 1/2 x 3 1/2 x 10 in.	1138 lbs.	201	203	208	203	206
1 1/2 x 3 1/2 x 10 in.	1122 lbs.	209	208	206	209	203
1 1/2 x 3 1/2 x 10 in.	1102 lbs.	206	203	202	202	207
1 1/2 x 3 1/2 x 10 in.	1114 lbs.	208	209	203	206	209
1 1/2 x 3 1/2 x 10 in.	1140 lbs.	206	208	209	207	207
1 1/2 x 3 1/2 x 14 in.	1570 lbs.	191	196	199	193	194
1 1/2 x 3 1/2 x 14 in.	1520 lbs.	200	201	209	208	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.					

TEST LOAD WEIGHT: 1543 lbs

14.33 mm

FUEL DATA

Date: 2018-09-20 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 2 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1174 lbs.	21	20	20	21	20
1 1/2 x 3 1/2 x 10 in.	1140 lbs.	201	200	191	196	199
1 1/2 x 3 1/2 x 10 in.	1178 lbs.	213	209	208	209	207
1 1/2 x 3 1/2 x 10 in.	1192 lbs.	210	203	207	206	208
1 1/2 x 3 1/2 x 10 in.	1218 lbs.	196	199	193	198	196
1 1/2 x 3 1/2 x 10 in.	1124 lbs.	200	210	196	198	193
1 1/2 x 3 1/2 x 10 in.	1182 lbs.	213	216	212	219	213
1 1/2 x 3 1/2 x 10 in.	1156 lbs.	193	192	192	196	195
1 1/2 x 3 1/2 x 10 in.	1170 lbs.	201	203	206	207	208
1 1/2 x 3 1/2 x 10 in.	1196 lbs.	203	206	208	204	205
1 1/2 x 3 1/2 x 10 in.	1180 lbs.	203	209	203	208	208
1 1/2 x 3 1/2 x 14 in.	1502 lbs.	209	201	204	204	208
1 1/2 x 3 1/2 x 14 in.	1498 lbs.	200	201	204	208	203
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: 1584 lbs
14.70 m

FUEL DATA

Date: 2018-09-20 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20173 Run: 2 Tech: MR Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)*				
3 1/2	x 3 1/2 x 2 in.	5 26 lbs.	2.3	20.2	20.9	21.0	21.1
3 1/2	x 3 1/2 x 2 in.	4 964 lbs.	2.3	20.9	20.5	20.9	21.0
3 1/2	x 3 1/2 x 2 in.	4 722 lbs.	2.6	20.8	20.5	20.5	20.3
3 1/2	x 3 1/2 x 2 in.	5 222 lbs.	2.1	21.6	21.8	21.1	21.3
1 1/2	x 3 1/2 x 5 in.	0 106 lbs.			20.3		
1 1/2	x 3 1/2 x 5 in.	0 120 lbs.			20.9		
1 1/2	x 3 1/2 x 5 in.	0 112 lbs.			20.6		
1 1/2	x 3 1/2 x 5 in.	0 098 lbs.			20.8		
1 1/2	x 3 1/2 x 5 in.	0 106 lbs.			20.7		
1 1/2	x 3 1/2 x 5 in.	0 102 lbs.			20.6		
1 1/2	x 3 1/2 x 5 in.	0 110 lbs.			20.8		
1 1/2	x 3 1/2 x 5 in.	0 104 lbs.			20.3		
1 1/2	x 3 1/2 x 5 in.	0 104 lbs.			20.9		
1 1/2	x 3 1/2 x 5 in.	0 120 lbs.			21.0		
1 1/2	x 3 1/2 x 5 in.	0 120 lbs.			21.1		
1 1/2	x 3 1/2 x 5 in.	0 118 lbs.			20.0		
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					
x	x in.	lbs.					

TEST LOAD WEIGHT: 21.42 lbs Min 20%: 429 Max 25%: 533

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-19 Manufacturer: Heartsberg Model: GM 80
 Project #: PI 2.177 Run: 2 Tech: MR Reviewer: RS

		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										
2018-09-19	19:20	014468	01244	346310	1087833	01271	01257	344328	01277		
2018-09-20	11:45	014468	01242	346309	1087833	01270	01257	344327	01277		

		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										
2018-09-20	20:00	014471	01255	346356	1087842	01286	01255	344374	01282		
2018-10-05	8:00	014470	01253	346323	1087837	01286	01255 01246	344344	01279		
2018-10-09	8:00	014470	01252	346323	1087837	01286	01255	344344	01279		

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2-18-09 19 Project #: PT 20177 Run: 2 Manufacturer: Hearths to life Model: GM 80
 Tech: NR Reviewer: DP

SYSTEM 2					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2018-02-19	19:00	1076464	01277	35	0581
2018-02-20	11:45	1076464	01250	35	0582

SYSTEM 2					
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	
Date	Time				
2018-02-20	20:00	1076472	01280	35	0628
2018-10-01	8:00	1076469	01278	35	0605
2018-10-09	8:00	1076469	01279	35	0605

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	3
Date	24-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	Dimensionless
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	6	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 20177
Date	24-09-2018
Technicien	M.M

Fuel data

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

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

	Start	End
Barometer (kPa):	102,9	102,8
Barometer (in.Hg):	30,386359	30,35682857
Dry Bulb (F):	75,2	77,82
Humidity (%):	30	28,1
Air velocity (ft/min)	0	0

DGM #1	Final:	27551,427	cuft
	Initial:	27471,925	cuft
DGM #2	Final:	25891,637	cuft
	Initial:	25814,246	cuft

DGM room	
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	Final:	780169,510	Liter
	Initial:	777918,260	Liter
	Final:	733169,510	Liter
	Initial:	730978,040	Liter

	Final:	942,020	cuft
	Initial:	761,260	cuft

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

283

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

Project nu.	PI 20177
Date	24-09-2018
Technicien	M.M

Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7109 cu. ft

Loading Density: 9,069 lbs./ft³
 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 40,310 lbs./ft³
 Dry Wood Density: 33,025107

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	1,11	22,4	22,3	22,8	22,6	22,4	24,975	52,50
1,5	3,5	10	0,966	21,9	21,8	22	22	22,1	21,21336	52,50
1,5	3,5	10	1,274	22,8	21,9	22,2	22,2	22,5	28,43568	52,50
1,5	3,5	10	1,044	21,9	21,7	21,8	21,6	21,4	22,63392	52,50
1,5	3,5	10	1,094	22	22,8	23	23,1	22,9	24,89944	52,50
1,5	3,5	10	1,114	22,6	22,3	22,8	22,4	22,3	25,04272	52,50
1,5	3,5	10	0,982	21,8	21,9	21,3	21,4	21,3	21,15228	52,50
1,5	3,5	10	1,09	21,6	21,8	21,9	21,3	21,4	23,544	52,50
1,5	3,5	10	0,992	23	23,1	23,2	23,4	23,3	23,0144	52,50
1,5	3,5	10	1,142	21,9	21,6	21,7	21,8	21,3	24,73572	52,50
1,5	3,5	10	1,614	22,3	22,6	22,3	22,4	22,6	36,21816	52,50
1,5	3,5	14	1,598	21,9	21,6	21,8	21,9	21,3	34,6766	73,50
										0,00
										0,00
1,5	3,5	10	1,004	21,9	21,3	22	21,8	21,8	21,84704	52,50
1,5	3,5	10	1,076	21,9	21,4	22,3	22	22,1	23,60744	52,50
1,5	3,5	10	1,224	23	23,1	22	22,8	22,3	27,71136	52,50
1,5	3,5	10	1,098	21,9	22	21,8	21,3	21,4	23,80464	52,50
1,5	3,5	10	1,21	21,9	21,8	21,8	21,9	21,7	26,4022	52,50
1,5	3,5	10	1,022	23	23,1	22,8	22,6	22,9	23,38336	52,50
1,5	3,5	10	1,188	22,3	22,6	22,8	22,9	22,4	26,8488	52,50
1,5	3,5	10	1,016	21,9	21,8	21,3	21,8	21,3	21,96592	52,50
1,5	3,5	10	1,22	21,7	21,7	21,8	21,9	21,3	26,4496	52,50
1,5	3,5	10	1,006	22,3	22,8	22,3	22,4	22,6	22,61488	52,50
1,5	3,5	10	1,932	21,9	21,8	21	21,2	21,4	41,46072	52,50
1,5	3,5	14	1,642	21,9	21,3	21,8	21,4	21,8	35,53288	73,50
										0,00
										0,00
										0,00
										0,00
										0,00
										0,00

SUM MC: 632,17012

PreTest Load Weight: 28,66 lbs.

Dry Weight: 10,65 kg.

 Dry: 22,06
 Average Moisture Content: %
 22,06
 Must be 18-28

 Wet: 18,07
 must be 15,2-22

Project nu.	PI 20177
Date	24-09-2018
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

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

19,9	22,1	24,3
------	------	------

* 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

Load Density (wet): 32,1 lbs./ft3

Spacer weight: lbs

Dry Wood Density: 26,5 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	20,25	4,75	20,90	20,20	20,10	20,80	20,60	97,38792	248,06	20,5
3,5	3,5	20,25	4,74	20,30	20,80	20,90	20,60	20,80	98,06456	248,06	20,7
3,5	3,5	20,25	5,10	22,10	22,10	22,00	21,80	22,00	112,112	248,06	22,0
3,5	3,5	20,25	5,08	21,50	21,40	21,30	21,80	21,30	109,05972	248,06	21,5
1,5	0,75	5	0,11			20,10			2,1306	5,63	20,1
1,5	0,75	5	0,11			20,60			2,2248	5,63	20,6
1,5	0,75	5	0,10			20,40			1,9992	5,63	20,4
1,5	0,75	5	0,10			20,80			2,1632	5,63	20,8
1,5	0,75	5	0,12			19,30			2,2388	5,63	19,3
1,5	0,75	5	0,10			19,40			1,9788	5,63	19,4
1,5	0,75	5	0,10			19,60			2,0384	5,63	19,6
1,5	0,75	5	0,12			20,10			2,3316	5,63	20,1
1,5	0,75	5	0,10			20,40			1,9584	5,63	20,4
1,5	0,75	5	0,10			20,80			2,1216	5,63	20,8
1,5	0,75	5	0,11			20,30			2,3142	5,63	20,3
1,5	0,75	5	0,11			20,00			2,12	5,63	20,0
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
										0,00	
								SUM MCx	442,2438		20,4 %

Test Load Weight: 20,94 lbs.

Dry Weight: 7,84 kg.

Average Moisture Content: %

Dry:	21,12	Dry(EPA)	21,12
		Dry(B415)	21,12

21,12
Must be 19-25

Wet: 17,44
must be 15,2-22

Coal Bed Range: lbs. to

5,2 lbs.

TEST CHARGE:

Coal bed weight: 4,7

lbs.

Project nu.	PI 20177
Date	24-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,26 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=
0,989

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,059	71,31	0,2429
B center	0,060	71,18	0,2449
A1	0,053	71,12	0,2302
A2	0,067	71,16	0,2588
A3	0,063	71,16	0,2510
A4	0,059	71,18	0,2429
B1	0,050	71,140	0,2236
B2	0,072	71,260	0,2683
B3	0,054	71,100	0,2324
B4	0,047	71,070	0,2168
AVERAGE	0,0584	71,1680	0,2412

Project nu.	PI 20177
Date	24-09-2018
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	17	812	813	10	32	814	815	18	38	816	817	26	819		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108,9490	0,1262	0,1291	33,5986	110,1770	0,1259	0,1269	35,0208	110,4336	0,1252	0,1274	35,5325	0,1257	2108-09-20	18:00
Before (6)	108,9491	0,1261	0,1292	33,5987	110,1771	0,1258	0,1270	35,0208	110,4336	0,1253	0,1275	35,5326	0,1257	2018-09-24	09:00
After (1)	108,9500	0,1265	0,1292	33,6018	110,1779	0,1256	0,1263	35,0236	110,4344	0,1259	0,1268	35,5351	0,1258	2018-09-24	21:00
After (2)	108,9496	0,1264	0,1289	33,5993	110,1774	0,1255	0,1262	35,0224	110,4339	0,1259	0,1268	35,5342	0,1258	2018-10-05	08:00
After (3)	108,9496	0,1264	0,1289	33,5993	110,1774	0,1255	0,1262	35,0224	110,4339	0,1259	0,1268	35,5342	0,1258	2018-10-09	08:00
After (4)															
After (5)															
After (6)	108,9496	0,1264	0,1289	33,5993	110,1774	0,1255	0,1262	35,0224	110,4339	0,1259	0,1268	35,5342	0,1258	2018-10-09	08:00
Difference	0,0005	0,0003	-0,0003	0,0006	0,0003	-0,0003	-0,0008	0,0016	0,0003	0,0006	-0,0007	0,0016	0,0001		
Total (mg)		1,1				1,9				1,8			0,1		
Total ajusté (mg)		1,00				1,80				1,70					

Project nu.	PI 20177
Date	24-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,2 g/hr
Burn Rate : 0,986 Dry kg/hr

Test Duration: 477 min

PRESSURE FACTOR: DGM 1 0,99530
 DGM 2 0,99898
 DGM 3 1,01509

BAROMETRIC PRESSURE
 Average: 30,371594 in Hg
 Start: 30,386359 in Hg
 End: 30,356829 in Hg

TEMPERATURE FACTORS DGM 1 0,97593
 DGM 2 0,97539
 DGM 3 0,98239

DGM CONTROLLER VALUES

DGM 1 Final: 27551,427 Cuft
 Initial: 27471,925 Cuft

VOLUMES SAMPLED DGM 1 76,333 SCft
 DGM 2 74,761 SCft
 DGM 3 179,492 SCft

DGM 2 Final: 25891,637 Cuft
 Initial: 25814,246 Cuft

DGM #3 Final: 942,020 Cuft
 Initial: 761,260 Cuft

TOTAL TUNNEL VOLUME : 81436

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1066,855
 Sample Train 2: 1089,288

DGM 1 541,025 °R
 DGM 2 541,321 °R

Paticulate concentration
 Sample Train 1 0,000025 g/dscf
 Sample Train 2 0,000024 g/dscf
 Room 0,000001 g/dscf

CALIBRATION FACTORS

DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

TUNNEL FLOW RATE: 170,726 Dscfm

TOTAL EMISSIONS
 Sample Train 1 1,98 g
 Sample Train 2 1,92 g

PARTICULATE CATCH

Total Sample Train 1: 1,90 mg
 Total Sample Train 2: 1,80 mg
 Total Sample Train 1 1st hour: 1,10 mg

EMISSION RATES
 Sample Train 1 0,25 g/hr
 Sample Train 2 0,24 g/hr

1st hour emission rate 1,17 g/hr

DEVIATION: 1,70%

Cs Train 1 Train 2
 2,489E-05 2,40767E-05

*		*	*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	*	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2
Elapsed		Weight				Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Catalyst	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO ₂	O ₂	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom	up	°F	°F	°F	°F	°F	°F	°F	°F
min		lbs	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F	%F	cutf/min				cutf/min			
0.00	283.00	20.8	0.2	2.6	0.0	222.6	77.0	116.4	327.2	293.1	374.0	376.2	476.1	469.5	0.16	78.87	78.32	78.28	0.16	78.86	78.87	78.35
1.0	284.0	20.7	0.4	2.4	0.0	224.0	77.4	98.9	326.9	301.9	372.7	374.9	468.7	562.9	0.16	79.14	78.39	78.36	0.16	78.96	78.91	78.37
2.0	285.0	20.6	0.0	4.8	0.0	237.5	77.1	95.3	326.8	308.3	370.9	372.2	466.6	675.7	0.16	79.45	78.45	78.33	0.15	79.05	78.97	78.40
3.0	286.0	20.6	0.0	4.8	0.0	249.9	76.6	94.3	327.0	313.0	369.4	371.5	457.5	709.9	0.16	79.45	78.52	78.34	0.16	79.14	79.00	78.44
4.0	287.0	20.5	0.0	4.6	0.0	259.4	76.8	94.3	326.7	316.5	367.3	369.4	453.0	717.0	0.16	79.44	78.57	78.39	0.16	79.19	79.05	78.46
5.0	288.0	20.5	0.0	4.7	0.0	246.5	77.2	90.8	326.7	319.1	365.3	367.7	458.5	696.8	0.16	79.35	78.60	78.42	0.16	79.15	79.08	78.51
6.0	289.0	20.4	0.0	5.0	0.0	233.3	76.9	89.3	324.9	321.0	364.0	364.8	459.5	694.0	0.16	79.28	78.63	78.45	0.16	79.13	79.10	78.53
7.0	290.0	20.4	0.0	4.3	0.0	225.7	76.8	89.0	323.6	322.2	362.0	362.2	460.0	679.8	0.16	79.20	78.65	78.50	0.16	79.11	79.10	78.57
8.0	291.0	20.3	0.0	4.2	0.0	220.1	76.2	88.1	321.6	323.0	359.5	359.4	459.3	669.7	0.16	79.21	78.69	78.56	0.15	79.09	79.13	78.64
9.0	292.0	20.3	0.0	4.2	0.0	216.4	75.9	87.7	319.8	323.3	357.1	356.7	458.1	668.6	0.16	79.24	78.72	78.59	0.15	79.10	79.15	78.68
10.0	293.0	20.2	0.0	4.3	0.0	213.7	75.6	87.3	318.0	323.3	354.8	354.0	457.4	669.9	0.16	79.24	78.75	78.61	0.16	79.12	79.16	78.71
11.0	294.0	20.2	0.0	4.4	0.0	212.1	75.4	87.3	316.3	323.1	352.4	351.0	455.9	673.7	0.16	79.22	78.78	78.64	0.16	79.10	79.19	78.75
12.0	295.0	20.1	0.0	4.5	0.0	210.9	75.3	87.4	314.7	322.5	349.9	348.0	454.6	679.6	0.16	79.22	78.80	78.66	0.16	79.09	79.19	78.78
13.0	296.0	20.1	0.0	4.6	0.0	210.7	75.2	87.1	313.4	321.8	347.7	345.1	452.8	687.6	0.16	79.19	78.82	78.72	0.16	79.08	79.20	78.84
14.0	297.0	20.0	0.0	4.7	0.0	210.5	75.7	87.4	312.5	320.9	345.1	342.2	451.3	694.5	0.16	79.17	78.84	78.75	0.16	79.09	79.21	78.88
15.0	298.0	20.0	0.0	4.8	0.0	210.6	75.8	87.2	311.3	320.0	342.5	339.7	450.3	706.4	0.16	79.14	78.84	78.76	0.16	79.06	79.22	78.90
16.0	299.0	19.9	0.0	5.0	0.0	211.5	75.9	87.2	310.5	318.9	339.9	336.9	448.3	722.6	0.16	79.09	78.86	78.83	0.15	79.04	79.25	78.93
17.0	300.0	19.9	0.0	5.3	0.0	212.8	76.0	87.5	309.8	317.7	337.9	334.2	446.4	745.4	0.16	79.04	78.86	78.84	0.16	78.99	79.23	78.93
18.0	301.0	19.8	0.0	5.7	0.0	214.9	76.3	87.5	309.1	316.5	335.3	331.4	444.0	764.5	0.16	79.00	78.86	78.86	0.16	78.95	79.22	78.94
19.0	302.0	19.7	0.0	5.8	0.0	216.5	76.0	87.6	308.9	315.2	332.7	329.0	443.6	774.8	0.16	79.00	78.88	78.89	0.16	78.98	79.25	78.98
20.0	303.0	19.7	0.0	6.1	0.0	218.2	76.1	87.9	309.0	313.9	330.8	326.4	441.7	782.6	0.16	79.02	78.90	78.92	0.16	78.98	79.26	78.99
21.0	304.0	19.6	0.0	6.2	0.0	220.5	76.2	88.4	310.2	312.5	328.6	323.9	439.6	789.4	0.16	79.04	78.91	78.95	0.16	78.98	79.27	79.00
22.0	305.0	19.5	0.0	6.4	0.0	222.4	76.2	88.4	310.0	311.3	326.0	321.3	438.4	798.9	0.16	79.04	78.92	78.96	0.16	78.98	79.27	79.04
23.0	306.0	19.5	0.0	6.6	0.0	224.3	76.2	88.6	310.3	309.9	324.0	318.9	436.1	812.1	0.16	79.05	78.92	78.98	0.16	78.98	79.29	79.04
24.0	307.0	19.4	0.0	6.8	0.0	226.4	76.2	88.3	310.5	308.6	321.9	316.5	434.7	820.7	0.16	79.08	78.92	78.98	0.16	79.00	79.28	79.06
25.0	308.0	19.3	0.0	6.8	0.0	228.7	76.1	88.6	311.3	307.4	319.7	314.2	433.1	827.1	0.16	79.09	78.94	79.01	0.15	79.01	79.31	79.10
26.0	309.0	19.2	0.0	6.9	0.0	230.2	76.4	88.6	312.1	306.1	317.8	311.8	431.8	834.9	0.16	79.06	78.93	79.04	0.16	78.99	79.30	79.07
27.0	310.0	19.2	0.0	7.0	0.0	232.4	76.1	88.9	312.8	304.8	316.1	309.7	430.4	839.6	0.16	79.15	78.96	79.06	0.16	78.99	79.33	79.11
28.0	311.0	19.1	0.0	7.1	0.0	234.0	76.4	88.7	313.4	303.7	314.0	307.6	429.0	841.9	0.16	79.30	79.01	79.09	0.16	79.14	79.37	79.13
29.0	312.0	19.0	0.0	7.1	0.0	235.8	76.3	88.7	310.8	293.0	312.2	305.2	427.6	841.8	0.16	79.35	79.02	79.11	0.16	79.17	79.41	79.16
30.0	313.0	19.0	0.0	7.2	0.0	236.6	76.1	89.3	311.0	282.8	310.4	303.2	426.5	843.2	0.16	79.33	79.04	79.15	0.16	79.18	79.43	79.19
31.0	314.0	18.9	0.0	7.3	0.0	239.1	76.2	89.7	312.4	274.4	309.0	301.5	425.0	849.1	0.16	79.32	79.04	79.16	0.16	79.17	79.43	79.22
32.0	315.0	18.8	0.0	8.1	0.0	240.9	76.2	89.9	312.0	272.0	308.4	299.3	423.2	851.0	0.16	79.33	79.06	79.19	0.16	79.16	79.45	79.24
33.0	316.0	18.6	0.0	11.0	0.0	239.8	76.3	90.0	332.8	262.5	306.0	298.2	421.7	772.9	0.16	79.34	79.08	79.22	0.15	79.17	79.47	79.28
34.0	317.0	18.6	0.0	10.2	0.0	236.9	76.3	89.9	336.4	257.9	304.9	296.4	420.6	775.3	0.16	79.39	79.08	79.26	0.16	79.21	79.47	79.30
35.0	318.0	18.5	0.0	8.9	0.0	235.7	76.6	90.0	336.5	253.8	304.0	295.0	419.3	812.4	0.16	79.42	79.10	79.24	0.16	79.24	79.49	79.31
36.0	319.0	18.4	0.1	8.2	0.0	234.9	76.4	90.0	336.9	250.4	303.3	293.7	417.8	826.7	0.16	79.49	79.10	79.29	0.16	79.28	79.50	79.35
37.0	320.0	18.3	0.1	7.8	0.0	234.2	76.4	90.1	336.6	247.3	302.2	292.1	416.8	828.4	0.16	79.62	79.14	79.33	0.16	79.37	79.53	79.40
38.0	321.0	18.3	0.1	7.3	0.0	234.2	76.2	89.8	335.9	244.7	301.8	290.6	414.9	833.7	0.16	79.69	79.15	79.34	0.16	79.43	79.54	79.40
39.0	322.0	18.2	0.1	7.0	0.0	234.5	76.3	89.9	334.1	242.1	301.3	289.6	413.6	842.6	0.16	79.76	79.17	79.37	0.16	79.48	79.53	79.42
40.0	323.0	18.2	0.1	6.9	0.0	236.1	76.4	90.0	332.6	239.8	300.2	288.5	413.0	852.6	0.16	79.82	79.19	79.40	0.15	79.52	79.58	79.44
41.0	324.0	18.0	0.1	7.0	0.0	237.0	76.3	90.4	330.2	237.7	299.7	287.1	410.6	861.9	0.16	79.91	79.21	79.42	0.16	79.58	79.58	79.45
42.0	325.0	18.0	0.1	7.3	0.0	238.8	76.4	90.1	328.8	235.9	298.8	286.0	409.6	874.3	0.16	80.04	79.23	79.46	0.16	79.65	79.62	79.46
43.0	326.0	17.9	0.0	7.5	0.0	240.5	76.6	90.1	324.0	234.2	297.8	284.5	408.5	886.4	0.16	80.01	79.26	79.49	0.16	79.67	79.64	79.51
44.0	327.0	17.9	0.0	7.7	0.0	242.2	76.6	90.4	326.9	232.5	296.9	283.5	407.2	898.3	0.16	80.06	79.27	79.50	0.15	79.72	79.65	79.54
45.0	328.0	17.8	0.0	7.9	0.0	244.6	76.5	90.5	326.9	231.0	296.3	282.3	406.5	906.7	0.16	80.24	79.31	79.52	0.16	79.82	79.68	79.57
46.0	329.0	17.7	0.0	7.9	0.0	245.6	76.6	90.8	326.1	229.8	295.5	281.0	405.6	912.2	0.16	80.28	79.34	79.54	0.16	79.86	79.71	79.58
47.0	330.0	17.7	0.0	8.1	0.0	247.9	76.8	90.7	325.6	228.5	294.7	279.6	403.3	919.2	0.16	80.26	79.34	79.57	0.16	79.86	79.74	79.60
48.0	331.0	17.5	0.0	8.2	0.0	249.9	76.4	91.0	325.7	227.5	293.9	278.4	403.0	924.3	0.16	80.31	79.38	79.61	0.16	79.91	79.77	79.63
49.0	332.0	17.5	0.0	8.3	0.0	251.3	76.5	91.1	325.8	226.6	293.1	277.1	401.7	928.3	0.16	80.38	79.40	79.61	0.16	79.96	79.79	79.64
50.0	333.0	17.4	0.0	8.4	0.0	252.0	76.4	91.0	325.9	225.8	292.2	276.1	401.6	932.9	0.16	80.39	79.42	79.65	0.16	79.97	79.80	79.61
51.0	334.0	17.3	0.0	8.5	0.0	253.6	76.4	91.4	326.5	225.1	291.5	274.8	400.6	938.5	0.16	80.44	79.44	79.67	0.15	80.03	79.84	79.71
52.0	335.0	17.3	0.0	8.6	0.0	255.4	76.4	91.6	327.1	224.4	290.4	273.4</										

89.0	372.0	14.1	0.0	11.9	0.0	297.2	77.5	96.7	379.2	235.5	288.9	253.7	392.8	1090.7	0.16	81.90	80.62	81.13	0.16	81.57	81.09	80.36
90.0	373.0	14.0	0.0	12.0	0.0	298.0	77.8	96.6	381.2	236.4	289.3	253.8	392.4	1095.4	0.16	81.96	80.67	81.17	0.16	81.64	81.13	80.45
91.0	374.0	13.9	0.0	12.0	0.0	299.4	77.8	96.8	383.4	237.3	289.6	253.6	392.2	1100.1	0.16	82.09	80.72	81.20	0.16	81.75	81.17	80.50
92.0	375.0	13.8	0.0	12.1	0.0	300.3	78.3	96.8	386.0	238.3	290.3	254.0	392.4	1105.1	0.16	82.16	80.80	81.24	0.16	81.89	81.26	80.57
93.0	376.0	13.7	0.0	12.3	0.0	301.0	77.5	96.8	387.6	239.2	290.7	254.0	392.1	1110.7	0.16	82.14	80.82	81.28	0.16	81.94	81.28	80.65
94.0	377.0	13.6	0.0	12.4	0.0	302.9	77.8	97.0	389.9	240.2	291.2	253.9	391.6	1115.6	0.16	82.10	80.84	81.33	0.15	81.91	81.32	80.72
95.0	378.0	13.5	0.0	12.5	0.0	304.3	75.9	97.1	392.1	241.2	291.5	254.1	391.5	1119.7	0.16	81.97	80.83	81.40	0.16	81.84	81.31	80.78
96.0	379.0	13.4	0.0	12.6	0.0	305.7	77.0	97.3	395.1	242.3	292.1	254.2	391.4	1124.4	0.16	81.95	80.85	81.43	0.15	81.87	81.33	80.84
97.0	380.0	13.3	0.0	12.8	0.0	306.3	77.1	97.4	396.7	243.4	292.8	254.5	391.7	1128.2	0.16	81.91	80.89	81.44	0.16	81.88	81.38	80.88
98.0	381.0	13.2	0.0	12.9	0.0	307.9	77.5	97.6	399.1	244.6	293.6	254.9	391.6	1133.6	0.16	81.86	80.90	81.46	0.15	81.89	81.41	80.95
99.0	382.0	13.1	0.0	13.1	0.0	309.5	77.6	97.8	401.9	245.7	294.5	255.4	392.1	1139.1	0.16	81.89	80.93	81.54	0.15	81.88	81.43	81.00
100.0	383.0	13.0	0.0	13.2	0.0	311.0	77.6	98.0	404.1	246.8	295.1	255.7	392.7	1144.9	0.16	81.88	80.92	81.53	0.15	81.85	81.44	81.04
101.0	384.0	12.9	0.0	13.4	0.0	312.8	77.5	98.0	406.5	248.0	295.9	256.2	392.8	1149.8	0.16	81.85	80.94	81.58	0.15	81.85	81.47	81.12
102.0	385.0	12.7	0.0	13.5	0.0	314.3	77.4	98.4	409.6	249.3	296.7	256.6	392.9	1153.8	0.16	81.86	80.94	81.61	0.16	81.85	81.47	81.15
103.0	386.0	12.7	0.1	13.6	0.0	315.6	77.6	98.5	412.0	250.5	297.7	257.3	392.9	1155.6	0.16	81.85	80.96	81.67	0.16	81.80	81.49	81.22
104.0	387.0	12.5	0.1	13.7	0.0	316.6	77.5	98.8	415.1	251.8	298.6	257.9	392.5	1155.8	0.16	81.85	80.98	81.68	0.16	81.79	81.49	81.28
105.0	388.0	12.4	0.2	13.8	0.0	317.8	77.3	99.1	417.1	253.2	299.6	258.5	392.9	1155.8	0.16	81.92	81.00	81.73	0.16	81.84	81.51	81.36
106.0	389.0	12.3	0.3	13.9	0.0	318.9	77.5	99.0	420.2	254.5	300.4	259.1	393.0	1157.8	0.16	81.93	81.03	81.77	0.16	81.87	81.53	81.39
107.0	390.0	12.2	0.3	13.8	0.0	320.8	77.5	99.2	422.9	256.0	301.1	259.8	393.0	1158.7	0.16	81.97	81.04	81.81	0.16	81.90	81.54	81.45
108.0	391.0	12.0	0.5	13.9	0.0	322.2	77.7	99.3	425.5	257.5	301.8	260.4	392.7	1157.8	0.16	82.07	81.07	81.83	0.15	81.94	81.57	81.49
109.0	392.0	11.9	0.6	13.8	0.0	322.5	77.5	99.5	428.1	259.1	302.9	261.0	393.2	1158.1	0.16	82.14	81.10	81.86	0.16	81.99	81.59	81.53
110.0	393.0	11.8	0.7	13.9	0.0	324.6	77.5	99.7	430.7	260.5	303.8	261.7	392.6	1158.1	0.16	82.16	81.14	81.88	0.16	82.06	81.63	81.58
111.0	394.0	11.7	0.7	13.8	0.0	325.4	77.7	100.0	433.4	261.7	304.6	262.4	392.7	1158.9	0.16	82.17	81.16	81.94	0.15	82.10	81.67	81.66
112.0	395.0	11.6	0.8	13.9	0.0	327.1	77.5	99.8	436.1	263.3	305.5	263.2	392.2	1159.7	0.16	82.18	81.19	82.01	0.16	82.12	81.68	81.72
113.0	396.0	11.5	0.8	13.8	0.0	329.6	77.9	101.6	439.6	264.6	306.2	263.8	392.0	1164.2	0.16	82.17	81.21	82.06	0.15	82.13	81.72	81.77
114.0	397.0	11.3	0.8	14.1	0.0	328.5	78.1	100.4	442.9	266.0	307.4	264.7	391.0	1139.4	0.16	82.12	81.23	82.13	0.15	82.13	81.73	81.87
115.0	398.0	11.3	1.0	13.8	0.0	333.7	77.9	101.7	446.4	267.2	308.5	265.5	391.4	1147.7	0.16	82.11	81.27	82.20	0.16	82.15	81.78	81.96
116.0	399.0	11.1	1.1	14.2	0.0	330.9	77.9	100.9	459.8	268.4	309.7	266.5	390.9	1030.8	0.16	82.13	81.29	82.22	0.15	82.16	81.81	81.99
117.0	400.0	11.0	1.9	13.9	0.0	325.4	78.0	100.6	467.3	269.8	311.0	267.6	390.9	979.8	0.16	82.11	81.28	82.24	0.16	82.13	81.81	82.04
118.0	401.0	10.8	2.0	13.1	0.0	324.7	77.9	100.8	466.1	270.9	312.1	268.5	391.4	1107.8	0.16	82.13	81.30	82.28	0.16	82.11	81.84	82.09
119.0	402.0	10.7	1.8	13.4	0.0	325.6	78.1	101.0	464.9	271.8	313.6	269.8	390.7	1135.0	0.16	82.16	81.30	82.34	0.16	82.12	81.84	82.17
120.0	403.0	10.6	1.6	13.7	0.0	326.4	78.4	101.1	463.5	272.9	315.0	270.9	390.6	1140.4	0.16	82.21	81.33	82.37	0.16	82.17	81.86	82.20
121.0	404.0	10.5	1.6	13.7	0.0	331.5	78.0	101.6	467.2	273.8	316.3	272.1	390.6	1119.2	0.16	82.21	81.34	82.43	0.16	82.17	81.89	82.26
122.0	405.0	10.3	0.8	14.1	0.0	327.7	78.0	101.2	479.7	274.7	317.9	273.3	390.1	988.3	0.16	82.22	81.36	82.46	0.16	82.19	81.91	82.32
123.0	406.0	10.2	0.3	13.9	0.0	322.8	77.8	101.3	472.8	273.7	319.5	273.8	390.8	949.3	0.16	82.22	81.38	82.49	0.16	82.21	81.93	82.37
124.0	407.0	10.0	0.5	14.0	0.0	318.6	78.1	101.4	503.1	276.6	321.3	275.8	389.0	920.7	0.16	82.22	81.40	82.52	0.16	82.22	81.93	82.39
125.0	408.0	10.0	0.4	14.1	0.0	314.7	78.5	100.9	513.8	277.5	323.1	277.5	388.0	908.3	0.16	82.23	81.45	82.58	0.15	82.25	81.97	82.46
126.0	409.0	9.8	0.3	14.0	0.0	312.0	78.5	100.8	521.8	278.0	325.0	279.3	387.7	903.4	0.16	82.28	81.45	82.61	0.15	82.28	82.00	82.49
127.0	410.0	9.6	0.4	14.7	0.0	309.4	78.6	100.7	529.6	278.1	327.1	281.1	386.1	884.4	0.16	82.33	81.50	82.63	0.16	82.31	82.00	82.53
128.0	411.0	9.5	0.3	14.4	0.0	306.6	78.7	100.7	536.5	277.9	329.1	283.0	385.6	871.9	0.16	82.34	81.51	82.67	0.16	82.32	82.02	82.54
129.0	412.0	9.3	0.3	14.3	0.0	303.4	78.4	100.6	542.1	277.5	331.6	285.2	384.4	864.9	0.16	82.32	81.51	82.69	0.16	82.34	82.05	82.56
130.0	413.0	9.2	0.3	14.2	0.0	300.5	78.7	100.3	546.5	276.9	333.9	287.6	382.9	859.1	0.16	82.30	81.52	82.72	0.16	82.31	82.08	82.60
131.0	414.0	9.1	0.2	14.2	0.0	297.3	78.6	100.1	551.4	276.1	336.5	290.0	381.4	860.2	0.16	82.29	81.53	82.69	0.15	82.28	82.08	82.62
132.0	415.0	8.9	0.2	14.0	0.0	294.7	78.5	99.7	556.2	275.2	338.9	292.5	379.4	859.7	0.16	82.29	81.55	82.75	0.16	82.29	82.08	82.66
133.0	416.0	8.9	0.5	14.0	0.0	292.3	78.6	99.2	559.5	274.3	340.9	295.0	378.7	861.5	0.16	82.30	81.56	82.76	0.16	82.31	82.09	82.67
134.0	417.0	8.7	0.3	14.0	0.0	289.7	78.6	98.9	562.3	273.4	343.4	297.6	377.4	858.5	0.16	82.31	81.55	82.76	0.16	82.33	82.09	82.64
135.0	418.0	8.6	0.2	13.8	0.0	286.7	78.8	98.8	563.0	272.4	345.6	300.3	375.9	853.9	0.16	82.36	81.57	82.76	0.16	82.37	82.11	82.66
136.0	419.0	8.5	0.1	13.3	0.0	283.8	78.5	98.4	563.8	271.4	347.6	302.9	374.3	840.6	0.16	82.36	81.57	82.77	0.16	82.34	82.12	82.68
137.0	420.0	8.4	0.0	12.8	0.0	280.4	77.8	97.9	563.8	270.5	349.1	305.2	372.8	816.3	0.16	82.33	81.58	82.76	0.15	82.32	82.14	82.67
138.0	421.0	8.3	0.0	12.4	0.0	276.4	77.2	97.3	563.3	269.3	351.1	307.5	370.8	797.0	0.16	82.30	81.58	82.75	0.15	82.30	82.14	82.69
139.0	422.0	8.2	0.0	12.4	0.0	273.4	77.8	97.4	563.1	268.2	352.9	310.0	370.0	779.2	0.16	82.33	81.62	82.78	0.16	82.33	82.16	82.72
140.0	423.0	8.1	0.0	12.3	0.0	270.2	78.0	96.7	560.6	267.2	354.9	312.2	368.3	761.2	0.16	82.32	81.61	82.75	0.16	82.34	82.17	82.69
141.0	424.0	8.0	0.0	11.9	0.0	266.6	78.0	96.4	558.1	266.5	356.4	314.4	367.2	746.4	0.16	82.33	81.62	82.71	0.15	82.33	82.18	82.68
142.0	425.0	8.0	0.0	11.7	0.0	263.8	77.6	96.4	555.6	265.6	358.1	316.5	366.0	739.3	0.16	82.30	81.60	82.69	0.16	82.33	82.17	82.65
143.0	426.0	7.9	0.0	11.5	0.0	260.7	77.8	96.1	552.7	264.5	359.9	318.6										

182.0	465.0	5.0	0.0	9.2	0.0	290.4	78.3	97.2	455.3	294.9	374.9	345.5	357.1	986.6	0.16	82.38	82.11	83.04	0.15	82.57	82.71	82.90
183.0	466.0	4.9	0.0	9.2	0.0	289.4	78.1	97.4	453.8	294.6	375.0	345.7	357.3	974.6	0.16	82.35	82.11	83.00	0.16	82.55	82.71	82.90
184.0	467.0	4.9	0.0	9.2	0.0	285.4	78.4	97.1	451.0	294.4	374.6	345.9	358.2	959.6	0.16	82.37	82.12	83.03	0.15	82.54	82.72	82.92
185.0	468.0	4.8	0.0	9.2	0.0	282.6	78.0	96.8	448.1	294.0	374.7	346.1	357.5	974.3	0.16	82.37	82.13	83.01	0.16	82.55	82.71	82.91
186.0	469.0	4.8	0.0	9.3	0.0	280.9	78.3	96.6	445.1	293.4	374.2	346.3	357.4	973.6	0.16	82.38	82.12	83.02	0.15	82.56	82.72	82.95
187.0	470.0	4.7	0.0	9.3	0.0	279.5	78.1	96.5	442.4	292.6	374.3	346.3	357.2	965.2	0.16	82.38	82.14	83.05	0.15	82.56	82.72	82.94
188.0	471.0	4.7	0.0	9.3	0.0	277.6	78.0	96.5	439.1	291.7	374.0	346.1	357.0	962.0	0.16	82.38	82.15	83.03	0.16	82.55	82.72	82.95
189.0	472.0	4.6	0.0	9.3	0.0	276.7	77.9	96.4	436.8	290.9	373.6	346.3	356.9	959.8	0.16	82.37	82.16	83.05	0.16	82.56	82.73	82.95
190.0	473.0	4.6	0.0	9.3	0.0	275.0	78.2	96.3	434.3	290.0	372.8	346.1	357.3	957.1	0.16	82.38	82.18	83.05	0.16	82.59	82.75	82.96
191.0	474.0	4.5	0.0	9.5	0.0	273.4	78.1	96.2	430.6	288.9	372.4	346.1	357.2	955.1	0.16	82.34	82.17	83.04	0.15	82.57	82.76	82.96
192.0	475.0	4.5	0.0	9.5	0.0	274.2	78.0	97.0	428.9	288.0	372.1	346.0	357.2	948.0	0.16	82.34	82.20	83.05	0.16	82.54	82.77	82.96
193.0	476.0	4.4	0.0	9.7	0.0	270.6	78.3	95.9	426.5	286.9	371.7	346.1	357.0	916.6	0.16	82.34	82.19	83.02	0.15	82.53	82.76	82.96
194.0	477.0	4.4	0.0	9.3	0.0	269.0	78.1	95.6	424.6	285.9	371.3	345.7	357.1	936.0	0.16	82.37	82.19	83.03	0.16	82.54	82.77	82.95
195.0	478.0	4.3	0.0	9.5	0.0	267.8	78.2	95.6	421.5	286.1	370.6	345.7	357.4	944.3	0.16	82.33	82.19	83.03	0.16	82.54	82.77	82.97
196.0	479.0	4.3	0.0	9.5	0.0	266.4	78.1	95.4	419.5	285.6	370.3	345.7	357.4	943.3	0.16	82.33	82.22	83.05	0.16	82.54	82.77	82.95
197.0	480.0	4.3	0.0	9.5	0.0	265.9	78.2	95.3	417.4	284.6	370.0	345.7	357.3	941.0	0.16	82.37	82.23	83.05	0.15	82.56	82.80	82.95
198.0	481.0	4.2	0.0	9.4	0.0	265.6	78.2	95.3	415.8	283.9	369.2	345.5	357.3	917.0	0.16	82.36	82.24	83.05	0.16	82.56	82.80	82.96
199.0	482.0	4.2	0.0	9.2	0.0	263.4	78.2	95.1	413.4	282.4	368.3	345.1	357.5	903.5	0.16	82.34	82.26	83.02	0.15	82.56	82.80	82.94
200.0	483.0	4.1	0.0	9.2	0.0	262.4	77.8	94.9	411.4	281.6	367.3	344.8	357.6	920.6	0.16	82.36	82.26	82.99	0.16	82.54	82.81	82.92
201.0	484.0	4.1	0.0	9.3	0.0	261.2	78.1	94.8	409.3	280.6	366.8	344.8	357.8	923.4	0.16	82.41	82.27	82.95	0.16	82.58	82.82	82.87
202.0	485.0	4.1	0.0	9.1	0.0	260.0	78.1	94.7	407.8	279.8	366.4	344.6	358.2	917.2	0.16	82.48	82.28	82.93	0.15	82.60	82.85	82.86
203.0	486.0	4.0	0.0	8.9	0.0	258.4	78.2	94.6	405.4	278.9	366.2	344.6	357.9	906.3	0.16	82.53	82.31	82.90	0.15	82.63	82.88	82.87
204.0	487.0	4.0	0.0	8.7	0.0	258.0	78.0	94.1	403.3	278.1	365.7	344.6	358.4	898.3	0.16	82.50	82.32	82.91	0.16	82.63	82.89	82.84
205.0	488.0	4.0	0.0	8.5	0.0	256.5	77.7	94.5	401.5	277.2	365.6	344.0	358.3	890.6	0.16	82.43	82.30	82.90	0.16	82.59	82.88	82.82
206.0	489.0	4.0	0.0	8.5	0.0	255.1	94.9	94.2	399.3	276.3	364.6	343.8	358.5	884.6	0.16	82.37	82.31	82.89	0.16	82.55	82.89	82.83
207.0	490.0	3.9	0.0	8.3	0.0	253.2	77.8	93.8	396.7	275.4	363.7	343.4	358.8	877.2	0.16	82.40	82.31	82.87	0.16	82.54	82.89	82.76
208.0	491.0	3.9	0.0	8.2	0.0	251.9	77.7	93.6	394.9	274.7	362.9	343.1	359.0	868.4	0.16	82.38	82.29	82.85	0.16	82.53	82.89	82.74
209.0	492.0	3.9	0.0	8.0	0.0	249.3	77.6	93.4	393.0	273.4	362.2	342.9	359.0	833.5	0.16	82.33	82.31	82.82	0.16	82.55	82.89	82.72
210.0	493.0	3.8	0.0	7.8	0.0	247.2	77.6	93.4	391.0	272.4	361.9	342.8	359.0	833.0	0.16	82.39	82.32	82.81	0.16	82.58	82.92	82.70
211.0	494.0	3.8	0.0	7.8	0.0	245.3	77.7	93.3	389.1	271.4	361.7	342.7	359.4	839.6	0.16	82.37	82.34	82.78	0.16	82.57	82.92	82.69
212.0	495.0	3.8	0.0	7.8	0.0	243.6	77.7	92.9	386.4	270.4	361.4	342.3	359.3	836.1	0.16	82.36	82.34	82.76	0.16	82.56	82.91	82.64
213.0	496.0	3.8	0.0	7.6	0.0	242.2	77.6	92.9	383.9	269.3	360.9	342.0	359.7	828.6	0.16	82.32	82.35	82.69	0.15	82.53	82.92	82.63
214.0	497.0	3.8	0.0	7.5	0.0	240.2	77.7	92.8	382.3	268.5	360.4	341.5	359.6	821.3	0.16	82.22	82.31	82.68	0.15	82.46	82.91	82.63
215.0	498.0	3.7	0.0	7.5	0.0	238.0	78.0	92.5	379.4	267.5	359.8	341.4	359.6	814.2	0.16	82.18	82.32	82.67	0.15	82.42	82.87	82.59
216.0	499.0	3.7	0.0	7.5	0.0	236.4	77.9	92.3	376.9	266.6	359.1	341.2	359.2	806.6	0.16	82.24	82.32	82.66	0.16	82.46	82.88	82.56
217.0	500.0	3.7	0.0	7.4	0.0	234.5	77.8	92.3	375.0	265.6	358.4	340.8	359.9	800.0	0.16	82.21	82.33	82.63	0.16	82.39	82.87	82.52
218.0	501.0	3.7	0.0	7.4	0.0	233.1	77.8	92.2	372.7	264.4	358.0	340.5	359.6	794.9	0.16	82.18	82.32	82.61	0.15	82.40	82.88	82.51
219.0	502.0	3.7	0.0	7.4	0.0	231.2	77.8	92.2	370.4	263.4	357.5	340.2	359.5	794.2	0.16	82.14	82.32	82.60	0.15	82.38	82.87	82.49
220.0	503.0	3.7	0.0	7.4	0.0	229.2	78.1	92.2	368.0	262.6	356.7	339.8	359.6	791.6	0.16	82.17	82.31	82.56	0.16	82.40	82.86	82.46
221.0	504.0	3.6	0.0	7.4	0.0	227.8	77.7	91.9	366.1	261.7	356.2	339.2	359.6	788.5	0.16	82.18	82.32	82.58	0.16	82.40	82.86	82.44
222.0	505.0	3.6	0.0	7.4	0.0	226.2	77.8	91.7	364.1	261.4	355.4	339.0	359.5	784.4	0.16	82.14	82.32	82.55	0.16	82.37	82.86	82.39
223.0	506.0	3.6	0.0	7.3	0.0	224.8	77.9	91.7	361.8	260.4	354.7	338.6	359.5	782.3	0.16	82.09	82.32	82.51	0.16	82.36	82.86	82.37
224.0	507.0	3.6	0.0	7.4	0.0	223.2	77.7	91.3	359.9	259.6	354.2	338.1	359.3	779.9	0.16	82.07	82.31	82.51	0.16	82.36	82.85	82.37
225.0	508.0	3.6	0.0	7.3	0.0	222.1	77.9	91.3	358.1	259.2	353.5	337.6	359.4	776.2	0.16	82.02	82.32	82.48	0.15	82.35	82.84	82.32
226.0	509.0	3.6	0.0	7.3	0.0	221.1	77.9	91.2	356.0	258.2	352.3	337.0	359.0	772.8	0.16	81.98	82.32	82.47	0.16	82.31	82.83	82.30
227.0	510.0	3.6	0.0	7.3	0.0	219.6	78.0	91.0	354.4	257.4	351.6	336.3	358.8	769.6	0.16	82.02	82.30	82.45	0.16	82.31	82.84	82.28
228.0	511.0	3.5	0.0	7.2	0.0	218.5	78.0	91.0	352.3	256.9	351.0	335.8	358.9	766.0	0.16	82.08	82.31	82.42	0.16	82.33	82.85	82.25
229.0	512.0	3.5	0.0	7.2	0.0	217.2	78.0	90.7	350.2	256.5	350.1	335.3	358.9	762.5	0.16	82.10	82.30	82.39	0.16	82.33	82.84	82.23
230.0	513.0	3.5	0.0	7.2	0.0	215.8	77.8	91.0	348.7	255.7	349.4	334.6	358.4	759.8	0.16	82.03	82.29	82.37	0.16	82.28	82.83	82.20
231.0	514.0	3.5	0.0	7.3	0.0	215.4	77.8	90.9	347.3	254.7	348.9	334.2	358.3	756.9	0.16	82.07	82.30	82.32	0.16	82.32	82.84	82.15
232.0	515.0	3.5	0.0	7.2	0.0	214.5	77.9	90.7	345.4	254.1	348.3	333.5	357.9	753.4	0.16	82.03	82.32	82.30	0.15	82.30	82.86	82.14
233.0	516.0	3.4	0.0	7.2	0.0	213.3	77.8	90.6	344.0	253.4	347.3	332.7	358.1	750.6	0.16	82.08	82.33	82.28	0.16	82.32	82.86	82.12
234.0	517.0	3.4	0.0	7.2	0.0	212.6	78.2	90.3	342.0	253.3	346.3	332.0	357.8	748.4	0.16	82.07	82.33	82.27	0.15	82.33	82.84	82.10
235.0	518.0	3.4	0.0	7.2	0.0	211.5	77.8	90.4	340.5	253.4	345.8	331.4	357.7	744.3	0.16	81.96	82.30	82.23	0.16	82.25	82.84	82.07
236.0	519.0	3.4	0.0	7.2	0.0	210.7	77.9	90.3	339.6	252.2	345.3	330.5	356.4	742.0	0.16	81.89	82.32	82.23	0.16	82.23	82.84	82.05
237.0	520.0	3.4	0																			

275.0	558.0	2,8	0,0	7,5	0,0	190,6	77,8	88,1	303,4	238,5	322,5	310,1	348,0	689,6	0,16	81,76	82,27	81,39	0,16	82,01	82,68	81,17
276,0	559,0	2,7	0,0	7,5	0,0	190,4	77,7	88,1	303,0	238,1	322,2	309,7	347,5	688,5	0,16	81,78	82,27	81,37	0,16	82,02	82,66	81,16
277,0	560,0	2,7	0,0	7,5	0,0	190,4	77,7	88,1	302,8	237,7	321,9	309,3	347,5	688,5	0,16	81,73	82,27	81,35	0,16	81,99	82,68	81,14
278,0	561,0	2,7	0,0	7,7	0,0	190,1	77,8	88,2	302,9	237,3	321,6	308,7	347,1	687,4	0,16	81,74	82,27	81,38	0,16	82,03	82,68	81,14
279,0	562,0	2,7	0,0	7,6	0,0	190,0	77,8	88,0	302,4	237,1	321,2	308,4	347,1	687,8	0,16	81,66	82,25	81,36	0,15	81,99	82,66	81,12
280,0	563,0	2,7	0,0	7,6	0,0	189,3	77,6	88,1	301,6	236,8	320,7	308,1	346,8	687,2	0,16	81,65	82,25	81,37	0,16	81,97	82,66	81,13
281,0	564,0	2,6	0,0	7,6	0,0	189,6	77,6	87,9	301,5	236,5	320,4	307,7	346,8	685,2	0,16	81,68	82,24	81,35	0,15	81,97	82,66	81,13
282,0	565,0	2,6	0,0	7,6	0,0	190,0	77,8	87,9	301,2	236,3	320,0	307,3	346,6	685,3	0,16	81,62	82,22	81,36	0,16	81,94	82,66	81,10
283,0	566,0	2,6	0,0	7,7	0,0	189,5	77,8	87,8	301,4	235,9	319,8	306,9	346,6	686,7	0,16	81,60	82,21	81,34	0,16	81,92	82,64	81,11
284,0	567,0	2,6	0,0	7,8	0,0	189,2	77,7	87,9	300,9	235,7	319,6	306,6	346,3	686,9	0,16	81,58	82,21	81,34	0,16	81,91	82,62	81,11
285,0	568,0	2,6	0,0	7,8	0,0	189,5	77,8	88,0	300,7	235,4	319,4	306,5	346,0	688,9	0,16	81,55	82,20	81,35	0,16	81,90	82,61	81,09
286,0	569,0	2,6	0,0	7,7	0,0	188,8	77,7	87,9	300,4	235,3	319,0	306,0	346,1	687,7	0,16	81,48	82,17	81,36	0,15	81,86	82,60	81,11
287,0	570,0	2,5	0,0	7,8	0,0	189,0	77,8	88,0	300,3	234,9	318,7	305,7	346,2	687,8	0,16	81,46	82,17	81,35	0,16	81,81	82,57	81,07
288,0	571,0	2,5	0,0	7,7	0,0	189,4	77,7	88,1	300,1	234,7	318,6	305,5	345,8	688,5	0,16	81,45	82,14	81,31	0,16	81,79	82,55	81,08
289,0	572,0	2,5	0,0	7,8	0,0	189,1	77,9	88,1	300,8	234,3	318,1	305,2	345,5	687,1	0,16	81,42	82,12	81,30	0,16	81,78	82,53	81,08
290,0	573,0	2,5	0,0	8,4	0,0	188,6	77,7	88,1	301,7	234,2	317,8	305,0	345,5	674,0	0,16	81,41	82,12	81,33	0,16	81,77	82,53	81,07
291,0	574,0	2,5	0,0	8,4	0,0	187,7	77,8	88,0	302,4	234,0	317,5	304,6	345,4	665,8	0,16	81,37	82,10	81,30	0,16	81,72	82,51	81,07
292,0	575,0	2,4	0,0	8,3	0,0	187,0	78,0	87,8	302,9	233,9	317,3	304,5	345,3	662,8	0,16	81,35	82,08	81,28	0,16	81,69	82,49	81,04
293,0	576,0	2,4	0,0	8,2	0,0	186,0	77,7	88,0	303,6	233,6	317,1	304,2	345,4	662,0	0,16	81,34	82,06	81,30	0,16	81,67	82,47	81,07
294,0	577,0	2,4	0,0	8,2	0,0	185,4	77,8	88,0	303,6	233,9	316,8	303,9	345,4	661,0	0,16	81,36	82,04	81,28	0,16	81,68	82,47	81,04
295,0	578,0	2,4	0,0	8,1	0,0	184,7	77,7	87,8	303,7	234,0	316,7	303,7	345,2	660,0	0,16	81,35	82,04	81,29	0,16	81,69	82,45	81,07
296,0	579,0	2,4	0,0	8,1	0,0	184,3	77,9	87,8	303,5	233,8	316,4	303,7	345,0	659,2	0,16	81,33	82,01	81,29	0,16	81,64	82,42	81,05
297,0	580,0	2,4	0,0	8,0	0,0	183,5	77,9	87,7	303,4	233,7	316,2	303,6	344,9	658,1	0,16	81,31	82,00	81,26	0,16	81,61	82,41	81,05
298,0	581,0	2,3	0,0	8,1	0,0	183,4	77,7	87,7	302,9	233,3	316,1	303,4	344,9	659,6	0,16	81,32	81,99	81,28	0,16	81,61	82,40	81,05
299,0	582,0	2,3	0,0	8,0	0,0	182,7	77,7	87,6	302,5	233,1	315,8	303,3	344,7	661,2	0,16	81,30	81,97	81,27	0,16	81,59	82,38	81,05
300,0	583,0	2,3	0,0	8,1	0,0	182,8	77,7	87,5	302,4	232,8	315,7	303,3	344,6	662,5	0,16	81,28	81,96	81,26	0,16	81,55	82,37	81,01
301,0	584,0	2,3	0,0	8,1	0,0	182,5	77,7	87,6	302,4	232,8	315,6	303,2	344,4	666,1	0,16	81,29	81,96	81,27	0,15	81,55	82,36	81,04
302,0	585,0	2,3	0,0	8,1	0,0	182,2	77,7	87,6	301,9	232,6	315,4	303,0	344,5	665,8	0,16	81,28	81,93	81,26	0,16	81,54	82,33	81,01
303,0	586,0	2,3	0,0	8,0	0,0	182,1	77,7	87,6	302,1	232,1	315,2	302,8	344,3	664,3	0,16	81,27	81,93	81,23	0,15	81,53	82,33	81,01
304,0	587,0	2,2	0,0	8,0	0,0	182,1	77,7	87,4	301,1	232,0	315,1	302,7	344,2	663,6	0,16	81,28	81,92	81,25	0,16	81,51	82,32	81,03
305,0	588,0	2,2	0,0	7,8	0,0	181,8	77,7	87,4	300,3	232,3	314,8	302,7	343,7	670,8	0,16	81,25	81,92	81,24	0,15	81,50	82,32	81,03
306,0	589,0	2,2	0,0	7,7	0,0	181,9	77,6	87,5	299,6	232,4	314,6	302,4	343,6	675,4	0,16	81,23	81,91	81,25	0,16	81,47	82,31	81,05
307,0	590,0	2,2	0,0	7,7	0,0	182,4	77,7	87,5	299,3	232,3	314,5	302,2	343,6	676,4	0,16	81,21	81,87	81,22	0,16	81,45	82,28	81,02
308,0	591,0	2,2	0,0	7,6	0,0	182,6	77,8	87,5	298,5	232,4	314,1	302,0	343,0	675,5	0,16	81,20	81,86	81,22	0,16	81,43	82,27	81,05
309,0	592,0	2,2	0,0	7,6	0,0	182,9	77,7	87,5	297,8	232,3	313,9	301,9	342,8	674,0	0,16	81,19	81,85	81,21	0,16	81,42	82,26	81,05
310,0	593,0	2,1	0,0	7,6	0,0	183,1	77,9	87,4	297,3	232,4	313,6	301,8	342,6	672,9	0,16	81,18	81,84	81,19	0,15	81,41	82,24	81,04
311,0	594,0	2,1	0,0	7,5	0,0	183,5	77,7	87,4	296,7	232,3	313,6	301,7	342,4	669,7	0,16	81,18	81,83	81,19	0,16	81,41	82,25	81,06
312,0	595,0	2,1	0,0	7,4	0,0	183,2	77,8	87,6	296,3	232,4	313,3	301,3	342,2	666,8	0,16	81,18	81,83	81,18	0,16	81,41	82,24	81,07
313,0	596,0	2,1	0,0	7,4	0,0	183,1	77,7	87,5	295,9	232,0	313,1	301,0	341,9	667,4	0,16	81,17	81,82	81,18	0,16	81,42	82,22	81,05
314,0	597,0	2,1	0,0	7,4	0,0	183,0	77,9	87,5	295,1	231,8	312,6	300,8	341,6	668,0	0,16	81,17	81,81	81,18	0,15	81,41	82,21	81,04
315,0	598,0	2,1	0,0	7,4	0,0	183,0	78,0	87,6	294,7	231,7	312,4	300,6	341,4	666,9	0,16	81,19	81,81	81,18	0,16	81,42	82,19	81,03
316,0	599,0	2,1	0,0	7,4	0,0	183,6	78,1	87,6	294,7	231,5	312,2	300,4	341,3	666,4	0,16	81,21	81,79	81,17	0,16	81,41	82,19	81,02
317,0	600,0	2,1	0,0	7,4	0,0	183,8	77,9	87,6	294,2	231,4	311,8	300,3	340,9	664,9	0,16	81,20	81,79	81,16	0,16	81,39	82,18	81,01
318,0	601,0	2,0	0,0	7,4	0,0	183,3	77,8	87,6	293,9	231,4	311,6	300,0	340,7	665,4	0,16	81,20	81,78	81,16	0,15	81,41	82,19	81,00
319,0	602,0	2,0	0,0	7,3	0,0	182,6	77,7	87,6	293,5	231,3	311,3	299,7	340,7	663,8	0,16	81,18	81,75	81,15	0,16	81,38	82,16	81,01
320,0	603,0	2,0	0,0	7,4	0,0	182,4	77,9	87,6	293,1	231,2	311,1	299,5	340,5	663,4	0,16	81,20	81,77	81,15	0,16	81,39	82,17	81,02
321,0	604,0	2,0	0,0	7,3	0,0	182,5	77,9	87,5	292,9	231,1	310,7	299,2	340,2	662,2	0,16	81,15	81,73	81,15	0,16	81,35	82,12	81,01
322,0	605,0	1,9	0,0	7,3	0,0	182,4	77,7	87,5	292,3	230,9	310,4	299,0	340,0	661,2	0,16	81,18	81,75	81,16	0,16	81,35	82,13	81,01
323,0	606,0	1,9	0,0	7,2	0,0	182,3	77,9	87,6	291,6	230,7	310,1	298,7	339,7	657,5	0,16	81,18	81,73	81,12	0,16	81,36	82,12	80,99
324,0	607,0	1,9	0,0	7,1	0,0	182,0	77,8	87,5	291,4	230,5	309,5	298,4	339,7	654,6	0,16	81,18	81,74	81,14	0,16	81,36	82,12	80,97
325,0	608,0	1,9	0,0	6,9	0,0	182,0	77,9	87,3	290,7	230,5	309,1	298,3	339,2	650,5	0,16	81,18	81,71	81,13	0,15	81,35	82,10	80,99
326,0	609,0	1,9	0,0	6,9	0,0	181,4	77,9	87,4	290,1	230,3	309,0	297,9	339,1	646,8	0,16	81,16	81,70	81,16	0,16	81,36	82,09	81,00
327,0	610,0	1,9	0,0	6,8	0,0	181,4	78,0	87,5	290,1	230,2	308,6	297,6	339,0	643,9	0,16	81,15	81,70	81,13	0,16	81,33	82,09	80,98
328,0	611,0	1,9	0,0	6,8	0,0	181,4	77,9	87,3	289,5	230,0	308,4	297,1	338,8	643,4	0,16	81,12	81,69	81,14	0,16	81,32	82,09	80,96
329,0	612,0	1,9	0,0	6,7	0,0	181,0	77,7	87,3	288,6	229,7	308,0	297,0	338,6	642,4	0,16	81,12	81,68	81,15	0,16	81,31	82,07	80,98
330,0	613,0	1,9	0																			

368.0	651.0	1,4	0,0	6,3	0,0	170,5	77,6	86,3	268,5	223,6	289,8	283,5	327,0	602,9	0,16	80,55	81,22	81,00	0,16	80,73	81,65	80,77
369.0	652.0	1,3	0,0	6,3	0,0	170,6	77,8	86,0	268,4	223,5	289,3	283,2	326,8	603,1	0,16	80,51	81,19	80,98	0,16	80,71	81,62	80,77
370.0	653.0	1,3	0,0	6,3	0,0	170,1	77,6	86,2	268,0	223,3	289,0	282,7	326,3	602,9	0,16	80,51	81,16	80,97	0,16	80,70	81,61	80,76
371.0	654.0	1,3	0,0	6,3	0,0	169,8	77,5	86,2	267,3	223,0	288,4	282,3	325,8	602,6	0,16	80,46	81,16	80,97	0,16	80,67	81,58	80,77
372.0	655.0	1,3	0,0	6,2	0,0	169,9	77,6	86,1	267,0	222,8	288,1	281,8	325,6	600,1	0,16	80,45	81,15	80,94	0,16	80,66	81,56	80,76
373.0	656.0	1,3	0,0	6,3	0,0	169,3	77,6	86,0	266,7	222,6	287,7	281,4	325,2	600,6	0,16	80,45	81,15	80,93	0,16	80,65	81,57	80,77
374.0	657.0	1,3	0,0	6,5	0,0	169,5	77,6	86,0	266,1	222,4	287,3	281,0	324,9	601,3	0,16	80,43	81,12	80,92	0,16	80,63	81,55	80,74
375.0	658.0	1,2	0,0	6,6	0,0	169,6	77,5	86,0	265,7	222,2	286,9	280,5	324,6	602,4	0,16	80,41	81,12	80,92	0,16	80,62	81,54	80,73
376.0	659.0	1,2	0,0	6,7	0,0	169,8	77,5	85,9	265,5	222,1	286,4	280,1	324,5	603,3	0,16	80,40	81,10	80,91	0,15	80,59	81,53	80,70
377.0	660.0	1,2	0,0	6,6	0,0	169,7	77,5	85,8	265,5	221,8	286,0	279,7	324,4	605,6	0,16	80,37	81,08	80,89	0,16	80,58	81,52	80,70
378.0	661.0	1,2	0,0	6,7	0,0	169,6	77,6	85,9	264,9	221,6	285,6	279,3	323,9	605,6	0,16	80,34	81,06	80,88	0,16	80,54	81,51	80,69
379.0	662.0	1,2	0,0	6,5	0,0	169,4	77,5	85,9	264,8	221,4	285,4	278,9	323,4	604,5	0,16	80,32	81,04	80,86	0,16	80,52	81,49	80,69
380.0	663.0	1,2	0,0	6,4	0,0	169,4	77,6	85,9	264,4	221,2	284,9	278,5	323,2	602,1	0,16	80,30	81,01	80,86	0,16	80,50	81,46	80,69
381.0	664.0	1,2	0,0	6,4	0,0	169,6	77,6	85,8	264,3	221,1	284,5	278,2	323,2	600,6	0,16	80,26	81,00	80,85	0,15	80,49	81,45	80,66
382.0	665.0	1,2	0,0	6,3	0,0	169,2	77,5	85,8	264,0	221,0	284,2	277,8	323,1	597,4	0,16	80,25	80,99	80,84	0,15	80,45	81,44	80,65
383.0	666.0	1,2	0,0	6,3	0,0	169,5	77,6	85,8	263,8	220,8	283,6	277,4	323,0	598,5	0,16	80,21	80,98	80,81	0,16	80,44	81,42	80,65
384.0	667.0	1,2	0,0	6,2	0,0	168,9	77,6	85,7	263,4	220,7	283,3	277,1	322,6	595,5	0,16	80,21	80,96	80,81	0,16	80,42	81,41	80,62
385.0	668.0	1,1	0,0	6,3	0,0	169,3	77,4	85,7	263,5	220,6	283,0	276,8	322,4	594,5	0,16	80,18	80,94	80,80	0,16	80,39	81,38	80,60
386.0	669.0	1,1	0,0	6,2	0,0	169,0	77,5	85,5	263,5	220,4	282,6	276,4	322,2	592,3	0,16	80,16	80,94	80,80	0,16	80,38	81,39	80,61
387.0	670.0	1,1	0,0	6,2	0,0	168,4	77,4	85,6	262,5	220,3	282,2	276,1	321,6	590,5	0,16	80,16	80,91	80,80	0,16	80,37	81,36	80,58
388.0	671.0	1,1	0,0	6,2	0,0	168,1	77,6	85,5	262,8	220,3	281,7	275,8	321,6	590,4	0,16	80,14	80,89	80,77	0,16	80,34	81,34	80,55
389.0	672.0	1,1	0,0	6,2	0,0	168,2	77,5	85,5	262,4	220,2	281,3	275,4	321,5	589,6	0,16	80,10	80,86	80,76	0,16	80,31	81,31	80,53
390.0	673.0	1,1	0,0	6,2	0,0	168,1	77,3	85,5	261,6	220,1	281,0	274,9	321,2	591,8	0,16	80,10	80,86	80,75	0,16	80,31	81,31	80,54
391.0	674.0	1,1	0,0	6,1	0,0	168,1	77,5	85,6	261,5	219,9	280,7	274,6	320,7	592,1	0,16	80,06	80,83	80,73	0,15	80,27	81,29	80,50
392.0	675.0	1,0	0,0	6,1	0,0	167,7	77,3	85,5	261,4	219,8	280,3	274,3	320,4	588,6	0,16	80,06	80,83	80,72	0,16	80,27	81,28	80,51
393.0	676.0	1,0	0,0	6,1	0,0	167,8	77,3	85,4	261,2	219,7	280,0	273,9	319,9	587,4	0,16	80,02	80,79	80,68	0,16	80,24	81,26	80,48
394.0	677.0	1,0	0,0	6,1	0,0	167,7	77,3	85,4	260,8	219,6	279,7	273,7	320,0	589,1	0,16	80,00	80,78	80,67	0,15	80,22	81,25	80,47
395.0	678.0	1,0	0,0	6,1	0,0	167,4	77,4	85,4	260,7	219,6	279,4	273,4	319,5	588,3	0,16	79,99	80,77	80,67	0,15	80,21	81,24	80,47
396.0	679.0	1,0	0,0	6,1	0,0	167,3	77,2	85,4	260,2	219,6	279,0	273,0	319,1	588,8	0,16	79,96	80,75	80,67	0,16	80,18	81,22	80,42
397.0	680.0	1,0	0,0	6,1	0,0	167,2	77,2	85,2	260,0	219,4	278,6	272,6	318,8	589,6	0,16	79,94	80,72	80,65	0,16	80,15	81,21	80,41
398.0	681.0	1,0	0,0	6,0	0,0	167,0	77,4	85,4	260,2	219,3	278,3	272,3	318,3	589,6	0,16	79,94	80,72	80,64	0,16	80,15	81,19	80,40
399.0	682.0	1,0	0,0	6,1	0,0	166,2	77,3	85,3	259,9	219,0	277,8	271,9	318,1	589,1	0,16	79,89	80,69	80,62	0,16	80,10	81,17	80,39
400.0	683.0	0,9	0,0	6,1	0,0	166,4	77,3	85,3	259,2	218,7	277,6	271,6	318,0	588,6	0,16	79,88	80,68	80,62	0,16	80,09	81,16	80,38
401.0	684.0	0,9	0,0	6,1	0,0	166,7	77,2	85,2	258,9	218,5	277,2	271,3	317,5	586,2	0,16	79,87	80,66	80,59	0,15	80,09	81,16	80,38
402.0	685.0	0,9	0,0	6,0	0,0	166,2	77,2	85,3	258,8	218,3	276,7	271,0	317,0	586,0	0,16	79,80	80,57	80,58	0,16	80,08	81,14	80,39
403.0	686.0	0,9	0,0	6,1	0,0	166,2	77,3	85,2	258,4	218,1	276,3	270,7	316,7	584,7	0,16	79,86	80,64	80,53	0,16	80,07	81,13	80,36
404.0	687.0	0,9	0,0	6,1	0,0	165,9	77,3	85,0	258,3	217,9	276,1	270,3	316,3	584,4	0,16	79,85	80,63	80,56	0,16	80,07	81,12	80,36
405.0	688.0	0,8	0,0	6,0	0,0	165,8	77,2	85,1	257,7	217,7	275,7	270,0	316,1	584,3	0,16	79,84	80,61	80,53	0,16	80,04	81,10	80,32
406.0	689.0	0,9	0,0	6,0	0,0	165,5	77,3	85,2	257,6	217,6	275,5	269,7	315,8	585,6	0,16	79,79	80,56	80,50	0,16	80,02	81,08	80,31
407.0	690.0	0,8	0,0	6,0	0,0	165,4	77,2	85,1	257,3	217,4	275,3	269,2	315,2	584,2	0,16	79,78	80,57	80,50	0,16	80,00	81,07	80,31
408.0	691.0	0,8	0,0	6,0	0,0	165,1	77,1	85,1	257,2	217,3	274,8	269,1	314,9	583,2	0,16	79,77	80,55	80,48	0,16	79,97	81,07	80,29
409.0	692.0	0,8	0,0	5,9	0,0	165,4	77,1	85,0	256,7	217,2	274,4	268,7	314,7	582,8	0,16	79,74	80,52	80,49	0,16	79,94	81,06	80,29
410.0	693.0	0,8	0,0	5,9	0,0	165,4	77,3	85,1	256,4	217,0	274,1	268,3	314,1	581,1	0,16	79,70	80,50	80,46	0,16	79,93	81,02	80,25
411.0	694.0	0,8	0,0	5,9	0,0	165,3	77,1	85,1	256,2	216,7	273,8	268,1	313,7	581,2	0,16	79,69	80,47	80,43	0,16	79,89	81,00	80,24
412.0	695.0	0,8	0,0	5,9	0,0	165,2	77,1	85,1	256,2	216,6	273,5	267,8	313,4	580,6	0,16	79,68	80,46	80,44	0,16	79,88	81,00	80,24
413.0	696.0	0,8	0,0	5,8	0,0	165,1	77,2	85,0	255,7	216,3	273,1	267,4	313,1	579,4	0,16	79,64	80,45	80,44	0,16	79,86	80,96	80,23
414.0	697.0	0,8	0,0	5,9	0,0	164,6	77,1	85,0	255,2	216,0	272,7	267,1	312,7	576,9	0,16	79,62	80,42	80,42	0,15	79,84	80,96	80,21
415.0	698.0	0,8	0,0	5,8	0,0	164,4	77,0	84,9	254,7	215,8	272,4	266,9	312,2	577,7	0,16	79,63	80,40	80,40	0,15	79,82	80,93	80,20
416.0	699.0	0,7	0,0	5,7	0,0	164,5	77,2	84,9	254,5	215,6	272,1	266,6	312,0	574,8	0,16	79,60	80,39	80,39	0,16	79,81	80,93	80,19
417.0	700.0	0,7	0,0	5,6	0,0	164,0	77,1	84,7	254,4	215,2	271,8	266,1	311,2	571,4	0,16	79,59	80,39	80,37	0,16	79,82	80,91	80,18
418.0	701.0	0,7	0,0	5,6	0,0	163,5	77,0	84,7	253,8	215,0	271,6	265,9	311,2	570,6	0,16	79,56	80,38	80,36	0,16	79,79	80,89	80,16
419.0	702.0	0,7	0,0	5,7	0,0	163,6	77,1	84,6	253,7	214,7	271,2	265,6	310,5	568,8	0,16	79,55	80,35	80,35	0,16	79,79	80,90	80,13
420.0	703.0	0,7	0,0	5,7	0,0	163,4	77,1	84,7	253,3	214,4	270,9	265,2	310,3	566,4	0,16	79,53	80,33	80,31	0,16	79,78	80,88	80,10
421.0	704.0	0,7	0,0	5,6	0,0	162,8	77,1	84,7	252,6	214,1	270,7	264,9	309,5	566,4	0,16	79,54	80,33	80,31	0,16	79,77	80,87	80,09
422.0	705.0	0,7	0,0	5,6	0,0	162,7	77,0	84,6	252,6	213,8	270,3	264,6	309,7	564,1	0,16	79,52	80,30	80,30	0,16	79,75	80,85	80,07
423.0	706.0	0,7	0																			

461,0	744,0	0,2	0,0	5,4	0,0	156,2	76,7	83,5	239,1	202,3	256,5	252,1	292,7	539,8	0,16	79,11	79,86	79,69	0,15	79,44	80,52	79,50
462,0	745,0	0,2	0,0	5,3	0,0	155,8	76,6	83,5	238,7	202,1	256,1	251,8	292,1	534,4	0,16	79,13	79,87	79,69	0,15	79,49	80,54	79,50
463,0	746,0	0,2	0,0	5,3	0,0	155,6	76,7	83,4	238,3	201,8	255,7	251,6	291,9	536,7	0,16	79,12	79,87	79,66	0,15	79,48	80,54	79,48
464,0	747,0	0,2	0,0	5,4	0,0	155,6	76,7	83,3	238,1	201,6	255,4	251,3	291,5	536,4	0,16	79,12	79,88	79,63	0,16	79,49	80,54	79,47
465,0	748,0	0,2	0,0	5,3	0,0	155,8	76,7	83,3	237,6	201,3	255,1	250,8	290,9	537,2	0,16	79,10	79,87	79,63	0,16	79,46	80,52	79,45
466,0	749,0	0,2	0,0	5,3	0,0	155,5	76,7	83,3	237,5	201,1	254,6	250,6	290,6	536,0	0,16	79,08	79,86	79,60	0,16	79,45	80,50	79,42
467,0	750,0	0,2	0,0	5,4	0,0	155,4	76,6	83,3	237,3	201,1	254,3	250,3	289,9	531,5	0,16	79,05	79,84	79,60	0,15	79,41	80,49	79,44
468,0	751,0	0,1	0,0	5,4	0,0	155,5	76,6	83,3	237,0	200,8	253,9	249,9	289,8	535,4	0,16	79,02	79,81	79,55	0,15	79,37	80,45	79,41
469,0	752,0	0,1	0,0	5,4	0,0	155,6	76,7	83,3	236,8	200,6	253,6	249,7	289,2	534,1	0,16	79,00	79,79	79,53	0,16	79,36	80,45	79,41
470,0	753,0	0,1	0,0	5,4	0,0	155,3	76,6	83,1	236,3	200,4	253,3	249,3	289,0	536,6	0,16	78,98	79,78	79,52	0,15	79,32	80,42	79,38
471,0	754,0	0,1	0,0	5,4	0,0	155,3	76,7	83,2	236,0	200,1	252,9	249,1	288,5	537,6	0,16	78,99	79,76	79,51	0,16	79,32	80,41	79,37
472,0	755,0	0,1	0,0	5,6	0,0	155,1	76,6	83,3	235,8	199,9	252,3	249,0	288,2	537,8	0,16	79,00	79,76	79,50	0,15	79,31	80,38	79,38
473,0	756,0	0,1	0,0	5,5	0,0	154,9	76,6	83,2	235,7	199,7	251,9	248,6	287,7	537,8	0,16	78,98	79,72	79,51	0,16	79,32	80,38	79,33
474,0	757,0	0,1	0,0	5,5	0,0	154,8	76,5	83,1	234,9	199,4	251,7	248,3	287,2	537,0	0,16	79,01	79,71	79,48	0,15	79,33	80,36	79,34
475,0	758,0	0,1	0,0	5,3	0,0	154,8	76,6	83,2	234,7	199,1	251,3	247,8	286,7	535,7	0,16	78,97	79,70	79,45	0,15	79,31	80,34	79,29
476,0	759,0	0,1	0,0	5,3	0,0	154,5	76,5	83,1	234,4	198,8	250,9	247,8	286,5	532,0	0,16	78,94	79,67	79,46	0,15	79,28	80,34	79,28
477,0	760,0	0,0	0,0	5,3	0,0	154,1	76,5	82,9	234,1	198,5	250,6	247,5	286,2	532,3	0,16	78,92	79,65	79,42	0,15	79,25	80,31	79,26

Manufacturer: HEARTHSTONE
Model: GM 80

Run: 3
Project #: PI 20177
Test Duration: 477

	min	
	HHV	LHV
Eff	81,88%	88,50%
Comb Eff	99,38%	99,38%
HT Eff	82,39%	89,05%
Output	15 885	kJ/h
Burn Rate	0,98	kg/h
Grams CO	102	g
Input	19 400	kJ/h
MC wet	17,44	

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

Overall Heating Efficiency:	81,88%	Air Fuel Ratio (A/F)	
Combustion Efficiency:	99,38%	Dry Molecular Weight (M _d)	29,80
Heat Transfer Efficiency:	82,39%	Dry Moles Exhaust Gas (N _e):	462,32
		Air Fuel Ratio (A/F)	13,27

Heat Output:	15 069 Btu/h	15 885 kJ/h
Heat Input:	18 403 Btu/h	19 400 kJ/h
Burn Duration:	7,95 h	
Burn Rate:	2,16 lb/h	0,979 kg/h
Stack Temp:	222,0 Deg. F	105,6 Deg. C

Date: 2018-09-24 Manufacturer: Hearthstone Model: GM 80
Project #: PT 20177 Run: 3 Tech: MM Reviewer: DS

42 LBS Small Pink Kindling
Fan ON low
bypass open
34 LBS close Door
100 LBS insert pre load 1"
200 LBS insert 2" pre load
71 LBS close air inlet (Drill bit 1/16)
47 LBS open Door open bypass
Back coat close Door close bypass
After 2 min open Door open bypass
open air inlet insert load close Door
close bypass
After 5 min close air inlet (Drill bit 1/16)

TEST LOAD CONFIGURATION

PRE / POST CHECKS

Date: 2018-09-24 Manufacturer: Hearthstone Model: GM 50
 Project #: PT 20177 Run: 3 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
<u>EM 191</u>	<u>7:10</u>	<u>ok</u>	<u>ok</u>

Pre-Test

Post-Test

Facility Conditions:

Air Velocity from less than 2 feet

Smoke Capture Check.....

Picture.....

<u>0</u> (max50 Fpm)	<u>0</u> (max50 Fpm)
<u>ok</u>	<u>ok</u>
4 sides <u>ok</u>	<u>ok</u>

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

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

Traverse before ignition.....

Flow Rate 140 cfm $\pm$ 10%.....

<u>2018-09-19</u>
<u>2018-09-19</u>
<u>ok</u>
<u>ok</u>

<u>ok</u>

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface ($\pm$ 125°F).....

<u>ok</u> °F
<u>ok</u> °F

Proportional Checks:

Thermocouple check.....

Pitot Clean.....

Pitot verification.....

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

Sampling Train ID Numbers:

Probe.....

Filter Front.....

Filter Back.....

Filter Thermocouple.....

Filter (<90°F).....

Train 1 st hour	Train 1	Train 2
<u>17</u>	<u>32</u>	<u>38</u>
<u>812</u>	<u>814</u>	<u>816</u>
<u>813</u>	<u>815</u>	<u>817</u>
<u>11</u>	<u>11</u>	<u>12</u>
<u>ok</u>	<u>ok</u>	<u>ok</u>

SAMPLING EQUIPMENT CHECK OUT

Date: 2018-09-24 Manufacturer: Hearths to the Model: GM 80
 Project #: PI 20177 Run: 3 Tech: MM Reviewer: SP

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)	777 917 69	780 158 79	777 917 80	780 158 86	730 977 24	733 170 48
Initial 1minute DGM (Liter)	777 917 68	780 158 78	777 917 78	780 158 86	730 977 24	733 170 48
Change © (Liter)	0.01	0	0.02	0	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	.4	3	.5
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2-18-09-24 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 3 Tech: MM Reviewer: DP

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

CONTINUOUS ANALYZERS

Date: 2018-09-24 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 3 Tech: MM Reviewer: JB

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2985	3000	1005	100
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	1793	1800	972	1000
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	2990	1000	0	0.02	0.005	0.15	0.005	0.05	✓	
CO ₂	0	1788	972	0	0.02	0.005	0.5	0.005	0.5	✓	

TEST DATA LOG

Date: 2018-09-24 Manufacturer: Heart/Hsloak Model: GM 80
 Project #: PI 2177 Run: 3 Tech: MM Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	780157.82	733169.51	942.02
Initial (Liter)	777918.26	730978.04	761.26

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102.9	102.8
Dry Bulb (F):	75.2	77.8
Humidity (%):	30	28.1

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

Date: 20180924 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 3 Tech: MM Reviewer: 8

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1110 lbs.	224	223	228	226	224
1 1/2 x 3 1/2 x 10 in.	966 lbs.	217	218	220	220	221
1 1/2 x 3 1/2 x 10 in.	1274 lbs.	228	219	222	222	225
1 1/2 x 3 1/2 x 10 in.	1044 lbs.	219	217	218	216	214
1 1/2 x 3 1/2 x 10 in.	1094 lbs.	220	228	230	231	229
1 1/2 x 3 1/2 x 10 in.	1114 lbs.	226	223	228	224	223
1 1/2 x 3 1/2 x 10 in.	982 lbs.	218	219	213	214	213
1 1/2 x 3 1/2 x 10 in.	1090 lbs.	216	218	219	213	214
1 1/2 x 3 1/2 x 10 in.	992 lbs.	230	231	232	234	233
1 1/2 x 3 1/2 x 10 in.	1142 lbs.	219	216	217	218	213
1 1/2 x 3 1/2 x 14 in.	1614 lbs.	223	226	223	224	226
1 1/2 x 3 1/2 x 14 in.	1598 lbs.	219	216	218	219	213
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: 1401 lbs

FUEL DATA

Date: 2018-07-24 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 3 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1004 lbs.	219	219	220	218	2.8
1 1/2 x 3 1/2 x 10 in.	1076 lbs.	219	214	223	220	2.1
1 1/2 x 3 1/2 x 10 in.	1224 lbs.	230	231	220	228	2.3
1 1/2 x 3 1/2 x 10 in.	1098 lbs.	219	220	218	213	2.4
1 1/2 x 3 1/2 x 10 in.	1240 lbs.	219	218	218	219	2.7
1 1/2 x 3 1/2 x 10 in.	1022 lbs.	230	231	228	226	2.9
1 1/2 x 3 1/2 x 10 in.	1188 lbs.	223	226	228	229	2.4
1 1/2 x 3 1/2 x 10 in.	1016 lbs.	219	218	213	218	2.3
1 1/2 x 3 1/2 x 10 in.	1220 lbs.	217	217	218	219	2.3
1 1/2 x 3 1/2 x 10 in.	1006 lbs.	223	228	223	224	2.6
1 1/2 x 3 1/2 x 14 in.	1932 lbs.	219	218	210	212	2.4
1 1/2 x 3 1/2 x 14 in.	1642 lbs.	219	213	218	214	2.8
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 1764 lbs

FUEL DATA

Date: 2018-09-24 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 2177 Run: 3 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
3 1/2 x 3 1/2 x 20 1/4 in.	4.746 lbs.	209	202	201	208	206
3 1/2 x 3 1/2 x 20 1/4 in.	4.742 lbs.	203	208	209	206	208
3 1/2 x 3 1/2 x 20 1/4 in.	5.096 lbs.	221	221	220	218	220
3 1/2 x 3 1/2 x 20 1/4 in.	5.082 lbs.	215	214	213	218	213
1 1/2 x 3/4 x 5 in.	0.106 lbs.			201		
1 1/2 x 3/4 x 5 in.	0.108 lbs.			216		
1 1/2 x 3/4 x 5 in.	0.098 lbs.			204		
1 1/2 x 3/4 x 5 in.	0.104 lbs.			208		
1 1/2 x 3/4 x 5 in.	0.116 lbs.			193		
1 1/2 x 3/4 x 5 in.	0.102 lbs.			194		
1 1/2 x 3/4 x 5 in.	0.104 lbs.			196		
1 1/2 x 3/4 x 5 in.	0.116 lbs.			201		
1 1/2 x 3/4 x 5 in.	0.096 lbs.			204		
1 1/2 x 3/4 x 5 in.	0.102 lbs.			208		
1 1/2 x 3/4 x 5 in.	0.114 lbs.			203		
1 1/2 x 3/4 x 5 in.	0.106 lbs.			200		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

TEST LOAD WEIGHT: 20.94 lbs Min 20%: 20.94 Max 25%: 524
419

Date: 2018-10-20 Manufacturer: Aerthos 2000 Model: GA80

Project #: PT 20177 Run: 3 Tech: MM Reviewer: SD

		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	17	812	813	10	32	814	815	18	819	
2018-09-20	18:00	108 9496	01262	01291	33 5986	110 1770	01259	01269	35 0208	01257	
2018-09-24	9:00	108 9491	01261	01292	33 5987	110 1771	01258	01270	35 0208	01257	

		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	17	812	813	10	32	814	815	18	819	
2018-09-24	21:00	108 9490	01265	01292	33 6018	110 1779	01256	01263	35 0226	01258	
2018-10-05	8:00	108 9496	01264	01289	33 5993	110 1774	01255	01262	35 0224	01258	
2018-10-09	8:00	108 9496	01264	01289	33 5993	110 1774	01255	01262	35 0224	01258	

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-20 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 3 Tech: 3 Reviewer: HR

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2018-09-20	18:00	110,4336	0,1252	0,1274
2018-09-20	19:00	110,4336	0,1253	0,1275

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2018-09-24	21:00	110,4334	0,1259	0,1268
2018-10-05	8:00	110,4339	0,1259	0,1268
2018-10-09	8:00	110,4339	0,1259	0,1268

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	4
Date	25-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	160	scfm
Tunnel diameter	6	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 20177
Date	25-09-2018
Technicien	M.M

Fuel data

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

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

	Start	End
Barometer (kPa):	102,5	101,8
Barometer (in.Hg):	30,268239	30,06152868
Dry Bulb (F):	80,6	78,09
Humidity (%):	27,2	29
Air velocity (ft/min)	0	0

DGM #1	Final:	27629,434	cuft
	Initial:	27551,100	cuft
DGM #2	Final:	25969,169	cuft
	Initial:	25891,764	cuft

DGM room	
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	Final:	782378,440	Liter
	Initial:	780160,260	Liter
	Final:	735364,950	Liter
	Initial:	733173,080	Liter

	Final:	1022,990	cuft
	Initial:	942,010	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 20177
Date	25-09-2018
Technicien	M.M

Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7535 cu. ft

Loading Density: 9,049 lbs./ft³
 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 37,950 lbs./ft³
 Dry Wood Density: 31,162897

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	0,92	21,6	21,9	21,8	21,8	21,6	20,0008	52,50
1,5	3,5	10	1,024	22	20,9	21,4	21,9	21,3	22,016	52,50
1,5	3,5	10	1,008	21,4	21,8	21,9	21,3	21,8	21,81312	52,50
1,5	3,5	10	0,984	21,9	21,6	21,8	21,3	21,9	21,3528	52,50
1,5	3,5	10	0,91	22,3	22,4	22,3	23,1	23	20,5842	52,50
1,5	3,5	10	0,976	21,9	21,3	21,6	21,4	21,9	21,10112	52,50
1,5	3,5	10	0,91	22,3	22,6	22,3	22,4	22,8	20,4568	52,50
1,5	3,5	10	0,984	21,9	21,3	21,4	21,5	21,5	21,17568	52,50
1,5	3,5	10	1,008	22	21,9	21,6	21,9	21,8	22,01472	52,50
1,5	3,5	10	1,024	23	23,1	23,4	23,6	23,9	23,9616	52,50
1,5	3,5	10	0,92	21,8	21,6	21,9	21,8	21,7	20,0192	52,50
1,5	3,5	10	0,97	22	21,8	21,7	21,6	21,3	21,0296	52,50
1,5	3,5	14	1,466	21,9	21,3	21,7	21,8	21,3	31,6656	73,50
1,5	3,5	14	1,386	22	21,9	22,3	22,4	22,6	30,82464	73,50
										0,00
1,5	3,5	10	0,944	21,6	21,4	21,8	21,9	21,8	20,4848	52,50
1,5	3,5	10	1,068	21	21,1	21,4	21,8	21,3	22,76976	52,50
1,5	3,5	10	1,004	22	21,9	21,3	21,6	21,9	21,82696	52,50
1,5	3,5	10	1,106	22,1	22,6	21,9	21,3	21,6	24,2214	52,50
1,5	3,5	10	1,036	20,1	20,3	21,3	21	21	21,48664	52,50
1,5	3,5	10	1,03	22,4	22	22,3	22,8	22,4	23,0514	52,50
1,5	3,5	10	1,018	21,6	21,8	21,3	21,9	21,6	22,02952	52,50
1,5	3,5	10	1,028	22	21,9	21,8	21,3	21,9	22,38984	52,50
1,5	3,5	10	1,032	22,3	22,4	22,9	22,3	22,8	23,26128	52,50
1,5	3,5	10	1,024	21,9	21,8	21,3	21,3	21,8	22,13888	52,50
1,5	3,5	10	1,022	22	22,4	22	22,3	22,2	22,66796	52,50
1,5	3,5	14	1,376	21,9	21,3	21,8	21,3	21,4	29,63904	73,50
1,5	3,5	14	1,416	19,9	19,6	20,9	20,8	20,3	28,7448	73,50
										0,00
										0,00
										0,00
										0,00

SUM MC: 622,72816

PreTest Load Weight: 28,59 lbs.

Dry Weight: 10,65 kg.

 Dry: 21,78
 Average Moisture Content: %
 21,78
 Must be 18-28

 Wet: 17,88
 must be 15,2-22

Project nu.	PI 20177
Date	25-09-2018
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
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19,9	22,1	24,3
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* For boilers, a loading density factor of 10 lb/ft³ is applied

Load Volume: cu. ft

Loading Density: 6,7 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	31,9	lbs./ft3
Dry Wood Density:	26,3	lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	20,5	4,89	20,60	20,30	20,40	20,80	20,80	100,59504	251,13	20,6
3,5	3,5	20,5	5,14	20,80	20,40	20,90	20,60	20,90	106,5008	251,13	20,7
3,5	3,5	20,5	5,14	21,00	21,00	21,90	21,60	21,40	109,8932	251,13	21,4
3,5	3,5	20,5	4,53	22,10	22,00	22,30	22,10	22,10	100,2036	251,13	22,1
1,5	0,75	5	0,12			21,90			2,628	5,63	21,9
1,5	0,75	5	0,13			21,60			2,808	5,63	21,6
1,5	0,75	5	0,11			21,40			2,3968	5,63	21,4
1,5	0,75	5	0,10			21,90			2,1024	5,63	21,9
1,5	0,75	5	0,12			21,80			2,5288	5,63	21,8
1,5	0,75	5	0,11			21,90			2,3214	5,63	21,9
1,5	0,75	5	0,11			21,40			2,2684	5,63	21,4
1,5	0,75	5	0,11			21,80			2,4416	5,63	21,8
1,5	0,75	5	0,10			21,90			2,19	5,63	21,9
1,5	0,75	5	0,09			21,80			2,0492	5,63	21,8
1,5	0,75	5	0,14			21,90			2,9784	5,63	21,9
1,5	0,75	5	0,11			21,20			2,2896	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	
										0,00	
										0,00	
									SUM MCx	446,19524	21,6 %

Test Load Weight: 21,03 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	21,21	Dry(EPA)	21,21
		Dry(B415)	21,21

21,21
Must be 19-25

Wet:
must be 15,2-22

Coal Bed Range: lbs. to

5,3 lbs.

TEST CHARGE:

Coal bed weight: 4,7

lbs.

Project nu.	PI 20177
Date	25-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

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

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

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

PITOT CONSTANT=
0,964

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,058	72,6	0,2408
B center	0,059	72,55	0,2429
A1	0,045	72,6	0,2121
A2	0,060	72,63	0,2449
A3	0,058	72,56	0,2408
A4	0,053	72,6	0,2302
B1	0,047	72,600	0,2168
B2	0,070	72,590	0,2646
B3	0,050	72,550	0,2236
B4	0,046	72,470	0,2145
AVERAGE	0,0546	72,5750	0,2331

Project nu.	PI 20177
Date	25-09-2018
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	5	804	805	30	10	806	807	36	33	808	809	43	810		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,5047	0,1261	0,1269	34,2403	94,6396	0,1249	0,1260	34,6076	109,3621	0,1243	0,1255	34,3815	0,1283	2018-09-24	18:00
Before (6)	61,5046	0,1261	0,1268	34,2404	94,6397	0,1248	0,1259	34,6077	109,3622	0,1244	0,1256	34,3816	0,1284	2018-09-25	09:30
After (1)	61,5055	0,1285	0,1257	34,2456	94,6419	0,1252	0,1250	34,6128	109,3630	0,1278	0,1252	34,3861	0,1288	2018-09-25	22:00
After (2)	61,5049	0,1282	0,1257	34,2419	94,6405	0,1252	0,1250	34,6097	109,3628	0,1277	0,1252	34,3831	0,1287	2018-10-05	08:00
After (3)	61,5049	0,1282	0,1257	34,2419	94,6405	0,1252	0,1250	34,6097	109,3628	0,1277	0,1252	34,3831	0,1287	2018-10-09	08:00
After (4)															
After (5)															
After (6)	61,5049	0,1282	0,1257	34,2419	94,6405	0,1252	0,1250	34,6097	109,3628	0,1277	0,1252	34,3831	0,1287	2018-10-09	08:00
Difference	0,0003	0,0021	-0,0011	0,0015	0,0008	0,0004	-0,0009	0,0020	0,0006	0,0033	-0,0004	0,0015	0,0003		
Total (mg)		2,8				5,1				5			0,3		
Total ajusté (mg)		2,50				4,80				4,70					

Project nu.	PI 20177
Date	25-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate:

0,7 g/hr

Burn Rate :

1,068 Dry kg/hr

Test Duration:**442**

min

PRESSURE FACTOR: DGM 1 0,98633
 DGM 2 0,98993
 DGM 3 1,00818

BAROMETRIC PRESSURE

Average: 30,16488365 in Hg
 Start: 30,26823861 in Hg
 End: 30,06152868 in Hg

TEMPERATURE FACTORS DGM 1 0,98074
 DGM 2 0,97998
 DGM 3 0,98180

DGM CONTROLLER VALUES

DGM 1 Final: 27629,434 Cuft
 Initial: 27551,100 Cuft

VOLUMES SAMPLED DGM 1 74,901 SCft
 DGM 2 74,446 SCft
 DGM 3 79,817 SCft

DGM 2 Final: 25969,169 Cuft
 Initial: 25891,764 Cuft

DGM #3 Final: 1022,990 Cuft
 Initial: 942,010 Cuft

TOTAL TUNNEL VOLUME : 77211

TEMPERATURES

DGM 1 538,370 °R
 DGM 2 538,785 °R

SAMPLE RATIOS

Sample Train 1: 1030,831
 Sample Train 2: 1037,134

CALIBRATION FACTORS

DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

Particulate concentration

Sample Train 1 **0,000068** g/dscf
 Sample Train 2 **0,000067** g/dscf
 Room **0,000004** g/dscf

TUNNEL FLOW RATE: 174,685 Dscfm

TOTAL EMISSIONS

Sample Train 1 **4,97** g
 Sample Train 2 **4,90** g

PARTICULATE CATCH

Total Sample Train 1: 5,10 mg
 Total Sample Train 2: 5,00 mg
 Total Sample Train 1 1st hour: 2,80 mg

EMISSION RATES

Sample Train 1 **0,67** g/hr
 Sample Train 2 **0,66** g/hr

1st hour emission rate **2,89** g/hr

DEVIATION:

0,73%

Cs Train 1 Train 2
 6,809E-05 6,7163E-05

*		*	*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	*	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2
Elapsed		Weight				Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Catalyst	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO ₂	O ₂	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom	up	°F	°F	°F	°F	°F	°F	°F	°F
min		lbs	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F	%F	cutf/min	oF	oF	oF	cutf/min	oF	oF	oF
0.00	243.00	20.9	0.1	1.1	0.0	236.5	77.5	123.8	363.4	349.3	375.8	369.7	430.8	504.8	0.17	77.77	77.85	78.73	0.17	78.14	78.31	78.52
1.0	244.0	20.8	0.3	2.2	0.0	236.7	77.1	101.1	360.9	348.7	374.2	367.2	421.3	572.3	0.17	77.88	77.84	78.72	0.17	78.14	78.35	78.56
2.0	245.0	20.7	0.0	5.2	0.0	250.9	77.2	96.9	360.4	347.9	373.0	367.1	414.8	691.6	0.17	77.95	77.84	78.75	0.17	78.17	78.34	78.60
3.0	246.0	20.6	0.0	5.7	0.0	265.3	77.6	96.3	360.1	346.9	371.7	365.8	410.7	706.7	0.17	78.00	77.84	78.78	0.17	78.20	78.38	78.61
4.0	247.0	20.6	0.1	5.9	0.0	278.5	77.4	96.6	361.8	345.8	369.8	364.2	406.4	713.5	0.17	78.04	77.85	78.82	0.17	78.22	78.39	78.68
5.0	248.0	20.6	0.1	6.3	0.0	270.0	77.6	92.9	362.1	344.5	368.5	362.9	412.5	751.5	0.17	78.06	77.89	78.85	0.17	78.23	78.41	78.72
6.0	249.0	20.4	0.0	5.7	0.0	254.1	77.2	90.7	359.3	342.7	366.4	361.3	415.2	727.5	0.17	78.08	77.89	78.92	0.17	78.24	78.42	78.77
7.0	250.0	20.3	0.0	4.1	0.0	242.9	77.3	89.5	355.9	340.8	364.4	359.3	416.5	695.9	0.17	78.09	77.90	78.96	0.17	78.25	78.45	78.83
8.0	251.0	20.3	0.0	3.9	0.0	234.9	77.5	88.7	353.1	338.8	362.4	357.2	416.7	678.4	0.17	78.13	77.92	79.02	0.17	78.26	78.46	78.89
9.0	252.0	20.3	0.0	3.9	0.0	228.6	77.6	87.9	350.1	336.7	360.1	354.8	416.1	664.4	0.17	78.13	77.93	79.07	0.17	78.25	78.46	78.92
10.0	253.0	20.3	0.0	3.9	0.0	225.0	77.4	88.0	347.9	334.6	357.6	352.3	415.9	660.5	0.17	78.11	77.95	79.11	0.17	78.25	78.48	78.98
11.0	254.0	20.2	0.0	4.1	0.0	221.7	77.3	87.7	344.9	332.5	355.3	349.8	415.7	657.3	0.17	78.07	77.96	79.16	0.17	78.23	78.51	79.02
12.0	255.0	20.1	0.0	4.3	0.0	219.0	77.3	87.5	342.4	329.9	353.1	347.3	415.2	652.5	0.17	78.07	77.97	79.19	0.17	78.22	78.51	79.05
13.0	256.0	20.1	0.0	4.6	0.0	217.3	77.4	87.5	340.1	326.9	350.3	344.8	414.5	650.0	0.17	78.07	77.98	79.25	0.17	78.25	78.54	79.10
14.0	257.0	20.0	0.1	4.8	0.0	216.1	77.3	87.2	338.3	323.8	348.3	342.1	413.5	654.4	0.17	78.07	77.99	79.27	0.17	78.25	78.54	79.12
15.0	258.0	20.0	0.1	4.9	0.0	215.3	77.3	87.2	335.9	321.4	345.6	339.5	412.4	650.3	0.17	78.06	78.00	79.34	0.17	78.24	78.54	79.16
16.0	259.0	19.9	0.1	5.0	0.0	214.8	77.3	87.4	334.3	319.5	343.3	336.8	411.2	656.9	0.17	78.05	78.01	79.39	0.17	78.23	78.56	79.19
17.0	260.0	19.8	0.1	5.0	0.0	214.7	77.1	87.3	332.3	316.1	340.6	334.4	409.8	668.6	0.17	78.05	78.03	79.42	0.17	78.22	78.56	79.20
18.0	261.0	19.8	0.1	5.0	0.0	214.2	77.4	87.2	330.9	313.3	338.2	331.9	408.5	669.8	0.17	78.05	78.03	79.46	0.17	78.22	78.58	79.23
19.0	262.0	19.7	0.1	5.1	0.0	214.4	77.3	87.1	329.3	311.7	335.5	329.5	407.4	657.6	0.17	78.02	78.05	79.46	0.17	78.23	78.58	79.24
20.0	263.0	19.7	0.1	5.0	0.0	214.4	77.2	87.0	327.8	309.7	333.1	327.2	405.5	633.2	0.17	78.04	78.07	79.49	0.17	78.23	78.60	79.27
21.0	264.0	19.6	0.1	5.2	0.0	214.2	76.9	87.0	327.0	307.3	330.6	324.7	404.2	605.0	0.17	78.02	78.07	79.51	0.17	78.22	78.61	79.27
22.0	265.0	19.5	0.3	5.6	0.0	215.1	77.1	87.4	326.4	305.4	328.3	322.5	402.6	587.2	0.17	78.00	78.09	79.52	0.17	78.20	78.61	79.26
23.0	266.0	19.5	0.3	6.7	0.0	217.5	77.1	87.6	323.3	303.4	326.1	320.3	401.1	574.0	0.17	78.00	78.06	79.54	0.17	78.20	78.61	79.29
24.0	267.0	19.4	0.3	7.7	0.0	218.8	77.0	87.6	336.5	301.7	323.7	318.3	399.9	582.6	0.17	78.02	78.07	79.57	0.17	78.21	78.62	79.27
25.0	268.0	19.3	0.2	7.2	0.0	218.4	77.1	87.5	339.9	300.1	321.6	316.3	398.3	604.9	0.17	78.03	78.08	79.59	0.17	78.21	78.63	79.31
26.0	269.0	19.2	0.1	6.6	0.0	216.7	77.1	87.2	341.0	298.4	319.5	314.2	396.9	634.1	0.17	78.01	78.09	79.60	0.17	78.20	78.63	79.29
27.0	270.0	19.2	0.1	5.8	0.0	216.3	76.5	86.9	338.7	296.9	317.4	312.2	395.8	710.7	0.17	77.99	78.07	79.64	0.17	78.18	78.64	79.32
28.0	271.0	19.2	0.1	5.2	0.0	216.3	76.9	87.1	335.5	295.2	315.5	310.2	394.6	737.7	0.17	77.95	78.08	79.66	0.17	78.17	78.64	79.30
29.0	272.0	19.1	0.1	5.0	0.0	216.2	77.2	86.8	333.2	293.9	313.6	308.4	393.1	739.0	0.17	77.95	78.10	79.66	0.17	78.15	78.64	79.33
30.0	273.0	19.0	0.1	5.2	0.0	216.8	77.1	86.9	331.5	292.6	311.8	306.5	391.8	724.0	0.17	77.96	78.09	79.65	0.17	78.16	78.63	79.30
31.0	274.0	19.0	0.1	5.4	0.0	216.5	77.0	87.0	329.9	291.3	309.9	304.6	389.6	714.3	0.17	77.98	78.09	79.65	0.17	78.15	78.64	79.32
32.0	275.0	18.9	0.1	5.8	0.0	216.9	77.0	87.0	329.1	290.2	309.6	302.9	388.0	707.9	0.17	77.95	78.09	79.68	0.17	78.14	78.65	79.32
33.0	276.0	18.8	0.1	6.2	0.0	217.1	76.8	87.2	328.7	288.9	306.4	301.1	387.9	716.6	0.17	77.94	78.10	79.67	0.17	78.14	78.65	79.31
34.0	277.0	18.8	0.2	6.7	0.0	218.9	77.0	87.4	329.9	288.2	304.6	299.4	386.5	720.7	0.17	77.93	78.09	79.70	0.17	78.14	78.65	79.30
35.0	278.0	18.7	0.2	7.4	0.0	219.9	77.1	87.5	333.7	287.2	302.8	297.7	385.1	700.9	0.17	77.92	78.09	79.72	0.17	78.13	78.65	79.31
36.0	279.0	18.6	0.2	8.1	0.0	221.6	76.9	87.4	338.6	286.3	301.2	296.2	384.1	704.6	0.17	77.93	78.10	79.71	0.17	78.13	78.66	79.29
37.0	280.0	18.5	0.2	8.1	0.0	222.2	76.8	87.6	343.3	285.3	299.6	294.8	382.5	706.7	0.17	77.94	78.10	79.71	0.17	78.13	78.67	79.29
38.0	281.0	18.4	0.2	8.2	0.0	222.2	77.0	87.4	347.6	284.5	298.2	293.4	382.0	705.0	0.17	77.92	78.11	79.74	0.17	78.14	78.66	79.29
39.0	282.0	18.3	0.1	8.0	0.0	221.7	77.0	87.5	352.0	283.6	296.7	292.2	380.5	697.6	0.17	77.90	78.11	79.72	0.17	78.11	78.65	79.29
40.0	283.0	18.3	0.1	7.8	0.0	222.0	77.0	87.4	352.5	282.8	295.7	291.0	379.6	727.6	0.17	77.90	78.11	79.73	0.17	78.10	78.65	79.28
41.0	284.0	18.2	0.1	7.3	0.0	222.7	77.1	87.5	350.7	282.0	294.3	289.9	379.0	782.5	0.17	77.91	78.11	79.73	0.17	78.10	78.67	79.27
42.0	285.0	18.1	0.2	7.2	0.0	224.5	76.6	87.5	348.9	281.5	293.2	288.6	377.7	827.5	0.17	77.90	78.10	79.74	0.17	78.07	78.65	79.30
43.0	286.0	18.0	0.1	7.4	0.0	226.5	76.9	87.4	346.1	280.9	291.9	287.6	377.1	821.5	0.17	77.89	78.09	79.75	0.17	78.07	78.66	79.29
44.0	287.0	18.0	0.1	7.9	0.0	228.4	77.1	88.1	348.7	280.5	290.7	286.4	376.3	825.8	0.17	77.93	78.09	79.75	0.17	78.10	78.66	79.29
45.0	288.0	17.9	0.2	8.2	0.0	230.4	77.0	88.1	350.9	280.2	289.7	285.3	370.5	828.3	0.17	77.97	78.11	79.76	0.17	78.12	78.65	79.29
46.0	289.0	17.8	0.1	8.4	0.0	232.9	77.2	88.4	353.4	280.3	288.5	284.3	374.3	786.6	0.17	77.98	78.10	79.78	0.17	78.12	78.67	79.28
47.0	290.0	17.7	0.1	9.4	0.0	235.2	77.0	88.4	359.3	280.0	287.5	283.3	373.0	725.9	0.17	78.00	78.13	79.79	0.17	78.15	78.67	79.29
48.0	291.0	17.6	0.1	9.7	0.0	236.1	77.0	88.8	365.6	279.6	286.7	282.4	372.2	691.5	0.17	78.03	78.13	79.79	0.17	78.16	78.66	79.29
49.0	292.0	17.5	0.1	9.6	0.0	237.1	77.1	88.7	370.0	279.2	286.0	281.6	370.9	661.8	0.17	78.05	78.14	79.80	0.17	78.19	78.67	79.29
50.0	293.0	17.4	0.1	9.2	0.0	237.5	77.2	88.8	373.5	278.7	285.4	280.7	370.3	638.3	0.17	78.08	78.16	79.81	0.17	78.22	78.70	79.31
51.0	294.0	17.3	0.1	8.9	0.0	237.1	77.1	88.9	375.9	278.4	285.1	280.1	369.2	624.0	0.17	78.08	78.14	79.81	0.17	78.25	78.70	79.30
52.0	295.0	17.3	0.1	8.6	0.0	236.9	77.2	88.7	377.4	278.1</												

89.0	332.0	14.2	0.0	11.7	0.0	284.1	77.2	92.0	393.9	287.4	288.6	265.5	345.2	1061.7	0.17	78.49	78.26	80.05	0.17	78.57	78.81	78.96
90.0	333.0	14.1	0.0	11.7	0.0	286.5	77.4	92.2	395.6	288.3	288.4	265.6	344.7	1067.7	0.17	78.44	78.24	80.06	0.17	78.56	78.81	79.01
91.0	334.0	14.0	0.0	11.9	0.0	288.7	76.6	92.5	396.9	289.9	288.1	265.7	344.7	1073.6	0.17	78.43	78.27	80.08	0.17	78.57	78.84	79.06
92.0	335.0	13.9	0.0	11.9	0.0	291.0	76.7	92.5	399.4	292.3	287.8	265.8	344.8	1078.6	0.17	78.34	78.24	80.08	0.17	78.51	78.82	79.09
93.0	336.0	13.8	0.1	12.0	0.0	292.7	76.6	93.2	401.8	293.4	288.0	265.9	344.0	1085.1	0.17	78.29	78.22	80.10	0.17	78.48	78.83	79.15
94.0	337.0	13.7	0.1	12.1	0.0	294.7	76.7	93.1	404.0	294.7	287.8	266.2	344.4	1091.4	0.17	78.26	78.23	80.14	0.17	78.48	78.83	79.21
95.0	338.0	13.6	0.1	12.1	0.0	296.1	76.8	93.2	406.0	296.7	287.6	266.5	344.8	1095.9	0.17	78.23	78.22	80.15	0.17	78.47	78.82	79.28
96.0	339.0	13.5	0.1	12.3	0.0	298.3	77.0	93.6	408.1	298.5	287.6	266.9	344.4	1100.7	0.17	78.25	78.21	80.17	0.17	78.45	78.82	79.32
97.0	340.0	13.4	0.1	12.3	0.0	299.8	77.2	93.6	410.2	300.4	287.7	267.3	344.2	1105.4	0.17	78.28	78.22	80.21	0.17	78.45	78.84	79.38
98.0	341.0	13.3	0.2	12.3	0.0	301.6	77.2	93.9	412.5	302.5	287.6	267.8	344.1	1109.9	0.17	78.29	78.24	80.25	0.17	78.45	78.85	79.47
99.0	342.0	13.2	0.2	12.4	0.0	302.9	77.2	94.0	414.6	304.6	287.8	268.3	344.1	1113.1	0.17	78.35	78.24	80.30	0.17	78.51	78.85	79.54
100.0	343.0	13.1	0.3	12.4	0.0	304.7	77.2	94.6	416.8	306.6	287.8	268.8	344.1	1119.0	0.17	78.37	78.23	80.35	0.17	78.53	78.85	79.59
101.0	344.0	13.0	0.3	12.4	0.0	305.7	77.2	94.6	419.2	308.7	288.0	269.5	344.4	1122.0	0.17	78.43	78.26	80.40	0.17	78.58	78.87	79.68
102.0	345.0	12.9	0.4	12.4	0.0	306.9	77.3	95.0	421.5	310.8	288.1	270.0	344.2	1125.1	0.17	78.48	78.25	80.43	0.17	78.62	78.87	79.76
103.0	346.0	12.8	0.4	12.5	0.0	308.4	77.2	95.1	423.3	313.1	288.2	270.6	344.5	1129.2	0.17	78.55	78.26	80.49	0.17	78.66	78.88	79.84
104.0	347.0	12.7	0.4	12.6	0.0	309.1	77.1	95.3	426.1	315.1	288.5	271.2	344.0	1133.9	0.17	78.56	78.25	80.52	0.17	78.67	78.89	79.90
105.0	348.0	12.6	0.5	12.5	0.0	310.3	77.1	95.2	427.8	317.1	288.5	271.6	344.2	1136.9	0.17	78.60	78.26	80.59	0.17	78.70	78.93	79.97
106.0	349.0	12.5	0.6	12.5	0.0	311.3	77.5	95.3	430.3	319.3	288.9	272.5	344.3	1140.4	0.17	78.54	78.26	80.63	0.17	78.69	78.93	80.00
107.0	350.0	12.4	0.6	12.6	0.0	312.4	77.5	95.6	432.2	321.2	289.3	273.2	344.0	1142.1	0.17	78.57	78.29	80.67	0.17	78.73	78.94	80.05
108.0	351.0	12.2	0.8	12.6	0.0	312.7	77.5	95.5	434.3	323.2	289.6	273.9	344.3	1142.5	0.17	78.64	78.31	80.71	0.17	78.77	78.94	80.09
109.0	352.0	12.1	0.9	12.6	0.0	314.3	77.5	95.9	436.1	325.2	289.9	274.7	344.3	1142.5	0.17	78.69	78.31	80.76	0.17	78.80	78.96	80.15
110.0	353.0	12.0	0.2	12.6	0.0	315.3	77.7	96.0	437.8	327.2	290.3	275.4	344.3	1143.4	0.17	78.72	78.32	80.82	0.17	78.83	78.98	80.23
111.0	354.0	11.9	0.2	12.6	0.0	316.2	77.4	96.3	440.0	329.1	290.7	276.3	344.6	1140.8	0.17	78.76	78.33	80.88	0.17	78.88	78.99	80.28
112.0	355.0	11.8	0.2	12.5	0.0	317.5	77.2	96.1	442.0	331.0	291.3	277.1	344.6	1140.6	0.17	78.83	78.36	80.91	0.17	78.93	79.01	80.33
113.0	356.0	11.7	0.3	12.5	0.0	318.3	77.6	96.3	443.9	332.9	291.8	278.1	344.7	1141.2	0.17	78.81	78.36	80.97	0.17	78.93	79.02	80.38
114.0	357.0	11.5	0.3	12.5	0.0	319.2	77.6	96.3	445.6	334.8	292.3	278.7	344.9	1141.8	0.17	78.82	78.37	81.05	0.17	78.90	79.03	80.46
115.0	358.0	11.5	0.3	12.5	0.0	320.1	77.8	96.8	447.4	336.5	292.8	279.3	344.8	1140.9	0.17	78.82	78.38	81.08	0.17	78.93	79.06	80.53
116.0	359.0	11.3	0.3	12.4	0.0	320.7	77.8	96.9	449.1	338.3	293.4	280.2	344.3	1140.2	0.17	78.82	78.39	81.10	0.17	78.94	79.07	80.58
117.0	360.0	11.2	0.3	12.3	0.0	321.5	77.5	97.3	450.6	340.0	293.9	281.1	344.3	1139.5	0.17	78.82	78.39	81.13	0.17	78.95	79.09	80.61
118.0	361.0	11.1	0.4	12.4	0.0	322.3	77.8	96.9	451.8	341.7	294.6	281.8	344.5	1137.2	0.17	78.80	78.41	81.18	0.17	78.95	79.10	80.67
119.0	362.0	11.0	0.4	12.3	0.0	323.6	77.9	97.2	453.3	343.4	295.3	282.6	344.5	1137.5	0.17	78.79	78.43	81.21	0.17	78.95	79.10	80.73
120.0	363.0	10.8	0.4	12.3	0.0	324.6	77.3	97.1	455.0	345.0	295.9	283.4	344.3	1136.7	0.17	78.73	78.39	81.26	0.17	78.94	79.11	80.77
121.0	364.0	10.7	0.4	12.3	0.0	324.9	77.8	97.3	456.4	346.6	296.6	284.2	344.5	1136.7	0.17	78.73	78.42	81.29	0.17	78.94	79.12	80.86
122.0	365.0	10.6	0.4	12.3	0.0	326.0	77.9	97.3	457.6	348.1	297.6	285.0	344.1	1134.3	0.17	78.70	78.42	81.33	0.17	78.93	79.13	80.89
123.0	366.0	10.5	0.5	12.2	0.0	327.1	77.7	97.2	459.2	349.7	298.4	285.7	344.7	1133.0	0.17	78.72	78.44	81.35	0.17	78.96	79.13	80.92
124.0	367.0	10.4	0.5	12.2	0.0	328.3	78.1	97.7	460.6	351.1	299.0	286.5	344.0	1134.6	0.17	78.68	78.45	81.40	0.17	78.97	79.15	80.98
125.0	368.0	10.2	0.5	12.2	0.0	330.0	77.8	97.6	461.5	352.5	299.7	287.1	343.9	1135.0	0.17	78.69	78.45	81.46	0.17	78.95	79.16	81.07
126.0	369.0	10.1	0.5	12.2	0.0	331.8	78.1	97.6	462.7	353.8	300.6	287.9	344.1	1137.8	0.17	78.69	78.45	81.49	0.17	78.97	79.17	81.11
127.0	370.0	10.0	0.5	12.3	0.0	333.2	78.1	98.0	464.2	355.2	301.5	288.8	343.8	1136.2	0.17	78.70	78.48	81.55	0.17	78.99	79.19	81.19
128.0	371.0	9.9	0.6	12.2	0.0	335.4	78.2	98.3	465.2	356.4	302.3	289.4	343.6	1137.1	0.17	78.68	78.46	81.60	0.17	78.97	79.19	81.21
129.0	372.0	9.7	0.6	12.2	0.0	338.3	78.2	98.3	467.0	357.7	303.2	290.3	343.7	1138.5	0.17	78.65	78.47	81.63	0.17	78.95	79.21	81.28
130.0	373.0	9.6	0.6	12.2	0.0	340.6	78.0	98.6	467.7	358.9	304.0	291.3	344.3	1137.7	0.17	78.66	78.48	81.70	0.17	78.97	79.22	81.33
131.0	374.0	9.5	0.6	12.2	0.0	342.9	78.3	98.9	468.7	360.0	304.9	292.2	344.5	1137.6	0.17	78.68	78.50	81.75	0.17	78.99	79.23	81.39
132.0	375.0	9.4	0.7	12.2	0.0	343.7	78.4	99.6	470.5	361.2	306.0	292.9	343.5	1134.9	0.17	78.73	78.51	81.77	0.17	79.03	79.23	81.43
133.0	376.0	9.2	0.7	12.2	0.0	345.2	78.4	99.7	471.3	362.3	306.6	293.7	343.9	1135.5	0.17	78.76	78.51	81.82	0.17	79.06	79.25	81.50
134.0	377.0	9.1	0.7	12.2	0.0	346.2	78.4	99.8	472.3	363.4	307.7	294.8	344.8	1134.1	0.17	78.80	78.53	81.88	0.17	79.10	79.27	81.55
135.0	378.0	9.0	0.7	12.2	0.0	347.3	78.4	100.1	473.2	364.4	308.8	295.4	344.0	1131.0	0.17	78.83	78.54	81.91	0.17	79.10	79.26	81.62
136.0	379.0	8.8	0.7	12.1	0.0	347.4	78.0	99.5	474.2	365.5	309.6	296.1	344.0	1130.3	0.17	78.85	78.54	81.97	0.17	79.13	79.28	81.68
137.0	380.0	8.7	0.7	12.1	0.0	349.0	78.1	99.5	475.3	366.5	310.5	297.1	344.2	1129.1	0.17	78.87	78.56	82.01	0.17	79.15	79.28	81.75
138.0	381.0	8.6	0.7	12.1	0.0	349.8	78.2	99.3	476.4	367.5	311.6	298.1	344.3	1130.2	0.17	78.86	78.57	82.05	0.17	79.13	79.30	81.80
139.0	382.0	8.4	0.7	12.1	0.0	350.6	78.4	100.0	477.4	368.4	312.6	298.9	344.0	1126.8	0.17	78.85	78.57	82.08	0.17	79.13	79.28	81.86
140.0	383.0	8.3	0.7	12.1	0.0	350.1	78.4	99.7	477.9	369.3	313.6	299.8	344.0	1126.8	0.17	78.84	78.56	82.13	0.17	79.13	79.31	81.92
141.0	384.0	8.2	0.7	12.1	0.0	351.9	78.2	99.8	478.9	370.2	314.6	300.6	343.9	1126.3	0.17	78.83	78.59	82.12	0.17	79.13	79.33	81.96
142.0	385.0	8.1	0.7	12.1	0.0	350.6	78.3	100.0	480.0	371.1	315.7	301.4	344.0	1126.1	0.17	78.85	78.60	82.19	0.17	79.12	79.34	82.02
143.0	386.0	8.0	0.7	12.0	0.0	350.2	78.4	99.7	480.0	371.9	316.7											

182.0	425.0	4,7	0,4	10,6	0,0	287,7	78,7	93,6	467,4	387,5	353,6	336,0	352,8	1023,5	0,17	78,93	78,82	82,40	0,17	79,24	79,55	82,36
183.0	426.0	4,7	0,4	10,5	0,0	286,3	78,7	93,8	465,9	387,4	354,0	336,7	352,7	1017,0	0,17	78,92	78,82	82,36	0,17	79,21	79,53	82,35
184.0	427.0	4,7	0,4	10,4	0,0	284,9	78,7	93,5	464,5	387,3	354,3	337,4	352,7	1008,2	0,17	78,93	78,83	82,34	0,17	79,20	79,55	82,34
185.0	428.0	4,6	0,3	10,3	0,0	283,4	78,5	93,3	462,9	387,3	354,5	338,2	353,1	1001,7	0,17	78,94	78,82	82,32	0,17	79,22	79,55	82,31
186.0	429.0	4,5	0,3	10,2	0,0	282,5	78,5	93,2	461,4	387,2	354,5	338,8	353,2	990,8	0,17	78,93	78,82	82,29	0,17	79,21	79,54	82,27
187.0	430.0	4,5	0,2	10,1	0,0	281,1	78,6	93,0	460,1	387,2	354,9	339,5	353,3	978,6	0,17	78,95	78,85	82,30	0,17	79,22	79,55	82,25
188.0	431.0	4,5	0,1	9,9	0,0	279,2	78,7	92,9	459,0	387,2	355,2	340,2	353,4	967,9	0,17	78,93	78,85	82,28	0,17	79,20	79,55	82,24
189.0	432.0	4,4	0,1	9,8	0,0	278,0	78,7	93,1	456,9	387,0	355,3	340,5	353,5	959,7	0,17	78,92	78,86	82,25	0,17	79,21	79,55	82,22
190.0	433.0	4,4	0,1	9,8	0,0	276,6	78,7	92,6	455,5	386,9	355,4	341,2	353,9	954,1	0,17	78,92	78,85	82,21	0,17	79,21	79,55	82,19
191.0	434.0	4,3	0,0	9,7	0,0	275,0	78,6	92,6	453,6	386,6	355,3	341,6	354,4	948,3	0,17	78,90	78,85	82,17	0,17	79,21	79,55	82,17
192.0	435.0	4,3	0,0	9,6	0,0	273,5	78,5	92,8	451,6	386,5	355,6	342,0	354,2	941,6	0,17	78,92	78,87	82,15	0,17	79,22	79,54	82,14
193.0	436.0	4,3	0,0	9,1	0,0	271,1	78,5	92,3	449,6	386,2	355,2	342,5	354,3	929,3	0,17	78,88	78,86	82,13	0,17	79,19	79,54	82,11
194.0	437.0	4,3	0,0	8,8	0,0	269,6	78,3	92,2	447,5	386,0	355,2	343,0	354,7	919,7	0,17	78,86	78,84	82,12	0,17	79,17	79,52	82,08
195.0	438.0	4,2	0,0	8,7	0,0	268,3	78,6	92,2	445,6	385,0	355,2	343,4	355,4	913,5	0,17	78,86	78,86	82,08	0,17	79,20	79,53	82,08
196.0	439.0	4,2	0,0	8,7	0,0	266,7	78,5	91,7	443,2	383,9	355,1	343,7	355,0	908,3	0,17	78,87	78,86	82,06	0,17	79,22	79,53	82,05
197.0	440.0	4,2	0,0	8,6	0,0	264,9	78,3	91,4	441,5	383,3	355,0	344,0	355,1	903,0	0,17	78,84	78,87	82,01	0,17	79,19	79,53	82,02
198.0	441.0	4,2	0,0	8,5	0,0	262,4	78,4	91,6	439,2	382,2	354,9	344,4	355,1	896,8	0,17	78,86	78,86	82,01	0,17	79,21	79,55	82,00
199.0	442.0	4,1	0,0	8,4	0,0	261,4	78,4	91,4	437,5	381,6	354,7	344,6	354,9	888,2	0,17	78,89	78,86	81,99	0,17	79,19	79,55	81,98
200.0	443.0	4,1	0,0	8,2	0,0	260,8	78,5	91,3	434,8	381,6	354,4	344,6	354,6	885,2	0,17	78,89	78,87	81,94	0,17	79,21	79,52	81,94
201.0	444.0	4,0	0,0	8,5	0,0	259,7	78,5	91,2	434,6	379,7	354,2	344,8	354,6	873,8	0,17	78,87	78,87	81,93	0,17	79,20	79,52	81,92
202.0	445.0	4,0	0,0	8,7	0,0	257,4	78,6	91,0	434,6	378,3	353,9	344,9	354,2	824,3	0,17	78,87	78,87	81,92	0,17	79,19	79,54	81,90
203.0	446.0	4,0	0,0	8,6	0,0	254,0	78,5	90,9	434,7	376,9	353,6	345,0	354,0	796,9	0,17	78,85	78,87	81,88	0,17	79,17	79,53	81,84
204.0	447.0	3,9	0,0	8,6	0,0	250,3	78,5	90,3	434,2	376,3	353,3	345,0	353,8	784,0	0,17	78,85	78,87	81,87	0,17	79,19	79,52	81,81
205.0	448.0	3,9	0,0	8,5	0,0	247,4	78,4	90,4	434,1	375,0	353,2	345,3	353,7	776,4	0,17	78,85	78,87	81,85	0,17	79,17	79,53	81,75
206.0	449.0	3,9	0,0	8,5	0,0	244,3	78,6	90,0	433,3	375,0	352,9	345,4	353,3	768,4	0,17	78,83	78,88	81,83	0,17	79,16	79,53	81,73
207.0	450.0	3,9	0,0	8,5	0,0	241,9	78,5	89,7	431,4	374,9	352,8	345,2	353,1	762,2	0,17	78,80	78,88	81,84	0,17	79,13	79,52	81,70
208.0	451.0	3,8	0,0	8,5	0,0	239,2	78,3	89,9	429,5	369,2	352,6	345,4	353,4	758,9	0,17	78,80	78,87	81,81	0,17	79,11	79,52	81,66
209.0	452.0	3,8	0,0	8,4	0,0	236,7	78,6	89,2	427,2	367,6	352,5	345,5	353,4	756,5	0,17	78,78	78,87	81,77	0,17	79,12	79,50	81,65
210.0	453.0	3,8	0,0	8,3	0,0	234,4	78,6	89,0	424,7	367,8	352,2	345,3	352,9	754,8	0,17	78,86	78,88	81,77	0,17	79,14	79,52	81,61
211.0	454.0	3,8	0,0	8,3	0,0	232,9	78,7	89,2	422,5	366,7	352,3	345,7	352,7	755,6	0,17	78,83	78,88	81,74	0,17	79,14	79,53	81,58
212.0	455.0	3,7	0,0	8,1	0,0	230,5	78,5	89,0	419,9	364,5	352,0	345,5	352,2	755,9	0,17	78,76	78,87	81,67	0,17	79,10	79,51	81,53
213.0	456.0	3,7	0,0	8,2	0,0	228,9	78,5	88,9	416,9	362,8	352,1	345,6	352,1	755,0	0,17	78,77	78,88	81,67	0,17	79,09	79,50	81,51
214.0	457.0	3,7	0,0	8,0	0,0	227,4	78,6	88,7	414,0	361,2	352,1	345,7	351,5	753,3	0,17	78,78	78,88	81,63	0,17	79,08	79,51	81,49
215.0	458.0	3,7	0,0	8,0	0,0	225,8	78,3	88,6	411,4	358,6	352,0	345,9	351,4	752,3	0,17	78,72	78,89	81,56	0,17	79,05	79,51	81,43
216.0	459.0	3,7	0,0	7,9	0,0	224,3	78,6	88,4	408,4	356,6	351,9	345,9	351,2	751,7	0,17	78,68	78,87	81,53	0,17	79,07	79,48	81,39
217.0	460.0	3,6	0,0	7,9	0,0	223,3	78,5	88,2	405,3	354,9	351,8	345,6	351,0	747,9	0,17	78,64	78,85	81,52	0,17	78,99	79,46	81,35
218.0	461.0	3,6	0,0	7,9	0,0	222,2	78,4	88,4	402,4	353,7	351,7	345,5	350,9	746,6	0,17	78,70	78,86	81,50	0,17	79,04	79,47	81,31
219.0	462.0	3,6	0,0	7,8	0,0	221,4	78,4	88,4	399,8	352,3	351,8	345,1	350,2	744,2	0,17	78,72	78,88	81,46	0,17	79,03	79,50	81,28
220.0	463.0	3,6	0,0	7,7	0,0	220,3	78,4	88,0	397,4	350,7	351,6	345,0	350,1	741,3	0,17	78,71	78,87	81,43	0,17	79,02	79,47	81,23
221.0	464.0	3,6	0,0	7,7	0,0	219,0	78,3	87,8	394,6	350,1	351,6	344,7	349,4	739,4	0,17	78,68	78,86	81,40	0,17	79,00	79,47	81,20
222.0	465.0	3,6	0,0	7,7	0,0	218,0	78,3	88,1	392,4	349,5	351,5	344,7	349,1	735,8	0,17	78,67	78,86	81,37	0,17	78,99	79,46	81,18
223.0	466.0	3,5	0,0	7,7	0,0	217,0	78,5	87,8	390,2	349,2	351,4	344,4	348,6	731,5	0,17	78,65	78,84	81,33	0,17	78,99	79,46	81,13
224.0	467.0	3,5	0,0	7,6	0,0	216,0	78,4	87,3	387,7	348,1	351,0	344,0	348,4	730,1	0,17	78,62	78,83	81,30	0,17	78,96	79,43	81,09
225.0	468.0	3,5	0,0	7,5	0,0	215,4	78,4	87,5	385,8	347,0	350,8	343,8	348,0	728,8	0,17	78,60	78,84	81,27	0,17	78,96	79,43	81,07
226.0	469.0	3,5	0,0	7,6	0,0	214,2	78,4	87,5	383,5	345,4	350,5	343,5	348,1	730,0	0,17	78,60	78,84	81,21	0,17	78,95	79,42	81,03
227.0	470.0	3,5	0,0	7,5	0,0	213,4	78,6	87,5	381,5	342,9	350,3	343,2	347,7	728,9	0,17	78,63	78,84	81,18	0,17	78,96	79,43	81,00
228.0	471.0	3,4	0,0	7,4	0,0	212,5	78,4	87,2	379,3	341,3	349,9	342,7	347,2	724,6	0,17	78,62	78,82	81,13	0,17	78,94	79,40	80,97
229.0	472.0	3,4	0,0	7,4	0,0	211,7	78,4	87,4	377,7	340,3	349,6	342,3	347,1	719,8	0,17	78,62	78,83	81,12	0,17	78,94	79,41	80,95
230.0	473.0	3,4	0,0	7,4	0,0	211,1	78,6	87,3	375,3	339,4	349,4	342,0	347,1	714,1	0,17	78,61	78,82	81,11	0,17	78,95	79,41	80,93
231.0	474.0	3,4	0,0	7,3	0,0	209,8	78,5	87,2	373,6	338,7	349,1	341,4	346,2	709,7	0,17	78,60	78,82	81,08	0,17	78,94	79,38	80,88
232.0	475.0	3,4	0,0	7,3	0,0	209,1	78,5	87,0	372,1	337,6	349,0	341,0	345,7	705,6	0,17	78,62	78,83	81,05	0,17	78,93	79,40	80,86
233.0	476.0	3,4	0,0	7,2	0,0	208,3	78,5	86,7	370,6	336,6	348,7	340,6	345,9	700,6	0,17	78,59	78,82	81,04	0,17	78,91	79,38	80,83
234.0	477.0	3,4	0,0	7,3	0,0	207,2	78,3	86,6	369,4	335,4	348,2	340,1	345,4	696,0	0,17	78,59	78,83	81,01	0,17	78,92	79,39	80,79
235.0	478.0	3,3	0,0	7,3	0,0	206,2	78,6	86,8	367,9	333,8	347,9	339,5	345,1	695,9	0,17	78,55	78,82	80,98	0,17	78,90	79,37	80,77
236.0	479.0	3,3	0,0	7,3	0,0	205,1	78,6	86,6	366,7	332,8	347,4	339,1	344,7	693,4	0,17	78,55	78,81	80,96	0,17	78,89	79,37	80,74
237.0	480.0</																					

275.0	518.0	2,7	0,0	7,4	0,0	192,2	78,5	85,6	334,2	313,4	331,1	320,5	339,6	687,6	0,17	78,80	78,91	80,32	0,17	79,13	79,42	80,05
276.0	519.0	2,7	0,0	7,4	0,0	192,5	78,5	85,4	333,8	313,0	330,7	320,2	339,7	690,1	0,17	78,79	78,92	80,30	0,17	79,12	79,44	80,05
277.0	520.0	2,7	0,0	7,4	0,0	192,9	78,3	85,4	333,0	312,4	330,2	319,9	340,3	690,3	0,17	78,71	78,89	80,29	0,17	79,09	79,41	80,04
278.0	521.0	2,7	0,0	7,5	0,0	192,9	78,2	85,8	333,1	312,1	329,8	319,6	339,9	693,4	0,17	78,72	78,90	80,29	0,17	79,07	79,41	80,00
279.0	522.0	2,7	0,0	7,7	0,0	192,8	78,5	85,7	332,6	311,8	329,4	319,1	339,5	691,5	0,17	78,70	78,90	80,27	0,17	79,07	79,42	80,01
280.0	523.0	2,6	0,0	7,8	0,0	192,7	78,4	85,7	331,9	311,4	329,0	318,9	340,3	687,6	0,17	78,71	78,90	80,26	0,17	79,07	79,41	80,01
281.0	524.0	2,6	0,0	7,9	0,0	192,7	78,0	85,5	332,1	311,0	328,5	318,6	340,8	686,0	0,17	78,69	78,89	80,24	0,17	79,05	79,40	80,02
282.0	525.0	2,6	0,0	8,0	0,0	192,0	78,2	85,8	331,7	310,6	328,0	318,4	340,4	687,3	0,17	78,75	78,91	80,24	0,17	79,08	79,41	80,00
283.0	526.0	2,6	0,0	8,0	0,0	192,1	78,1	85,3	331,4	310,2	327,6	318,1	340,2	688,6	0,17	78,75	78,91	80,23	0,17	79,09	79,40	79,99
284.0	527.0	2,6	0,0	7,9	0,0	191,7	78,1	85,4	331,3	309,9	327,0	317,9	340,2	687,3	0,17	78,77	78,92	80,23	0,17	79,13	79,40	79,98
285.0	528.0	2,6	0,0	7,8	0,0	191,6	78,2	85,2	330,7	309,5	326,6	317,7	340,7	688,9	0,17	78,75	78,91	80,23	0,17	79,12	79,40	79,95
286.0	529.0	2,6	0,0	7,8	0,0	191,4	78,3	85,3	330,6	309,2	326,3	317,6	340,6	690,5	0,17	78,76	78,92	80,22	0,17	79,13	79,40	79,96
287.0	530.0	2,5	0,0	8,0	0,0	191,3	78,1	85,1	330,6	308,9	325,9	317,4	340,8	690,3	0,17	78,75	78,92	80,21	0,17	79,12	79,39	79,96
288.0	531.0	2,5	0,0	8,0	0,0	191,6	78,2	84,7	330,4	308,6	325,3	317,1	340,8	690,9	0,17	78,76	78,92	80,19	0,17	79,13	79,40	79,95
289.0	532.0	2,5	0,0	8,0	0,0	191,4	78,4	85,1	330,0	308,3	325,0	317,0	341,5	689,2	0,17	78,74	78,91	80,20	0,17	79,12	79,39	79,94
290.0	533.0	2,5	0,0	8,0	0,0	191,0	78,2	85,4	329,9	308,0	324,7	316,8	342,2	687,9	0,17	78,73	78,91	80,18	0,17	79,12	79,38	79,90
291.0	534.0	2,5	0,0	8,0	0,0	190,9	78,2	85,5	329,9	307,7	324,4	316,3	341,6	687,4	0,17	78,74	78,91	80,19	0,17	79,13	79,38	79,92
292.0	535.0	2,4	0,0	8,0	0,0	191,0	77,8	84,9	329,6	307,5	324,0	316,4	341,8	687,6	0,17	78,70	78,91	80,16	0,17	79,09	79,38	79,91
293.0	536.0	2,4	0,0	8,0	0,0	191,0	77,7	84,8	329,8	307,1	323,6	316,3	342,2	686,7	0,17	78,62	78,91	80,12	0,17	79,03	79,35	79,90
294.0	537.0	2,4	0,0	8,0	0,0	190,6	77,9	84,8	329,6	306,9	323,3	315,8	342,0	686,7	0,17	78,57	78,89	80,11	0,17	79,01	79,37	79,88
295.0	538.0	2,4	0,0	8,0	0,0	190,1	77,8	85,1	329,3	306,6	323,0	315,9	342,6	687,9	0,17	78,53	78,86	80,08	0,17	78,97	79,35	79,87
296.0	539.0	2,3	0,0	7,9	0,0	189,8	78,1	85,1	329,5	306,3	322,9	315,8	342,7	685,9	0,17	78,49	78,87	80,04	0,17	78,96	79,33	79,84
297.0	540.0	2,4	0,0	7,8	0,0	190,0	78,0	84,3	328,6	306,0	322,1	315,6	342,5	685,3	0,17	78,48	78,87	80,02	0,17	78,94	79,35	79,85
298.0	541.0	2,3	0,0	7,7	0,0	190,5	78,0	84,7	328,4	305,7	321,9	315,6	342,6	684,5	0,17	78,47	78,86	80,00	0,17	78,91	79,33	79,82
299.0	542.0	2,3	0,0	7,7	0,0	190,1	78,8	84,8	327,9	305,4	321,8	315,7	342,2	682,9	0,17	78,44	78,85	79,97	0,17	78,89	79,33	79,83
300.0	543.0	2,3	0,0	7,7	0,0	189,5	77,7	84,9	328,0	305,2	321,4	315,4	343,2	682,4	0,17	78,44	78,83	79,97	0,17	78,87	79,31	79,83
301.0	544.0	2,3	0,0	7,8	0,0	189,5	77,3	84,6	327,2	305,0	320,7	315,6	343,5	681,6	0,17	78,39	78,82	79,95	0,17	78,85	79,31	79,79
302.0	545.0	2,3	0,0	7,6	0,0	189,2	77,5	84,7	327,5	304,7	320,7	315,4	343,7	680,8	0,17	78,35	78,81	79,92	0,17	78,82	79,30	79,77
303.0	546.0	2,2	0,0	7,7	0,0	189,4	77,8	84,6	326,8	304,4	320,3	315,3	343,6	679,3	0,17	78,34	78,81	79,87	0,17	78,83	79,29	79,75
304.0	547.0	2,2	0,0	7,7	0,0	189,2	77,6	84,9	326,5	304,3	320,1	315,0	343,9	676,0	0,17	78,32	78,79	79,85	0,17	78,80	79,28	79,73
305.0	548.0	2,2	0,0	7,7	0,0	188,4	77,6	84,7	326,1	304,0	319,8	315,3	343,7	675,7	0,17	78,33	78,79	79,82	0,17	78,78	79,28	79,73
306.0	549.0	2,2	0,0	7,6	0,0	187,9	77,8	84,7	326,1	303,8	319,9	314,9	344,1	674,8	0,17	78,32	78,79	79,77	0,17	78,77	79,25	79,70
307.0	550.0	2,2	0,0	7,6	0,0	187,2	77,7	84,6	325,9	303,6	319,6	314,9	344,2	673,0	0,17	78,28	78,79	79,76	0,17	78,75	79,25	79,70
308.0	551.0	2,2	0,0	7,6	0,0	187,5	77,9	84,6	325,2	303,4	319,2	314,9	344,4	671,6	0,17	78,29	78,79	79,75	0,17	78,76	79,26	79,71
309.0	552.0	2,2	0,0	7,5	0,0	187,6	77,8	84,6	324,9	303,1	318,9	314,9	344,9	669,8	0,17	78,27	78,78	79,74	0,17	78,75	79,25	79,68
310.0	553.0	2,1	0,0	7,4	0,0	187,1	77,9	84,7	324,9	302,9	318,7	314,8	344,5	665,2	0,17	78,27	78,77	79,69	0,17	78,71	79,25	79,64
311.0	554.0	2,1	0,0	7,4	0,0	186,7	78,0	84,2	324,3	302,6	318,4	314,6	344,3	665,1	0,17	78,24	78,76	79,66	0,17	78,70	79,25	79,66
312.0	555.0	2,1	0,0	7,3	0,0	186,6	77,8	84,6	323,9	302,4	318,0	314,6	344,6	660,0	0,17	78,23	78,76	79,65	0,17	78,69	79,22	79,66
313.0	556.0	2,1	0,0	7,2	0,0	186,6	77,9	84,5	323,6	302,1	317,8	314,5	344,7	657,3	0,17	78,26	78,74	79,64	0,17	78,69	79,22	79,64
314.0	557.0	2,1	0,0	7,1	0,0	186,1	77,9	84,6	323,4	301,9	317,7	314,4	344,9	655,4	0,17	78,25	78,73	79,61	0,17	78,68	79,22	79,62
315.0	558.0	2,0	0,0	7,2	0,0	185,4	77,7	84,6	322,8	301,6	317,2	313,9	344,6	654,3	0,17	78,28	78,75	79,63	0,17	78,70	79,22	79,63
316.0	559.0	2,1	0,0	7,1	0,0	185,3	77,9	84,5	322,1	301,3	317,1	313,8	344,7	652,5	0,17	78,30	78,74	79,60	0,17	78,70	79,20	79,61
317.0	560.0	2,0	0,0	7,1	0,0	184,8	77,8	84,3	321,5	301,0	316,7	313,4	344,4	650,1	0,17	78,31	78,73	79,59	0,17	78,72	79,20	79,61
318.0	561.0	2,0	0,0	7,2	0,0	184,1	77,8	84,2	321,0	300,8	316,4	313,4	344,9	649,6	0,17	78,31	78,72	79,55	0,17	78,68	79,20	79,60
319.0	562.0	2,0	0,0	7,2	0,0	184,2	77,9	84,4	320,9	300,5	316,0	312,9	344,6	650,0	0,17	78,31	78,73	79,56	0,17	78,71	79,19	79,59
320.0	563.0	2,0	0,0	7,3	0,0	184,4	77,8	84,6	320,4	300,3	315,9	312,9	345,1	650,1	0,17	78,33	78,71	79,53	0,17	78,70	79,18	79,57
321.0	564.0	2,0	0,0	7,3	0,0	184,2	77,6	84,4	319,8	300,1	315,5	312,6	344,7	650,5	0,17	78,32	78,70	79,52	0,17	78,71	79,18	79,56
322.0	565.0	1,9	0,0	7,3	0,0	183,8	77,7	84,1	319,2	299,8	315,0	312,2	344,5	648,9	0,17	78,28	78,71	79,52	0,17	78,68	79,17	79,55
323.0	566.0	2,0	0,0	7,3	0,0	183,7	77,9	84,2	318,9	299,6	314,7	312,0	344,7	647,9	0,17	78,25	78,70	79,52	0,17	78,67	79,15	79,55
324.0	567.0	1,9	0,0	7,3	0,0	183,1	77,9	84,2	318,7	299,4	314,4	312,0	344,8	647,8	0,17	78,25	78,68	79,52	0,17	78,63	79,14	79,57
325.0	568.0	1,9	0,0	7,3	0,0	182,8	77,7	84,0	317,8	299,2	314,1	311,6	344,5	646,6	0,17	78,24	78,68	79,50	0,17	78,62	79,12	79,55
326.0	569.0	1,9	0,0	7,2	0,0	182,5	77,7	84,1	317,4	299,0	314,0	311,3	345,2	643,9	0,17	78,20	78,67	79,49	0,17	78,61	79,12	79,53
327.0	570.0	1,9	0,0	7,2	0,0	182,5	77,7	83,9	316,8	298,8	313,4	311,0	344,8	644,1	0,17	78,23	78,66	79,47	0,17	78,61	79,10	79,52
328.0	571.0	1,8	0,0	7,2	0,0	181,7	77,5	83,8	316,5	298,5	313,1	310,7	345,1	644,4	0,17	78,21	78,66	79,45	0,17	78,58	79,10	79,51
329.0	572.0	1,8	0,0	7,2	0,0	181,9	77,9	84,1	316,3	298,4	313,1	310,5	345,2	643,2	0,17	78,19	78,63	79,44	0,17	78,55	79,10	79,51
330.0	573.0	1,8																				

368.0	611.0	1,2	0,0	7,7	0,0	177,0	77,4	83,3	307,7	294,4	301,4	302,9	347,7	643,8	0,17	77,86	78,24	79,14	0,17	78,19	78,65	79,14
369.0	612.0	1,2	0,0	7,7	0,0	176,9	77,5	83,4	307,8	294,4	301,3	303,1	347,6	643,7	0,17	77,85	78,21	79,11	0,17	78,19	78,64	79,10
370.0	613.0	1,2	0,0	7,7	0,0	176,9	77,6	83,2	308,0	294,6	300,9	302,8	347,1	645,4	0,17	77,85	78,20	79,09	0,17	78,17	78,63	79,11
371.0	614.0	1,2	0,0	7,7	0,0	176,8	77,4	83,1	308,2	294,6	300,8	302,7	346,8	645,7	0,17	77,83	78,19	79,10	0,17	78,15	78,62	79,11
372.0	615.0	1,2	0,0	7,8	0,0	176,7	77,5	83,0	308,0	294,6	300,6	302,9	346,9	646,0	0,17	77,81	78,18	79,07	0,17	78,13	78,60	79,08
373.0	616.0	1,2	0,0	7,9	0,0	176,8	77,5	83,1	308,7	294,5	300,4	302,9	347,3	643,9	0,17	77,80	78,18	79,05	0,17	78,12	78,59	79,08
374.0	617.0	1,1	0,0	7,9	0,0	177,0	77,6	83,0	308,8	294,4	300,3	303,0	347,5	635,7	0,17	77,79	78,15	79,06	0,17	78,10	78,60	79,06
375.0	618.0	1,1	0,0	8,1	0,0	177,1	77,4	83,2	309,3	294,4	300,1	303,2	347,9	630,8	0,17	77,77	78,14	79,04	0,17	78,09	78,57	79,04
376.0	619.0	1,1	0,0	8,1	0,0	176,4	77,5	83,2	309,5	294,4	299,9	303,2	347,5	627,7	0,17	77,77	78,12	79,02	0,17	78,09	78,55	79,03
377.0	620.0	1,1	0,0	8,1	0,0	175,9	77,7	83,1	310,1	294,3	299,8	303,0	347,7	624,8	0,17	77,78	78,10	79,03	0,17	78,08	78,52	79,04
378.0	621.0	1,1	0,0	8,2	0,0	175,5	77,7	83,3	310,5	294,5	299,8	303,2	348,2	624,0	0,17	77,77	78,09	79,01	0,17	78,06	78,52	79,01
379.0	622.0	1,0	0,0	8,1	0,0	175,2	77,4	83,0	310,8	294,5	299,6	303,2	347,9	620,6	0,17	77,75	78,09	78,99	0,17	78,07	78,51	79,00
380.0	623.0	1,0	0,0	8,1	0,0	174,6	77,5	83,0	310,8	294,4	299,4	303,4	348,6	620,1	0,17	77,77	78,09	78,99	0,17	78,07	78,50	78,99
381.0	624.0	1,0	0,0	8,1	0,0	174,2	77,6	82,9	311,0	294,4	299,3	303,7	348,9	619,4	0,17	77,76	78,07	78,98	0,17	78,06	78,52	78,96
382.0	625.0	1,0	0,0	8,1	0,0	174,3	77,6	83,2	310,8	294,3	299,2	303,7	348,8	620,3	0,17	77,75	78,05	78,98	0,17	78,06	78,49	78,98
383.0	626.0	1,0	0,0	8,0	0,0	174,4	77,5	83,0	310,6	294,2	299,1	304,0	349,2	620,6	0,17	77,74	78,06	78,98	0,17	78,06	78,49	78,96
384.0	627.0	1,0	0,0	8,0	0,0	174,7	77,5	82,9	310,4	294,7	298,8	304,3	349,3	621,0	0,17	77,74	78,01	78,97	0,17	78,05	78,46	78,95
385.0	628.0	0,9	0,0	8,0	0,0	174,5	77,6	83,0	310,2	294,6	298,7	304,5	349,4	622,2	0,17	77,72	78,03	78,97	0,17	78,03	78,47	78,96
386.0	629.0	0,9	0,0	8,0	0,0	174,7	77,5	82,8	310,1	294,5	298,7	304,6	349,5	624,1	0,17	77,68	78,01	78,97	0,17	78,00	78,46	78,93
387.0	630.0	0,9	0,0	8,0	0,0	175,1	77,5	82,6	309,8	294,3	298,5	304,5	349,0	625,7	0,17	77,66	77,99	78,95	0,17	77,96	78,42	78,90
388.0	631.0	0,9	0,0	8,0	0,0	174,9	77,5	82,7	309,8	294,1	298,2	304,9	349,3	628,7	0,17	77,63	77,97	78,91	0,17	77,94	78,40	78,90
389.0	632.0	0,9	0,0	7,9	0,0	174,7	77,4	82,6	309,8	293,8	298,3	304,9	349,3	629,5	0,17	77,63	77,98	78,93	0,17	77,94	78,41	78,90
390.0	633.0	0,9	0,0	7,9	0,0	174,5	77,5	82,6	309,2	293,7	298,0	305,1	349,5	631,5	0,17	77,65	77,95	78,90	0,17	77,93	78,39	78,88
391.0	634.0	0,9	0,0	7,9	0,0	174,9	77,5	82,7	309,1	293,5	298,0	305,3	349,7	633,2	0,17	77,65	77,95	78,89	0,17	77,95	78,37	78,86
392.0	635.0	0,8	0,0	8,0	0,0	175,5	77,4	82,6	308,8	293,3	297,9	305,5	349,6	633,0	0,17	77,64	77,93	78,86	0,17	77,93	78,35	78,85
393.0	636.0	0,8	0,0	7,9	0,0	175,5	77,5	82,6	308,5	293,2	297,9	305,4	349,5	633,5	0,17	77,62	77,93	78,86	0,17	77,92	78,35	78,83
394.0	637.0	0,8	0,0	7,9	0,0	175,1	77,4	82,6	308,3	293,0	297,8	305,8	349,7	634,2	0,17	77,62	77,92	78,85	0,17	77,91	78,36	78,82
395.0	638.0	0,8	0,0	7,9	0,0	175,1	77,5	82,6	308,2	292,9	297,6	305,8	349,5	635,6	0,17	77,59	77,90	78,82	0,17	77,90	78,33	78,81
396.0	639.0	0,8	0,0	7,8	0,0	175,3	77,4	82,6	308,3	292,7	297,3	306,0	349,3	637,3	0,17	77,58	77,88	78,80	0,17	77,87	78,33	78,79
397.0	640.0	0,8	0,0	7,8	0,0	175,1	77,4	82,5	308,0	292,6	297,3	306,0	349,2	638,2	0,17	77,57	77,88	78,84	0,17	77,86	78,33	78,79
398.0	641.0	0,7	0,0	7,8	0,0	175,6	77,4	82,7	308,1	292,4	296,9	306,3	349,5	641,1	0,17	77,55	77,86	78,81	0,17	77,84	78,30	78,79
399.0	642.0	0,7	0,0	7,8	0,0	176,1	77,4	82,6	308,1	292,3	297,1	306,4	349,0	645,5	0,17	77,55	77,86	78,84	0,17	77,81	78,29	78,76
400.0	643.0	0,7	0,0	7,7	0,0	176,1	77,5	82,7	308,3	292,3	296,8	306,5	349,3	646,8	0,17	77,53	77,83	78,82	0,17	77,80	78,28	78,77
401.0	644.0	0,7	0,0	7,7	0,0	176,5	77,3	82,8	308,0	292,1	296,7	306,4	349,2	647,6	0,17	77,51	77,83	78,83	0,17	77,81	78,27	78,77
402.0	645.0	0,7	0,0	7,7	0,0	177,1	77,4	82,9	307,7	292,1	296,5	306,8	349,8	650,2	0,17	77,51	77,83	78,83	0,17	77,79	78,27	78,75
403.0	646.0	0,6	0,0	7,7	0,0	176,7	77,5	82,8	308,2	292,0	296,2	306,9	349,5	650,0	0,17	77,51	77,82	78,82	0,17	77,80	78,27	78,75
404.0	647.0	0,7	0,0	7,7	0,0	176,9	77,3	82,7	307,9	291,9	296,1	306,9	349,1	652,0	0,17	77,48	77,80	78,79	0,17	77,77	78,22	78,72
405.0	648.0	0,6	0,0	7,6	0,0	177,4	77,4	82,7	307,9	291,8	296,0	306,7	348,7	654,1	0,17	77,48	77,80	78,79	0,17	77,74	78,22	78,74
406.0	649.0	0,6	0,0	7,6	0,0	177,8	77,4	82,7	307,7	291,7	295,7	306,6	348,9	661,5	0,17	77,49	77,78	78,78	0,17	77,76	78,22	78,74
407.0	650.0	0,5	0,0	7,6	0,0	178,0	77,5	82,6	307,7	291,7	295,4	306,6	348,4	672,7	0,17	77,49	77,76	78,75	0,17	77,75	78,22	78,72
408.0	651.0	0,6	0,0	7,7	0,0	179,0	77,4	82,6	307,8	291,6	295,3	306,7	348,3	678,5	0,17	77,50	77,76	78,77	0,17	77,76	78,22	78,72
409.0	652.0	0,5	0,0	7,7	0,0	180,0	77,4	82,9	308,1	291,5	295,1	306,7	348,5	681,1	0,17	77,49	77,77	78,75	0,17	77,77	78,19	78,71
410.0	653.0	0,5	0,0	7,6	0,0	180,5	77,3	83,0	307,9	291,5	294,8	306,8	348,7	683,0	0,17	77,47	77,76	78,73	0,17	77,72	78,20	78,71
411.0	654.0	0,5	0,0	7,5	0,0	180,8	77,4	83,2	308,1	291,4	294,9	306,8	348,0	683,4	0,17	77,45	77,73	78,74	0,17	77,71	78,18	78,69
412.0	655.0	0,5	0,0	7,5	0,0	181,5	77,3	83,0	308,2	291,4	294,5	306,8	347,9	683,7	0,17	77,45	77,72	78,77	0,17	77,72	78,16	78,69
413.0	656.0	0,5	0,0	7,5	0,0	181,7	77,3	83,1	308,2	291,3	294,3	306,7	347,6	684,2	0,17	77,44	77,73	78,77	0,17	77,71	78,16	78,69
414.0	657.0	0,5	0,0	7,5	0,0	182,0	77,3	82,9	308,1	291,3	294,0	306,5	347,4	683,3	0,17	77,43	77,70	78,73	0,17	77,70	78,13	78,68
415.0	658.0	0,4	0,0	7,4	0,0	181,8	77,5	83,1	308,3	291,3	293,8	306,6	347,2	681,1	0,17	77,44	77,71	78,75	0,17	77,70	78,11	78,68
416.0	659.0	0,4	0,0	7,3	0,0	182,7	77,1	83,0	308,3	291,2	293,4	306,1	346,6	679,6	0,17	77,41	77,71	78,74	0,17	77,69	78,13	78,70
417.0	660.0	0,4	0,0	7,4	0,0	183,0	77,2	82,8	308,0	291,1	293,2	306,0	346,0	678,2	0,17	77,39	77,68	78,72	0,17	77,66	78,09	78,67
418.0	661.0	0,4	0,0	7,3	0,0	183,2	77,4	83,1	308,1	291,0	293,1	306,2	346,6	678,0	0,17	77,39	77,68	78,71	0,17	77,64	78,09	78,66
419.0	662.0	0,4	0,0	7,3	0,0	183,1	77,4	83,2	308,6	291,0	292,8	306,1	346,1	677,1	0,17	77,39	77,67	78,71	0,17	77,64	78,08	78,66
420.0	663.0	0,4	0,0	7,3	0,0	183,6	77,4	83,0	308,5	290,9	292,6	306,0	345,8	677,5	0,17	77,39	77,66	78,71	0,17	77,65	78,09	78,67
421.0	664.0	0,4	0,0	7,2	0,0	183,8	77,5	83,1	308,5	290,8	292,4	305,9	345,4	675,3	0,17	77,41	77,68	78,71	0,17	77,67	78,10	78,68
422.0	665.0	0,3	0,0	7,1	0,0	184,2	77,2	83,0	308,1	290,7	292,1	305,7	344,8	674,7	0,17	77,40	77,65	78,67	0,17	77,65	78,08	78,65
423.0	666.0	0,3																				

Manufacturer: HEARTHSTONE
Model: GM 80

Run: 4
Project #: PI 20177
Test Duration: 442 min

	HHV	LHV
Eff	80,70%	87,22%
Comb Eff	98,47%	98,47%
HT Eff	81,95%	88,58%
Output	16 961	kJ/h
Burn Rate	1,06	kg/h
Grams CO	199	g
Input	21 018	kJ/h
MC wet	17,50	

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:	80,70%	Dry Molecular Weight (M _d) 29,84
Combustion Efficiency:	98,47%	Dry Moles Exhaust Gas (N _e): 444,05
Heat Transfer Efficiency:	81,95%	Air Fuel Ratio (A/F) 12,74

Heat Output:	16 089 Btu/h	16 961 kJ/h
Heat Input:	19 938 Btu/h	21 018 kJ/h
Burn Duration:	7,37 h	
Burn Rate:	2,34 lb/h	1,061 kg/h
Stack Temp:	230,4 Deg. F	110,2 Deg. C

Date: 2018-09-25 Manufacturer: Hearthstone Model: GM 80
Project #: PF 20177 Run: 4 Tech: MM Reviewer: DP

	4.00 LBS	kindling	split fire
	Far	off	
	by pass	open	
At	35 LBS	close	Door
At	100 LBS	close	install 1" prebore
At	135 LBS	close	Door
At	21 LBS	install	2" prebore
At	153 LBS	close	Door
At	1200 LBS	close	bypass
At	71 LBS	close	air inlet (Drill bit 1/16)
At	47 LBS	open	Door open bypass
	Break coal	close	Door close bypass
After	2 min	open	Door open bypass
	open air inlet	install	load close Door
	close	by pass	
TEST LOAD CONFIGURATION			
After	5 min	close	air inlet (Drill bit 1/16)

PRE / POST CHECKS

 Date: 2018-09-25

 Manufacturer: Hearthstone

 Model: Gmgo

 Project #: PI 20177

 Run: 4

 Tech: Mr

 Reviewer: Dr

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
Em-191	7:50	ok	ok

Facility Conditions:

Air Velocity from less than 2 feet

Smoke Capture Check.....

Picture.....

Pre-Test		Post-Test	
0	(max50 Fpm)	0	(max50 Fpm)
ok		ok	
4 sides	ok	ok	

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

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

Traverse before ignition.....

 Flow Rate 140 cfm $\pm$ 10%.....

2018-09-19
2018-09-19
ok
ok
ok

Temperature System:

Ambient (65°-90°F).....

 Wood Heater Surface ($\pm$ 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
5	10	33
804	806	808
805	807	809
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

 Date: 2018-09-25

 Manufacturer: Heathco

 Model: GM 80

 Project #: PI 20177

 Run: 4

 Tech: mm

 Reviewer: Bo

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)	780159.60	782379.40	780159.76	782379.53	733171.95	735364.95
Initial 1minute DGM (Liter)	780159.50	782379.40	780159.76	782379.51	733171.94	735364.94
Change © (Liter)	0.10	0	0	0.02	0.01	0.03
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: 2018-09-25 Manufacturer: Heartline Model: GM 80
 Project #: PI 20177 Run: 4 Tech: MR Reviewer: DP

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

LIMITS OF WEIGHT RANGES

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

CONTINUOUS ANALYZERS

CONTINUOUS ANALYZERS

Date: 2018-09-25 Manufacturer: Hearlthstone Model: GM 80
 Project #: PI 20177 Run: 4 Tech: rr Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2.979	3.000	1.003	1.000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	17.92	18.00	9.78	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	2.985	1.001	0	0.02	0.006	0.15	0.002	0.05	✓	
CO ₂	0	17.85	9.80	0	0.02	0.007	0.5	0.02	0.5		

TEST DATA LOG

Date: 2018-09-25 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 2177 Run: 4 Tech: MM Reviewer: SO

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	782378.44	735364.95	1023.99
Initial (Liter)	780160.26	733173.08	942.01 DP

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102.5	100.5 101.8
Dry Bulb (F):	80.60	78.09
Humidity (%):	27.2	29.0

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

 Date: 2018 09 25

 Manufacturer: Hearthstone

 Model: GM 80

 Project #: PI 20177

 Run: 4

 Tech: mm

 Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
3 1/4 x 3 1/4 x 20.5 in.	4 888 lbs.	20.6	20.3	20.4	20.8	20.8
3 1/4 x 3 1/4 x 20.5 in.	5 140 lbs.	20.8	20.4	20.9	20.6	20.7
3 1/4 x 3 1/4 x 20.5 in.	5 14 lbs.	21.0	21.0	21.9	21.6	21.4
3 1/4 x 3 1/4 x 20.5 in.	4 530 lbs.	22.1	22.0	22.3	22.1	22.1
1 1/2 x 3/4 x 5 in.	0 120 lbs.			21.9		
1 1/2 x 3/4 x 5 in.	0 130 lbs.			21.6		
1 1/2 x 3/4 x 5 in.	0 112 lbs.			21.4		
1 1/2 x 3/4 x 5 in.	0 096 lbs.			21.7		
1 1/2 x 3/4 x 5 in.	0 116 lbs.			21.8		
1 1/2 x 3/4 x 5 in.	0 106 lbs.			21.9		
1 1/2 x 3/4 x 5 in.	0 106 lbs.			21.4		
1 1/2 x 3/4 x 5 in.	0 112 lbs.			21.8		
1 1/2 x 3/4 x 5 in.	0 100 lbs.			21.9		
1 1/2 x 3/4 x 5 in.	0 094 lbs.			21.8		
1 1/2 x 3/4 x 5 in.	0 116 0.136 lbs.			21.9		
1 1/2 x 3/4 x 5 in.	0 108 lbs.			21.3		
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

 TEST LOAD WEIGHT: 21,03 lbs

4,206 4,206 526
 20% 25%

FUEL DATA

Date: 2018-09-25 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 4 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*					
1 1/2 x 3 1/2 x 10 in.	0.920 lbs.	216	219	218	218	216	
1 1/2 x 3 1/2 x 10 in.	1.024 lbs.	220	209	214	219	213	
1 1/2 x 3 1/2 x 10 in.	1.008 lbs.	214	218	219	213	218	
1 1/2 x 3 1/2 x 10 in.	0.984 lbs.	219	216	218	213	219	
1 1/2 x 3 1/2 x 10 in.	0.910 lbs.	223	224	223	231	230	
1 1/2 x 3 1/2 x 10 in.	0.976 lbs.	219	213	216	214	219	
1 1/2 x 3 1/2 x 10 in.	0.910 lbs.	223	220	223	224	228	
1 1/2 x 3 1/2 x 10 in.	0.984 lbs.	219	213	214	215	215	
1 1/2 x 3 1/2 x 10 in.	1.008 lbs.	220	217	216	219	218	
1 1/2 x 3 1/2 x 10 in.	1.024 lbs.	230	231	234	236	239	
1 1/2 x 3 1/2 x 10 in.	0.920 lbs.	218	216	219	218	217	
1 1/2 x 3 1/2 x 10 in.	0.970 lbs.	220	218	217	216	213	
1 1/2 x 3 1/2 x 14 in.	1.466 lbs.	219	213	217	218	213	
1 1/2 x 3 1/2 x 14 in.	1.386 lbs.	220	219	223	224	226	
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: 1443 lbs

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018.09.14 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20173 Tech: MM Reviewer: BP

		SYSTEM 1 - 1 st hour					SYSTEM 1			
Pre-test Weight Record	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
2018-09-24	18:00	615047	01261	01269	342403	946396	01249	01260	346076	01283
2018-09-25	9:30	615046	01261	01268	342404	946397	01248	01259	346077	01284

		SYSTEM 1 - 1 st hour					SYSTEM 1			
Post-test Weight Record	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
2018-09-25	22:00	615055	01285	01257	342456	946419	01252	01250	346128	01288
2018-10-05	8:00	615049	01282	01257	342419	946405	01252	01250	346097	01287
2018-10-09	8:00	615045	01282	01257	342419	946405	01252	01250	346097	01287

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-24 4 Manufacturer: Heathstone Model: GM 80
 Project # PT 20177 Run: 4 Tech: MM Reviewer: NP

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2018-09-24	18:00	1093621	01243	01255
2018-09-25	9:30	1093622	01244	01256

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			
2018-09-25	22:00	1093630	01278	01252
2018-10-05	8:00	1093628	01277	01252
2018-10-09	8:00	1093628	01277	01252

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	5
Date	26-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	Dimensionless
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	6	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 20177
Date	26-09-2018
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	101,5
Barometer (in.Hg):	29,707169	29,97293872
Dry Bulb (F):	76,64	81,84
Humidity (%):	59,1	53
Air velocity (ft/min)	0	0

DGM #1	Final:	27675,677	cuft
	Initial:	27629,509	cuft
DGM #2	Final:	26014,235	cuft
	Initial:	25969,210	cuft

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

	Final:	783687,890	Liter
	Initial:	782380,560	Liter
	Final:	736641,080	Liter
	Initial:	735366,120	Liter

	Final:	225,750	cuft
	Initial:	122,980	cuft

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

248

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

Project nu.	PI 20177
Date	26-09-2018
Technicien	M.M

Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7535 cu. ft

Loading Density: 9,056 lbs./ft³
 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 37,981 lbs./ft³
 Dry Wood Density: 31,270806

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	0,95	22,1	22,6	22	22,3	22,1	21,109	52,50
1,5	3,5	10	1,064	21,9	21,6	21,8	21,9	21,6	23,15264	52,50
1,5	3,5	10	1,04	20,6	20,3	20,4	20,3	20,8	21,2992	52,50
1,5	3,5	10	1,05	21,9	21,6	21,8	21,8	21,9	22,89	52,50
1,5	3,5	10	1	22,4	22,8	22,3	22,8	22,4	22,54	52,50
1,5	3,5	10	1,01	21,9	21,3	21,9	21,8	21,9	21,9776	52,50
1,5	3,5	10	1,034	22,4	22,8	22,9	22,8	22,6	23,4718	52,50
1,5	3,5	10	1,048	21,9	21,8	22,4	22,8	23	23,45424	52,50
1,5	3,5	10	1,126	22,9	22,9	22,8	22,3	22	25,42508	52,50
1,5	3,5	10	1,062	21,9	21,8	21,8	21,8	21,9	23,19408	52,50
1,5	3,5	10	1,044	22,8	22,6	22,9	22,8	22,9	23,8032	52,50
1,5	3,5	14	1,492	23	22,8	22,6	22	22,1	33,57	73,50
1,5	3,5	14	1,472	22,1	21,8	20,9	21	21,3	31,53024	73,50
										0,00
1,5	3,5	10	1,02	22,1	22,3	22,8	22,3	22,1	22,7664	52,50
1,5	3,5	10	1,142	21,9	21,8	21,3	21,8	21,6	24,75856	52,50
1,5	3,5	10	0,994	21,8	21,9	21,6	21,3	21,3	21,45052	52,50
1,5	3,5	10	1,022	22,4	22,3	22,4	22,8	22,9	23,05632	52,50
1,5	3,5	10	1,122	21,1	21,3	21	21,3	21,3	23,7864	52,50
1,5	3,5	10	1,012	20,3	20,3	20,8	20,4	20,8	20,76624	52,50
1,5	3,5	10	0,984	20	20,1	20,3	20,4	20,8	19,99488	52,50
1,5	3,5	10	1	20	20,9	20,9	20,6	20,3	20,54	52,50
1,5	3,5	10	0,996	19,9	19,6	19,3	19,3	19,6	19,46184	52,50
1,5	3,5	10	0,972	20	20,3	20,3	20,2	20,8	19,75104	52,50
1,5	3,5	10	0,976	19,9	19,6	19,4	19,6	19,3	19,09056	52,50
1,5	3,5	14	1,502	20,1	20,3	20,4	20,8	20,3	30,61076	73,50
1,5	3,5	14	1,484	20,9	20,8	20,7	20,6	20,4	30,68912	73,50
										0,00
										0,00
										0,00
										0,00
										0,00

SUM MC: 614,13972

PreTest Load Weight: 28,62 lbs.

Dry Weight: 10,69 kg.

 Dry: 21,46
 Average Moisture Content: %
 21,46
 Must be 18-28

 Wet: 17,67
 must be 15,2-22

Project nu.	PI 20177
Date	26-09-2018
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
19,9	22,1	24,3

* 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): 31,7 lbs./ft3
Dry Wood Density: 26,1 lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	20,5	4,67	21,10	21,60	21,90	20,30	20,80	98,76608	251,13	21,1
3,5	3,5	20,5	4,66	21,40	21,60	21,20	21,30	21,90	100,18272	251,13	21,5
3,5	3,5	20,5	5,02	21,90	21,60	21,80	21,90	22,00	109,72416	251,13	21,8
3,5	3,5	20,5	5,24	22,00	21,80	21,90	21,90	22,10	114,87784	251,13	21,9
1,5	0,75	5	0,11			20,10			2,2512	5,63	20,1
1,5	0,75	5	0,12			20,30			2,436	5,63	20,3
1,5	0,75	5	0,10			20,60			2,1012	5,63	20,6
1,5	0,75	5	0,10			20,80			2,0384	5,63	20,8
1,5	0,75	5	0,11			20,90			2,3408	5,63	20,9
1,5	0,75	5	0,11			20,40			2,244	5,63	20,4
1,5	0,75	5	0,11			20,80			2,2464	5,63	20,8
1,5	0,75	5	0,11			20,10			2,2512	5,63	20,1
1,5	0,75	5	0,10			20,00			2	5,63	20,0
1,5	0,75	5	0,10			20,10			2,0904	5,63	20,1
1,5	0,75	5	0,12			20,80			2,5792	5,63	20,8
1,5	0,75	5	0,11			20,10			2,2512	5,63	20,1
										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	450,3808		20,7 %

Test Load Weight: 20,91 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	21,54	Dry(EPA)	21,54
		Dry(B415)	21,54

21,54
Must be 19-25

Wet: 17,72
must be 15,2-22

Coal Bed Range: lbs. to

5,2 lbs.

TEST CHARGE:

Coal bed weight:

lbs.

Project nu.	PI 20177
Date	26-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 0,26 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=
0,967

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,063	75,31	0,2510
B center	0,064	75,2	0,2530
A1	0,051	75,3	0,2258
A2	0,066	75,28	0,2569
A3	0,063	75,13	0,2510
A4	0,063	75,03	0,2510
B1	0,051	75,360	0,2258
B2	0,071	75,450	0,2665
B3	0,053	75,400	0,2302
B4	0,051	75,320	0,2258
AVERAGE	0,0596	75,2780	0,2437

Project nu.	PI 20177
Date	26-09-2018
Technicien	M.M

Filter set weight

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	7	521	522	13	39	523	524	20	40	800	801	29	802		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,4756	0,1280	0,1260	35,7139	110,2775	0,1267	0,1252	34,5637	110,1096	0,1266	0,1277	33,4455	0,1264	2108-09-25	18:00
Before (6)	61,4757	0,1281	0,1259	35,7140	110,2776	0,1267	0,1250	34,5638	110,1095	0,1266	0,1276	33,4454	0,1264	2018-09-26	10:00
After (1)	61,4760	0,1295	0,1256	35,7177	110,2780	0,1265	0,1245	34,5687	110,1097	0,1282	0,1270	33,4516	0,1267	2108-09-26	18:00
After (2)	61,4759	0,1292	0,1256	35,7158	110,2777	0,1265	0,1245	34,5656	110,1096	0,1282	0,1268	33,4485	0,1266	2018-10-05	08:00
After (3)	61,4759	0,1292	0,1256	35,7158	110,2777	0,1265	0,1245	34,5656	110,1096	0,1282	0,1268	33,4485	0,1266	2018-10-09	08:00
After (4)															
After (5)															
After (6)	61,4759	0,1292	0,1256	35,7158	110,2777	0,1265	0,1245	34,5656	110,1096	0,1282	0,1268	33,4485	0,1266	2018-10-09	08:00
Difference	0,0002	0,0011	-0,0003	0,0018	0,0001	-0,0002	-0,0005	0,0018	0,0001	0,0016	-0,0008	0,0031	0,0002		
Total (mg)		2,8				4				4			0,2		
Total ajusté (mg)		2,60				3,80				3,80					

Project nu.	PI 20177
Date	26-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,9 g/hr

Burn Rate : 1,721 Dry kg/hr

Test Duration: 272 min

PRESSURE FACTOR: DGM 1 0,97598
 DGM 2 0,97934
 DGM 3 0,99733

BAROMETRIC PRESSURE
 Average: 29,840054 in Hg
 Start: 29,707169 in Hg
 End: 29,972939 in Hg

TEMPERATURE FACTORS DGM 1 0,97177
 DGM 2 0,97068
 DGM 3 0,97392

DGM CONTROLLER VALUES

DGM 1 Final: 27675,677 Cuft
 Initial: 27629,509 Cuft

VOLUMES SAMPLED DGM 1 43,282 SCft
 DGM 2 42,434 SCft
 DGM 3 99,399 SCft

DGM 2 Final: 26014,235 Cuft
 Initial: 25969,210 Cuft

DGM #3 Final: 225,750 Cuft
 Initial: 122,980 Cuft

TOTAL TUNNEL VOLUME : 46242

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1068,377
 Sample Train 2: 1089,732

DGM 1 543,337 °R
 DGM 2 543,947 °R

Paticulate concentration
 Sample Train 1 0,000092 g/dscf
 Sample Train 2 0,000094 g/dscf
 Room 0,000002 g/dscf

CALIBRATION FACTORS

DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

TUNNEL FLOW RATE: 170,006 Dscfm

TOTAL EMISSIONS
 Sample Train 1 4,18 g
 Sample Train 2 4,27 g

PARTICULATE CATCH
 Total Sample Train 1: 4,00 mg
 Total Sample Train 2: 4,00 mg
 Total Sample Train 1 1st hour: 2,80 mg

EMISSION RATES
 Sample Train 1 0,92 g/hr
 Sample Train 2 0,94 g/hr

1st hour emission rate 2,99 g/hr

DEVIATION: 1,01%

Cs Train 1 Train 2
 9,242E-05 9,42643E-05

*		*	*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	*	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2
Elapsed		Weight				Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Catalyst	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO ₂	O ₂	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom	up	°F	°F	°F	°F	°F	°F	°F	°F
min		lbs	%	%	%	%F	%F	%F	%F	%F	%F	%F	%F		cutf/min	oF	oF	oF	cutf/min	oF	oF	oF
0.00	248.00	20.9	0.1	5.2	0.0	303.6	81.8	140.6	447.5	291.3	431.4	426.0	447.4	555.2	0.16	84.35	83.74	82.52	0.15	84.82	84.53	82.11
1.0	249.0	20.8	0.1	3.4	0.0	309.9	81.6	138.9	438.9	291.4	430.2	425.6	442.0	698.1	0.16	84.52	83.71	82.65	0.15	84.83	84.51	82.20
2.0	250.0	20.7	0.0	4.8	0.0	307.4	81.1	112.0	432.6	291.5	429.1	424.6	444.6	811.0	0.16	84.52	83.67	82.75	0.15	84.81	84.50	82.28
3.0	251.0	20.6	0.0	4.7	0.0	313.4	81.1	109.7	426.3	291.1	428.2	423.6	443.3	798.8	0.16	84.57	83.65	82.82	0.15	84.81	84.47	82.39
4.0	252.0	20.5	0.0	4.2	0.0	321.9	81.2	109.4	420.3	290.3	425.9	422.2	442.9	781.2	0.16	84.60	83.62	82.94	0.15	84.85	84.45	82.48
5.0	253.0	20.4	0.0	4.5	0.0	317.3	81.2	107.1	416.2	289.4	423.8	420.0	445.1	766.8	0.16	84.60	83.64	83.04	0.15	84.87	84.47	82.61
6.0	254.0	20.4	0.0	4.8	0.0	313.1	81.3	106.4	412.5	288.4	421.3	417.5	445.3	777.3	0.16	84.59	83.63	83.16	0.15	84.87	84.47	82.71
7.0	255.0	20.4	0.0	4.6	0.0	312.6	81.4	105.7	408.8	291.0	417.9	414.8	444.7	799.8	0.16	84.58	83.64	83.29	0.15	84.87	84.49	82.84
8.0	256.0	20.2	0.0	4.9	0.0	311.6	81.1	105.6	405.7	289.3	415.1	412.1	442.8	813.5	0.16	84.57	83.65	83.39	0.15	84.88	84.50	82.92
9.0	257.0	20.2	0.0	4.7	0.0	310.6	81.4	105.0	400.5	288.7	412.1	408.9	441.0	813.4	0.16	84.49	83.65	83.51	0.15	84.86	84.51	83.04
10.0	258.0	20.0	0.0	4.9	0.0	310.3	81.6	105.0	397.4	286.5	408.5	405.3	438.7	818.8	0.16	84.43	83.68	83.63	0.15	84.85	84.53	83.17
11.0	259.0	20.0	0.0	5.0	0.0	310.8	81.4	105.0	393.9	284.6	405.0	402.7	436.6	818.6	0.16	84.36	83.68	83.74	0.15	84.82	84.52	83.26
12.0	260.0	19.9	0.0	4.8	0.0	311.6	80.8	105.2	389.5	283.0	401.6	399.2	435.1	811.7	0.16	84.35	83.68	83.82	0.15	84.85	84.54	83.36
13.0	261.0	19.8	0.0	4.8	0.0	312.8	80.6	105.5	392.5	281.3	398.6	395.6	432.1	797.0	0.16	84.36	83.72	83.99	0.15	84.87	84.57	83.49
14.0	262.0	19.7	0.0	6.9	0.0	312.1	81.0	105.6	400.0	279.8	395.3	392.3	430.4	815.0	0.16	84.40	83.76	84.10	0.15	84.86	84.59	83.62
15.0	263.0	19.6	0.0	6.9	0.0	315.6	80.6	105.8	400.1	278.2	391.7	389.4	428.6	863.4	0.16	84.46	83.78	84.22	0.15	84.94	84.60	83.74
16.0	264.0	19.5	0.0	7.2	0.0	319.3	81.1	106.3	400.1	276.7	388.1	386.1	426.7	889.5	0.16	84.48	83.83	84.34	0.15	84.99	84.63	83.84
17.0	265.0	19.4	0.0	7.3	0.0	322.6	80.8	106.7	401.1	275.0	385.1	382.9	424.4	908.6	0.16	84.46	83.84	84.49	0.15	84.96	84.66	83.95
18.0	266.0	19.3	0.0	7.4	0.0	327.1	81.0	107.2	404.2	273.5	382.4	380.2	421.7	916.8	0.16	84.45	83.85	84.64	0.15	84.91	84.67	84.05
19.0	267.0	19.1	0.0	8.4	0.0	331.7	81.5	107.6	405.5	272.0	379.5	377.1	419.5	906.5	0.16	84.41	83.87	84.76	0.15	84.87	84.66	84.14
20.0	268.0	19.0	0.0	8.5	0.0	335.3	81.3	107.5	406.4	270.6	376.3	374.3	417.5	879.0	0.16	84.35	83.89	84.83	0.15	84.87	84.68	84.23
21.0	269.0	18.9	0.0	8.6	0.0	338.5	81.9	108.0	406.9	269.4	373.5	371.5	415.4	900.3	0.16	84.36	83.93	84.93	0.15	84.90	84.69	84.35
22.0	270.0	18.8	0.0	8.4	0.0	340.8	82.0	107.9	408.4	267.8	371.3	369.2	412.1	886.6	0.16	84.32	83.92	85.03	0.15	84.85	84.68	84.43
23.0	271.0	18.7	0.0	8.0	0.0	340.0	82.0	108.1	406.4	266.6	368.4	366.3	411.1	882.7	0.16	84.35	83.94	85.10	0.15	84.83	84.69	84.54
24.0	272.0	18.6	0.0	7.0	0.0	339.8	81.8	107.9	403.9	265.1	366.9	364.0	408.8	918.4	0.16	84.38	83.93	85.18	0.15	84.82	84.70	84.61
25.0	273.0	18.5	0.0	6.6	0.0	340.0	81.5	107.8	403.1	263.8	364.3	361.4	407.1	914.2	0.16	84.39	83.98	85.28	0.15	84.86	84.71	84.69
26.0	274.0	18.4	0.0	7.0	0.0	338.4	81.3	108.1	406.3	262.9	362.4	359.1	405.6	886.3	0.16	84.39	83.99	85.37	0.15	84.84	84.72	84.74
27.0	275.0	18.3	0.0	7.3	0.0	336.4	81.2	107.9	412.3	261.8	360.1	357.0	404.0	879.2	0.16	84.35	84.00	85.47	0.15	84.81	84.72	84.80
28.0	276.0	18.1	0.0	7.7	0.0	334.7	81.1	107.9	419.5	260.6	358.5	355.1	402.4	878.0	0.16	84.27	83.98	85.54	0.15	84.72	84.73	84.85
29.0	277.0	18.0	0.0	8.3	0.0	334.9	81.2	108.2	428.5	259.6	356.6	353.0	400.7	888.2	0.16	84.25	83.99	85.67	0.15	84.70	84.73	84.90
30.0	278.0	17.9	0.0	10.6	0.0	337.6	81.4	108.6	442.2	258.9	354.8	351.2	399.5	930.2	0.16	84.26	84.02	85.80	0.15	84.69	84.74	84.96
31.0	279.0	17.7	0.0	11.2	0.0	340.5	81.4	108.9	453.1	258.2	353.1	349.6	398.0	922.0	0.16	84.25	84.01	85.88	0.15	84.67	84.74	85.05
32.0	280.0	17.6	0.0	11.0	0.0	342.7	81.0	109.2	463.5	257.5	351.7	348.2	396.5	903.7	0.16	84.27	84.02	85.93	0.15	84.65	84.75	85.08
33.0	281.0	17.4	0.0	11.0	0.0	344.5	81.4	109.3	473.1	257.0	350.6	346.9	395.3	889.8	0.16	84.28	84.02	86.01	0.15	84.65	84.77	85.13
34.0	282.0	17.3	0.0	11.0	0.0	346.7	81.6	109.4	481.6	256.8	349.0	346.0	393.7	884.3	0.16	84.01	86.08	0.15	84.65	84.75	85.19	
35.0	283.0	17.1	0.0	11.1	0.0	348.3	82.2	110.0	490.8	256.5	348.1	344.8	392.3	888.0	0.16	84.31	84.03	86.16	0.15	84.68	84.78	85.23
36.0	284.0	17.0	0.0	11.4	0.0	350.3	82.3	110.2	499.1	256.4	347.8	343.9	390.9	871.9	0.16	84.38	84.04	86.22	0.15	84.73	84.77	85.28
37.0	285.0	16.8	0.0	11.4	0.0	350.8	82.1	110.3	505.3	256.6	347.3	342.9	390.0	869.0	0.16	84.43	84.06	86.28	0.15	84.74	84.78	85.33
38.0	286.0	16.7	0.0	11.5	0.0	351.5	82.5	110.5	511.5	256.5	347.1	341.9	388.7	865.0	0.16	84.50	84.08	86.33	0.15	84.81	84.79	85.38
39.0	287.0	16.5	0.0	11.7	0.0	352.0	82.2	110.8	515.9	256.3	347.5	341.1	387.3	862.4	0.16	84.54	84.10	86.41	0.15	84.84	84.80	85.43
40.0	288.0	16.3	0.0	11.9	0.0	352.5	82.7	110.9	521.7	256.6	347.2	340.4	386.2	859.9	0.16	84.51	84.09	86.43	0.15	84.82	84.81	85.46
41.0	289.0	16.2	0.0	11.9	0.0	352.3	83.2	110.7	527.1	256.4	347.8	339.8	384.1	856.0	0.16	84.54	84.13	86.49	0.15	84.86	84.84	85.48
42.0	290.0	16.0	0.0	11.9	0.0	352.6	83.3	110.8	531.9	256.9	348.1	339.7	383.2	854.6	0.16	84.55	84.14	86.55	0.15	84.91	84.85	85.53
43.0	291.0	15.9	0.0	12.1	0.0	353.6	82.9	111.2	535.6	257.7	348.4	339.2	382.2	851.5	0.16	84.57	84.15	86.59	0.15	84.95	84.85	85.56
44.0	292.0	15.7	0.0	12.2	0.0	354.7	83.4	111.3	541.8	257.7	349.3	339.1	380.1	852.5	0.16	84.62	84.18	86.65	0.15	84.95	84.85	85.61
45.0	293.0	15.5	0.0	12.3	0.0	355.1	83.3	111.3	549.0	256.2	349.7	339.2	379.4	853.9	0.16	84.64	84.18	86.72	0.15	84.95	84.85	85.66
46.0	294.0	15.4	0.0	13.2	0.0	355.7	84.1	111.6	553.0	256.6	350.5	339.4	378.4	856.0	0.16	84.61	84.18	86.77	0.15	84.96	84.86	85.69
47.0	295.0	15.2	0.0	12.2	0.0	354.1	83.1	111.4	554.9	256.8	351.6	339.6	376.7	829.2	0.16	84.63	84.21	86.80	0.15	84.97	84.88	85.73
48.0	296.0	15.1	0.0	10.9	0.0	351.5	82.9	111.0	556.0	256.7	352.4	340.1	375.6	810.5	0.16	84.65	84.22	86.81	0.15	84.99	84.91	85.78
49.0	297.0	15.0	0.0	10.2	0.0	349.1	82.9	110.5	555.6	256.6	353.7	340.2	374.5	814.9	0.16	84.64	84.22	86.82	0.15	84.94	84.89	85.77
50.0	298.0	14.9	0.0	10.1	0.0	347.1	83.1	110.2	553.6	257.0	354.5	340.7	373.4	831.8	0.16	84.61	84.21	86.85	0.15	84.91	84.90	85.79
51.0	299.0	14.7	0.0	10.9	0.0	347.4	83.2	110.0	554.2	257.3	355.6	341.0	371.4	856.7	0.16	84.61	84.23	86.92	0.15	84.91	84.93	85.79
52.0	300.0	14.5	0.0	12.																		

89.0	337.0	8.7	0.1	13.8	0.0	365.3	83.2	110.8	605.9	296.6	423.3	383.2	334.8	967.6	0.16	84.42	83.46	86.33	0.15	84.45	84.59	85.27
90.0	338.0	8.5	0.1	13.9	0.0	365.0	83.1	110.7	606.7	297.9	424.8	384.3	335.5	966.1	0.16	84.50	83.49	86.35	0.15	84.53	84.61	85.35
91.0	339.0	8.4	0.1	13.8	0.0	365.4	82.6	110.6	605.4	299.5	426.0	385.9	335.2	968.2	0.16	84.57	83.53	86.35	0.15	84.58	84.64	85.39
92.0	340.0	8.3	0.1	13.7	0.0	365.0	83.7	110.6	605.1	300.8	427.5	387.4	335.1	962.4	0.16	84.63	83.54	86.33	0.15	84.65	84.66	85.42
93.0	341.0	8.1	0.1	13.8	0.0	364.7	82.8	110.4	605.2	302.4	428.5	388.9	335.5	960.4	0.16	84.61	83.54	86.35	0.15	84.66	84.71	85.50
94.0	342.0	7.9	0.1	13.7	0.0	364.2	83.5	110.7	603.8	304.0	430.0	390.3	335.3	963.5	0.16	84.62	83.57	86.31	0.15	84.68	84.71	85.54
95.0	343.0	7.8	0.1	13.8	0.0	364.2	83.2	110.9	601.9	305.4	431.2	391.8	335.0	958.2	0.16	84.65	83.62	86.32	0.15	84.74	84.75	85.58
96.0	344.0	7.7	0.1	13.7	0.0	364.1	83.5	110.7	600.3	306.8	432.9	393.5	335.2	953.0	0.16	84.65	83.63	86.35	0.15	84.76	84.75	85.64
97.0	345.0	7.5	0.1	13.7	0.0	363.7	82.8	110.5	599.3	308.1	433.8	395.1	335.6	956.8	0.16	84.72	83.64	86.34	0.15	84.81	84.77	85.66
98.0	346.0	7.4	0.1	13.7	0.0	364.0	83.8	110.4	598.7	309.7	434.9	396.5	335.3	956.0	0.16	84.77	83.64	86.39	0.15	84.83	84.79	85.73
99.0	347.0	7.2	0.1	13.7	0.0	363.3	83.8	110.5	597.9	311.3	436.0	398.6	335.4	955.6	0.16	84.83	83.67	86.39	0.15	84.87	84.79	85.77
100.0	348.0	7.1	0.2	13.6	0.0	362.5	84.1	110.6	597.4	312.6	437.2	400.4	335.5	954.6	0.16	84.87	83.71	86.41	0.15	84.90	84.82	85.84
101.0	349.0	7.0	0.2	13.6	0.0	362.2	83.4	110.5	597.1	314.0	438.0	402.1	335.9	958.4	0.16	84.88	83.72	86.36	0.15	84.98	84.85	85.88
102.0	350.0	6.9	0.2	13.7	0.0	362.5	83.0	110.3	595.8	315.3	439.3	404.5	336.7	965.2	0.16	84.92	83.74	86.34	0.15	85.03	84.87	85.89
103.0	351.0	6.7	0.2	13.7	0.0	362.2	83.6	110.1	596.2	316.8	440.1	406.3	337.4	963.9	0.16	84.94	83.74	86.32	0.15	85.06	84.88	85.92
104.0	352.0	6.6	0.2	13.7	0.0	361.8	83.2	109.7	595.4	318.1	441.6	408.2	337.4	962.1	0.16	84.94	83.75	86.31	0.15	85.03	84.88	85.92
105.0	353.0	6.5	0.2	13.6	0.0	361.2	83.0	109.8	594.7	319.8	442.6	410.0	337.4	961.6	0.16	84.91	83.76	86.31	0.15	85.06	84.90	85.95
106.0	354.0	6.3	0.2	13.6	0.0	361.2	83.3	109.9	594.2	321.2	443.6	412.1	337.3	965.4	0.16	85.01	83.79	86.34	0.15	85.12	84.92	85.96
107.0	355.0	6.2	0.2	13.6	0.0	360.5	83.0	109.7	593.9	321.4	444.7	414.0	337.6	968.9	0.16	84.94	83.78	86.33	0.15	85.08	84.91	85.97
108.0	356.0	6.1	0.2	13.6	0.0	359.5	83.5	109.8	593.9	322.3	445.8	416.0	338.2	973.5	0.16	85.02	83.83	86.36	0.15	85.15	84.94	86.02
109.0	357.0	6.0	0.2	13.5	0.0	359.6	82.8	109.9	593.2	322.9	447.2	418.2	337.9	975.8	0.16	85.10	83.85	86.39	0.15	85.19	84.96	86.06
110.0	358.0	5.8	0.2	13.6	0.0	359.2	83.0	109.5	593.1	323.4	448.3	420.6	338.2	978.0	0.16	85.09	83.88	86.39	0.15	85.21	84.99	86.11
111.0	359.0	5.7	0.3	13.7	0.0	358.8	83.3	109.7	593.5	324.6	449.2	422.3	339.0	976.8	0.16	84.98	83.86	86.36	0.15	85.09	84.99	86.13
112.0	360.0	5.6	0.4	13.7	0.0	358.2	83.3	109.4	592.7	324.5	450.4	424.0	339.3	970.3	0.16	84.96	83.87	86.36	0.15	85.04	84.98	86.13
113.0	361.0	5.5	0.3	13.7	0.0	357.4	83.5	109.5	592.0	325.2	451.8	426.0	339.0	963.6	0.16	84.92	83.85	86.39	0.15	85.02	84.98	86.13
114.0	362.0	5.4	0.2	13.6	0.0	356.3	83.5	109.0	595.6	325.9	452.7	427.7	338.9	947.3	0.16	84.83	83.86	86.38	0.15	84.96	84.98	86.19
115.0	363.0	5.3	0.2	13.3	0.0	353.8	83.4	109.0	590.7	327.2	453.9	429.9	340.0	923.7	0.16	84.74	83.85	86.37	0.15	84.89	84.98	86.19
116.0	364.0	5.2	0.2	12.8	0.0	351.4	83.5	108.3	589.2	327.4	455.1	432.0	340.8	883.7	0.16	84.61	83.83	86.32	0.15	84.76	84.95	86.19
117.0	365.0	5.1	0.1	12.3	0.0	347.9	83.6	108.3	587.2	328.3	456.4	433.2	340.9	854.0	0.16	84.55	83.84	86.36	0.15	84.70	84.94	86.24
118.0	366.0	5.0	0.1	12.3	0.0	345.0	83.2	108.0	584.7	329.6	457.6	435.2	341.3	843.5	0.16	84.54	83.83	86.34	0.15	84.64	84.92	86.21
119.0	367.0	4.9	0.1	12.2	0.0	342.7	83.1	107.5	582.3	330.3	458.7	437.2	342.3	842.2	0.16	84.53	83.85	86.35	0.15	84.64	84.91	86.23
120.0	368.0	4.8	0.1	12.2	0.0	340.9	83.7	107.4	579.7	329.4	459.5	439.0	342.8	842.0	0.16	84.51	83.84	86.35	0.15	84.64	84.92	86.23
121.0	369.0	4.7	0.2	12.2	0.0	339.5	82.8	107.1	578.0	330.7	460.8	440.2	343.1	832.5	0.16	84.40	83.83	86.32	0.15	84.60	84.91	86.22
122.0	370.0	4.6	0.2	12.0	0.0	337.6	83.5	107.2	576.8	331.4	461.5	441.3	344.3	820.2	0.16	84.35	83.82	86.32	0.15	84.56	84.94	86.21
123.0	371.0	4.6	0.2	11.8	0.0	334.6	83.8	106.8	573.6	332.9	462.7	442.2	344.9	807.1	0.16	84.36	83.84	86.29	0.15	84.56	84.94	86.21
124.0	372.0	4.5	0.2	11.6	0.0	333.2	83.6	106.1	570.9	332.2	463.8	444.5	345.6	795.5	0.16	84.30	83.84	86.27	0.15	84.55	84.93	86.14
125.0	373.0	4.4	0.2	11.5	0.0	331.3	83.3	105.7	568.2	333.0	464.4	445.8	346.8	789.7	0.16	84.16	83.83	86.25	0.15	84.46	84.93	86.14
126.0	374.0	4.3	0.1	11.4	0.0	329.3	83.3	105.3	567.7	331.8	464.8	446.5	347.1	782.2	0.16	84.02	83.81	86.19	0.15	84.39	84.91	86.10
127.0	375.0	4.3	0.1	11.3	0.0	327.4	83.3	105.2	564.2	332.4	465.2	447.7	347.9	775.1	0.16	83.94	83.78	86.16	0.15	84.31	84.89	86.10
128.0	376.0	4.2	0.1	11.1	0.0	324.3	83.4	104.6	560.5	332.6	465.6	448.6	348.9	767.3	0.16	83.90	83.78	86.13	0.15	84.27	84.89	86.10
129.0	377.0	4.1	0.0	10.8	0.0	321.6	82.7	104.1	555.4	334.8	465.8	449.4	349.9	759.1	0.16	83.83	83.75	86.07	0.15	84.14	84.87	86.07
130.0	378.0	4.1	0.0	10.5	0.0	318.4	83.0	103.6	550.4	335.7	466.2	450.1	351.0	751.0	0.16	83.75	83.72	86.05	0.15	84.07	84.84	86.06
131.0	379.0	4.1	0.0	10.0	0.0	315.2	83.1	103.4	546.1	336.5	466.1	451.7	352.6	742.3	0.16	83.78	83.73	86.01	0.15	84.03	84.82	86.06
132.0	380.0	4.0	0.0	9.6	0.0	311.2	83.5	103.0	539.6	336.2	466.5	452.6	353.2	735.0	0.16	83.80	83.69	85.98	0.15	84.04	84.79	86.04
133.0	381.0	4.0	0.0	9.2	0.0	307.2	82.9	102.6	534.2	334.8	466.5	453.2	354.7	731.0	0.16	83.85	83.72	85.93	0.15	84.08	84.80	86.01
134.0	382.0	3.9	0.0	9.1	0.0	303.8	82.8	102.1	527.4	338.8	467.1	453.8	355.4	730.1	0.16	83.86	83.71	85.87	0.15	84.06	84.78	85.97
135.0	383.0	3.9	0.0	9.1	0.0	300.9	82.8	101.8	523.3	338.6	467.0	454.4	356.0	728.0	0.16	83.83	83.72	85.85	0.15	84.05	84.78	85.98
136.0	384.0	3.9	0.0	9.0	0.0	298.0	83.0	101.2	516.7	334.0	466.9	455.1	357.0	725.1	0.16	83.78	83.70	85.79	0.15	84.02	84.76	85.94
137.0	385.0	3.8	0.0	9.0	0.0	295.4	83.3	101.4	512.6	333.4	467.0	455.2	358.4	723.5	0.16	83.75	83.69	85.76	0.15	84.00	84.75	85.93
138.0	386.0	3.8	0.0	9.0	0.0	293.2	82.9	101.0	506.3	331.6	466.8	455.8	359.5	723.4	0.16	83.73	83.68	85.72	0.15	83.98	84.74	85.87
139.0	387.0	3.7	0.0	9.0	0.0	290.4	82.9	100.4	501.0	328.8	466.1	456.5	361.2	721.3	0.16	83.71	83.68	85.66	0.15	83.94	84.72	85.84
140.0	388.0	3.7	0.0	9.0	0.0	288.3	83.0	100.1	494.7	329.5	465.7	456.9	361.2	719.7	0.16	83.63	83.65	85.60	0.15	83.90	84.70	85.78
141.0	389.0	3.7	0.0	8.9	0.0	287.0	82.6	100.0	489.8	328.5	465.5	457.5	362.4	719.0	0.16	83.61	83.63	85.52	0.15	83.86	84.68	85.72
142.0	390.0	3.6	0.0	8.9	0.0	284.9	83.1	100.2	485.1	328.5	464.8	457.8	363.5	718.3	0.16	83.60	83.63	85.53	0.15	83.88	84.66	85.71
143.0	391.0	3.6	0.0	8.9	0.0	283.6	83.1	99.9	481.4	327.9	464.7	458.1	364.4	718.1	0.16	83.56	83.62					

182.0	430.0	2,4	0,0	8,6	0,0	265,1	81,9	96,6	401,4	301,6	437,5	441,6	380,6	718,3	0,16	82,42	83,24	84,17	0,15	82,86	84,17	84,19
183.0	431.0	2,4	0,0	8,6	0,0	265,5	82,1	96,6	400,5	301,4	436,8	440,8	381,1	717,3	0,16	82,43	83,23	84,14	0,15	82,85	84,15	84,17
184.0	432.0	2,4	0,0	8,9	0,0	265,0	81,8	96,3	399,4	300,8	435,8	440,2	381,7	702,4	0,16	82,38	83,20	84,08	0,15	82,82	84,13	84,10
185.0	433.0	2,3	0,0	8,8	0,0	264,4	81,6	96,3	399,7	300,8	435,2	439,4	381,7	696,7	0,16	82,33	83,17	84,05	0,15	82,78	84,13	84,07
186.0	434.0	2,3	0,0	8,8	0,0	264,1	81,6	96,2	399,6	300,3	434,6	438,7	382,7	694,6	0,16	82,29	83,15	84,02	0,15	82,73	84,10	84,04
187.0	435.0	2,3	0,0	8,8	0,0	264,0	81,8	96,1	398,0	299,8	434,0	437,9	384,2	693,7	0,16	82,27	83,14	84,02	0,15	82,73	84,09	84,03
188.0	436.0	2,2	0,0	8,8	0,0	263,3	81,8	96,0	397,2	299,2	433,5	436,9	385,0	693,8	0,16	82,24	83,10	83,99	0,15	82,70	84,06	83,99
189.0	437.0	2,2	0,0	8,8	0,0	263,3	81,9	96,1	396,8	298,2	432,9	435,8	386,5	693,7	0,16	82,19	83,10	83,91	0,15	82,67	84,04	83,94
190.0	438.0	2,2	0,0	8,8	0,0	262,9	81,7	96,2	398,0	297,9	432,1	435,0	387,6	692,8	0,16	82,19	83,08	83,92	0,15	82,64	84,04	83,93
191.0	439.0	2,2	0,0	8,8	0,0	263,1	81,8	96,0	396,1	297,4	431,5	434,0	389,4	692,4	0,16	82,23	83,08	83,89	0,15	82,64	84,03	83,92
192.0	440.0	2,1	0,0	8,8	0,0	262,5	81,8	95,8	395,2	296,9	431,1	433,0	391,5	691,9	0,16	82,19	83,08	83,87	0,15	82,64	84,01	83,89
193.0	441.0	2,1	0,0	8,8	0,0	262,4	81,6	96,0	395,1	296,6	430,3	432,3	393,6	691,8	0,16	82,21	83,06	83,83	0,15	82,64	84,00	83,88
194.0	442.0	2,1	0,0	8,8	0,0	262,7	81,8	95,7	394,3	295,8	429,4	431,2	395,8	691,2	0,16	82,13	83,01	83,79	0,15	82,56	83,97	83,81
195.0	443.0	2,1	0,0	8,8	0,0	262,1	81,8	95,7	393,4	295,9	428,7	430,1	398,2	690,1	0,16	82,02	82,98	83,75	0,15	82,49	83,94	83,76
196.0	444.0	2,0	0,0	8,9	0,0	261,7	81,8	95,7	393,1	296,0	428,5	429,5	399,9	692,1	0,16	81,92	82,96	83,72	0,15	82,44	83,93	83,75
197.0	445.0	2,0	0,0	8,8	0,0	261,7	81,3	95,5	392,6	295,3	427,9	428,5	402,6	691,9	0,16	81,89	82,92	83,65	0,15	82,42	83,87	83,72
198.0	446.0	2,0	0,0	8,8	0,0	261,3	81,3	95,5	391,8	294,5	427,4	427,8	405,5	691,1	0,16	81,94	82,93	83,70	0,15	82,45	83,87	83,72
199.0	447.0	1,9	0,0	8,9	0,0	260,8	81,7	95,3	391,7	293,9	426,7	426,9	407,2	688,9	0,16	81,96	82,92	83,62	0,15	82,44	83,86	83,70
200.0	448.0	1,9	0,0	8,8	0,0	260,8	81,3	95,3	391,6	292,9	426,3	425,6	408,9	686,3	0,16	81,94	82,90	83,59	0,15	82,41	83,84	83,68
201.0	449.0	1,9	0,0	8,8	0,0	260,3	81,5	95,6	390,8	292,3	425,3	425,2	411,3	686,3	0,16	81,92	82,89	83,59	0,15	82,41	83,85	83,67
202.0	450.0	1,9	0,0	8,8	0,0	260,6	81,2	95,8	391,2	291,3	424,9	424,2	413,3	685,0	0,16	81,93	82,87	83,58	0,15	82,39	83,83	83,67
203.0	451.0	1,8	0,0	8,8	0,0	260,4	81,6	95,6	390,5	290,3	424,2	423,8	415,8	684,4	0,16	81,96	82,86	83,55	0,15	82,42	83,81	83,66
204.0	452.0	1,8	0,0	8,8	0,0	260,2	80,9	95,3	389,3	289,6	423,8	422,8	417,9	684,4	0,16	81,95	82,86	83,55	0,15	82,41	83,82	83,61
205.0	453.0	1,8	0,0	8,8	0,0	260,3	81,4	95,4	388,9	289,1	422,9	422,0	420,4	686,9	0,16	81,92	82,83	83,52	0,15	82,34	83,77	83,56
206.0	454.0	1,8	0,0	8,8	0,0	260,0	81,6	95,5	388,9	288,5	422,5	421,7	421,9	687,7	0,16	81,90	82,82	83,50	0,15	82,31	83,74	83,54
207.0	455.0	1,7	0,0	8,9	0,0	260,2	81,1	95,3	389,1	287,3	421,6	420,9	423,8	688,7	0,16	81,83	82,80	83,48	0,15	82,25	83,76	83,51
208.0	456.0	1,7	0,0	8,8	0,0	260,1	81,0	95,3	388,0	286,6	421,6	420,2	425,7	689,5	0,16	81,70	82,79	83,44	0,15	82,16	83,73	83,46
209.0	457.0	1,6	0,0	8,8	0,0	260,1	81,2	94,8	387,9	286,1	421,0	419,5	427,9	691,5	0,16	81,61	82,73	83,41	0,15	82,08	83,70	83,43
210.0	458.0	1,7	0,0	8,8	0,0	260,4	81,1	94,7	388,5	285,5	420,4	418,5	429,6	693,0	0,16	81,72	82,78	83,32	0,15	82,20	83,67	83,42
211.0	459.0	1,6	0,0	8,8	0,0	260,6	80,9	95,2	388,7	284,8	419,9	417,7	431,4	690,4	0,16	81,93	82,82	83,30	0,15	82,38	83,66	83,44
212.0	460.0	1,5	0,0	8,8	0,0	260,7	81,4	95,3	386,8	284,0	419,4	417,4	433,5	690,5	0,16	81,99	82,82	83,28	0,15	82,41	83,66	83,43
213.0	461.0	1,5	0,0	8,6	0,0	260,4	80,9	95,4	386,7	283,5	418,6	416,4	435,4	699,6	0,16	81,95	82,79	83,28	0,15	82,34	83,65	83,44
214.0	462.0	1,5	0,0	8,5	0,0	260,6	81,2	95,5	386,2	282,9	418,0	415,9	437,4	705,2	0,16	81,90	82,75	83,26	0,15	82,30	83,61	83,41
215.0	463.0	1,5	0,0	8,5	0,0	260,9	81,4	95,5	385,6	282,5	417,6	415,9	439,0	707,3	0,16	81,87	82,71	83,28	0,15	82,25	83,59	83,40
216.0	464.0	1,5	0,0	8,5	0,0	261,5	81,5	95,4	385,5	282,0	417,2	415,2	440,5	710,0	0,16	81,85	82,68	83,29	0,15	82,20	83,55	83,38
217.0	465.0	1,4	0,0	8,4	0,0	260,9	81,2	95,4	384,9	281,4	416,5	414,8	442,0	710,2	0,16	81,81	82,65	83,24	0,15	82,15	83,55	83,38
218.0	466.0	1,4	0,0	8,5	0,0	261,5	81,6	95,3	384,5	280,7	416,3	414,4	443,3	710,9	0,16	81,78	82,63	83,26	0,15	82,10	83,53	83,37
219.0	467.0	1,4	0,0	8,5	0,0	261,3	81,0	95,5	384,9	280,0	415,5	414,0	444,0	712,7	0,16	81,75	82,59	83,25	0,15	82,09	83,49	83,33
220.0	468.0	1,3	0,0	8,5	0,0	261,5	81,1	95,6	384,4	279,3	415,4	413,1	445,0	715,2	0,16	81,78	82,56	83,25	0,15	82,08	83,48	83,34
221.0	469.0	1,3	0,0	8,5	0,0	261,4	81,2	95,6	384,4	278,6	414,6	413,2	447,0	715,1	0,16	81,80	82,53	83,21	0,15	82,08	83,47	83,30
222.0	470.0	1,3	0,0	8,4	0,0	261,7	80,8	95,3	384,1	278,0	413,8	412,0	448,2	715,5	0,16	81,80	82,54	83,21	0,15	82,11	83,48	83,31
223.0	471.0	1,3	0,0	8,3	0,0	262,0	81,2	95,5	383,1	277,5	413,4	412,0	448,4	716,8	0,16	81,79	82,54	83,20	0,15	82,12	83,47	83,30
224.0	472.0	1,3	0,0	8,3	0,0	262,6	81,2	95,4	382,1	277,0	412,9	411,4	449,7	717,2	0,16	81,82	82,52	83,21	0,15	82,15	83,47	83,29
225.0	473.0	1,2	0,0	8,4	0,0	263,1	81,3	95,3	381,4	276,6	412,4	410,8	450,0	717,9	0,16	81,82	82,52	83,18	0,15	82,14	83,45	83,28
226.0	474.0	1,2	0,0	8,3	0,0	263,0	81,0	95,7	381,9	276,3	411,7	410,1	450,5	718,4	0,16	81,83	82,50	83,18	0,15	82,15	83,48	83,28
227.0	475.0	1,2	0,0	8,4	0,0	263,2	81,2	95,7	380,6	275,9	411,0	409,7	451,3	719,0	0,16	81,85	82,51	83,20	0,15	82,16	83,45	83,29
228.0	476.0	1,1	0,0	8,4	0,0	263,4	81,3	95,6	380,0	275,2	410,2	409,2	452,9	718,5	0,16	81,81	82,49	83,18	0,15	82,15	83,43	83,29
229.0	477.0	1,1	0,0	8,3	0,0	263,4	80,9	95,6	380,1	275,0	409,4	409,0	453,4	719,5	0,16	81,86	82,49	83,17	0,15	82,17	83,42	83,28
230.0	478.0	1,1	0,0	8,4	0,0	262,9	81,0	95,6	380,6	274,6	408,8	408,5	453,9	718,8	0,16	81,87	82,48	83,19	0,15	82,18	83,42	83,29
231.0	479.0	1,1	0,0	8,4	0,0	263,0	81,2	95,5	380,2	274,2	408,1	408,0	455,0	715,7	0,16	81,87	82,48	83,17	0,15	82,18	83,40	83,27
232.0	480.0	1,0	0,0	8,4	0,0	263,3	81,4	95,3	380,5	273,5	407,3	407,5	455,5	715,2	0,16	81,90	82,47	83,17	0,15	82,18	83,43	83,25
233.0	481.0	1,0	0,0	8,4	0,0	263,0	81,5	95,3	380,3	273,1	406,9	407,2	456,9	717,4	0,16	81,92	82,47	83,19	0,15	82,20	83,41	83,26
234.0	482.0	1,0	0,0	8,4	0,0	263,0	81,0	94,9	379,2	272,6	405,9	406,6	457,5	718,1	0,16	81,92	82,48	83,16	0,15	82,23	83,41	83,24
235.0	483.0	1,0	0,0	8,3	0,0	263,2	81,3	95,1	379,2	272,3	405,1	406,1	458,5	718,1	0,16	81,88	82,48	83,16	0,15	82,19	83,41	83,22
236.0	484.0	0,9	0,0	8,3	0,0	263,5	81,0	95,2	379,7	272,1	404,3	405,8	458,4	715,3	0,16	81,86	82,45	83,13	0,15	82,16	83,38	83,17
237.0	485.0	0,9	0																			

Manufacturer: HEARTHSTONE
Model: GM 80

Run: 5
Project #: PI 20177
Test Duration: 272 min

	HHV	LHV
Eff	79,69%	86,13%
Comb Eff	99,50%	99,50%
HT Eff	80,09%	86,57%
Output	27 147	kJ/h
Burn Rate	1,72	kg/h
Grams CO	45	g
Input	34 064	kJ/h
MC wet	17,72	

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:	79,69%	Air Fuel Ratio (A/F)	
Combustion Efficiency:	99,50%	Dry Molecular Weight (M _d)	30,00
Heat Transfer Efficiency:	80,09%	Dry Moles Exhaust Gas (N _p):	393,72
		Air Fuel Ratio (A/F)	11,30

Heat Output:	25 752 Btu/h	27 147 kJ/h
Heat Input:	32 314 Btu/h	34 064 kJ/h
Burn Duration:	4,53 h	
Burn Rate:	3,79 lb/h	1,720 kg/h
Stack Temp:	306,3 Deg. F	152,4 Deg. C

Date: 2018-09-26

Manufacturer: Hearthstone

Model: GM 80

Project #: PL 20177

Run: 5

Tech: MN

Reviewer: SP

- kindling 41 LBS START F IRV
- by pass open
- Fan ON low
- AD 300 LBS close DOOR
- AD 100 LBS instnd 1" pre load
- AD 200 LBS instnd 2" pre load
- AD 120 LBS close bypass
- AD 112 LBS close air inlet space 1/2
- AD 51 LBS open DOOR open bypass
- Back cool close DOOR close bypass
- After 2 min open DOOR open bypass
- open air inlet instnd load close DOOR
- close bypass
- After 5 min close air inlet space 1/2

TEST LOAD CONFIGURATION

PRE / POST CHECKS

Date: 2018-09-26 Manufacturer: Heathstone Model: GM 80
 Project #: PJ 20177 Run: 5 Tech: MM Reviewer: DE

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
0 (max 50 Fpm)	0 (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 $\pm$ 10%

2018-09-19
2018-09-19
ok
ok

ok

Temperature System:

Ambient (65°-90°F)

Wood Heater Surface ($\pm$ 125°F)

ok	°F
ok	°F

Proportional Checks:

Thermocouple check

Pitot Clean

Pitot verification

ok
ok
ok

Sampling Train ID Numbers:

Probe

Filter Front

Filter Back

Filter Thermocouple

Filter (< 90°F)

Train 1 st hour	Train 1	Train 2
7	39	40
521	523	800
522	524	801
11	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

Date: 2018-09-26 Manufacturer: Hearlston Model: GM 80
 Project #: PI 2177 Run: 5 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)	783379.80	783688.83	783379.84	783688.97	735365.77	736645.06
Initial 1minute DGM (Liter)	782379.71	783688.83	782379.82	783688.96	735365.77	736645.06
Change © (Liter)	001	0	002	001	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 (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	.5	3	.4
Check OK (no change after 15 sec.)	ok	ok	ok	ok

PRE-TEST SCALE AUDIT

Date: 2018 09 26 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 5 Tech: mm Reviewer: DE

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

LIMITS OF WEIGHT RANGES

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

CONTINUOUS ANALYZERS

Date: 2018-09-26 Manufacturer: Aearo 5600 Model: GM 80
 Project #: PI 2177 Run: 5 Tech: MM Reviewer: DE

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2982	3000	1007	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	0	1799	1800	9.75	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	2988	1000	0	0.02	0.006	0.15	0.007	0.05	✓	
CO ₂	0	1792	9.80	0	0.02	0.07	0.5	0.05	0.5	✓	

TEST DATA LOG

Date: 2018-09-26 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 5 Tech: MM Reviewer: DP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	783687.89	736641.08	225.75
Initial (Liter)	782380.56	735366.12	122.98

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	100.6	101.5
Dry Bulb (F):	76.64	81.84
Humidity (%):	59.1	53.0

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

Date: 2018-09-26 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 5 Tech: Mr Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size			Weight	Meter Moisture Content (% dry)*				
1 1/2	x 3 1/2	x 10 in.	0 950 lbs.	221	226	220	223	221
1 1/2	x 3 1/2	x 10 in.	1 064 lbs.	219	216	218	219	216
1 1/2	x 3 1/2	x 10 in.	1 040 lbs.	216	213	214	213	218
1 1/2	x 3 1/2	x 10 in.	1 050 lbs.	219	216	218	218	219
1 1/2	x 3 1/2	x 10 in.	1 000 lbs.	224	228	223	228	224
1 1/2	x 3 1/2	x 10 in.	1 010 lbs.	219	213	219	218	219
1 1/2	x 3 1/2	x 10 in.	1 034 lbs.	224	228	229	228	226
1 1/2	x 3 1/2	x 10 in.	1 048 lbs.	219	218	224	228	230
1 1/2	x 3 1/2	x 10 in.	1 116 lbs.	229	229	228	223	220
1 1/2	x 3 1/2	x 10 in.	1 062 lbs.	219	218	218	218	219
1 1/2	x 3 1/2	x 10 in.	1 044 lbs.	228	226	229	228	229
1 1/2	x 3 1/2	x 10 in.	1 492 lbs.	230	228	226	220	221
1 1/2	x 3 1/2	x 14 in.	1 472 lbs.	221	218	219	210	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: 1439 lbs

FUEL DATA

Date: 2018-09-26 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 2177 Run: 5 Tech: mn Reviewer: SP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1026 lbs.	221	223	228	223	221
1 1/2 x 3 1/2 x 10 in.	1142 lbs.	219	218	213	218	216
1 1/2 x 3 1/2 x 10 in.	0994 lbs.	218	219	216	213	213
1 1/2 x 3 1/2 x 10 in.	1022 lbs.	224	223	224	228	229
1 1/2 x 3 1/2 x 10 in.	1122 lbs.	211	213	210	213	213
1 1/2 x 3 1/2 x 10 in.	1012 lbs.	203	203	208	204	208
1 1/2 x 3 1/2 x 10 in.	0984 lbs.	200	201	203	204	208
1 1/2 x 3 1/2 x 10 in.	1000 lbs.	200	209	209	206	203
1 1/2 x 3 1/2 x 10 in.	0996 lbs.	199	196	193	197	196
1 1/2 x 3 1/2 x 10 in.	0972 lbs.	200	203	203	204	208
1 1/2 x 3 1/2 x 10 in.	0976 lbs.	199	196	194	196	193
1 1/2 x 3 1/2 x 14 in.	1502 lbs.	201	203	204	208	203
1 1/2 x 3 1/2 x 14 in.	1484 lbs.	209	208	207	206	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.					

TEST LOAD WEIGHT: 14228 lbs

FUEL DATA

Date: 2018-09-26 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 5 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size			Weight		Meter Moisture Content (% dry)*			
3 1/2	x 3 1/2	x 20.5 in.	4672	lbs.	211	216	219	203
3 1/2	x 3 1/2	x 20.5 in.	4664	lbs.	214	216	212	213
3 1/2	x 3 1/2	x 20.5 in.	5024	lbs.	219	216	218	219
3 1/2	x 3 1/2	x 20.5 in.	5236	lbs.	220	218	219	219
1 1/2	x 3/4	x 5 in.	0112	lbs.			201	
1 1/2	x 3/4	x 5 in.	0120	lbs.			203	
1 1/2	x 3/4	x 5 in.	0102	lbs.			206	
1 1/2	x 3/4	x 5 in.	0098	lbs.			208	
1 1/2	x 3/4	x 5 in.	0112	lbs.			209	
1 1/2	x 3/4	x 5 in.	0110	lbs.			204	
1 1/2	x 3/4	x 5 in.	0108	lbs.			208	
1 1/2	x 3/4	x 5 in.	0112	lbs.			201	
1 1/2	x 3/4	x 5 in.	0110	lbs.			205	
1 1/2	x 3/4	x 5 in.	0104	lbs.			201	
1 1/2	x 3/4	x 5 in.	0124	lbs.			208	
1 1/2	x 3/4	x 5 in.	0112	lbs.			201	
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: 2093 lbs Min 20%: 419 Max 25%: 523

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-25 Manufacturer: hearth stone Model: GM 80
 Project # 0120177 Run: 5 Tech: MM Reviewer: RP

Pre-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1		
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time	7	52114 5222	5226 5223	13	39	523	524	20	802
2018-09-25	18:00	614756	01280	01260	357139	1102775	01267	01252	345637	01264
2018-09-26	10:00	614757	01281	01259	357140	1102776	01267	01250	345638	01264

Post-test Weight Record		SYSTEM 1 - 1 st hour						SYSTEM 1		
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time	7	521	522	13	39	523	524	20	802
2018-09-26	18:00	614760	01295	01256	357177	1102780	01265	01245	345687	01267
2018-10-05	8:00	614759	01292	01256	357158	1102777	01265	01245	345656	01266
2018-10-09	8:00	614759	01292	01256	357158	1102777	01265	01245	345656	01266

DILUTION TUNNEL PARTICULATE SAMPLER DATA

2018-09-25

Date: PT 20177 NR

Project #: PT 20177 Run: 5

Manufacturer: heartstone

Tech: MR

Reviewer: SR

Model: GM 80 mm

SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	800	801	29
2018-09-25	18:00	110 1096	0 1277	33 4455
2018-09-25	18:00	110 1095	0 1276	33 4454

SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	800	801	29
2018-09-26	18:00	110 1097	0 1282	33 4516
2018-10-05	8:00	110 1096	0 1282	33 4485
2018-10-10	8:00	110 1096	0 1282	33 4485

Paramètres

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

Code verrouillage: HEA

Description du test

Test standard	EPA
Run #	6
Date	27-09-2018
Technicien	M.M
Project #	PI 20177

Description de l'unité

Manufacturier	HEARTHSTONE	
Modèle	GM 80	
Combustion system	Cat	
Appliance type	WOOD STOVE	
Firebox volume	3,16	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):	0,988	Dimensionless
Equipment number (DGM #1):	EM-178	
Calibration Factor (DGM #2):	0,991	Dimensionless
Equipment number (DGM #2):	EM-179	
Calibration Factor (DGM #3):	0,996	Dimensionless
Equipment number (DGM #3):	EM-070	Dimensionless

Tunnel

Targeted tunnel flow rate	140	scfm
Tunnel diameter	6	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 20177
Date	27-09-2018
Technicien	M.M

Fuel data

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

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

	Start	End
Barometer (kPa):	101,8	101,8
Barometer (in.Hg):	30,061529	30,06152868
Dry Bulb (F):	75,02	78,06
Humidity (%):	44	30,4
Air velocity (ft/min)	0	0

DGM #1	Final:	27709,987	cuft
	Initial:	27675,761	cuft
DGM #2	Final:	26048,112	cuft
	Initial:	26014,429	cuft

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

Final:	784659,440	Liter
Initial:	783690,260	Liter
Final:	737600,380	Liter
Initial:	736646,580	Liter

Final:	304,680	cuft
Initial:	225,750	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 20177
Date	27-09-2018
Technicien	M.M

Preload data sheet

Test Load Weight:		
Lower	Ideal	Upper
19,91	22,12	24,33

Load Volume: 0,7535 cu. ft

Loading Density: 8,979 lbs./ft3

 Number of Spaces:
 Spacer weight (lbs):

 Load Density (wet): 37,658 lbs./ft3
 Dry Wood Density: 31,230575

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume
Thick	Wide	x Length		Dry Uncorrected %					Weight	Cubic Inches
1,5	3,5	10	1,02	21,3	21,9	22	21,9	21,6	22,1748	52,50
1,5	3,5	10	0,998	23	22,9	22,8	22,8	22,3	22,71448	52,50
1,5	3,5	10	0,978	20,4	20,6	20,8	20,9	21	20,28372	52,50
1,5	3,5	10	1,024	21,3	21,9	21,6	21,8	21,9	22,2208	52,50
1,5	3,5	10	1,022	22	22	22,1	22,3	22,3	22,62708	52,50
1,5	3,5	10	1,016	21,6	21,9	21,3	21,8	21,4	21,9456	52,50
1,5	3,5	10	0,96	23	23,1	22,8	22,9	22,8	22,0032	52,50
1,5	3,5	10	1,086	19,6	20	20,4	20,3	20,6	21,91548	52,50
1,5	3,5	10	1,052	19,3	19,8	19,6	19,4	19,3	20,49296	52,50
1,5	3,5	10	1,068	20,4	20,6	20,9	20,8	20,3	22,0008	52,50
1,5	3,5	10	1,034	19,9	19,6	19,8	19,3	19,8	20,34912	52,50
1,5	3,5	14	1,498	20	20,6	20,4	20,8	20,3	30,58916	73,50
1,5	3,5	14	1,458	19,9	19,6	19,3	19,9	19,8	28,7226	73,50
										0,00
1,5	3,5	10	1,036	19,1	19,6	19,5	19,3	19,3	20,05696	52,50
1,5	3,5	10	1,01	20	19,3	19,4	19,4	19,3	19,6748	52,50
1,5	3,5	10	1,104	20,6	20,6	20,4	20,3	20,8	22,67616	52,50
1,5	3,5	10	1,026	20,9	20,8	20,3	20,9	20,4	21,19716	52,50
1,5	3,5	10	1,102	19,1	19,3	19,8	19,8	19,8	21,55512	52,50
1,5	3,5	10	0,968	19,9	19,7	19,7	19,9	20,3	19,2632	52,50
1,5	3,5	10	1,04	20,8	20,9	20,6	20,9	20,4	21,5488	52,50
1,5	3,5	10	0,964	19,3	19,9	20,3	20,8	20,3	19,39568	52,50
1,5	3,5	10	1,028	20,9	21	21,3	21,6	21,3	21,81416	52,50
1,5	3,5	10	0,938	19,9	20,4	20,8	20,9	20,8	19,28528	52,50
1,5	3,5	10	0,932	20,6	20,4	20,9	20,8	20,8	19,2924	52,50
1,5	3,5	14	1,468	19,9	19,3	19,2	19,3	19,9	28,65536	73,50
1,5	3,5	14	1,544	20	20,6	20,8	20,3	20,2	31,46672	73,50
										0,00
										0,00
										0,00
										0,00
										0,00

SUM MC: 583,9216

PreTest Load Weight: 28,37 lbs.

Dry Weight: 10,67 kg.

 Dry: 20,58
 Average Moisture Content: %
 20,58
 Must be 18-28

 Wet: 17,07
 must be 15,2-22

Project nu.	PI 20177
Date	27-09-2018
Technicien	M.M

FUEL LOAD DATA SHEET, CSA B415

Test Load Weight:

Lower	Ideal	Upper
19,9	22,1	24,3

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

Load Volume: cu. ft

Loading Density: 6,7 lbs./ft3

Number of Spaces: 12
Spacer weight: lbs

Load Density (wet):	31,0	lbs./ft3
Dry Wood Density:	25,6	lbs./ft3

Piece Size (in):			Weight lbs	Meter Moisture Content					Ave. MC x	Volume	Ave. MC
Thick	Wide	Length		Dry Uncorrected %					Weight	Cubic Inches	%
3,5	3,5	21,25	5,37	21,10	22,30	21,90	22,00	21,30	116,54952	260,31	21,7
3,5	3,5	21,25	4,20	21,30	20,30	20,60	20,80	20,40	86,856	260,31	20,7
3,5	3,5	21,25	5,08	20,90	22,10	20,70	20,60	20,80	106,73956	260,31	21,0
3,5	3,5	21,25	5,07	20,00	20,60	21,80	21,60	20,90	106,45252	260,31	21,0
1,5	0,75	5	0,12			20,80			2,5792	5,63	20,8
1,5	0,75	5	0,13			20,10			2,613	5,63	20,1
1,5	0,75	5	0,11			19,60			2,1168	5,63	19,6
1,5	0,75	5	0,12			19,30			2,316	5,63	19,3
1,5	0,75	5	0,13			19,10			2,4448	5,63	19,1
1,5	0,75	5	0,11			19,50			2,067	5,63	19,5
1,5	0,75	5	0,11			19,30			2,0844	5,63	19,3
1,5	0,75	5	0,10			19,80			2,0592	5,63	19,8
1,5	0,75	5	0,12			19,30			2,316	5,63	19,3
1,5	0,75	5	0,12			19,30			2,2774	5,63	19,3
1,5	0,75	5	0,10			19,80			1,9008	5,63	19,8
1,5	0,75	5	0,12			19,80			2,376	5,63	19,8
										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	443,7482		20,0 %

Test Load Weight: 21,10 lbs.

Dry Weight: kg.

Average Moisture Content: %

Dry:	21,03	Dry(EPA)	21,03
		Dry(B415)	21,03

21,03
Must be 19-25

Wet:
must be 15,2-22

Coal Bed Range: lbs. to

5,3 lbs.

TEST CHARGE:

Coal bed weight:

lbs.

Project nu.	PI 20177
Date	27-09-2018
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure: 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=
0,974

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,057	73,73	0,2387
B center	0,058	73,46	0,2408
A1	0,046	73,73	0,2145
A2	0,065	73,85	0,2550
A3	0,058	73,46	0,2408
A4	0,055	73,44	0,2345
B1	0,047	73,460	0,2168
B2	0,067	73,470	0,2588
B3	0,048	73,470	0,2191
B4	0,047	73,430	0,2168
AVERAGE	0,0548	73,5500	0,2336

Project nu.	PI 20177
Date	27-09-2018
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	12	424	425	7	16	426	427	31	43	428	429	45	821		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	94,5412	0,1259	0,1262	34,2692	109,1650	0,1253	0,1237	34,2766	108,7535	0,1258	0,1268	33,9909	0,1265	2018-09-25	18:00
Before (6)	94,5413	0,1258	0,1263	34,2693	109,1649	0,1254	0,1237	34,2766	108,7534	0,1258	0,1268	33,9910	0,1264	2018-09-26	10:00
After (1)	94,5418	0,1258	0,1260	34,2724	109,1650	0,1260	0,1228	34,2804	108,7542	0,1259	0,1269	33,9945	0,1266	2018-09-27	16:00
After (2)	94,5415	0,1255	0,1258	34,271	109,165	0,1259	0,1226	34,2782	108,7539	0,1258	0,1267	33,9926	0,1265	2018-10-05	08:00
After (3)	94,5415	0,1254	0,1258	34,2709	109,165	0,1259	0,1226	34,2782	108,7539	0,1258	0,1267	33,9926	0,1265	2018-10-09	08:00
After (4)															
After (5)															
After (6)	94,5415	0,1254	0,1258	34,2709	109,165	0,1259	0,1226	34,2782	108,7539	0,1258	0,1267	33,9926	0,1265	2018-10-09	08:00
Difference	0,0002	-0,0004	-0,0005	0,0016	0,0001	0,0005	-0,0011	0,0016	0,0005	0,0000	-0,0001	0,0016	0,0001		
Total (mg)		0,9				2				2			0,1		
Total ajusté (mg)		0,80				1,90				1,90					

Project nu.	PI 20177
Date	27-09-2018
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,6 g/hr
Burn Rate : 2,281 Dry kg/hr

Test Duration: 208 min

PRESSURE FACTOR: DGM 1 0,98229
 DGM 2 0,98545
 DGM 3 1,00473

BAROMETRIC PRESSURE
 Average: 30,061529 in Hg
 Start: 30,061529 in Hg
 End: 30,061529 in Hg

TEMPERATURE FACTORS DGM 1 0,97755
 DGM 2 0,97631
 DGM 3 0,98129

DGM CONTROLLER VALUES

DGM 1 Final: 27709,987 Cuft
 Initial: 27675,761 Cuft

VOLUMES SAMPLED DGM 1 32,486 Scft
 DGM 2 32,128 Scft
 DGM 3 77,489 Scft

DGM 2 Final: 26048,112 Cuft
 Initial: 26014,429 Cuft

DGM #3 Final: 304,680 Cuft
 Initial: 225,750 Cuft

TOTAL TUNNEL VOLUME : 36922

TEMPERATURES

SAMPLE RATIOS
 Sample Train 1: 1136,540
 Sample Train 2: 1149,221

DGM 1 540,123 °R
 DGM 2 540,814 °R

Paticulate concentration
 Sample Train 1 0,000062 g/dscf
 Sample Train 2 0,000062 g/dscf
 Room 0,000001 g/dscf

CALIBRATION FACTORS

DGM 1 0,9885
 DGM 2 0,9914
 DGM #3 0,9958

TUNNEL FLOW RATE: 177,510 Dscfm

TOTAL EMISSIONS
 Sample Train 1 2,23 g
 Sample Train 2 2,25 g

PARTICULATE CATCH
 Total Sample Train 1: 2,00 mg
 Total Sample Train 2: 2,00 mg
 Total Sample Train 1 1st hour: 0,90 mg

EMISSION RATES
 Sample Train 1 0,64 g/hr
 Sample Train 2 0,65 g/hr

1st hour emission rate 1,02 g/hr

DEVIATION: 0,57%

Cs Train 1 Train 2
 6,156E-05 6,22511E-05

* Elapsed Time min	* Raw data row	* Weight Remaining lbs	* CO %	* CO ₂ %	* O ₂ %	*1 Flue Gas °F	*2 Room Temp °F	*3 Tunnel Dry Bulb °F	*4 Unit Top °F	*5 Unit Back °F	*6 Unit R.Side °F	*7 Unit L.Side °F	*8 Unit Bottom °F	* Catalyst up	Mass flow 1 Reading °F	DGM 1 Inlet T °F	DGM 1 Outlet T °F	Filter 1 Temp °F	Mass flow 2 Reading °F	DGM 2 Inlet T °F	DGM 2 Outlet T °F	Filter 2 Temp °F
0.00	213.00	20.9	0.0	6.2	0.0	371.3	79.9	164.4	563.4	324.1	464.8	468.1	427.9	661.8	0.15	85.16	83.67	82.03	0.15	85.56	84.42	81.85
1.0	214.0	20.8	0.1	5.8	0.0	363.3	80.0	120.3	551.0	325.1	465.5	469.0	425.2	793.8	0.15	85.33	83.62	82.12	0.15	85.59	84.38	81.85
2.0	215.0	20.6	0.0	6.5	0.0	365.7	79.9	122.1	541.8	325.6	466.2	469.7	425.9	850.8	0.15	85.38	83.55	82.15	0.15	85.62	84.34	81.84
3.0	216.0	20.5	0.0	6.8	0.0	370.1	80.0	119.8	541.0	324.4	465.7	469.6	426.2	859.8	0.15	85.37	83.52	82.26	0.15	85.61	84.29	81.77
4.0	217.0	20.3	0.0	9.6	0.0	376.8	80.1	119.6	556.2	323.8	465.4	469.0	425.2	922.7	0.15	85.34	83.47	82.41	0.15	85.60	84.28	81.78
5.0	218.0	20.1	0.1	11.7	0.0	383.5	80.3	119.5	565.4	323.5	463.7	468.0	424.9	961.4	0.15	85.32	83.46	82.56	0.15	85.62	84.23	81.75
6.0	219.0	19.9	0.0	11.5	0.0	389.1	80.4	119.9	575.6	321.9	462.1	466.5	422.9	979.0	0.15	85.30	83.44	82.68	0.15	85.61	84.22	81.73
7.0	220.0	19.8	0.0	12.9	0.0	393.2	80.7	119.9	585.1	319.9	460.5	464.3	421.8	981.0	0.15	85.32	83.45	82.84	0.15	85.63	84.22	81.74
8.0	221.0	19.5	0.0	12.4	0.0	395.2	80.9	120.0	592.0	318.8	458.6	462.4	420.3	989.4	0.15	85.33	83.47	83.00	0.15	85.65	84.23	81.74
9.0	222.0	19.4	0.0	12.3	0.0	395.5	80.7	119.5	594.4	316.4	457.6	460.2	418.3	969.9	0.15	85.35	83.46	83.16	0.15	85.65	84.24	81.76
10.0	223.0	19.2	0.0	10.3	0.0	396.6	80.3	118.9	590.2	314.4	456.0	457.5	415.3	926.7	0.16	85.36	83.48	83.32	0.15	85.66	84.22	81.74
11.0	224.0	19.0	0.0	9.8	0.0	396.7	80.7	119.0	588.3	312.9	453.5	455.0	413.9	906.1	0.15	85.31	83.52	83.47	0.15	85.69	84.25	82.76
12.0	225.0	18.8	0.0	9.7	0.0	396.9	80.2	118.7	588.1	310.9	451.7	452.4	411.7	889.5	0.15	85.32	83.57	83.65	0.15	85.73	84.26	82.98
13.0	226.0	18.7	0.0	9.7	0.0	396.3	80.5	119.0	589.1	307.5	450.3	449.7	409.3	887.0	0.15	85.29	83.57	83.77	0.15	85.75	84.28	83.08
14.0	227.0	18.5	0.0	10.0	0.0	396.5	80.6	118.9	591.7	305.6	447.8	446.6	407.2	883.0	0.16	85.26	83.61	83.90	0.15	85.76	84.30	83.25
15.0	228.0	18.3	0.0	10.4	0.0	397.3	80.8	119.6	595.8	304.0	446.4	444.1	405.8	894.2	0.15	85.31	83.63	84.05	0.15	85.77	84.29	83.43
16.0	229.0	18.2	0.0	11.4	0.0	398.6	81.0	120.0	602.8	302.2	445.1	441.6	403.4	922.0	0.16	85.37	83.69	84.21	0.15	85.80	84.31	83.60
17.0	230.0	18.0	0.0	12.3	0.0	399.6	80.7	120.4	605.1	301.0	443.3	438.5	401.4	947.6	0.15	85.40	83.75	83.99	0.15	85.83	84.34	83.30
18.0	231.0	17.7	0.0	12.1	0.0	400.8	81.0	120.6	608.5	299.8	442.4	436.3	399.2	941.7	0.15	85.45	83.80	83.12	0.15	85.87	84.36	82.06
19.0	232.0	17.5	0.0	12.1	0.0	402.2	81.0	120.9	613.9	298.8	441.0	434.7	397.6	950.8	0.16	85.53	83.84	82.59	0.15	85.90	84.42	81.44
20.0	233.0	17.4	0.0	12.4	0.0	403.1	81.3	121.2	617.8	297.9	440.4	432.9	396.4	953.8	0.16	85.56	83.84	82.18	0.15	85.87	84.44	81.05
21.0	234.0	17.2	0.0	12.5	0.0	404.9	78.7	120.9	621.2	296.7	438.7	430.4	393.6	972.2	0.15	85.52	83.88	81.91	0.15	85.87	84.45	80.87
22.0	235.0	17.0	0.0	12.9	0.0	407.6	79.1	120.4	624.1	295.8	437.6	428.5	391.3	991.9	0.15	85.19	83.89	81.65	0.15	85.73	84.51	80.64
23.0	236.0	16.7	0.1	13.1	0.0	410.2	79.8	120.1	629.4	295.1	437.1	426.6	388.7	995.7	0.16	84.68	83.84	81.43	0.15	85.45	84.43	80.53
24.0	237.0	16.5	0.1	13.5	0.0	412.9	80.0	120.2	633.0	294.6	436.7	425.9	387.5	998.4	0.16	84.10	83.76	81.29	0.15	85.10	84.36	80.45
25.0	238.0	16.3	0.1	13.6	0.0	415.3	78.6	120.1	636.9	294.1	436.4	424.1	385.3	1009.7	0.16	83.59	83.69	81.16	0.15	84.76	84.25	80.37
26.0	239.0	16.1	0.1	13.9	0.0	418.0	77.5	119.5	640.9	293.2	436.1	422.5	382.9	1016.4	0.16	82.97	83.56	81.01	0.15	84.33	84.11	80.25
27.0	240.0	15.8	0.2	13.8	0.0	420.3	77.9	119.3	643.5	292.2	436.3	421.7	381.5	1018.4	0.15	82.41	83.40	80.88	0.15	83.91	83.99	80.13
28.0	241.0	15.6	0.2	13.8	0.0	422.1	78.0	119.4	648.8	291.7	436.5	421.4	379.3	1011.9	0.15	81.98	83.16	80.77	0.15	83.41	83.84	80.07
29.0	242.0	15.4	0.2	13.9	0.0	423.4	78.2	119.2	650.3	291.2	436.7	420.6	378.1	1020.5	0.15	81.69	82.97	80.64	0.15	83.02	83.71	79.97
30.0	243.0	15.2	0.1	13.9	0.0	424.2	78.2	119.7	654.5	291.5	437.9	420.1	376.3	1023.9	0.15	81.46	82.80	80.54	0.15	82.72	83.61	79.87
31.0	244.0	15.0	0.1	14.0	0.0	425.6	78.9	119.8	655.2	291.3	438.7	420.0	374.4	1025.2	0.15	81.25	82.63	80.44	0.15	82.44	83.50	79.77
32.0	245.0	14.8	0.1	14.0	0.0	426.5	79.2	120.7	656.2	291.7	439.9	419.8	373.1	1027.5	0.15	81.24	82.51	80.39	0.15	82.33	83.40	79.73
33.0	246.0	14.5	0.1	14.0	0.0	427.2	79.6	120.8	658.9	292.1	441.6	419.8	371.9	1028.1	0.15	81.27	82.41	80.27	0.15	82.16	83.30	79.65
34.0	247.0	14.3	0.1	14.0	0.0	428.0	79.6	120.7	661.2	292.5	443.1	420.3	370.5	1029.2	0.15	81.27	82.35	80.20	0.15	82.15	83.28	79.61
35.0	248.0	14.1	0.1	14.0	0.0	428.0	79.4	120.5	662.5	292.8	444.6	420.4	369.5	1030.3	0.15	81.22	82.30	80.10	0.15	82.14	83.23	79.52
36.0	249.0	13.9	0.1	14.1	0.0	428.8	78.7	120.6	664.7	293.1	446.3	420.6	366.8	1028.4	0.15	81.20	82.27	80.03	0.15	82.12	83.20	79.45
37.0	250.0	13.7	0.1	14.1	0.0	429.1	78.7	120.4	667.6	293.5	448.0	421.1	365.5	1029.2	0.15	81.12	82.19	79.96	0.15	82.04	83.16	79.42
38.0	251.0	13.5	0.1	14.2	0.0	429.8	78.9	120.6	670.2	294.1	449.3	421.3	364.4	1030.3	0.15	81.04	82.10	79.89	0.15	81.85	83.09	79.36
39.0	252.0	13.3	0.1	14.3	0.0	430.6	78.8	121.0	672.5	294.8	451.0	422.1	363.3	1035.6	0.15	80.96	82.00	79.80	0.15	81.66	83.01	79.31
40.0	253.0	13.0	0.1	14.5	0.0	431.4	78.4	120.8	675.0	295.5	452.5	422.0	361.6	1038.8	0.15	80.91	81.94	79.78	0.15	81.55	82.96	79.32
41.0	254.0	12.8	0.2	14.4	0.0	432.1	78.1	120.9	675.4	296.2	454.4	422.3	360.1	1039.5	0.15	80.90	81.88	79.71	0.15	81.54	82.91	79.25
42.0	255.0	12.6	0.3	14.5	0.0	433.1	78.3	121.0	677.0	297.1	456.5	423.3	358.9	1037.0	0.15	80.89	81.85	79.64	0.15	81.51	82.89	79.23
43.0	256.0	12.4	0.3	14.5	0.0	433.2	79.1	121.2	677.5	297.9	458.0	423.8	357.8	1037.2	0.15	80.85	81.80	79.58	0.15	81.45	82.85	79.16
44.0	257.0	12.2	0.3	14.6	0.0	433.1	78.1	121.3	678.3	298.7	459.9	423.5	356.0	1038.2	0.15	80.84	81.78	79.55	0.15	81.43	82.83	79.13
45.0	258.0	12.0	0.4	14.5	0.0	434.0	78.0	121.2	680.0	299.5	461.8	424.3	355.2	1034.0	0.15	80.77	81.73	79.50	0.15	81.39	82.81	79.09
46.0	259.0	11.8	0.4	14.8	0.0	435.0	77.9	121.4	682.6	300.4	464.0	425.0	353.8	1033.2	0.15	80.72	81.67	79.46	0.15	81.33	82.79	79.07
47.0	260.0	11.5	0.5	14.8	0.0	435.2	78.1	121.5	683.7	301.5	465.3	425.3	352.9	1032.5	0.15	80.65	81.62	79.43	0.15	81.23	82.73	79.03
48.0	261.0	11.3	0.5	14.8	0.0	435.5	76.9	120.8	685.1	302.5	467.0	425.1	351.4	1031.1	0.15	80.48	81.58	79.37	0.15	81.14	82.66	78.98
49.0	262.0	11.1	0.4	14.9	0.0	435.7	77.1	120.2	687.8	303.5	469.4	425.5	350.5	1037.6	0.15	80.27	81.52	79.32	0.15	80.96	82.60	78.92
50.0	263.0	10.9	0.3	14.8	0.0	436.0	75.6	119.8	688.3	304.5	471.1	425.7	349.0	1036.6	0.15	80.02	81.41	79.27	0.15	80.75	82.51	78.86
51.0	264.0	10.7	0.3	14.7	0.0	435.1	76.2	119.7	689.5	305.6	473.1	426.7	348.0	1033.2	0.15	79.81	81.29	79.20	0.15	80.61	82.46	78.83
52.0	265.0	10.5	0.2	14.8	0.0	435.0	75.7	119.7	690.9	306.7	475.2	427.7	347.8	1032.4	0.15	79.66	81.18	79.16	0.15	80.49	82.36	78

89.0	302.0	4.7	0.0	12.3	0.0	379.7	78.5	109.9	645.4	333.3	534.7	469.7	345.1	852.0	0.15	79.75	80.68	81.05	0.15	80.31	81.62	79.55
90.0	303.0	4.6	0.0	12.0	0.0	377.6	79.0	109.5	640.6	334.5	535.1	471.2	345.9	846.8	0.15	79.72	80.66	81.16	0.15	80.30	81.61	79.66
91.0	304.0	4.5	0.0	11.8	0.0	375.9	78.0	109.1	634.6	334.0	535.3	471.2	345.8	839.7	0.15	79.68	80.65	81.20	0.15	80.29	81.56	79.74
92.0	305.0	4.4	0.0	11.7	0.0	374.6	77.3	108.5	630.9	335.2	535.2	472.8	347.1	834.3	0.15	79.53	80.66	81.21	0.15	80.23	81.51	79.78
93.0	306.0	4.3	0.0	11.6	0.0	372.8	77.1	107.8	627.5	336.4	535.4	473.4	347.5	829.5	0.15	79.20	80.56	81.21	0.15	79.99	81.45	79.83
94.0	307.0	4.2	0.0	11.4	0.0	370.7	77.8	107.1	622.9	336.4	534.9	475.2	348.4	824.4	0.15	78.99	80.50	81.21	0.15	79.84	81.36	79.84
95.0	308.0	4.1	0.0	11.3	0.0	368.1	77.3	107.3	616.1	336.6	534.9	476.3	348.7	819.2	0.15	78.82	80.43	81.20	0.15	79.73	81.28	79.87
96.0	309.0	4.1	0.0	11.1	0.0	365.8	78.1	106.8	611.5	336.4	534.8	478.7	350.0	812.9	0.15	78.73	80.39	81.20	0.15	79.60	81.23	79.89
97.0	310.0	4.0	0.0	10.7	0.0	363.2	77.7	106.4	608.1	335.8	533.7	480.6	350.9	804.9	0.15	78.65	80.31	81.24	0.15	79.44	81.18	79.93
98.0	311.0	3.9	0.0	10.3	0.0	360.1	77.9	105.8	601.2	334.5	533.5	481.9	351.8	799.6	0.15	78.59	80.26	81.24	0.15	79.35	81.12	79.94
99.0	312.0	3.8	0.0	10.0	0.0	356.8	78.2	105.3	598.1	335.0	532.1	483.6	352.3	796.5	0.15	78.57	80.22	81.29	0.15	79.29	81.07	79.98
100.0	313.0	3.8	0.0	9.7	0.0	353.2	78.7	105.3	587.8	336.2	531.5	486.1	353.0	792.5	0.15	78.60	80.20	81.30	0.15	79.29	81.02	80.02
101.0	314.0	3.7	0.0	9.7	0.0	350.5	78.8	104.9	583.6	333.6	530.9	487.8	354.0	789.8	0.15	78.68	80.19	81.35	0.15	79.27	81.03	80.09
102.0	315.0	3.7	0.0	9.5	0.0	347.4	79.0	105.1	581.6	332.5	529.2	489.3	355.4	786.7	0.15	78.74	80.15	81.36	0.15	79.28	81.01	80.16
103.0	316.0	3.6	0.0	9.6	0.0	344.3	79.0	104.8	573.5	329.8	528.6	491.3	356.8	784.0	0.15	78.86	80.13	81.42	0.15	79.31	80.97	80.23
104.0	317.0	3.6	0.0	9.6	0.0	342.1	79.4	104.5	567.2	330.0	527.1	492.5	357.2	780.9	0.15	79.00	80.14	81.48	0.15	79.39	80.99	80.32
105.0	318.0	3.6	0.0	9.5	0.0	339.2	79.1	104.2	564.0	329.2	526.3	493.6	358.3	779.2	0.15	79.06	80.16	81.48	0.15	79.49	80.99	80.36
106.0	319.0	3.5	0.0	9.5	0.0	336.9	78.8	103.7	558.6	328.5	525.1	494.6	359.1	776.2	0.15	79.16	80.20	81.48	0.15	79.59	81.00	80.39
107.0	320.0	3.5	0.0	9.2	0.0	334.4	78.6	103.0	553.2	334.6	524.1	495.5	360.2	772.8	0.15	79.21	80.21	81.48	0.15	79.64	81.01	80.42
108.0	321.0	3.4	0.0	9.0	0.0	331.9	78.2	102.5	548.2	339.8	522.5	497.1	361.4	770.4	0.15	79.17	80.21	81.50	0.15	79.61	81.01	80.42
109.0	322.0	3.3	0.0	8.9	0.0	329.7	78.2	102.0	544.1	341.3	520.7	498.6	362.6	767.9	0.15	79.07	80.19	81.49	0.15	79.57	80.99	80.42
110.0	323.0	3.3	0.0	8.9	0.0	327.8	78.1	101.7	537.5	343.7	519.3	500.1	364.0	765.5	0.15	78.94	80.16	81.47	0.15	79.49	80.96	80.44
111.0	324.0	3.3	0.0	8.8	0.0	324.8	78.0	101.7	528.8	343.4	517.4	500.1	364.6	760.1	0.15	78.86	80.13	81.46	0.15	79.41	80.94	80.43
112.0	325.0	3.3	0.0	8.5	0.0	323.1	78.3	101.2	523.3	343.2	516.0	500.3	365.7	762.4	0.15	78.87	80.15	81.42	0.15	79.44	80.89	80.44
113.0	326.0	3.2	0.0	8.4	0.0	322.2	76.8	101.0	516.5	344.0	514.7	506.9	366.9	761.1	0.15	78.89	80.14	81.44	0.15	79.50	80.87	80.45
114.0	327.0	3.2	0.0	8.4	0.0	321.3	78.0	100.7	512.1	342.2	513.0	500.9	367.2	766.4	0.15	78.85	80.11	81.39	0.15	79.45	80.86	80.41
115.0	328.0	3.1	0.0	8.4	0.0	320.4	78.0	100.7	506.9	341.6	511.0	500.8	367.4	766.1	0.15	78.79	80.07	81.37	0.15	79.34	80.82	80.39
116.0	329.0	3.1	0.0	8.4	0.0	319.6	78.5	100.6	503.7	340.0	509.9	500.9	367.9	767.1	0.15	78.80	80.06	81.36	0.15	79.30	80.81	80.39
117.0	330.0	3.1	0.0	8.3	0.0	319.0	77.8	100.7	496.6	340.0	507.8	500.7	369.0	767.3	0.15	78.85	80.05	81.34	0.15	79.37	80.78	80.40
118.0	331.0	3.0	0.0	8.3	0.0	318.6	78.4	100.8	492.4	338.5	506.0	500.5	369.1	767.7	0.15	78.90	80.04	81.33	0.15	79.40	80.77	80.38
119.0	332.0	3.0	0.0	8.4	0.0	317.7	78.4	100.4	489.0	337.2	504.1	499.8	369.2	768.3	0.15	78.90	80.04	81.31	0.15	79.41	80.73	80.36
120.0	333.0	2.9	0.0	8.4	0.0	317.0	78.9	100.5	488.0	335.7	502.6	498.7	369.5	768.7	0.15	79.00	80.05	81.31	0.15	79.52	80.74	80.41
121.0	334.0	2.9	0.0	8.4	0.0	316.6	78.4	100.6	480.7	334.7	500.5	498.4	369.7	769.6	0.15	79.07	80.06	81.31	0.15	79.57	80.76	80.41
122.0	335.0	2.9	0.0	8.4	0.0	316.2	78.8	100.6	477.2	335.7	498.6	497.9	369.7	768.0	0.15	79.07	80.05	81.32	0.15	79.57	80.78	80.42
123.0	336.0	2.9	0.0	8.4	0.0	316.3	78.5	100.4	473.3	334.3	497.1	496.2	369.5	767.7	0.15	79.06	80.05	81.30	0.15	79.63	80.75	80.43
124.0	337.0	2.8	0.0	8.3	0.0	316.3	78.6	99.8	469.8	333.1	495.2	495.6	368.8	768.5	0.15	79.12	80.07	81.29	0.15	79.67	80.75	80.42
125.0	338.0	2.8	0.0	8.3	0.0	315.4	78.4	99.7	467.2	331.9	494.1	493.8	369.9	767.7	0.15	79.24	80.12	81.27	0.15	79.74	80.73	80.42
126.0	339.0	2.7	0.0	8.4	0.0	315.5	78.2	99.7	463.9	330.8	491.7	492.9	369.3	769.2	0.15	79.25	80.11	81.23	0.15	79.77	80.73	80.42
127.0	340.0	2.8	0.0	8.4	0.0	315.5	77.8	100.0	461.7	334.2	489.6	491.8	369.0	769.6	0.15	79.17	80.10	81.26	0.15	79.71	80.69	80.41
128.0	341.0	2.7	0.0	8.4	0.0	314.7	77.8	99.5	459.1	333.2	487.8	490.2	369.3	766.9	0.15	79.07	80.09	81.26	0.15	79.68	80.68	80.42
129.0	342.0	2.7	0.0	8.4	0.0	314.4	78.2	99.1	458.6	331.8	485.8	488.4	369.3	767.3	0.15	79.01	80.08	81.23	0.15	79.64	80.66	80.43
130.0	343.0	2.6	0.0	8.4	0.0	314.3	77.9	99.3	454.4	330.9	484.3	486.4	368.6	766.9	0.15	79.00	80.10	81.23	0.15	79.69	80.66	80.43
131.0	344.0	2.6	0.0	8.4	0.0	313.8	77.8	99.2	453.0	330.3	482.9	484.6	368.2	771.2	0.15	78.92	80.11	81.20	0.15	79.65	80.62	80.38
132.0	345.0	2.5	0.0	8.5	0.0	314.3	77.4	98.8	451.4	329.4	481.1	483.9	368.6	772.5	0.15	78.80	80.07	81.12	0.15	79.58	80.57	80.33
133.0	346.0	2.5	0.0	8.5	0.0	314.2	78.7	98.7	449.3	328.6	479.7	482.2	368.5	774.5	0.15	78.65	80.04	81.06	0.15	79.51	80.54	80.38
134.0	347.0	2.5	0.0	8.5	0.0	314.2	77.3	98.1	447.4	327.6	477.6	481.4	368.4	773.7	0.15	78.50	80.02	80.99	0.15	79.41	80.48	80.27
135.0	348.0	2.4	0.0	8.5	0.0	314.1	76.4	98.6	445.5	327.4	475.6	479.9	369.0	772.9	0.15	78.34	79.95	80.92	0.15	79.30	80.44	80.20
136.0	349.0	2.4	0.0	8.5	0.0	313.7	77.2	99.0	443.6	326.3	473.9	478.6	368.9	770.6	0.15	78.17	79.86	80.87	0.15	79.10	80.40	80.16
137.0	350.0	2.4	0.0	8.6	0.0	313.5	77.4	98.7	442.1	325.5	472.0	477.3	369.1	771.1	0.15	78.18	79.82	80.86	0.15	79.07	80.36	80.14
138.0	351.0	2.3	0.0	8.5	0.0	313.4	76.5	98.7	441.1	324.9	470.6	475.8	369.1	770.5	0.15	78.26	79.81	80.79	0.15	79.11	80.35	80.10
139.0	352.0	2.3	0.0	8.5	0.0	312.4	77.0	98.4	440.8	324.0	468.8	474.8	369.7	768.9	0.15	78.25	79.78	80.78	0.15	79.11	80.32	80.08
140.0	353.0	2.3	0.0	8.5	0.0	312.1	77.1	98.4	438.2	323.4	467.6	473.1	369.5	768.9	0.15	78.20	79.73	80.74	0.15	78.97	80.31	80.04
141.0	354.0	2.2	0.0	8.4	0.0	312.0	77.1	98.2	438.7	321.7	465.8	471.7	370.1	769.2	0.15	78.11	79.71	80.70	0.15	78.89	80.26	79.98
142.0	355.0	2.2	0.0	8.4	0.0	311.8	77.1	98.1	435.8	321.1	464.1	471.2	370.4	771.1	0.15	78.04	79.69	80.68	0.15	78.86	80.21	79.93
143.0	356.0	2.2	0.0	8.4	0.0	311.9	77.3	98.3	433.3	321.2	463.0	470.9	371.0	770.2	0.15	77.97	79.65	80.66	0.15	78.81	80.18	79.91

182,0	395,0	0,8	0,0	8,1	0,0	304,3	77,4	96,8	407,3	319,4	424,0	437,3	390,9	753,3	0,15	77,54	78,78	79,77	0,15	78,00	79,49	79,05
183,0	396,0	0,8	0,0	8,1	0,0	304,1	77,3	97,1	409,5	319,7	423,5	436,5	391,3	754,6	0,15	77,53	78,74	79,75	0,15	77,98	79,46	79,02
184,0	397,0	0,7	0,0	8,2	0,0	304,4	77,4	97,0	407,4	319,9	422,4	435,9	391,7	757,0	0,15	77,53	78,74	79,72	0,15	77,93	79,46	79,02
185,0	398,0	0,7	0,0	8,1	0,0	304,5	77,1	96,8	409,0	319,9	421,8	435,0	392,0	759,2	0,15	77,56	78,73	79,70	0,15	77,99	79,44	79,02
186,0	399,0	0,7	0,0	8,1	0,0	304,7	76,9	96,7	407,0	319,9	421,2	435,0	392,2	759,2	0,15	77,59	78,74	79,67	0,15	78,05	79,45	78,99
187,0	400,0	0,7	0,0	8,1	0,0	305,1	76,6	96,7	407,9	321,0	420,3	433,9	392,6	759,4	0,15	77,55	78,74	79,64	0,15	78,03	79,42	78,94
188,0	401,0	0,6	0,0	8,1	0,0	305,2	76,1	96,2	408,3	317,5	419,4	433,3	392,9	760,0	0,15	77,45	78,73	79,60	0,15	78,00	79,41	78,93
189,0	402,0	0,6	0,0	8,1	0,0	305,5	75,9	96,1	406,9	317,7	418,9	432,9	393,2	755,8	0,15	77,35	78,71	79,55	0,15	77,98	79,40	78,86
190,0	403,0	0,6	0,0	7,9	0,0	304,7	76,1	96,3	407,9	317,8	418,3	432,2	393,2	743,1	0,15	77,24	78,68	79,51	0,15	77,88	79,38	78,80
191,0	404,0	0,6	0,0	7,9	0,0	304,4	76,3	96,2	407,9	317,3	417,4	431,9	393,8	737,2	0,15	77,13	78,65	79,44	0,15	77,77	79,32	78,77
192,0	405,0	0,5	0,0	7,9	0,0	304,3	75,7	95,6	408,4	317,0	416,8	431,1	394,1	737,7	0,15	77,01	78,62	79,43	0,15	77,74	79,30	78,72
193,0	406,0	0,5	0,0	7,9	0,0	303,4	75,6	95,8	406,3	316,5	416,0	430,5	394,2	739,5	0,15	76,91	78,60	79,38	0,15	77,68	79,27	78,65
194,0	407,0	0,4	0,0	7,8	0,0	303,8	75,5	95,8	406,0	317,3	415,8	430,3	394,3	740,5	0,15	76,82	78,53	79,33	0,15	77,58	79,22	78,57
195,0	408,0	0,4	0,0	7,9	0,0	303,5	75,3	96,0	405,3	316,9	414,7	429,6	394,8	741,6	0,15	76,77	78,51	79,33	0,15	77,55	79,19	78,54
196,0	409,0	0,3	0,0	7,8	0,0	303,4	75,5	95,7	405,5	316,4	414,2	428,8	394,6	743,0	0,15	76,69	78,47	79,28	0,15	77,48	79,14	78,51
197,0	410,0	0,3	0,0	7,8	0,0	303,1	75,0	95,9	404,9	315,7	413,6	428,5	395,2	744,6	0,15	76,66	78,41	79,25	0,15	77,40	79,11	78,46
198,0	411,0	0,3	0,0	7,8	0,0	303,0	74,7	95,8	404,6	315,4	412,7	427,3	395,2	743,2	0,15	76,62	78,38	79,21	0,15	77,34	79,08	78,41
199,0	412,0	0,3	0,0	7,8	0,0	302,7	75,5	96,2	403,8	315,0	412,6	427,5	396,0	742,3	0,15	76,64	78,34	79,15	0,15	77,31	79,05	78,35
200,0	413,0	0,2	0,0	7,8	0,0	302,5	75,9	96,4	403,7	314,4	412,0	427,1	395,8	742,2	0,15	76,75	78,33	79,17	0,15	77,35	79,04	78,37
201,0	414,0	0,2	0,0	7,7	0,0	302,1	76,2	96,7	402,4	313,9	411,5	426,9	396,7	741,4	0,15	76,94	78,36	79,20	0,15	77,45	79,04	78,43
202,0	415,0	0,2	0,0	7,7	0,0	301,7	76,4	96,3	403,3	313,9	410,6	426,1	397,5	739,8	0,15	77,09	78,34	79,18	0,15	77,53	79,03	78,45
203,0	416,0	0,2	0,0	7,6	0,0	301,8	76,4	96,5	404,5	313,7	410,2	425,7	397,6	738,6	0,15	77,22	78,35	79,19	0,15	77,60	79,05	78,47
204,0	417,0	0,1	0,0	7,6	0,0	301,5	76,6	96,4	402,5	313,1	409,7	425,8	398,1	738,0	0,15	77,30	78,36	79,21	0,15	77,68	79,06	78,51
205,0	418,0	0,1	0,0	7,6	0,0	301,6	76,7	96,4	403,5	312,6	409,2	425,4	398,7	737,3	0,15	77,37	78,37	79,19	0,15	77,74	79,05	78,50
206,0	419,0	0,1	0,0	7,6	0,0	301,8	76,2	96,2	403,0	312,4	408,7	424,4	398,9	739,0	0,15	77,43	78,38	79,21	0,15	77,83	79,06	78,52
207,0	420,0	0,1	0,0	7,6	0,0	301,9	76,6	96,5	401,0	312,2	408,1	424,1	399,1	740,6	0,15	77,43	78,41	79,22	0,15	77,87	79,09	78,54
208,0	421,0	0,0	0,0	7,6	0,0	302,2	76,9	96,4	399,9	311,8	407,8	423,7	399,6	741,3	0,15	77,44	78,41	79,21	0,15	77,90	79,09	78,56

Manufacturer: HEARTHSTONE
Model: GM 80

Run: 6
Project #: PI 20177
Test Duration: 208 min

	HHV	LHV
Eff	78,70%	85,06%
Comb Eff	99,50%	99,50%
HT Eff	79,10%	85,49%
Output	35 206	kJ/h
Burn Rate	2,26	kg/h
Grams CO	62	g
Input	44 733	kJ/h
MC wet	17,38	

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:	78,70%	Air Fuel Ratio (A/F)	
Combustion Efficiency:	99,50%	Dry Molecular Weight (M _d)	30,07
Heat Transfer Efficiency:	79,10%	Dry Moles Exhaust Gas (N _p):	371,59
		Air Fuel Ratio (A/F)	10,66

Heat Output:	33 396 Btu/h	35 206 kJ/h
Heat Input:	42 434 Btu/h	44 733 kJ/h
Burn Duration:	3,47 h	
Burn Rate:	4,98 lb/h	2,258 kg/h
Stack Temp:	357,1 Deg. F	180,6 Deg. C

Date: 2018-09-27 Manufacturer: Hearthstone Model: Gm 80
Project #: PT 20177 Run: 6 Tech: MM Reviewer: DP

- handling 400 LBS START FIRE
- by pass open
- Fan ON (Low)
- At 32 LBS reset close Door
- At 100 LBS insert 1" pre load
- At 144 LBS close Door
- At 25 LBS hold second pre load
- At 1200 LBS close by pass
- At 5 LBS open Door open by pass
- Make cool close Door close by pass
- After 1 minute open Door open by pass
- insert load close Door close by pass

TEST LOAD CONFIGURATION

PRE / POST CHECKS

Date: 2018-09-27 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 6 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
GM 191	7.0	ok	ok

Pre-Test

Post-Test

Facility Conditions:

Air Velocity from less than 2 feet

Smoke Capture Check.....

Picture.....

Pre-Test	Post-Test
0 (max50 Fpm)	0 (max50 Fpm)
ok	ok
4 sides ok	ok

Wood Heater Conditions:

Date Wood Heater Stack Cleaned.....

Date Dilution Tunnel Cleaned.....

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

Traverse before ignition.....

Flow Rate 140 cfm $\pm$ 10%.....

2018-09-19
2018-09-19
ok
ok

ok

Temperature System:

Ambient (65°-90°F).....

Wood Heater Surface ($\pm$ 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
12	16	43
429	426	428
425	427	429
h	11	12
ok	ok	ok

SAMPLING EQUIPMENT CHECK OUT

 Date: 2018-09-27

 Manufacturer: Hearthstone

 Model: GM 80

 Project #: PT 20177

 Run: 6

 Tech: MM

 Reviewer: SP

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)	738689.70	784660.38	783689.80	784660.48	736646.03	737661.33
Initial 1minute DGM (Liter)	783689.60	784660.38	783689.80	784660.46	736646.02	737661.30
Change © (Liter)	0.10	Ø	Ø	0.02	0.01	0.03
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: 2018-09-27 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 6 Tech: MM Reviewer: DB

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

LIMITS OF WEIGHT RANGES

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

Date: 2018-09-27 Manufacturer: Hearststone Model: GM 80
 Project #: PI 2177 Run: 6 Tech: MM Reviewer: SP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 101.8 (KPa.) Static pressure (P_q) 0.25 (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	0057	73.73
B - Centroid	3.00	3.50	4	0058	73.46
A-1	0.40	0.50	0.50	0046	73.73
A-2	1.50	1.75	2	0065	73.85
A-3	4.50	5.25	6	0058	73.46
A-4	5.60	6.5	7.5	0055	73.44
B-1	0.40	0.50	0.50	0047	73.46
B-2	1.50	1.75	2	0067	73.47
B-3	4.50	5.25	6	0048	73.47
B-4	5.60	6.5	7.5	0047	73.43
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: 20180927 Manufacturer: Hearlstone Model: GM 80
 Project #: PI 2177 Run: 6 Tech: MR Reviewer: RS

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	3000 0	2985	3000	1.006	1.000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO ₂	0	1800 0	1796	1800	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	2999	1.000	0	0.02	0.000	0.15	0.006	0.05	☒	
CO ₂	0	1791	9.78	0	0.02	0.005	0.5	0.06	0.5	☒	

TEST DATA LOG

Date: 2018-09-27 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 6 Tech: MR Reviewer: RP

RAW DRY GAS METER READINGS

	System 1	System 2	Blank
Final (Liter)	784659, 44	737600, 38	304, 68
Initial (Liter)	783690, 26	736646, 58	225, 75

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101,8	101,8
Dry Bulb (F):	75,02	78,06
Humidity (%):	44	30,4

Flow Meter

	Start	End
Flow meter reading	NA	NA

Flow Meter Verification

	Before	After
Flow meter Check (liters)	NA	NA
Scale Weight (Kg)	NA	NA

FUEL DATA

Date: 2018-09-27 Manufacturer: Heartland Model: GM 80
 Project #: PT 20177 Run: 6 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/2 x 3 1/2 x 10 in.	1020 lbs.	213	219	220	219	216
1 1/2 x 3 1/2 x 10 in.	0998 lbs.	230	229	228	228	22.3
1 1/2 x 3 1/2 x 10 in.	0978 lbs.	204	206	208	207	210
1 1/2 x 3 1/2 x 10 in.	1024 lbs.	213	219	216	218	219
1 1/2 x 3 1/2 x 10 in.	1022 lbs.	220	220	221	223	223
1 1/2 x 3 1/2 x 10 in.	1016 lbs.	210	219	211	218	214
1 1/2 x 3 1/2 x 10 in.	0960 lbs.	230	231	228	227	228
1 1/2 x 3 1/2 x 10 in.	1086 lbs.	196	20	204	203	206
1 1/2 x 2 1/2 x 10 in.	1052 lbs.	193	198	196	194	193
1 1/2 x 3 1/2 x 10 in.	1068 lbs.	204	206	207	208	203
1 1/2 x 3 1/2 x 10 in.	1034 lbs.	199	196	198	193	198
1 1/2 x 3 1/2 x 14 in.	1498 lbs.	200	206	204	208	203
1 1/2 x 3 1/2 x 14 in.	1458 lbs.	199	196	193	199	198
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: 1421 lbs

FUEL DATA

Date: 2018-09-27 Manufacturer: Hearthstone Model: GM 80
 Project #: PI 20177 Run: 6 Tech: MM Reviewer: JP

FUEL DESCRIPTION:

Type of wood:

PRE-TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*				
1 1/4 x 3 1/2 x 10 in.	1036 lbs.	191	196	195	193	193
1 1/4 x 3 1/2 x 10 in.	1010 lbs.	200	193	194	194	193
1 1/4 x 3 1/2 x 10 in.	1104 lbs.	206	206	204	203	208
1 1/4 x 3 1/2 x 10 in.	1026 lbs.	209	208	203	209	204
1 1/4 x 3 1/2 x 10 in.	1102 lbs.	191	193	198	198	198
1 1/4 x 3 1/2 x 10 in.	0968 lbs.	199	197	197	199	203
1 1/2 x 3 1/2 x 10 in.	1040 lbs.	208	209	206	209	204
1 1/2 x 3 1/2 x 10 in.	0964 lbs.	193	199	203	208	203
1 1/4 x 3 1/2 x 10 in.	1028 lbs.	209	210	213	216	213
1 1/4 x 3 1/2 x 10 in.	0938 lbs.	199	204	208	209	208
1 1/4 x 3 1/2 x 10 in.	0932 lbs.	206	204	209	208	208
1 1/4 x 3 1/2 x 14 in.	1468 lbs.	199	193	192	193	199
1 1/4 x 3 x 14 in.	1544 lbs.	200	206	208	203	202
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: 1416 lbs

FUEL DATA

Date: 2018-09-27 Manufacturer: Hearthstone Model: GM 80
 Project #: PT 20177 Run: 6 Tech: mm Reviewer: DP

FUEL DESCRIPTION:

Type of wood :

TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)*						
3 1/2 x 3 1/2 x 2 1/4 in.	5.366 lbs.	21'	223	219	220	213		
3 1/2 x 3 1/2 x 2 1/4 in.	4.20 lbs.	213	203	206	108	204		
3 1/2 x 3 1/2 x 2 1/4 in.	5.078 lbs.	209	220	207	206	208		
3 1/2 x 3 1/2 x 2 1/4 in.	5.074 lbs.	205	206	218	216	209		
1 1/2 x 3/4 x 5 in.	0.124 lbs.			208				
1 1/2 x 3/4 x 5 in.	0.130 lbs.			201				
1 1/2 x 3/4 x 5 in.	0.108 lbs.			196				
1 1/2 x 3/4 x 5 in.	0.120 lbs.			193				
1 1/2 x 3/4 x 5 in.	0.128 lbs.			191				
1 1/2 x 3/4 x 5 in.	0.106 lbs.			195				
1 1/2 x 3/4 x 5 in.	0.108 lbs.			193				
1 1/2 x 3/4 x 5 in.	0.104 lbs.			198				
1 1/2 x 3/4 x 5 in.	0.110 lbs.			193				
1 1/2 x 3/4 x 5 in.	0.118 lbs.			193				
1 1/2 x 3/4 x 5 in.	0.096 lbs.			198				
1 1/2 x 3/4 x 5 in.	0.120 lbs.			198				
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: 21.10 lbs Min 20%: 422 Max 25%: 527

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-26 Manufacturer: Heartsong Model: GN 80
 Project #: PT 1.177 Run: 6 Tech: MM Reviewer: KS

SYSTEM 1 - 1 st hour		SYSTEM 1 - Sys 2 hr								
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	12	424	425	7	16	426	427	31	821
2-18-06-25	18:00	945412	01254	01262	34, 2692	108, 7535	01258	01268	33, 9909	01265
2-18-06-26	18:00	945413	01258	01263	34, 2693	108, 7534	01258	01268	33, 9910	01264

SYSTEM 1 - 1 st hour					SYSTEM 1 - Sys 2MM					
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	12	424	425	7	16	426	427	31	821
2018-09-26	16:00	945418	01258	01260	34, 2624 34, 2724	108.7542	01259	01269	33.9945	01266
2018-10-05	8:00	945415	01255 01258	01258	34, 2710	108.7539	01258	01267	33.9926	01265
2018-10-05	8:00	945415	01254	01258	34, 2709	108.7538	01258	01267	33.9925	01265

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2018-09-26 Project #: PT 20177 Run: 6 Manufacturer: Heathstone Model: GM 80
Tech: mr Reviewer: SL

Pre-test Weight Record		SYSTEM 2			
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
2018-09-26	18:00	43	428	429	45
2018-09-26	18:00	109, 1650	0, 1253	0, 1237	34, 2766
2018-09-26	18:00	109, 1650	0, 1254	0, 1237	34, 2766

Post-test Weight Record		SYSTEM 2			
Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
2018-09-27	16:00	43	428	429	45
2018-10-05	8:00	109, 1650	0, 1260	0, 1228	34, 2804
2018-10-05	8:00	109, 1650	0, 1259	0, 1226	34, 2782
2018-10-09	8:00	109, 1650	0, 1259	0, 1226	34, 2782

APPENDIX 2: Proportionality results

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,50	100,24	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
15,902	535,5	535,8			0,154	0,151	0	0,2341997
15,595	535,6	535,9	103,05	102,81	0,154	0,151	1	0,2337665
15,536	535,6	535,9	102,69	102,23	0,154	0,151	2	0,2337672
15,400	535,7	536,0	103,46	102,97	0,154	0,151	3	0,2319492
15,557	535,8	536,0	102,42	102,10	0,154	0,151	4	0,2342
15,476	535,9	536,1	102,01	101,79	0,153	0,151	5	0,2337666
15,515	536,0	536,2	101,39	101,33	0,153	0,151	6	0,2348498
15,558	536,1	536,3	101,00	100,66	0,153	0,151	7	0,2357128
15,543	536,1	536,3	100,93	100,64	0,153	0,151	8	0,2357128
15,491	536,2	536,4	101,30	100,96	0,154	0,151	9	0,2350337
15,428	536,2	536,4	101,43	101,14	0,154	0,151	10	0,2342013
15,567	536,2	536,5	100,42	100,07	0,153	0,151	11	0,2363583
15,463	536,3	536,5	100,91	100,82	0,153	0,151	12	0,2348505
15,462	536,3	536,5	101,08	100,84	0,153	0,151	13	0,2348503
15,420	536,4	536,6	101,24	101,40	0,153	0,151	14	0,2342016
15,563	536,4	536,6	100,69	100,24	0,154	0,151	15	0,236359
15,495	536,5	536,6	100,92	100,68	0,154	0,151	16	0,2352834
15,564	536,6	536,7	100,48	100,22	0,153	0,151	17	0,2363595
15,397	536,7	536,7	101,61	101,24	0,153	0,151	18	0,2337698
15,474	536,7	536,8	100,90	100,46	0,153	0,150	19	0,2350096
15,562	536,9	536,9	100,38	99,99	0,153	0,150	20	0,2363614
15,562	537,0	537,0	100,44	100,01	0,153	0,150	21	0,2363579
15,472	537,1	537,1	100,98	100,61	0,153	0,150	22	0,2348537
15,503	537,2	537,2	100,80	100,48	0,153	0,150	23	0,2352863
15,533	537,3	537,3	100,65	100,38	0,153	0,150	24	0,2357176
15,507	537,5	537,4	100,70	100,44	0,153	0,150	25	0,2352875
15,535	537,6	537,5	100,28	100,23	0,153	0,150	26	0,2357181
15,607	537,7	537,5	99,97	99,97	0,153	0,150	27	0,236793
15,297	537,7	537,5	101,96	101,90	0,153	0,150	28	0,232031
15,539	537,7	537,6	100,50	100,22	0,153	0,150	29	0,2357191
15,538	537,8	537,6	100,45	100,46	0,153	0,150	30	0,2357195
15,548	537,8	537,6	100,59	100,32	0,153	0,150	31	0,2357205
15,495	537,9	537,7	100,87	100,78	0,153	0,150	32	0,2348594
15,503	538,0	537,8	101,01	100,64	0,153	0,150	33	0,2348583
15,600	538,1	537,8	100,35	99,99	0,153	0,150	34	0,2363668
15,451	538,1	537,9	101,07	100,88	0,153	0,150	35	0,2342102
15,524	538,1	537,9	100,60	100,44	0,153	0,150	36	0,2352917
15,349	538,1	537,9	101,71	101,42	0,153	0,150	37	0,2326894
15,590	538,1	537,9	100,32	100,00	0,153	0,150	38	0,2363679
15,420	538,1	538,0	101,33	100,96	0,153	0,150	39	0,2337771
15,552	538,2	538,0	100,39	100,16	0,153	0,150	40	0,2357239
15,494	538,2	538,0	100,71	100,42	0,153	0,150	41	0,2348616
15,496	538,3	538,0	100,72	100,51	0,153	0,150	42	0,2348614
15,529	538,3	538,0	100,74	100,30	0,153	0,150	43	0,2352934
15,504	538,3	538,1	100,86	100,59	0,153	0,150	44	0,2348611
15,501	538,4	538,1	100,93	100,63	0,153	0,150	45	0,2347505
15,535	538,5	538,1	100,58	100,44	0,153	0,150	46	0,2352946
15,365	538,5	538,2	101,57	101,62	0,152	0,150	47	0,2326925
15,507	538,5	538,2	100,72	100,72	0,152	0,150	48	0,2348626
15,546	538,5	538,2	100,45	100,15	0,152	0,150	49	0,235438
15,368	538,5	538,2	101,58	101,62	0,152	0,150	50	0,2326933
15,570	538,6	538,2	100,36	100,43	0,152	0,150	51	0,2357258
15,537	538,7	538,3	100,55	100,25	0,152	0,150	52	0,2352695
15,443	538,7	538,3	101,17	100,95	0,152	0,150	53	0,2337802
15,272	538,7	538,3	102,39	102,17	0,152	0,150	54	0,2311621
15,444	538,7	538,2	101,12	101,49	0,152	0,150	55	0,2337802

15,545	538,7	538,2	100,53	100,60	0,152	0,150	56	0,2352956
15,445	538,7	538,2	101,20	100,74	0,152	0,150	57	0,2337811
15,375	538,7	538,2	101,65	101,47	0,152	0,150	58	0,2326932
15,444	538,7	538,2	101,20	101,12	0,152	0,150	59	0,2337814
15,471	538,7	538,2	100,83	100,69	0,152	0,150	60	0,2342148
15,443	538,7	538,2	101,17	101,19	0,152	0,150	61	0,2337812
15,304	538,7	538,2	102,06	102,04	0,152	0,150	62	0,2315996
15,381	538,8	538,3	101,61	101,57	0,152	0,150	63	0,2326935
15,455	538,9	538,4	101,27	100,97	0,152	0,150	64	0,2337814
15,341	539,0	538,4	101,90	101,64	0,152	0,150	65	0,2320389
15,311	539,1	538,5	102,18	101,93	0,152	0,150	66	0,2315985
15,456	539,2	538,6	101,19	100,84	0,152	0,150	67	0,2337813
15,386	539,2	538,6	101,73	101,22	0,152	0,149	68	0,2326934
15,316	539,1	538,6	102,31	101,78	0,152	0,149	69	0,2316
15,347	539,1	538,6	101,84	102,03	0,152	0,150	70	0,2320385
15,348	539,1	538,6	101,91	101,58	0,152	0,150	71	0,2320384
15,316	539,1	538,6	102,20	102,13	0,152	0,150	72	0,2315997
15,389	539,1	538,6	101,64	101,57	0,152	0,150	73	0,232693
15,490	539,2	538,7	100,98	100,57	0,152	0,150	74	0,2342151
15,389	539,2	538,7	101,61	101,68	0,152	0,150	75	0,2326936
15,388	539,2	538,7	101,39	101,48	0,152	0,150	76	0,232694
15,289	539,3	538,8	102,18	102,13	0,152	0,150	77	0,231163
15,318	539,3	538,7	102,07	101,94	0,152	0,150	78	0,2316012
15,391	539,3	538,7	101,50	101,53	0,152	0,150	79	0,2326945
15,246	539,3	538,7	102,53	102,38	0,152	0,150	80	0,2305034
15,321	539,3	538,7	102,09	101,79	0,152	0,149	81	0,2316014
15,394	539,3	538,7	101,59	101,43	0,152	0,149	82	0,2326943
15,393	539,3	538,7	101,62	101,51	0,152	0,150	83	0,2326947
15,495	539,3	538,6	100,95	100,40	0,152	0,149	84	0,2342159
15,469	539,3	538,6	101,33	101,23	0,152	0,149	85	0,2337824
15,355	539,3	538,6	101,87	101,89	0,152	0,150	86	0,2320397
15,330	539,4	538,6	102,10	102,10	0,152	0,150	87	0,2316014
15,257	539,4	538,7	102,61	102,57	0,152	0,150	88	0,2305032
15,261	539,4	538,7	102,61	102,47	0,152	0,150	89	0,230503
15,437	539,4	538,7	101,34	101,35	0,152	0,150	90	0,2331713
15,364	539,4	538,8	101,94	101,84	0,152	0,150	91	0,2320403
15,552	539,5	538,9	100,73	100,38	0,152	0,149	92	0,2348659
15,364	539,5	538,9	101,88	101,65	0,152	0,149	93	0,2320402
15,337	539,6	538,9	102,12	102,50	0,152	0,150	94	0,2316017
15,371	539,7	539,0	101,95	101,48	0,152	0,150	95	0,2320403
15,371	539,8	539,1	102,02	101,87	0,152	0,149	96	0,2320402
15,414	539,8	539,1	101,70	101,45	0,152	0,149	97	0,2326965
15,369	539,8	539,1	101,80	101,83	0,152	0,149	98	0,2320405
15,313	539,7	539,1	102,23	102,01	0,152	0,149	99	0,2311638
15,529	539,7	539,1	101,05	100,90	0,152	0,149	100	0,2344022
15,371	539,7	539,0	101,95	101,71	0,152	0,149	101	0,2320408
15,370	539,7	539,0	101,93	101,59	0,152	0,149	102	0,2320411
15,314	539,7	539,1	102,18	102,21	0,152	0,149	103	0,2311644
15,345	539,8	539,1	102,12	101,90	0,152	0,149	104	0,2315919
15,420	539,9	539,2	101,57	101,54	0,152	0,149	105	0,2326957
15,318	539,9	539,2	102,27	102,28	0,152	0,149	106	0,2311638
15,317	539,9	539,2	102,35	102,18	0,152	0,149	107	0,2311643
15,561	539,8	539,2	100,43	100,70	0,152	0,150	108	0,2348664
15,350	539,8	539,2	102,18	102,09	0,152	0,150	109	0,2316024
15,349	539,7	539,2	102,02	101,99	0,152	0,149	110	0,2316013
15,320	539,6	539,3	102,33	102,00	0,152	0,149	111	0,2311643
15,249	539,6	539,3	102,73	102,37	0,152	0,149	112	0,230063
15,278	539,5	539,2	102,72	102,31	0,152	0,149	113	0,2305031
15,348	539,5	539,2	102,07	101,55	0,152	0,149	114	0,2316012
15,378	539,4	539,1	101,91	101,75	0,152	0,149	115	0,2320387
15,351	539,4	539,0	102,08	102,00	0,152	0,149	116	0,2316005

15,250	539,4	539,0	102,64	102,71	0,152	0,149	117	0,2300613
15,376	539,4	539,0	101,84	101,59	0,152	0,149	118	0,2320389
15,248	539,3	538,9	102,81	102,43	0,152	0,149	119	0,2300615
15,248	539,2	538,9	102,75	102,58	0,152	0,149	120	0,2300622
15,348	539,1	538,8	102,10	101,72	0,152	0,149	121	0,2315996
15,380	539,1	538,7	101,84	101,76	0,152	0,149	122	0,2320379
15,422	539,1	538,7	101,60	101,44	0,152	0,149	123	0,2326931
15,280	539,0	538,6	102,54	102,65	0,152	0,149	124	0,2305014
15,143	539,0	538,6	103,54	103,45	0,152	0,150	125	0,2285112
15,319	538,9	538,5	102,25	102,18	0,152	0,149	126	0,2311607
14,997	538,9	538,5	104,53	104,48	0,152	0,149	127	0,2262803
15,321	538,8	538,4	102,45	102,38	0,152	0,150	128	0,2311594
15,282	538,8	538,4	102,71	102,31	0,152	0,149	129	0,2304994
15,250	538,7	538,3	102,78	102,76	0,152	0,149	130	0,2300594
15,249	538,6	538,3	102,79	102,30	0,152	0,149	131	0,2300591
15,355	538,6	538,3	102,25	101,94	0,152	0,149	132	0,2315971
15,356	538,6	538,2	102,12	102,13	0,152	0,149	133	0,2315968
15,388	538,6	538,3	102,05	101,76	0,152	0,149	134	0,2320345
15,214	538,6	538,3	103,26	103,01	0,152	0,149	135	0,2293956
15,428	538,6	538,3	101,74	101,25	0,152	0,149	136	0,2326893
15,327	538,6	538,3	102,41	102,06	0,152	0,149	137	0,2311578
15,354	538,5	538,2	102,22	101,96	0,152	0,149	138	0,2315954
15,210	538,5	538,2	103,12	102,75	0,152	0,149	139	0,2293946
15,215	538,5	538,2	103,22	102,89	0,152	0,149	140	0,2293937
15,291	538,5	538,1	102,69	102,34	0,152	0,149	141	0,2304975
15,361	538,5	538,1	102,26	102,07	0,152	0,149	142	0,2315944
15,388	538,4	538,1	102,04	102,01	0,152	0,149	143	0,2320324
15,333	538,4	538,2	102,54	102,16	0,152	0,149	144	0,2311565
15,335	538,4	538,2	102,54	102,56	0,152	0,150	145	0,2311561
15,392	538,4	538,2	102,18	101,74	0,152	0,149	146	0,2320322
15,360	538,5	538,2	102,24	102,10	0,152	0,149	147	0,231594
15,333	538,5	538,2	102,29	101,90	0,152	0,149	148	0,231156
15,365	538,6	538,2	102,24	102,05	0,152	0,149	149	0,231594
15,365	538,6	538,2	102,18	102,06	0,152	0,149	150	0,2315937
15,260	538,6	538,3	102,78	102,72	0,152	0,149	151	0,2300552
15,328	538,6	538,2	102,38	102,01	0,152	0,149	152	0,2311549
15,378	538,5	538,2	101,86	101,83	0,152	0,149	153	0,2320312
15,376	538,4	538,1	101,89	101,88	0,152	0,149	154	0,2320314
15,418	538,3	538,1	101,65	101,75	0,152	0,150	155	0,2326866
15,368	538,2	538,1	101,93	101,81	0,152	0,150	156	0,2319928
15,344	538,2	538,1	102,14	101,94	0,152	0,149	157	0,2315928
15,373	538,2	538,0	101,95	101,61	0,152	0,149	158	0,232031
15,337	538,2	538,0	102,08	101,96	0,152	0,149	159	0,231592
15,516	538,2	538,1	101,02	101,09	0,152	0,150	160	0,234207
15,487	538,2	538,0	101,19	101,06	0,152	0,150	161	0,2337735
15,413	538,2	538,1	101,69	101,58	0,152	0,150	162	0,2326644
15,343	538,2	538,0	102,14	101,95	0,152	0,149	163	0,2315923
15,313	538,2	538,0	102,33	102,14	0,152	0,149	164	0,231154
15,341	538,2	538,0	102,12	101,84	0,152	0,149	165	0,2315914
15,268	538,2	538,0	102,66	102,51	0,152	0,149	166	0,2304934
15,561	538,2	538,0	100,67	100,34	0,152	0,149	167	0,2348554
15,416	538,2	538,0	101,67	101,63	0,152	0,149	168	0,232685
15,374	538,3	538,0	101,99	101,74	0,152	0,149	169	0,2320283
15,562	538,3	538,0	100,69	100,56	0,152	0,149	170	0,2348555
15,491	538,3	538,0	101,21	101,15	0,152	0,149	171	0,2337718
15,418	538,3	538,1	101,77	101,58	0,152	0,150	172	0,2326846
15,379	538,3	538,1	102,02	101,51	0,152	0,149	173	0,2320293
15,376	538,3	538,2	101,91	101,97	0,152	0,149	174	0,232029
15,492	538,3	538,2	101,19	101,32	0,152	0,150	175	0,233772
15,521	538,4	538,2	101,00	100,74	0,152	0,150	176	0,2342051
15,349	538,4	538,3	102,16	102,09	0,152	0,149	177	0,2315907

15,488	538,4	538,3	101,35	100,52	0,152	0,149	178	0,2337725
15,485	538,4	538,2	101,13	101,01	0,152	0,149	179	0,2337722
15,513	538,4	538,3	100,95	100,55	0,152	0,149	180	0,2342049
15,513	538,3	538,2	100,97	100,99	0,152	0,149	181	0,234205
15,583	538,2	538,1	100,51	100,25	0,152	0,149	182	0,2352863
15,366	538,2	538,1	101,95	101,73	0,152	0,149	183	0,2320284
15,578	538,1	538,1	100,38	100,26	0,152	0,149	184	0,2352863
15,333	538,1	538,1	102,01	101,81	0,152	0,149	185	0,2315904
15,333	538,1	538,0	102,10	102,03	0,152	0,149	186	0,2315902
15,409	538,2	538,1	101,60	101,31	0,152	0,149	187	0,2326836
15,366	538,2	538,1	101,85	101,61	0,152	0,149	188	0,2320284
15,367	538,2	538,1	101,84	101,90	0,152	0,149	189	0,2320279
15,550	538,2	538,1	100,61	100,61	0,152	0,150	190	0,2348539
15,505	538,2	538,1	101,02	100,80	0,152	0,150	191	0,234205
15,473	538,2	538,0	101,18	101,05	0,152	0,150	192	0,2337707
15,473	538,1	538,0	101,17	100,70	0,152	0,149	193	0,2337708
15,398	538,1	538,0	101,69	101,38	0,152	0,149	194	0,2326831
15,354	538,1	538,0	101,82	101,68	0,152	0,149	195	0,2320277
15,394	538,1	538,0	101,56	101,26	0,152	0,149	196	0,2326832
15,495	538,1	538,0	101,01	100,77	0,152	0,149	197	0,2342047
15,595	538,1	538,0	100,21	100,32	0,152	0,150	198	0,2357168
15,590	538,1	538,0	99,99	100,15	0,152	0,150	199	0,2357167
15,554	538,1	538,0	100,20	99,80	0,152	0,149	200	0,2352858
15,584	538,1	537,9	100,20	99,97	0,152	0,149	201	0,2357167
15,524	538,1	538,0	100,38	100,44	0,152	0,149	202	0,2348536
15,378	538,1	537,9	101,54	101,25	0,152	0,149	203	0,2326834
15,519	538,0	537,9	100,54	100,50	0,152	0,150	204	0,2348719
15,545	537,9	537,8	100,31	100,01	0,152	0,150	205	0,2352862
15,438	537,9	537,8	100,92	100,56	0,152	0,149	206	0,2337714
15,463	537,8	537,7	100,74	100,60	0,152	0,149	207	0,2342046
15,560	537,8	537,7	100,19	99,73	0,152	0,149	208	0,235716
15,531	537,7	537,6	100,35	100,07	0,152	0,149	209	0,2352855
15,454	537,7	537,6	100,76	100,37	0,152	0,149	210	0,2342041
15,313	537,6	537,5	101,62	101,39	0,152	0,149	211	0,2320278
15,350	537,6	537,5	101,31	101,05	0,152	0,149	212	0,2326828
15,308	537,6	537,5	101,52	101,53	0,152	0,150	213	0,2320252
15,517	537,6	537,5	100,12	99,97	0,152	0,150	214	0,235286
15,449	537,6	537,5	100,80	100,58	0,152	0,150	215	0,2342042
15,445	537,5	537,5	100,63	100,48	0,152	0,150	216	0,2342088
15,413	537,5	537,5	100,89	100,48	0,152	0,149	217	0,2337707
15,412	537,5	537,5	100,87	100,49	0,152	0,149	218	0,233771
15,411	537,5	537,5	100,84	100,50	0,152	0,149	219	0,233771
15,541	537,5	537,6	100,04	99,68	0,152	0,149	220	0,2357165
15,435	537,5	537,6	100,64	100,14	0,152	0,149	221	0,2342052
15,434	537,5	537,6	100,53	100,30	0,152	0,149	222	0,2342049
15,475	537,5	537,6	100,23	100,00	0,152	0,149	223	0,2348537
15,430	537,5	537,6	100,49	100,30	0,152	0,149	224	0,2342051
15,400	537,5	537,6	100,82	100,40	0,152	0,149	225	0,2337715
15,467	537,5	537,6	100,18	99,98	0,152	0,149	226	0,234854
15,523	537,6	537,6	99,82	99,78	0,152	0,150	227	0,2357164
15,461	537,6	537,6	100,17	100,00	0,152	0,150	228	0,2348535
15,422	537,5	537,6	100,41	100,43	0,152	0,150	229	0,2342046
15,515	537,5	537,6	99,86	99,37	0,152	0,149	230	0,2357166
15,458	537,4	537,6	100,20	99,96	0,152	0,149	231	0,234854
15,484	537,4	537,5	99,91	99,78	0,152	0,150	232	0,2352864
15,453	537,3	537,5	100,19	99,91	0,152	0,149	233	0,2348536
15,551	537,3	537,5	99,58	99,46	0,152	0,150	234	0,2363623
15,506	537,3	537,4	99,84	99,63	0,152	0,150	235	0,2357172
15,235	537,3	537,4	101,49	101,61	0,152	0,150	236	0,2315907
15,306	537,2	537,3	101,14	100,98	0,152	0,150	237	0,2326843
15,480	537,3	537,3	99,96	99,77	0,152	0,150	238	0,235287

15,450	537,3	537,3	100,19	99,94	0,152	0,150	239	0,2348546
15,379	537,3	537,3	100,58	100,41	0,152	0,150	240	0,2337234
15,383	537,3	537,4	100,61	100,58	0,152	0,150	241	0,2337725
15,481	537,3	537,4	99,95	99,76	0,152	0,150	242	0,2352869
15,476	537,3	537,4	99,94	99,53	0,152	0,149	243	0,2352869
15,446	537,3	537,4	100,09	99,83	0,152	0,149	244	0,2348547
15,398	537,2	537,3	100,42	99,97	0,152	0,149	245	0,2342057
15,470	537,2	537,3	99,91	99,57	0,152	0,149	246	0,2352878
15,539	537,1	537,3	99,51	99,36	0,152	0,150	247	0,2363633
15,500	537,2	537,3	99,75	99,49	0,152	0,150	248	0,2357184
15,500	537,2	537,3	99,74	99,59	0,152	0,150	249	0,2357169
15,400	537,2	537,3	100,44	100,15	0,152	0,150	250	0,2342061
15,471	537,2	537,4	99,95	99,50	0,152	0,149	251	0,2352882
15,399	537,2	537,3	100,41	100,24	0,152	0,149	252	0,2342066
15,498	537,3	537,4	99,66	99,61	0,152	0,150	253	0,2357185
15,498	537,3	537,4	99,80	99,50	0,152	0,150	254	0,2357181
15,466	537,3	537,4	99,96	99,69	0,152	0,150	255	0,2352874
15,469	537,3	537,4	100,00	99,68	0,152	0,150	256	0,2352876
15,397	537,3	537,4	100,40	100,12	0,152	0,150	257	0,2342067
15,439	537,3	537,4	100,07	99,98	0,152	0,150	258	0,2348554
15,463	537,2	537,4	99,84	99,47	0,152	0,149	259	0,2352877
15,490	537,2	537,4	99,68	99,25	0,152	0,149	260	0,2357183
15,435	537,2	537,3	100,20	99,78	0,152	0,149	261	0,2348835
15,462	537,2	537,4	99,99	99,56	0,152	0,149	262	0,2352878
15,491	537,2	537,4	99,71	99,81	0,152	0,150	263	0,235718
15,434	537,3	537,3	100,02	99,96	0,152	0,150	264	0,2348555
15,462	537,3	537,3	99,99	99,66	0,152	0,150	265	0,235288
15,488	537,3	537,3	99,70	99,43	0,152	0,150	266	0,2357181
15,288	537,3	537,3	101,02	100,78	0,152	0,150	267	0,2326852
15,428	537,3	537,3	100,19	99,85	0,152	0,150	268	0,2348551
15,455	537,2	537,3	99,78	99,63	0,152	0,150	269	0,235288
15,481	537,2	537,2	99,80	99,40	0,152	0,150	270	0,2357183
15,350	537,1	537,2	100,44	100,20	0,152	0,150	271	0,2337727
15,278	537,0	537,1	100,94	100,80	0,152	0,150	272	0,2326845
15,447	537,0	537,1	99,77	99,59	0,152	0,150	273	0,2352874
15,375	537,0	537,1	100,38	99,86	0,152	0,149	274	0,2342061
15,420	537,0	537,1	100,15	99,75	0,152	0,149	275	0,2348551
15,480	537,0	537,1	99,68	99,47	0,152	0,150	276	0,2357181
15,423	537,0	537,1	100,03	99,81	0,152	0,150	277	0,2348551
15,380	537,0	537,2	100,20	100,09	0,152	0,150	278	0,2342057
15,281	537,0	537,2	101,00	100,71	0,152	0,150	279	0,2326843
15,422	537,0	537,2	99,90	99,67	0,152	0,149	280	0,2348545
15,377	536,9	537,1	100,36	99,95	0,152	0,149	281	0,2342058
15,375	536,9	537,1	100,31	99,84	0,152	0,149	282	0,2342057
15,514	536,8	537,1	99,55	99,18	0,152	0,150	283	0,2363634
15,415	536,7	537,1	100,08	99,82	0,152	0,150	284	0,2348544
15,272	536,7	537,0	100,67	94,26	0,152	0,145	285	0,2326844
15,515	536,7	537,0	99,39	99,02	0,152	0,145	286	0,2363621
15,343	536,7	537,0	100,60	100,31	0,152	0,150	287	0,2337716
15,469	536,6	537,0	99,65	99,68	0,152	0,150	288	0,2357042
15,443	536,6	537,0	99,95	99,48	0,152	0,150	289	0,2352864
15,413	536,6	537,0	100,13	99,66	0,152	0,149	290	0,234854
15,511	536,7	537,0	99,45	98,73	0,152	0,149	291	0,2363625
15,340	536,6	536,9	100,24	100,24	0,152	0,149	292	0,2337711
15,367	536,6	536,9	100,24	99,90	0,152	0,150	293	0,2342045
15,368	536,6	536,9	100,25	100,11	0,152	0,150	294	0,2342049
15,465	536,6	536,9	99,60	99,33	0,152	0,150	295	0,2357183
15,263	536,6	536,8	100,87	100,68	0,152	0,150	296	0,2326836
15,405	536,5	536,8	99,94	99,82	0,152	0,150	297	0,2348536
15,364	536,5	536,8	100,27	100,18	0,152	0,150	298	0,2342041
15,337	536,4	536,7	100,61	100,13	0,152	0,150	299	0,2337705

15,435	536,3	536,7	99,73	99,50	0,152	0,150	300	0,2352858
15,246	536,3	536,7	100,94	100,52	0,152	0,149	301	0,2324716
15,404	536,3	536,7	99,98	99,64	0,152	0,149	302	0,2348528
15,404	536,2	536,6	100,06	99,80	0,152	0,150	303	0,2348527
15,501	536,3	536,6	99,53	99,27	0,153	0,150	304	0,2363606
15,459	536,2	536,6	99,67	99,48	0,153	0,150	305	0,2357159
15,402	536,2	536,6	100,01	99,89	0,152	0,150	306	0,234853
15,258	536,2	536,5	100,94	100,55	0,152	0,150	307	0,2326823
15,358	536,2	536,5	100,42	99,70	0,153	0,149	308	0,2342036
15,425	536,1	536,5	99,90	99,18	0,153	0,149	309	0,235285
15,398	536,1	536,4	100,15	99,55	0,153	0,149	310	0,2348509
15,355	536,0	536,4	100,33	99,91	0,153	0,150	311	0,2342034
15,395	536,0	536,4	99,99	99,61	0,152	0,150	312	0,2348524
15,495	536,0	536,4	99,34	99,00	0,152	0,150	313	0,2363604
15,256	536,0	536,3	101,06	100,72	0,153	0,150	314	0,2327632
15,456	536,0	536,3	99,67	99,25	0,153	0,150	315	0,2357144
15,504	536,0	536,3	99,40	98,99	0,152	0,150	316	0,2363602
15,372	536,1	536,3	100,43	100,31	0,152	0,150	317	0,2342024
15,478	536,2	536,4	99,63	99,57	0,152	0,150	318	0,2357146
15,527	536,4	536,6	99,59	99,14	0,152	0,150	319	0,23636
15,491	536,6	536,7	99,73	99,55	0,152	0,150	320	0,2357144
15,468	536,7	536,8	99,84	99,90	0,152	0,150	321	0,2352846
15,469	536,9	536,9	99,91	99,75	0,152	0,150	322	0,2352851
15,402	537,1	537,1	100,50	100,14	0,152	0,150	323	0,2342031
15,303	537,2	537,2	100,98	100,87	0,152	0,150	324	0,2326825
15,507	537,3	537,3	99,68	99,43	0,152	0,149	325	0,2357149
15,550	537,4	537,4	99,45	99,28	0,152	0,149	326	0,2363607
15,509	537,5	537,5	99,66	99,45	0,152	0,149	327	0,2357157
15,482	537,6	537,6	99,75	99,77	0,152	0,149	328	0,235285
15,483	537,7	537,7	99,80	99,57	0,152	0,149	329	0,2352854
15,484	537,8	537,8	99,73	99,79	0,152	0,149	330	0,2352854
15,555	537,9	537,9	99,32	99,40	0,152	0,150	331	0,2363612
15,555	537,9	538,0	99,46	99,03	0,152	0,149	332	0,2363616
15,513	538,0	538,0	99,81	99,26	0,152	0,149	333	0,2357163
15,486	538,1	538,1	99,90	99,72	0,152	0,149	334	0,2352857
15,550	538,1	538,2	99,50	99,07	0,152	0,149	335	0,2362717
15,557	538,1	538,3	99,43	99,17	0,152	0,149	336	0,2363565
15,512	538,2	538,3	99,60	99,50	0,152	0,149	337	0,2357166
15,558	538,3	538,4	99,30	99,41	0,152	0,149	338	0,236362
15,557	538,3	538,4	99,38	99,17	0,152	0,149	339	0,2363626
15,516	538,3	538,5	99,65	99,54	0,152	0,149	340	0,2357173
15,514	538,4	538,5	99,68	99,50	0,152	0,149	341	0,2357169
15,515	538,4	538,5	99,59	99,74	0,152	0,150	342	0,2357175
15,488	538,4	538,6	99,77	99,48	0,152	0,149	343	0,2352864
15,490	538,5	538,6	99,91	99,72	0,152	0,149	344	0,2352867
15,499	538,5	538,6	99,99	99,38	0,152	0,149	345	0,2354186
15,561	538,5	538,7	99,27	99,24	0,152	0,149	346	0,2363634
15,518	538,5	538,7	99,53	99,61	0,152	0,149	347	0,2357178
15,559	538,5	538,7	99,56	99,12	0,152	0,149	348	0,2363636
15,517	538,6	538,7	99,64	99,65	0,152	0,149	349	0,2357179
15,561	538,6	538,8	99,45	98,92	0,152	0,149	350	0,2363632
15,519	538,6	538,8	99,66	99,35	0,152	0,149	351	0,2357179
15,517	538,6	538,8	99,58	99,34	0,152	0,149	352	0,2357181
15,560	538,6	538,8	99,17	99,06	0,152	0,149	353	0,2363638
15,516	538,7	538,8	99,70	99,27	0,152	0,149	354	0,2357181
15,588	538,7	538,9	99,23	98,86	0,152	0,149	355	0,2367919
15,519	538,7	538,9	99,58	99,11	0,152	0,149	356	0,2357182
15,517	538,7	538,9	99,79	99,46	0,152	0,149	357	0,2357179
15,488	538,8	538,9	99,72	99,55	0,152	0,149	358	0,2352881
15,515	538,8	538,9	99,61	99,55	0,152	0,149	359	0,2357183
15,489	538,8	539,0	99,66	99,69	0,152	0,149	360	0,2352883

15,490	538,8	539,0	99,82	99,52	0,152	0,149	361	0,2352878
15,517	538,8	539,0	99,80	99,31	0,152	0,149	362	0,2357189
15,516	538,8	539,0	99,63	99,27	0,152	0,149	363	0,2357184
15,517	538,9	539,0	99,61	99,33	0,152	0,149	364	0,2357187
15,390	538,9	539,0	100,44	100,37	0,152	0,149	365	0,2337732
15,560	538,9	539,1	99,47	99,14	0,152	0,149	366	0,2363644
15,588	538,9	539,1	99,24	98,89	0,152	0,149	367	0,2367928
15,559	538,9	539,1	99,45	99,17	0,152	0,149	368	0,2363641
15,487	538,9	539,1	99,86	99,30	0,152	0,149	369	0,2352885
15,517	538,9	539,1	99,71	99,53	0,152	0,149	370	0,2357186
15,516	539,0	539,1	99,59	99,37	0,152	0,149	371	0,2357185
15,518	539,0	539,2	99,68	99,49	0,152	0,149	372	0,235718
15,440	539,0	539,2	100,04	99,80	0,152	0,149	373	0,2345755
15,517	539,0	539,2	99,76	99,17	0,152	0,149	374	0,2357187
15,488	539,0	539,2	99,87	99,53	0,152	0,149	375	0,2352882
15,488	539,1	539,2	99,78	99,66	0,152	0,149	376	0,2352885
15,515	539,1	539,2	99,66	99,46	0,152	0,149	377	0,2357188
15,515	539,1	539,3	99,55	99,33	0,152	0,149	378	0,2357185
15,458	539,1	539,3	100,04	100,00	0,152	0,149	379	0,234856
15,557	539,1	539,3	99,46	99,03	0,152	0,149	380	0,236365
15,459	539,1	539,3	100,17	99,64	0,152	0,149	381	0,2348537
15,486	539,1	539,3	99,78	99,55	0,152	0,149	382	0,2352882
15,556	539,1	539,3	99,36	99,18	0,152	0,149	383	0,2363581
15,559	539,1	539,3	99,40	99,19	0,152	0,149	384	0,2363649
15,487	539,2	539,3	99,73	99,53	0,152	0,149	385	0,2352885
15,487	539,2	539,3	99,74	99,70	0,152	0,149	386	0,2352885
15,482	539,2	539,3	99,79	99,87	0,152	0,149	387	0,2352136
15,456	539,2	539,3	99,90	99,79	0,152	0,149	388	0,2348562
15,490	539,2	539,3	99,79	99,46	0,152	0,149	389	0,2353421
15,556	539,2	539,4	99,39	99,07	0,152	0,149	390	0,2363644
15,486	539,2	539,4	99,72	99,50	0,152	0,149	391	0,2352887
15,557	539,2	539,4	99,26	98,90	0,152	0,149	392	0,2363642
15,558	539,2	539,4	99,28	99,04	0,152	0,149	393	0,2363644
15,458	539,3	539,4	99,92	99,81	0,152	0,149	394	0,2348565
15,557	539,3	539,4	99,32	99,10	0,152	0,149	395	0,236364
15,515	539,3	539,4	99,73	99,30	0,152	0,149	396	0,2357188
15,556	539,3	539,4	99,26	99,16	0,152	0,149	397	0,2363629
15,520	539,3	539,4	99,53	99,16	0,152	0,149	398	0,2357957
15,414	539,3	539,5	100,20	99,81	0,152	0,149	399	0,2342073
15,515	539,3	539,4	99,64	99,25	0,152	0,149	400	0,235719
15,271	539,3	539,5	101,12	101,06	0,152	0,149	401	0,2320308
15,387	539,3	539,5	100,43	100,26	0,152	0,149	402	0,2337745
15,625	539,3	539,5	98,81	98,65	0,152	0,149	403	0,2374355
15,312	539,3	539,5	100,89	100,58	0,152	0,149	404	0,2326864
15,512	539,3	539,5	99,63	99,24	0,152	0,149	405	0,2357193
15,513	539,4	539,5	99,60	99,13	0,152	0,149	406	0,235719
15,484	539,4	539,5	99,84	99,52	0,152	0,149	407	0,2352883
15,482	539,4	539,5	99,79	99,27	0,152	0,149	408	0,2352889
15,553	539,4	539,5	99,35	98,89	0,152	0,149	409	0,2363646
15,312	539,4	539,5	100,99	100,65	0,152	0,149	410	0,2326862
15,411	539,4	539,5	100,25	99,90	0,152	0,149	411	0,2342074
15,269	539,4	539,5	101,09	100,84	0,152	0,149	412	0,2320309
15,554	539,4	539,5	99,37	98,94	0,152	0,149	413	0,2363644
15,552	539,4	539,5	99,38	98,93	0,152	0,149	414	0,2363646
15,481	539,4	539,5	99,81	99,74	0,152	0,149	415	0,2352889
15,552	539,4	539,5	99,28	99,02	0,152	0,149	416	0,2363649
15,453	539,4	539,5	100,16	99,72	0,152	0,149	417	0,2348566
15,452	539,4	539,6	99,84	99,45	0,152	0,149	418	0,2348565
15,508	539,4	539,6	99,64	99,16	0,152	0,149	419	0,2357193
15,408	539,4	539,6	100,11	99,95	0,152	0,149	420	0,2341815
15,509	539,4	539,6	99,45	99,25	0,152	0,149	421	0,2357193

15,508	539,4	539,6	99,57	99,37	0,152	0,149	422	0,2357191
15,508	539,4	539,6	99,69	99,45	0,152	0,149	423	0,2357196
15,509	539,4	539,6	99,65	99,32	0,152	0,149	424	0,2357198
15,478	539,4	539,6	99,87	99,68	0,152	0,149	425	0,235289
15,377	539,4	539,6	100,55	100,32	0,152	0,149	426	0,2337746
15,407	539,4	539,6	100,27	100,15	0,152	0,149	427	0,2342078
15,509	539,5	539,6	99,66	99,57	0,152	0,149	428	0,2357196
15,552	539,5	539,6	99,32	99,03	0,152	0,149	429	0,2363653
15,453	539,5	539,6	100,07	99,79	0,152	0,149	430	0,2348567
15,508	539,5	539,6	99,53	99,42	0,152	0,149	431	0,2357197
15,549	539,5	539,6	99,23	99,02	0,152	0,149	432	0,2363649
15,537	539,5	539,6	99,45	99,07	0,152	0,149	433	0,2361619
15,381	539,5	539,6	100,54	100,37	0,152	0,149	434	0,2337741
15,507	539,5	539,6	99,66	99,09	0,152	0,149	435	0,2357196
15,451	539,5	539,6	99,96	99,73	0,152	0,149	436	0,2348564
15,507	539,5	539,6	99,65	99,32	0,152	0,149	437	0,2357198
15,452	539,5	539,6	99,99	99,91	0,152	0,149	438	0,2348567
15,405	539,5	539,6	100,28	99,90	0,152	0,149	439	0,2342073
15,478	539,5	539,6	99,72	99,40	0,152	0,149	440	0,2352885
15,507	539,5	539,6	99,76	99,39	0,152	0,149	441	0,2357184
15,405	539,5	539,6	100,21	99,91	0,152	0,149	442	0,2342077
15,450	539,5	539,6	100,05	99,76	0,152	0,149	443	0,2348563
15,476	539,5	539,6	99,70	99,85	0,152	0,149	444	0,2352891
15,548	539,5	539,6	99,29	99,07	0,152	0,149	445	0,2363651
15,447	539,5	539,6	100,08	99,87	0,152	0,149	446	0,2348567
15,403	539,5	539,7	100,19	100,02	0,152	0,149	447	0,2342078
15,446	539,5	539,7	100,12	99,89	0,152	0,149	448	0,2348567
15,449	539,5	539,7	100,21	99,81	0,152	0,149	449	0,2348567
15,260	539,5	539,6	101,02	101,01	0,152	0,149	450	0,2320317
15,475	539,5	539,6	99,92	99,42	0,152	0,149	451	0,2352884
15,476	539,5	539,6	99,88	99,54	0,152	0,149	452	0,2352888
15,506	539,5	539,7	99,69	99,40	0,152	0,149	453	0,2357192
15,503	539,5	539,7	99,63	99,46	0,152	0,149	454	0,2357101
15,502	539,5	539,7	99,76	99,09	0,152	0,149	455	0,2357193
15,446	539,5	539,7	99,97	99,86	0,152	0,149	456	0,2348564
15,475	539,5	539,7	99,74	99,52	0,152	0,149	457	0,2352886
15,260	539,5	539,7	101,10	100,88	0,152	0,149	458	0,232031
15,503	539,5	539,7	99,58	99,38	0,152	0,149	459	0,2357191
15,471	539,5	539,7	99,90	99,19	0,152	0,149	460	0,2352889
15,444	539,5	539,7	100,01	99,83	0,152	0,149	461	0,2348568
15,444	539,5	539,6	99,91	99,63	0,152	0,149	462	0,2348564
15,500	539,5	539,6	99,57	98,98	0,152	0,149	463	0,2357195
15,500	539,5	539,6	99,54	99,42	0,152	0,149	464	0,2357197
15,473	539,5	539,6	99,70	99,52	0,152	0,149	465	0,2352892
15,501	539,5	539,6	99,54	99,23	0,152	0,149	466	0,2357194
15,257	539,5	539,7	101,22	101,06	0,152	0,149	467	0,2320311
15,642	539,5	539,6	98,66	98,36	0,152	0,149	468	0,2378633
15,445	539,5	539,6	99,93	99,63	0,152	0,149	469	0,2348566
15,544	539,5	539,6	99,36	98,94	0,152	0,149	470	0,2363643
15,542	539,5	539,6	99,49	98,94	0,152	0,149	471	0,2363654
15,372	539,5	539,6	100,58	100,33	0,152	0,149	472	0,2337742
15,502	539,5	539,6	99,75	99,48	0,152	0,149	473	0,2357194
15,570	539,5	539,6	99,21	98,69	0,152	0,149	474	0,2367935
15,470	539,5	539,6	99,70	99,41	0,152	0,149	475	0,235289
15,370	539,5	539,6	100,42	100,14	0,152	0,149	476	0,233774
15,497	539,4	539,6	99,55	99,10	0,152	0,149	477	0,235719
15,442	539,4	539,6	100,07	99,62	0,152	0,149	478	0,2348567
15,397	539,4	539,6	100,32	100,06	0,152	0,149	479	0,2342079
15,499	539,4	539,6	99,64	99,34	0,152	0,149	480	0,2357194
15,441	539,4	539,6	99,91	99,57	0,152	0,149	481	0,2348567
15,570	539,4	539,6	99,21	98,95	0,152	0,149	482	0,2367933

15,397	539,4	539,5	100,44	99,99	0,152	0,149	483	0,234171
15,498	539,4	539,5	99,55	99,35	0,152	0,149	484	0,2357193
15,499	539,4	539,6	99,67	99,16	0,152	0,149	485	0,2357196
15,441	539,4	539,5	100,08	99,81	0,152	0,149	486	0,2348565
15,253	539,4	539,6	101,26	101,13	0,152	0,150	487	0,2320088
15,540	539,4	539,6	99,46	99,39	0,152	0,150	488	0,2363644
15,440	539,4	539,5	100,02	100,06	0,152	0,150	489	0,2348569
15,439	539,4	539,5	100,01	99,61	0,152	0,149	490	0,2348564
15,496	539,4	539,5	99,71	99,48	0,152	0,149	491	0,2357189
15,496	539,4	539,5	99,69	99,53	0,152	0,150	492	0,2357192
15,467	539,3	539,5	99,75	99,59	0,152	0,149	493	0,2352892
15,469	539,3	539,5	99,75	99,40	0,152	0,149	494	0,2352887
15,495	539,3	539,5	99,54	99,20	0,152	0,149	495	0,2357191
15,467	539,3	539,5	99,79	99,40	0,152	0,149	496	0,2352889
15,496	539,3	539,5	99,69	99,20	0,152	0,149	497	0,2357191
15,440	539,3	539,5	99,90	99,66	0,152	0,149	498	0,234857
15,441	539,3	539,5	100,17	99,38	0,152	0,149	499	0,2348565
15,497	539,3	539,5	99,60	99,52	0,152	0,149	500	0,235719
15,367	539,3	539,5	100,57	100,17	0,152	0,149	501	0,2337741
15,225	539,3	539,5	101,53	101,18	0,152	0,149	502	0,2315929
15,538	539,3	539,5	99,49	99,13	0,152	0,149	503	0,2363648
15,395	539,3	539,5	100,26	100,11	0,152	0,149	504	0,2342074
15,439	539,3	539,4	100,08	99,75	0,152	0,149	505	0,2348469
15,395	539,2	539,4	100,46	99,87	0,152	0,149	506	0,2342072
15,537	539,2	539,4	99,24	99,06	0,152	0,149	507	0,2363642
15,467	539,2	539,4	99,85	99,99	0,152	0,150	508	0,2352887
15,537	539,2	539,4	99,40	99,09	0,152	0,150	509	0,2363639
15,438	539,2	539,4	100,05	99,76	0,152	0,149	510	0,2348562
15,465	539,2	539,4	99,74	99,65	0,152	0,149	511	0,2352884
15,536	539,2	539,4	99,40	99,30	0,152	0,150	512	0,2363641
15,464	539,2	539,4	99,69	99,64	0,152	0,150	513	0,2352881
15,464	539,2	539,4	99,76	99,65	0,152	0,150	514	0,2352882
15,435	539,1	539,4	100,01	99,47	0,152	0,149	515	0,234856
15,521	539,1	539,4	99,61	99,22	0,152	0,149	516	0,2361453
15,435	539,1	539,3	99,83	99,54	0,152	0,149	517	0,2348563
15,493	539,1	539,4	99,58	99,27	0,152	0,149	518	0,2357189
15,464	539,2	539,4	99,76	99,62	0,152	0,149	519	0,235288
15,465	539,2	539,4	99,84	99,58	0,152	0,149	520	0,2352886
15,395	539,2	539,4	100,39	100,11	0,152	0,149	521	0,234206
15,494	539,2	539,4	99,80	99,92	0,152	0,150	522	0,2357186
15,494	539,2	539,4	99,50	99,21	0,152	0,150	523	0,2357189
15,538	539,2	539,4	99,31	99,10	0,152	0,149	524	0,2363643
15,295	539,2	539,4	100,99	100,62	0,152	0,149	525	0,2326857
15,534	539,2	539,4	99,32	99,04	0,152	0,149	526	0,2363635
15,564	539,2	539,5	99,18	98,85	0,152	0,149	527	0,2367926
15,438	539,2	539,4	100,06	99,76	0,152	0,149	528	0,2348543
15,437	539,2	539,4	99,94	99,48	0,152	0,149	529	0,2348563
15,466	539,1	539,4	99,82	99,43	0,152	0,149	530	0,2352878
15,537	539,1	539,4	99,51	99,31	0,152	0,149	531	0,2363636
15,536	539,1	539,4	99,33	99,06	0,152	0,149	532	0,2363635
15,495	539,1	539,4	99,72	99,66	0,152	0,150	533	0,2357181
15,496	539,1	539,4	99,62	99,50	0,152	0,150	534	0,235718
15,495	539,1	539,3	99,71	99,41	0,152	0,149	535	0,2357178
15,494	539,1	539,3	99,67	99,47	0,152	0,149	536	0,2357179
15,396	539,1	539,3	100,29	99,93	0,152	0,149	537	0,2342062
15,539	539,1	539,3	99,44	99,37	0,152	0,150	538	0,2363877
15,494	539,1	539,3	99,66	99,22	0,152	0,149	539	0,2357181
15,536	539,1	539,3	99,35	99,29	0,152	0,149	540	0,2363637
15,437	539,1	539,3	99,93	99,63	0,152	0,149	541	0,2348511
15,366	539,1	539,3	100,41	100,17	0,152	0,149	542	0,2337735
15,564	539,1	539,3	99,22	98,81	0,152	0,149	543	0,2367921

15,495	539,1	539,3	99,55	99,50	0,152	0,149	544	0,2357183
15,534	539,1	539,3	99,32	99,28	0,152	0,150	545	0,2363637
15,464	539,1	539,3	99,99	99,58	0,152	0,150	546	0,2352878
15,534	539,1	539,3	99,51	99,01	0,152	0,149	547	0,2363641
15,535	539,1	539,3	99,48	99,19	0,152	0,149	548	0,2363631
15,493	539,1	539,3	99,68	99,32	0,152	0,149	549	0,2357183
15,434	539,0	539,2	100,05	99,68	0,152	0,149	550	0,2348573
15,536	539,0	539,2	99,47	98,92	0,152	0,149	551	0,2363642
15,536	539,0	539,2	99,39	99,13	0,152	0,149	552	0,2363637
15,436	539,0	539,2	99,99	99,63	0,152	0,149	553	0,2348554
15,251	539,0	539,2	101,11	100,94	0,152	0,149	554	0,2320301
15,436	539,0	539,2	100,08	99,76	0,152	0,149	555	0,234855
15,564	539,0	539,2	99,24	98,88	0,152	0,149	556	0,2367859
15,534	539,0	539,2	99,39	99,06	0,152	0,149	557	0,2363638
15,534	539,0	539,2	99,41	99,13	0,152	0,149	558	0,2363636
15,535	539,0	539,2	99,31	99,02	0,152	0,149	559	0,2363638
15,464	539,0	539,2	99,85	99,56	0,152	0,149	560	0,2352883
15,535	539,0	539,2	99,41	98,99	0,152	0,149	561	0,2363636
15,464	539,0	539,2	99,62	99,60	0,152	0,149	562	0,2352874
15,435	539,0	539,2	100,00	99,96	0,152	0,150	563	0,2348555
15,535	538,9	539,1	99,40	99,02	0,152	0,149	564	0,2363639
15,492	538,9	539,1	99,77	99,36	0,152	0,149	565	0,2357179
15,534	538,9	539,1	99,53	99,36	0,152	0,150	566	0,2363631
15,563	538,9	539,1	99,30	98,97	0,152	0,150	567	0,2367921
15,492	538,9	539,1	99,63	99,35	0,152	0,149	568	0,2357181
15,532	538,9	539,1	99,35	98,97	0,152	0,149	569	0,2363638
15,295	538,9	539,1	100,94	100,81	0,152	0,149	570	0,2327346
15,462	538,8	539,1	99,88	99,56	0,152	0,150	571	0,2352879
15,464	538,8	539,1	99,84	99,55	0,152	0,149	572	0,2352881
15,491	538,8	539,1	99,66	99,13	0,152	0,149	573	0,2357162
15,435	538,8	539,0	99,95	99,95	0,152	0,149	574	0,2348873
15,490	538,8	539,0	99,85	99,53	0,152	0,150	575	0,235718
15,390	538,8	539,0	100,29	100,15	0,152	0,150	576	0,2342064
15,489	538,8	539,0	99,58	99,45	0,152	0,150	577	0,2357179
15,534	538,8	539,0	99,50	99,01	0,152	0,149	578	0,2363634
15,492	538,8	539,0	99,65	99,43	0,152	0,149	579	0,2357176
15,490	538,8	539,0	99,78	99,37	0,152	0,149	580	0,2357179
15,432	538,8	539,0	100,11	99,78	0,152	0,149	581	0,2348548
15,488	538,7	539,0	99,69	99,29	0,152	0,149	582	0,2357176
15,437	538,7	539,0	100,07	99,90	0,152	0,150	583	0,2349364
15,389	538,7	539,0	100,38	100,03	0,152	0,150	584	0,2342058
15,460	538,8	539,0	99,91	99,54	0,152	0,149	585	0,235287
15,529	538,7	538,9	99,37	98,94	0,152	0,149	586	0,2363625
15,487	538,7	538,9	99,48	99,53	0,152	0,149	587	0,2357169
15,431	538,7	538,9	100,02	99,92	0,152	0,150	588	0,2348541
15,487	538,7	538,9	99,54	99,22	0,152	0,149	589	0,2357175
15,487	538,7	538,9	99,58	99,19	0,152	0,149	590	0,2357169
15,555	538,7	538,9	99,13	98,93	0,152	0,149	591	0,2367908
15,528	538,6	538,9	99,48	99,16	0,152	0,149	592	0,2363621
15,359	538,6	538,9	100,65	100,03	0,152	0,149	593	0,2337716
15,450	538,6	538,9	99,92	99,55	0,152	0,149	594	0,2352021
15,526	538,6	538,8	99,57	99,05	0,152	0,149	595	0,2363624
15,485	538,5	538,8	-0,01	-0,02	0,076	0,075	596	0,2357173
15,485	538,5	538,7	-0,01	-0,02	0,000	0,000	597	0,2357164
15,455	538,4	538,7	-0,02	-0,02	0,000	0,000	598	0,2352863
15,454	538,4	538,7	-0,01	-0,02	0,000	0,000	599	0,2352861
15,384	538,3	538,7	-0,01	-0,02	0,000	0,000	600	0,2342038
15,481	538,3	538,6	-0,02	-0,01	0,000	0,000	601	0,235716
15,454	538,3	538,6	-0,01	-0,02	0,000	0,000	602	0,2352857

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	100,45	99,84	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
15,713	539,9	540,2			0,154	0,151	0	0,2315907
15,413	539,9	540,2	105,03	104,09	0,154	0,151	1	0,2322893
15,581	540,0	540,2	103,01	102,28	0,154	0,151	2	0,2357169
15,149	540,1	540,3	105,75	105,06	0,154	0,151	3	0,2293902
15,379	540,1	540,3	104,31	103,48	0,154	0,151	4	0,2326876
15,461	540,1	540,3	103,06	102,36	0,154	0,151	5	0,2348545
15,559	540,1	540,3	101,94	101,10	0,154	0,151	6	0,2367911
15,452	540,1	540,3	102,44	101,57	0,154	0,151	7	0,2352868
15,346	540,1	540,4	103,22	102,31	0,154	0,151	8	0,233772
15,373	540,1	540,4	103,00	102,13	0,154	0,151	9	0,2342056
15,444	540,1	540,4	102,45	101,81	0,154	0,151	10	0,2352932
15,345	540,2	540,5	103,08	102,51	0,154	0,151	11	0,2337716
15,371	540,1	540,4	102,87	102,09	0,154	0,151	12	0,2342052
15,344	540,1	540,4	103,19	102,72	0,154	0,151	13	0,2337717
15,508	540,2	540,5	101,93	101,22	0,154	0,151	14	0,2363069
15,341	540,2	540,5	103,03	102,29	0,154	0,151	15	0,2337725
15,508	540,2	540,5	101,96	100,98	0,154	0,151	16	0,2363622
15,474	540,2	540,5	102,12	101,68	0,154	0,151	17	0,2358112
15,470	540,2	540,5	102,14	101,59	0,154	0,151	18	0,2357169
15,465	540,2	540,5	102,12	101,33	0,154	0,151	19	0,2357171
15,433	540,2	540,6	102,34	101,43	0,154	0,151	20	0,2352865
15,468	540,2	540,6	102,21	101,70	0,154	0,151	21	0,2357169
15,513	540,2	540,6	101,90	101,30	0,154	0,151	22	0,2363622
15,678	540,3	540,6	100,75	100,17	0,154	0,151	23	0,2389247
15,409	540,3	540,6	102,50	101,98	0,154	0,151	24	0,2348539
15,709	540,3	540,6	100,74	100,06	0,154	0,151	25	0,2393492
15,199	540,3	540,6	103,94	103,36	0,154	0,151	26	0,2315901
15,518	540,4	540,7	101,98	101,33	0,154	0,151	27	0,2363622
15,478	540,4	540,7	102,10	101,69	0,154	0,151	28	0,2357168
15,522	540,4	540,7	101,89	101,44	0,154	0,151	29	0,2363626
15,451	540,5	540,7	102,43	101,89	0,154	0,151	30	0,2352866
15,425	540,5	540,8	102,60	102,03	0,154	0,151	31	0,2348546
15,482	540,5	540,8	102,22	101,71	0,154	0,151	32	0,2357171
15,456	540,6	540,8	102,36	101,85	0,154	0,151	33	0,2352864
15,486	540,5	540,8	102,22	101,81	0,154	0,151	34	0,2357172
15,359	540,6	540,9	103,23	102,47	0,154	0,151	35	0,233772
15,535	540,7	540,9	101,91	101,34	0,154	0,151	36	0,2363633
15,466	540,7	540,9	102,32	101,87	0,154	0,151	37	0,2352874
15,529	540,9	541,0	102,12	101,32	0,154	0,151	38	0,2361737
15,471	540,9	541,1	102,42	101,80	0,154	0,151	39	0,2352874
15,475	541,0	541,1	102,37	101,69	0,154	0,151	40	0,2352874
15,547	541,1	541,2	101,61	101,33	0,153	0,151	41	0,2363633
15,409	541,1	541,2	102,77	102,12	0,153	0,151	42	0,2342064
15,486	541,1	541,3	102,19	101,74	0,153	0,151	43	0,2352882
15,521	541,2	541,3	101,99	101,16	0,153	0,151	44	0,2358258
15,558	541,3	541,3	101,68	101,37	0,153	0,151	45	0,2363642
15,457	541,4	541,4	102,36	101,65	0,153	0,151	46	0,2348564
15,555	541,4	541,5	101,69	101,09	0,153	0,151	47	0,2363651
15,548	541,4	541,5	101,53	101,09	0,153	0,151	48	0,2363651
15,574	541,5	541,6	101,57	100,89	0,153	0,151	49	0,236794
15,547	541,5	541,6	101,66	101,18	0,153	0,151	50	0,2363652
15,500	541,5	541,6	101,96	101,38	0,153	0,151	51	0,2357223
15,500	541,6	541,7	101,78	101,27	0,153	0,151	52	0,2357213
15,498	541,6	541,7	101,84	101,17	0,153	0,151	53	0,2357209
15,707	541,7	541,8	100,66	99,88	0,153	0,151	54	0,2389292
15,540	541,7	541,8	101,60	100,99	0,153	0,151	55	0,236367

15,498	541,7	541,8	101,78	101,18	0,153	0,151	56	0,2357219
15,544	541,8	541,9	101,59	100,86	0,153	0,150	57	0,2363668
15,499	541,9	541,9	101,79	101,23	0,153	0,150	58	0,2357213
15,544	541,9	542,0	101,40	100,81	0,153	0,150	59	0,2363674
15,572	541,9	542,0	101,32	100,56	0,153	0,150	60	0,236796
15,645	542,0	542,1	100,98	100,34	0,153	0,150	61	0,2378663
15,552	542,1	542,2	101,75	100,99	0,153	0,151	62	0,2363677
15,510	542,2	542,2	101,56	101,39	0,153	0,151	63	0,2357229
15,583	542,3	542,3	101,70	100,83	0,153	0,151	64	0,2367972
15,517	542,4	542,4	101,96	101,48	0,153	0,151	65	0,2357261
15,520	542,5	542,4	102,06	101,54	0,153	0,151	66	0,235724
15,567	542,6	542,5	101,74	101,27	0,153	0,151	67	0,2363698
15,596	542,7	542,6	101,48	100,86	0,153	0,151	68	0,2367988
15,525	542,8	542,7	101,85	101,27	0,153	0,150	69	0,2357251
15,601	542,9	542,8	101,52	100,83	0,153	0,150	70	0,2367993
15,573	543,0	542,9	101,55	100,95	0,153	0,150	71	0,2363717
15,477	543,2	543,1	102,36	101,71	0,153	0,150	72	0,2348631
15,604	543,2	543,1	101,36	100,83	0,153	0,150	73	0,2368006
15,675	543,3	543,2	101,03	100,63	0,153	0,150	74	0,2378705
15,748	543,5	543,3	100,71	100,09	0,153	0,151	75	0,2389345
15,655	543,5	543,4	101,26	100,84	0,153	0,151	76	0,2374437
15,824	543,7	543,6	100,19	99,68	0,153	0,151	77	0,2399954
15,614	543,7	543,7	101,50	101,10	0,153	0,151	78	0,2368026
15,546	543,8	543,7	102,04	101,23	0,153	0,150	79	0,2357285
15,659	543,9	543,8	101,24	100,67	0,153	0,150	80	0,2374451
15,623	544,0	543,9	101,58	101,06	0,153	0,150	81	0,2368028
15,553	544,1	544,0	102,12	101,47	0,153	0,150	82	0,2357294
15,648	544,1	544,0	101,29	100,91	0,153	0,150	83	0,2371531
15,558	544,2	544,1	102,05	101,35	0,153	0,150	84	0,2357301
15,675	544,3	544,2	101,24	100,66	0,153	0,150	85	0,2374465
15,677	544,3	544,3	101,13	100,65	0,153	0,150	86	0,2374467
15,569	544,4	544,3	102,07	101,49	0,153	0,150	87	0,2357315
15,787	544,4	544,4	100,59	100,10	0,153	0,150	88	0,2389393
15,617	544,5	544,5	101,67	101,02	0,153	0,150	89	0,2363774
15,689	544,5	544,5	101,27	100,72	0,153	0,150	90	0,2374479
15,889	544,6	544,6	100,14	99,32	0,153	0,150	91	0,2404165
15,691	544,8	544,8	101,18	100,42	0,153	0,150	92	0,2374483
15,695	544,9	544,8	101,34	100,76	0,153	0,150	93	0,2374488
15,586	545,1	545,0	102,00	101,44	0,153	0,150	94	0,235733
15,699	545,2	545,1	101,05	100,96	0,152	0,150	95	0,2374489
15,633	545,2	545,2	101,74	101,14	0,152	0,150	96	0,2363788
15,802	545,3	545,2	100,71	100,23	0,153	0,150	97	0,238942
15,667	545,4	545,3	101,68	101,05	0,153	0,150	98	0,236808
15,713	545,6	545,5	101,26	100,86	0,153	0,150	99	0,2374503
15,667	545,7	545,6	101,61	101,14	0,153	0,150	100	0,2368075
15,813	545,7	545,7	100,71	100,19	0,153	0,150	101	0,2389424
15,676	545,8	545,8	101,70	101,22	0,153	0,150	102	0,2368086
15,610	545,9	545,8	102,13	101,67	0,153	0,150	103	0,235735
15,583	546,0	545,9	102,25	101,86	0,153	0,150	104	0,2353134
15,857	546,1	546,0	100,59	100,09	0,153	0,150	105	0,2393676
15,824	546,1	546,0	100,85	99,97	0,153	0,150	106	0,2389436
15,620	546,1	546,1	102,07	101,73	0,153	0,150	107	0,2357923
15,734	546,1	546,1	101,35	100,95	0,152	0,150	108	0,2374522
15,836	546,2	546,2	100,82	100,30	0,152	0,150	109	0,2389445
15,698	546,3	546,3	101,82	101,10	0,153	0,150	110	0,2368099
15,758	546,4	546,4	101,42	100,96	0,153	0,150	111	0,2376226
15,843	546,6	546,5	100,77	100,33	0,152	0,150	112	0,2389451
15,703	546,7	546,6	101,59	101,22	0,152	0,150	113	0,2368108
15,748	546,8	546,7	101,38	100,62	0,152	0,150	114	0,2374529
15,708	546,9	546,8	101,92	100,90	0,153	0,149	115	0,236811
15,755	546,9	546,9	101,34	101,04	0,152	0,150	116	0,2374539

15,640	547,0	546,9	101,99	101,49	0,152	0,150	117	0,2357376
15,885	547,1	547,0	100,48	100,05	0,152	0,150	118	0,2393704
15,691	547,1	547,1	101,83	101,32	0,152	0,150	119	0,2363837
15,723	547,2	547,2	101,76	101,27	0,152	0,150	120	0,2368123
15,767	547,2	547,2	101,39	100,82	0,152	0,150	121	0,2374547
15,801	547,3	547,3	101,18	100,69	0,152	0,150	122	0,2378824
15,771	547,3	547,3	101,32	100,82	0,152	0,150	123	0,2374551
15,704	547,4	547,4	101,99	101,46	0,152	0,150	124	0,2363845
15,706	547,5	547,5	101,95	101,52	0,152	0,150	125	0,2363855
15,778	547,6	547,6	101,46	100,99	0,152	0,150	126	0,2374552
15,908	547,7	547,7	100,64	100,18	0,152	0,150	127	0,2393717
15,808	547,8	547,8	101,31	100,60	0,152	0,150	128	0,2378839
15,800	547,9	547,9	101,18	100,52	0,152	0,149	129	0,2377381
15,718	548,0	547,9	101,93	101,26	0,152	0,149	130	0,2363851
15,747	548,1	548,0	101,83	101,01	0,152	0,149	131	0,2368142
15,718	548,2	548,1	101,83	101,37	0,152	0,149	132	0,2363852
15,791	548,3	548,2	101,38	100,72	0,152	0,149	133	0,2374566
15,993	548,3	548,2	100,18	99,41	0,152	0,149	134	0,2404306
15,760	548,4	548,3	101,46	101,05	0,152	0,149	135	0,2368145
15,896	548,5	548,4	100,62	100,10	0,152	0,149	136	0,238949
15,753	548,4	548,4	101,75	100,86	0,152	0,149	137	0,2368144
15,907	548,3	548,4	100,71	100,28	0,152	0,149	138	0,2389481
15,683	548,2	548,4	102,21	101,58	0,152	0,149	139	0,2357403
15,733	548,2	548,3	101,99	101,31	0,152	0,149	140	0,2363849
15,770	548,2	548,3	101,81	101,18	0,152	0,149	141	0,2368138
15,697	548,2	548,4	102,20	101,54	0,152	0,149	142	0,2357399
15,697	548,3	548,4	102,18	101,32	0,152	0,149	143	0,2357396
15,776	548,3	548,4	101,53	100,93	0,152	0,149	144	0,2370078
15,732	548,4	548,5	101,59	101,43	0,152	0,149	145	0,2363839
15,723	548,4	548,5	101,78	101,17	0,152	0,149	146	0,2363843
15,679	548,4	548,5	102,00	101,53	0,152	0,149	147	0,2357389
15,673	548,4	548,5	102,05	101,31	0,152	0,149	148	0,2357385
15,711	548,4	548,5	101,58	101,17	0,152	0,149	149	0,2363839
15,668	548,4	548,5	101,88	101,35	0,152	0,149	150	0,2357381
15,662	548,3	548,5	101,90	101,39	0,152	0,149	151	0,2357382
15,775	548,3	548,5	101,12	100,53	0,152	0,149	152	0,2374539
15,697	548,3	548,5	101,72	101,25	0,152	0,149	153	0,2363832
15,648	548,3	548,4	101,82	101,28	0,152	0,149	154	0,2357376
15,648	548,3	548,5	101,64	101,47	0,152	0,149	155	0,2357372
15,855	548,3	548,4	100,31	99,89	0,152	0,149	156	0,2389454
15,951	548,2	548,4	99,73	99,40	0,152	0,149	157	0,2404282
15,711	548,2	548,4	101,37	100,70	0,152	0,149	158	0,236811
15,679	548,2	548,4	101,27	100,76	0,152	0,149	159	0,2363824
15,705	548,1	548,4	101,16	100,57	0,152	0,149	160	0,2368112
15,843	548,2	548,4	100,41	99,91	0,152	0,149	161	0,2389429
15,632	548,1	548,3	101,88	101,20	0,152	0,149	162	0,2357363
15,770	548,1	548,3	100,86	100,37	0,152	0,149	163	0,237878
15,767	548,1	548,3	100,81	100,55	0,152	0,150	164	0,2378805
15,625	548,1	548,3	101,80	101,06	0,152	0,149	165	0,2357369
15,762	548,1	548,3	100,78	100,29	0,152	0,149	166	0,2378796
15,658	548,1	548,3	101,45	100,99	0,152	0,149	167	0,236381
15,687	548,0	548,2	101,25	100,62	0,152	0,149	168	0,2368093
15,686	548,0	548,2	101,25	100,76	0,152	0,149	169	0,2368085
15,557	548,0	548,2	102,26	101,61	0,152	0,149	170	0,2348835
15,753	548,0	548,2	100,95	100,02	0,152	0,149	171	0,2378783
15,677	548,0	548,2	101,26	100,75	0,152	0,149	172	0,2367723
15,648	548,0	548,2	101,38	100,97	0,152	0,150	173	0,2363797
15,715	548,0	548,2	100,96	100,27	0,152	0,149	174	0,2374507
15,838	548,0	548,2	100,11	99,38	0,152	0,149	175	0,2393662
15,711	547,9	548,1	100,88	100,32	0,152	0,149	176	0,2374503
15,734	547,9	548,1	100,60	100,10	0,152	0,149	177	0,2378775

15,631	547,8	548,0	101,37	100,85	0,152	0,149	178	0,2363794
15,699	547,6	547,9	100,83	100,33	0,152	0,150	179	0,2374495
15,861	547,5	547,8	99,82	98,98	0,152	0,149	180	0,2400007
15,816	547,4	547,7	100,11	99,47	0,152	0,149	181	0,2393653
15,914	547,2	547,6	99,42	98,82	0,152	0,149	182	0,240845
15,613	547,2	547,6	101,37	100,70	0,152	0,149	183	0,2363784
15,716	547,1	547,5	100,93	100,22	0,152	0,150	184	0,2378762
15,855	547,0	547,4	99,74	99,21	0,152	0,150	185	0,2400002
15,724	546,9	547,4	100,75	100,11	0,152	0,149	186	0,2378759
15,824	546,8	547,3	100,12	99,50	0,152	0,149	187	0,2393647
15,658	546,7	547,2	101,30	100,46	0,152	0,149	188	0,2368054
15,700	546,6	547,1	100,99	100,40	0,152	0,149	189	0,2374477
15,831	546,6	547,0	100,30	99,58	0,152	0,150	190	0,2393644
15,662	546,5	547,0	101,26	100,60	0,152	0,149	191	0,2368057
15,732	546,4	546,9	100,85	100,22	0,152	0,149	192	0,2378755
15,737	546,4	546,9	100,86	100,24	0,152	0,150	193	0,2378755
15,805	546,3	546,8	100,46	99,78	0,152	0,150	194	0,2389397
15,902	546,3	546,8	99,78	99,24	0,152	0,150	195	0,2404217
15,873	546,2	546,7	99,94	99,62	0,152	0,150	196	0,239998
15,802	546,2	546,6	100,54	99,82	0,152	0,150	197	0,2389394
15,801	546,1	546,6	100,38	99,82	0,152	0,150	198	0,2389383
15,799	546,0	546,5	100,37	99,81	0,152	0,150	199	0,2389384
15,868	546,0	546,4	99,99	99,34	0,152	0,150	200	0,2399977
15,795	545,9	546,4	100,57	99,95	0,152	0,150	201	0,2389381
15,695	545,9	546,3	101,09	100,60	0,152	0,150	202	0,2373891
15,896	545,8	546,3	99,84	99,42	0,152	0,150	203	0,2404204
15,724	545,7	546,2	100,91	100,23	0,152	0,150	204	0,2378737
15,724	545,7	546,2	100,94	100,13	0,152	0,150	205	0,2378736
15,860	545,7	546,1	100,13	99,35	0,153	0,150	206	0,2399973
15,716	545,7	546,1	100,90	100,15	0,153	0,150	207	0,2378734
15,859	545,6	546,1	100,04	99,20	0,152	0,150	208	0,2399968
15,814	545,7	546,1	100,16	99,38	0,152	0,149	209	0,239362
15,646	545,7	546,1	101,32	100,76	0,152	0,150	210	0,236803
15,612	545,7	546,1	101,47	100,78	0,152	0,150	211	0,2363745
15,804	545,7	546,0	100,24	99,43	0,152	0,150	212	0,2393611
15,702	545,6	546,0	100,70	100,21	0,152	0,150	213	0,2378727
15,700	545,6	545,9	100,76	100,27	0,152	0,150	214	0,2378726
15,863	545,6	545,9	99,71	99,09	0,152	0,150	215	0,2404194
15,625	545,5	545,9	101,29	100,28	0,153	0,150	216	0,2368584
15,755	545,5	545,9	100,34	99,60	0,153	0,150	217	0,2389363
15,850	545,5	545,9	99,50	98,91	0,152	0,150	218	0,2404187
15,874	545,5	545,8	99,36	98,97	0,152	0,150	219	0,2408397
15,743	545,4	545,7	100,03	99,59	0,152	0,150	220	0,2389366
15,741	545,3	545,7	100,14	99,53	0,152	0,150	221	0,238936
15,903	545,2	545,6	99,03	98,62	0,152	0,150	222	0,2414718
15,825	545,2	545,6	99,46	99,06	0,152	0,150	223	0,2403336
15,853	545,2	545,6	99,41	98,60	0,153	0,150	224	0,2408395
15,791	545,1	545,5	99,61	99,21	0,153	0,150	225	0,2398968
15,725	545,1	545,5	100,22	99,39	0,153	0,150	226	0,2389361
15,789	545,1	545,4	99,75	99,04	0,153	0,150	227	0,2399949
15,718	545,0	545,4	100,06	99,50	0,153	0,150	228	0,2389357
15,619	544,9	545,3	100,84	99,86	0,153	0,150	229	0,2374431
15,839	544,9	545,3	99,28	98,64	0,153	0,150	230	0,240839
15,644	544,9	545,2	100,53	99,93	0,153	0,150	231	0,237871
15,835	544,9	545,2	99,33	98,63	0,153	0,150	232	0,2408385
15,708	544,8	545,2	100,03	99,34	0,153	0,150	233	0,2389351
15,737	544,8	545,2	99,86	99,11	0,153	0,150	234	0,2393583
15,707	544,8	545,1	99,99	99,63	0,153	0,150	235	0,2389344
15,703	544,8	545,1	99,99	99,26	0,153	0,150	236	0,2389414
15,867	544,8	545,0	98,91	98,37	0,153	0,150	237	0,2414703
15,697	544,8	545,0	99,94	99,35	0,153	0,150	238	0,2389311

15,869	544,8	545,0	99,02	98,04	0,153	0,150	239	0,2414698
15,565	544,8	545,0	100,93	100,46	0,153	0,150	240	0,2367999
15,635	544,9	545,0	100,46	99,85	0,153	0,150	241	0,2378696
15,776	544,9	545,0	99,50	99,16	0,153	0,150	242	0,2399916
15,773	545,0	545,1	99,66	98,94	0,153	0,150	243	0,2399931
15,804	545,0	545,1	99,45	98,85	0,153	0,150	244	0,2404155
15,606	545,0	545,1	100,48	100,04	0,152	0,150	245	0,2374411
15,798	545,1	545,2	99,26	99,07	0,152	0,150	246	0,2404151
15,822	545,0	545,1	99,14	98,38	0,152	0,150	247	0,2408372
15,862	545,0	545,1	98,97	98,35	0,153	0,150	248	0,241469
15,695	544,9	545,1	99,86	99,47	0,153	0,150	249	0,2389335
15,765	544,9	545,1	99,50	98,85	0,153	0,150	250	0,2399924
15,628	545,0	545,1	100,40	99,78	0,153	0,150	251	0,2378686
15,723	545,0	545,1	99,77	99,21	0,153	0,150	252	0,2393572
15,866	545,0	545,1	98,91	98,29	0,153	0,150	253	0,2414692
15,798	545,0	545,1	99,39	98,69	0,153	0,150	254	0,2404161
15,698	545,0	545,1	99,87	99,44	0,153	0,150	255	0,2389336
15,628	545,0	545,1	100,39	99,75	0,153	0,150	256	0,2378689
15,768	545,0	545,1	99,41	98,88	0,152	0,150	257	0,2399924
15,599	545,0	545,1	100,55	100,04	0,152	0,150	258	0,2374418
15,865	545,0	545,1	98,83	98,29	0,152	0,150	259	0,241469
15,766	545,0	545,1	99,49	98,86	0,153	0,150	260	0,2399923
15,767	545,0	545,1	99,52	98,89	0,153	0,150	261	0,2399837
15,722	545,0	545,1	99,88	99,38	0,153	0,150	262	0,2393578
15,823	545,0	545,1	99,24	98,52	0,153	0,150	263	0,2408397
15,764	545,0	545,1	99,50	98,97	0,153	0,150	264	0,239992
15,722	545,0	545,1	99,82	99,33	0,153	0,150	265	0,2393574
15,765	545,0	545,1	99,52	99,10	0,153	0,150	266	0,2399927
15,872	545,0	545,1	98,81	98,25	0,153	0,150	267	0,2416621
15,791	544,9	545,1	99,40	98,83	0,153	0,150	268	0,2404156
15,723	544,9	545,1	99,72	99,33	0,153	0,150	269	0,2393572
15,693	544,9	545,1	100,03	99,16	0,153	0,150	270	0,2389327
15,797	544,9	545,1	99,36	98,70	0,153	0,150	271	0,2405004
15,551	544,9	545,1	101,08	99,93	0,153	0,150	272	0,236799
15,817	544,8	545,0	99,04	98,57	0,153	0,150	273	0,2408375
15,654	544,8	545,0	100,09	99,53	0,152	0,150	274	0,2383915
15,719	544,8	545,0	99,89	99,22	0,153	0,150	275	0,2393571
15,622	544,8	545,0	100,52	99,79	0,153	0,150	276	0,2378689
15,816	544,8	545,0	99,20	98,70	0,153	0,150	277	0,2408368
15,784	544,8	545,0	99,33	98,92	0,153	0,150	278	0,2403745
15,758	544,8	545,0	99,47	98,89	0,153	0,150	279	0,239992
15,759	544,7	544,9	99,56	98,99	0,153	0,150	280	0,2399922
15,619	544,7	545,0	100,46	99,91	0,153	0,150	281	0,2378683
15,690	544,7	544,9	99,92	99,20	0,153	0,150	282	0,2389328
15,619	544,7	544,9	100,57	99,75	0,153	0,150	283	0,2378683
15,717	544,7	544,9	99,70	99,33	0,153	0,150	284	0,239357
15,756	544,6	544,9	99,48	98,89	0,153	0,150	285	0,2399919
15,813	544,6	544,9	99,28	98,46	0,153	0,150	286	0,240836
15,716	544,6	544,9	99,77	98,99	0,153	0,150	287	0,2393565
15,689	544,6	544,8	99,96	99,54	0,153	0,150	288	0,2389323
15,950	544,6	544,8	98,47	97,86	0,153	0,150	289	0,2429454
15,855	544,6	544,8	98,85	98,37	0,153	0,150	290	0,2414681
15,811	544,5	544,8	99,17	98,57	0,153	0,150	291	0,2408365
15,715	544,5	544,8	100,02	98,95	0,153	0,150	292	0,2393566
15,755	544,5	544,8	99,67	98,97	0,153	0,150	293	0,2399917
15,783	544,5	544,8	99,46	98,73	0,153	0,150	294	0,240415
15,516	544,5	544,7	101,07	100,21	0,153	0,150	295	0,2363701
15,757	544,5	544,7	99,52	98,84	0,153	0,150	296	0,240011
15,784	544,5	544,7	99,51	98,76	0,153	0,150	297	0,2404149
15,756	544,4	544,7	99,73	99,17	0,153	0,150	298	0,2399914
15,755	544,4	544,7	99,55	98,89	0,153	0,150	299	0,2399918

15,712	544,4	544,7	99,94	99,16	0,153	0,150	300	0,2393566
15,753	544,4	544,7	99,54	98,98	0,153	0,150	301	0,2399916
15,750	544,4	544,6	99,65	98,83	0,153	0,150	302	0,2399916
15,681	544,3	544,6	99,98	99,32	0,153	0,150	303	0,2389318
15,778	544,4	544,6	99,35	98,69	0,153	0,150	304	0,2404146
15,750	544,3	544,6	99,54	98,94	0,153	0,150	305	0,2399912
15,876	544,3	544,6	98,88	98,14	0,153	0,150	306	0,2418873
15,797	544,3	544,6	99,31	98,46	0,153	0,150	307	0,2406943
15,849	544,3	544,6	98,90	98,42	0,153	0,150	308	0,2414679
15,613	544,3	544,5	100,45	99,92	0,153	0,150	309	0,2378678
15,848	544,3	544,5	98,99	98,32	0,153	0,150	310	0,2414679
15,513	544,3	544,5	101,24	100,33	0,153	0,150	311	0,2363696
15,777	544,2	544,5	99,34	98,79	0,153	0,150	312	0,2404142
15,709	544,2	544,5	99,78	99,15	0,153	0,150	313	0,2393556
15,777	544,2	544,5	99,53	98,85	0,153	0,150	314	0,2404261
15,611	544,2	544,5	100,57	99,76	0,153	0,150	315	0,2378672
15,707	544,2	544,5	99,97	99,25	0,153	0,150	316	0,2393408
15,678	544,2	544,5	99,94	99,41	0,153	0,150	317	0,2389321
15,804	544,2	544,4	99,21	98,54	0,153	0,150	318	0,2408349
15,748	544,2	544,4	99,63	98,97	0,153	0,150	319	0,2399909
15,748	544,1	544,4	99,63	98,95	0,153	0,150	320	0,239991
15,747	544,1	544,4	99,64	98,97	0,153	0,150	321	0,2399908
15,678	544,1	544,4	100,05	99,42	0,153	0,150	322	0,2389312
15,845	544,1	544,4	98,96	98,38	0,153	0,150	323	0,2414612
15,749	544,1	544,3	99,71	98,97	0,153	0,150	324	0,2399908
15,677	544,1	544,3	100,13	99,49	0,153	0,150	325	0,2389314
15,678	544,1	544,3	99,98	99,24	0,153	0,150	326	0,2389312
15,538	544,0	544,3	101,06	100,26	0,153	0,150	327	0,2367973
15,774	544,0	544,3	99,35	98,79	0,153	0,150	328	0,2404136
15,679	544,0	544,3	100,14	99,48	0,153	0,150	329	0,2389307
15,776	544,0	544,3	99,46	98,64	0,153	0,150	330	0,240414
15,776	544,0	544,2	99,31	98,67	0,153	0,150	331	0,2404137
15,748	544,0	544,2	99,70	99,11	0,153	0,150	332	0,2399904
15,802	544,0	544,2	99,15	98,78	0,153	0,150	333	0,2408348
15,801	543,9	544,2	99,20	98,52	0,153	0,150	334	0,2408347
15,579	543,9	544,2	100,70	99,96	0,153	0,150	335	0,237439
15,802	543,9	544,2	99,24	98,62	0,153	0,150	336	0,2408344
15,705	543,9	544,2	99,89	99,27	0,153	0,150	337	0,2393547
15,747	543,9	544,2	99,73	98,73	0,153	0,150	338	0,2399899
15,536	543,9	544,2	100,78	100,25	0,153	0,150	339	0,2367961
15,965	543,9	544,1	98,45	97,63	0,153	0,150	340	0,2433506
15,741	543,8	544,1	99,48	98,86	0,153	0,150	341	0,2399901
15,961	543,8	544,1	98,13	97,61	0,153	0,150	342	0,2433504
15,865	543,8	544,1	98,95	97,99	0,153	0,150	343	0,2418836
15,797	543,8	544,1	99,12	98,59	0,153	0,150	344	0,240835
15,741	543,8	544,1	99,59	99,02	0,153	0,150	345	0,2399899
15,697	543,8	544,1	99,90	99,06	0,153	0,150	346	0,2393547
15,601	543,8	544,1	100,45	99,95	0,153	0,150	347	0,2378667
15,770	543,8	544,0	99,43	98,92	0,153	0,150	348	0,2404135
15,699	543,7	544,0	99,67	99,23	0,153	0,150	349	0,2393549
15,672	543,7	544,0	100,07	99,41	0,153	0,150	350	0,2389306
15,770	543,7	544,0	99,48	98,90	0,153	0,150	351	0,2404417
15,573	543,7	544,0	100,69	100,26	0,153	0,150	352	0,2374402
15,699	543,7	544,0	99,80	99,39	0,153	0,151	353	0,2393547
15,602	543,7	543,9	100,30	100,20	0,153	0,151	354	0,2378662
15,739	543,7	543,9	99,69	98,77	0,153	0,150	355	0,23999
15,600	543,6	543,9	100,50	99,93	0,153	0,150	356	0,2378663
15,669	543,6	543,9	100,00	99,52	0,153	0,150	357	0,2389304
15,768	543,6	543,9	99,32	98,70	0,153	0,150	358	0,240434
15,767	543,6	543,9	99,39	98,64	0,153	0,150	359	0,240413
15,696	543,6	543,9	99,85	99,24	0,153	0,150	360	0,2393544

15,736	543,6	543,8	99,52	99,20	0,153	0,150	361	0,2399895
15,860	543,5	543,8	98,80	98,00	0,153	0,150	362	0,2418858
15,791	543,5	543,8	99,18	98,47	0,153	0,150	363	0,2408338
15,862	543,5	543,8	98,69	98,08	0,153	0,150	364	0,2418861
15,765	543,5	543,8	99,35	98,85	0,153	0,150	365	0,2404494
15,791	543,5	543,8	99,37	98,66	0,153	0,150	366	0,2408344
15,736	543,5	543,8	99,49	99,12	0,153	0,150	367	0,2399894
15,831	543,5	543,8	98,92	98,80	0,153	0,151	368	0,2414659
15,666	543,4	543,7	99,97	99,49	0,153	0,151	369	0,2389306
15,595	543,4	543,7	100,51	99,79	0,153	0,150	370	0,2378659
15,789	543,4	543,7	99,34	98,47	0,153	0,150	371	0,2408336
15,859	543,4	543,7	98,78	98,34	0,153	0,150	372	0,241885
15,737	543,4	543,7	99,51	98,88	0,153	0,150	373	0,2400312
15,761	543,4	543,7	99,47	98,77	0,153	0,150	374	0,2404128
15,593	543,4	543,7	100,38	99,81	0,153	0,150	375	0,2378655
15,662	543,3	543,7	100,03	99,58	0,153	0,150	376	0,2389299
15,789	543,3	543,6	99,30	98,76	0,153	0,151	377	0,2408345
15,788	543,3	543,6	99,35	98,72	0,153	0,150	378	0,2408336
15,789	543,3	543,6	99,19	98,53	0,153	0,150	379	0,2408303
15,662	543,3	543,6	100,15	99,53	0,153	0,150	380	0,2389295
15,786	543,3	543,6	99,14	98,79	0,153	0,151	381	0,2408335
15,827	543,3	543,6	99,02	98,40	0,153	0,150	382	0,2414652
15,594	543,3	543,6	100,55	100,06	0,153	0,150	383	0,2378658
15,828	543,2	543,5	99,02	98,51	0,153	0,151	384	0,2414664
15,662	543,2	543,5	100,00	99,32	0,153	0,150	385	0,23893
15,757	543,2	543,5	99,50	98,77	0,153	0,150	386	0,2404126
15,854	543,2	543,5	98,85	98,46	0,153	0,151	387	0,2418849
15,757	543,2	543,5	99,47	98,64	0,153	0,150	388	0,240412
15,729	543,2	543,5	99,53	99,01	0,153	0,150	389	0,2399888
15,729	543,2	543,5	99,51	99,11	0,153	0,150	390	0,2399724
15,922	543,1	543,5	98,44	97,93	0,153	0,151	391	0,2429326
15,588	543,2	543,5	100,46	99,81	0,153	0,150	392	0,2378658
15,853	543,1	543,4	98,82	98,26	0,153	0,150	393	0,2418852
15,825	543,1	543,4	99,05	98,41	0,153	0,150	394	0,2414659
15,727	543,1	543,4	99,62	99,14	0,153	0,151	395	0,2399892
15,755	543,1	543,4	99,47	98,87	0,153	0,151	396	0,2404125
15,689	543,1	543,4	99,78	99,41	0,153	0,151	397	0,2393947
15,782	543,1	543,4	99,31	98,71	0,153	0,151	398	0,2408332
15,685	543,0	543,4	99,82	99,62	0,153	0,151	399	0,2393534
15,755	543,0	543,4	99,44	98,75	0,153	0,151	400	0,2404119
15,686	543,0	543,3	100,00	99,22	0,153	0,150	401	0,2393537
15,783	543,0	543,3	99,21	98,59	0,153	0,150	402	0,2408333
15,948	543,0	543,3	98,18	97,61	0,153	0,150	403	0,2433494
15,824	543,0	543,3	99,11	98,40	0,153	0,150	404	0,2414607
15,753	543,0	543,3	99,63	98,91	0,153	0,150	405	0,2404118
15,782	543,0	543,3	99,43	98,53	0,153	0,150	406	0,2408333
15,725	543,0	543,3	99,66	98,88	0,153	0,150	407	0,2399888
15,848	543,0	543,3	98,73	98,15	0,153	0,150	408	0,2418849
15,657	543,0	543,3	100,09	99,40	0,153	0,150	409	0,2389277
15,754	542,9	543,3	99,45	98,74	0,153	0,150	410	0,2404121
15,780	542,9	543,3	99,18	98,77	0,153	0,150	411	0,2408329
15,755	542,9	543,3	99,45	98,82	0,153	0,150	412	0,2404121
15,781	542,9	543,3	99,34	98,72	0,153	0,150	413	0,240833
15,779	542,9	543,3	99,36	98,53	0,153	0,150	414	0,2408334
15,724	542,9	543,2	99,59	99,08	0,153	0,150	415	0,2399889
15,725	542,9	543,2	99,52	98,99	0,153	0,150	416	0,2399882
15,680	542,9	543,2	99,72	99,32	0,153	0,150	417	0,2393533
15,779	542,9	543,2	99,25	98,58	0,153	0,150	418	0,2408329
15,822	542,8	543,2	98,93	98,35	0,153	0,150	419	0,241465
15,779	542,8	543,2	99,24	98,68	0,153	0,150	420	0,240833
15,779	542,8	543,2	99,32	98,72	0,153	0,150	421	0,240813

15,819	542,8	543,2	98,89	98,34	0,153	0,150	422	0,2414422
15,752	542,8	543,2	99,41	98,92	0,153	0,150	423	0,2404118
15,778	542,8	543,2	99,32	98,56	0,153	0,150	424	0,2408329
15,777	542,8	543,2	99,32	98,92	0,153	0,151	425	0,2408334
15,779	542,8	543,1	99,10	98,89	0,153	0,151	426	0,2408327
15,724	542,8	543,1	99,69	99,03	0,153	0,151	427	0,2399861
15,655	542,8	543,1	100,09	99,50	0,153	0,150	428	0,238929
15,915	542,8	543,2	98,39	97,86	0,153	0,151	429	0,2429316
15,749	542,8	543,1	99,41	98,79	0,153	0,150	430	0,2404115
15,779	542,8	543,1	99,37	98,79	0,153	0,151	431	0,2408322
15,723	542,8	543,1	99,65	99,03	0,153	0,151	432	0,2399881
15,819	542,7	543,1	98,97	98,36	0,153	0,150	433	0,2414643
15,817	542,7	543,1	98,87	98,42	0,153	0,150	434	0,2414642
15,749	542,7	543,1	99,28	98,88	0,153	0,151	435	0,2404117
15,554	542,7	543,1	100,73	100,12	0,153	0,151	436	0,2374367
15,679	542,7	543,1	99,84	99,07	0,153	0,150	437	0,2393529
15,679	542,6	543,0	99,91	99,05	0,153	0,150	438	0,2393527
15,719	542,6	543,0	99,68	98,89	0,153	0,150	439	0,2399872
15,677	542,6	543,0	99,80	99,24	0,153	0,150	440	0,2393521
15,747	542,6	543,0	99,54	98,87	0,153	0,150	441	0,2404107
15,578	542,6	543,0	100,62	99,96	0,153	0,151	442	0,2378642
15,815	542,6	543,0	99,09	98,48	0,153	0,151	443	0,2414639
15,774	542,6	543,0	99,29	98,68	0,153	0,151	444	0,240832
15,551	542,6	543,0	100,76	99,71	0,153	0,150	445	0,2374366
15,676	542,6	542,9	99,82	99,26	0,153	0,150	446	0,2393521
15,718	542,5	542,9	99,63	98,90	0,153	0,150	447	0,2399876
15,677	542,5	542,9	99,73	99,19	0,153	0,150	448	0,2393522
15,648	542,5	542,9	100,10	99,24	0,153	0,150	449	0,2389284
15,813	542,5	542,9	98,99	98,19	0,153	0,150	450	0,2414638
15,674	542,5	542,9	100,05	99,37	0,153	0,150	451	0,239352
15,741	542,4	542,9	99,50	98,85	0,153	0,151	452	0,2404102
15,810	542,4	542,8	98,92	98,41	0,153	0,151	453	0,2414638
15,672	542,4	542,8	99,90	99,19	0,153	0,150	454	0,2393516
15,644	542,4	542,8	100,06	99,64	0,153	0,151	455	0,2389281
15,672	542,4	542,8	99,82	99,13	0,153	0,151	456	0,2393517
15,768	542,4	542,8	99,30	98,51	0,153	0,150	457	0,2408313
15,838	542,3	542,8	98,87	98,31	0,153	0,150	458	0,241883
15,769	542,3	542,8	99,28	98,56	0,153	0,151	459	0,2408313
15,671	542,3	542,7	99,86	99,40	0,153	0,151	460	0,2393517
15,766	542,3	542,7	99,46	98,59	0,153	0,151	461	0,2408317
15,739	542,3	542,7	99,34	98,80	0,153	0,150	462	0,2404099
15,642	542,3	542,7	100,09	99,21	0,153	0,150	463	0,2389279
15,808	542,3	542,7	98,94	98,47	0,153	0,150	464	0,2414627
15,767	542,2	542,7	99,16	98,60	0,153	0,151	465	0,2408108
15,807	542,2	542,7	98,95	98,40	0,153	0,150	466	0,2414536
15,808	542,2	542,6	99,07	98,30	0,153	0,150	467	0,2414634
15,806	542,2	542,6	98,86	98,35	0,153	0,150	468	0,2414625
15,766	542,2	542,6	99,39	98,60	0,153	0,150	469	0,2408313
15,904	542,2	542,6	98,33	97,90	0,153	0,151	470	0,2429296
15,668	542,1	542,6	99,86	99,21	0,153	0,151	471	0,2393514
15,668	542,1	542,6	99,86	99,12	0,153	0,150	472	0,2393515
15,667	542,1	542,6	99,75	99,30	0,153	0,150	473	0,2393507
15,471	542,1	542,6	101,21	100,69	0,153	0,151	474	0,2363651
15,666	542,1	542,5	99,85	99,27	0,153	0,151	475	0,2393515
15,762	542,1	542,5	99,20	98,43	0,153	0,150	476	0,2408305
15,830	542,1	542,5	98,68	98,17	0,153	0,150	477	0,2418826
15,635	542,0	542,5	100,03	99,15	0,153	0,150	478	0,2389266
15,759	542,0	542,5	99,27	98,50	0,153	0,150	479	0,2408303
15,567	542,0	542,5	100,50	99,65	0,153	0,150	480	0,2378845
15,663	542,0	542,5	99,77	99,21	0,153	0,150	481	0,2393513
15,803	542,0	542,5	98,97	98,46	0,153	0,151	482	0,2414621

15,764	542,0	542,5	99,25	98,44	0,153	0,150	483	0,2408307
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	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,92	98,98	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
15,306	538,6	538,9			0,156	0,153	0	0,2251507
15,071	538,8	538,9	101,61	101,73	0,156	0,153	1	0,2251508
15,023	538,9	539,0	101,15	100,97	0,156	0,153	2	0,2251512
15,084	539,0	539,1	100,51	100,78	0,155	0,153	3	0,2262747
14,979	539,0	539,1	101,39	101,39	0,156	0,153	4	0,2246999
15,144	539,0	539,1	99,62	99,92	0,156	0,153	5	0,227885
14,912	539,0	539,1	100,81	100,88	0,156	0,153	6	0,2247001
15,190	538,9	539,1	99,02	99,02	0,156	0,153	7	0,2289494
15,178	538,9	539,1	98,95	98,85	0,156	0,153	8	0,2289494
15,098	539,0	539,1	99,28	99,24	0,156	0,153	9	0,2278381
14,991	539,0	539,1	99,97	100,09	0,156	0,153	10	0,2263125
15,195	539,0	539,1	98,60	98,70	0,156	0,153	11	0,2293927
15,168	539,0	539,1	99,02	98,89	0,156	0,153	12	0,2289491
15,061	539,0	539,1	99,48	99,60	0,156	0,153	13	0,2273933
15,187	539,0	539,2	98,73	99,11	0,156	0,153	14	0,2292438
14,958	539,0	539,1	100,41	100,28	0,156	0,153	15	0,2258256
14,988	539,0	539,1	100,02	99,82	0,156	0,153	16	0,2262735
15,066	538,9	539,1	99,51	99,71	0,156	0,153	17	0,2273927
15,169	538,9	539,1	98,75	99,09	0,155	0,153	18	0,2289482
15,096	538,9	539,1	99,47	99,51	0,156	0,153	19	0,2278374
15,100	539,0	539,1	99,30	99,49	0,156	0,153	20	0,2278371
15,176	539,0	539,1	99,00	99,08	0,156	0,153	21	0,2289484
15,152	539,0	539,1	99,09	99,27	0,156	0,153	22	0,2285049
15,007	539,0	539,1	100,19	100,32	0,156	0,153	23	0,2262735
15,253	539,0	539,1	98,65	98,55	0,156	0,153	24	0,2300545
15,155	539,0	539,2	99,03	99,04	0,156	0,153	25	0,2285053
15,286	539,0	539,1	98,17	98,43	0,155	0,153	26	0,2304942
15,217	539,1	539,2	98,70	98,96	0,155	0,153	27	0,2293912
15,008	539,2	539,3	100,21	100,21	0,156	0,153	28	0,2262737
15,156	539,2	539,3	99,11	99,29	0,156	0,153	29	0,2285051
15,164	539,2	539,3	99,19	99,27	0,156	0,153	30	0,2285052
15,199	539,2	539,3	98,90	99,33	0,155	0,153	31	0,2289485
15,173	539,2	539,3	99,25	99,28	0,155	0,153	32	0,2285053
15,174	539,2	539,3	99,29	99,17	0,156	0,153	33	0,2285047
15,202	539,2	539,3	98,99	99,47	0,156	0,153	34	0,2289482
15,129	539,3	539,4	99,39	99,72	0,155	0,153	35	0,2278374
15,129	539,3	539,4	99,52	99,66	0,155	0,153	36	0,2278376
15,102	539,4	539,5	99,75	99,95	0,156	0,153	37	0,2273924
15,127	539,4	539,5	99,41	99,68	0,155	0,153	38	0,2278382
15,128	539,5	539,5	99,54	99,62	0,155	0,153	39	0,2278384
15,232	539,5	539,6	98,88	98,74	0,156	0,153	40	0,2293927
15,105	539,6	539,6	99,80	99,82	0,156	0,153	41	0,2273934
15,278	539,6	539,6	98,43	98,50	0,155	0,153	42	0,2300555
15,102	539,6	539,7	99,62	99,72	0,155	0,153	43	0,2273936
15,208	539,7	539,7	98,89	98,96	0,155	0,153	44	0,2289502
15,105	539,8	539,7	99,61	99,68	0,155	0,153	45	0,2273586
15,184	539,8	539,8	99,15	99,44	0,155	0,153	46	0,2285072
14,960	539,8	539,8	100,56	100,95	0,155	0,153	47	0,2251512
15,143	539,8	539,8	99,42	99,68	0,155	0,153	48	0,2278398
15,218	539,9	539,9	98,88	99,19	0,155	0,153	49	0,2289509
15,143	539,9	539,9	99,42	99,54	0,155	0,153	50	0,2278394
15,296	539,9	539,9	98,60	98,37	0,155	0,152	51	0,2300566
15,196	540,0	540,0	99,20	99,12	0,155	0,152	52	0,2285077
15,197	540,0	540,0	99,08	98,97	0,155	0,152	53	0,2285079
15,229	540,0	540,0	99,03	99,53	0,155	0,153	54	0,2289549
15,126	540,0	540,1	99,79	99,78	0,155	0,153	55	0,2273949

15,203	540,1	540,1	99,26	98,95	0,155	0,152	56	0,2285077
15,158	540,1	540,2	99,50	99,87	0,155	0,152	57	0,2278403
14,978	540,2	540,2	100,73	100,77	0,155	0,153	58	0,2251349
15,134	540,2	540,2	99,88	99,98	0,155	0,153	59	0,2273954
15,318	540,2	540,2	98,70	98,81	0,155	0,153	60	0,2300578
15,066	540,3	540,3	100,27	100,09	0,155	0,152	61	0,2262767
15,066	540,3	540,4	100,52	100,41	0,155	0,152	62	0,2262767
15,170	540,4	540,4	99,62	99,75	0,155	0,153	63	0,2278409
14,987	540,4	540,4	100,65	100,85	0,155	0,153	64	0,2251528
15,274	540,4	540,5	98,97	98,83	0,155	0,152	65	0,2293955
15,217	540,4	540,5	99,28	99,49	0,155	0,152	66	0,2285088
15,281	540,4	540,5	98,72	98,91	0,155	0,152	67	0,2293956
15,073	540,5	540,5	100,32	100,51	0,155	0,152	68	0,2262776
15,152	540,5	540,6	99,87	99,81	0,155	0,152	69	0,2273962
15,156	540,6	540,7	99,78	100,04	0,155	0,152	70	0,2273959
15,257	540,6	540,7	99,04	99,08	0,155	0,152	71	0,2289523
15,231	540,6	540,7	99,43	99,39	0,155	0,152	72	0,2285094
15,236	540,7	540,8	99,50	99,11	0,155	0,152	73	0,2285435
15,009	540,7	540,8	100,85	100,97	0,155	0,152	74	0,2251529
15,290	540,8	540,8	98,92	98,87	0,155	0,152	75	0,2293955
15,235	540,8	540,9	99,33	99,55	0,155	0,152	76	0,2285091
15,237	540,8	540,9	99,32	99,34	0,155	0,152	77	0,2285091
15,166	540,8	540,9	99,87	99,74	0,155	0,152	78	0,2273908
15,273	540,9	541,0	99,13	99,17	0,155	0,152	79	0,2289525
15,198	541,0	541,1	99,62	99,72	0,155	0,152	80	0,2278409
14,990	541,0	541,1	100,90	100,89	0,155	0,152	81	0,2247025
15,280	541,0	541,1	99,04	99,22	0,155	0,152	82	0,2289529
15,253	541,1	541,2	99,39	99,45	0,155	0,152	83	0,2285093
15,072	541,1	541,2	100,42	100,64	0,155	0,152	84	0,225829
14,998	541,1	541,2	100,97	100,91	0,155	0,152	85	0,2247033
15,362	541,1	541,3	98,92	98,97	0,155	0,152	86	0,2300588
15,360	541,2	541,3	98,78	98,97	0,155	0,152	87	0,2300593
15,088	541,2	541,3	100,54	100,83	0,155	0,152	88	0,2258971
15,087	541,3	541,3	100,72	100,72	0,155	0,152	89	0,2258295
15,086	541,3	541,4	100,60	100,64	0,155	0,152	90	0,2258299
15,268	541,4	541,5	99,40	99,76	0,155	0,152	91	0,2285101
15,268	541,5	541,6	99,39	99,70	0,155	0,152	92	0,2285096
15,267	541,5	541,6	99,46	99,56	0,155	0,152	93	0,2285103
15,046	541,5	541,6	100,86	100,68	0,155	0,152	94	0,2251544
15,272	541,4	541,6	99,39	99,77	0,155	0,152	95	0,2285102
15,102	541,4	541,6	100,44	100,44	0,155	0,152	96	0,2259294
15,127	541,4	541,6	100,34	100,50	0,155	0,152	97	0,2262774
15,308	541,4	541,6	99,07	99,19	0,155	0,152	98	0,228953
15,102	541,4	541,7	100,59	100,65	0,155	0,152	99	0,2258296
15,135	541,4	541,6	100,38	100,37	0,155	0,152	100	0,226278
15,104	541,4	541,7	100,85	100,41	0,155	0,152	101	0,2258292
15,215	541,4	541,7	100,16	100,23	0,155	0,152	102	0,2273965
15,111	541,4	541,6	100,76	100,87	0,155	0,152	103	0,225825
15,156	541,4	541,6	100,39	100,71	0,155	0,152	104	0,2264281
15,299	541,5	541,7	99,63	99,83	0,155	0,152	105	0,2285098
14,998	541,5	541,7	101,73	101,58	0,155	0,152	106	0,2240247
15,151	541,5	541,7	100,56	100,89	0,155	0,152	107	0,2262773
15,002	541,6	541,8	101,67	101,45	0,155	0,152	108	0,2240247
15,260	541,6	541,8	99,84	99,95	0,155	0,152	109	0,2278418
15,158	541,7	541,8	100,57	100,68	0,155	0,152	110	0,2262776
15,237	541,7	541,9	99,97	100,10	0,155	0,152	111	0,2273963
15,130	541,7	541,9	100,74	100,96	0,155	0,152	112	0,2258287
15,184	541,7	541,9	100,89	100,75	0,155	0,152	113	0,2262768
15,242	541,7	541,9	100,11	100,10	0,155	0,152	114	0,2273958
15,184	541,7	542,0	100,80	100,91	0,155	0,152	115	0,226277
15,144	541,7	542,0	100,81	100,87	0,155	0,152	116	0,2258287

15,245	541,7	542,0	100,19	100,17	0,155	0,152	117	0,2273962
15,352	541,7	542,0	99,38	99,52	0,155	0,152	118	0,2289523
15,175	541,7	542,0	100,67	100,88	0,155	0,152	119	0,226274
15,177	541,8	542,0	100,57	100,80	0,155	0,152	120	0,2262767
15,078	541,8	542,0	101,46	101,51	0,155	0,152	121	0,2247022
15,073	541,8	542,0	101,29	101,55	0,155	0,152	122	0,224702
15,104	541,8	542,1	100,98	101,38	0,154	0,152	123	0,2251522
15,106	541,8	542,1	101,10	101,32	0,154	0,152	124	0,2251498
15,254	541,8	542,1	100,14	100,13	0,155	0,152	125	0,22746
15,067	541,9	542,1	101,30	101,27	0,155	0,152	126	0,2247044
15,276	541,9	542,2	99,82	100,08	0,155	0,152	127	0,2278408
15,172	541,9	542,2	100,56	100,73	0,155	0,152	128	0,2262764
15,019	541,9	542,2	101,64	101,70	0,155	0,152	129	0,2240236
15,241	541,9	542,2	100,07	100,14	0,155	0,152	130	0,2273957
15,087	541,9	542,2	101,03	100,98	0,155	0,152	131	0,2251527
15,158	541,9	542,2	100,45	100,77	0,155	0,152	132	0,2262758
15,075	541,9	542,2	101,04	101,01	0,155	0,152	133	0,2251524
15,222	541,9	542,2	99,86	100,13	0,155	0,152	134	0,2273949
15,250	542,0	542,2	99,72	100,04	0,155	0,152	135	0,2278404
15,349	542,0	542,2	99,01	99,19	0,155	0,152	136	0,2293947
15,386	542,0	542,2	98,79	98,67	0,155	0,152	137	0,2300574
15,125	541,9	542,2	100,24	100,29	0,155	0,152	138	0,2262765
15,201	542,0	542,2	99,71	99,84	0,155	0,152	139	0,2273951
15,116	542,0	542,3	100,14	100,45	0,154	0,152	140	0,226276
15,083	542,0	542,3	100,47	100,15	0,155	0,152	141	0,2258285
15,113	542,0	542,2	100,15	100,33	0,155	0,152	142	0,2262762
15,109	542,0	542,2	100,14	100,29	0,155	0,152	143	0,2262759
15,207	542,0	542,3	99,38	99,56	0,154	0,152	144	0,2277908
15,202	542,0	542,3	99,47	99,48	0,155	0,152	145	0,2278405
15,171	542,0	542,3	99,64	99,53	0,155	0,152	146	0,2273948
14,919	542,0	542,3	101,35	101,29	0,155	0,152	147	0,2235691
15,030	542,0	542,3	100,69	100,68	0,155	0,152	148	0,2251519
15,258	542,1	542,3	99,03	99,38	0,155	0,152	149	0,2285075
15,320	542,0	542,3	98,81	98,96	0,154	0,152	150	0,2293944
15,219	542,0	542,3	99,42	99,48	0,155	0,152	151	0,2278398
15,290	542,0	542,3	99,11	99,12	0,155	0,152	152	0,2288181
15,120	542,1	542,3	100,12	100,05	0,154	0,152	153	0,2262759
15,303	542,1	542,3	99,08	99,20	0,154	0,152	154	0,2289508
15,324	542,1	542,3	98,95	99,19	0,155	0,152	155	0,2292151
15,132	542,1	542,3	100,45	100,60	0,155	0,152	156	0,2262753
15,099	542,1	542,4	100,48	100,50	0,155	0,152	157	0,225827
15,206	542,1	542,4	99,93	99,71	0,155	0,152	158	0,2273935
15,206	542,1	542,4	99,73	99,87	0,155	0,152	159	0,2273941
15,207	542,1	542,4	99,84	99,77	0,155	0,152	160	0,2273935
15,242	542,1	542,4	99,67	99,88	0,155	0,152	161	0,2278273
15,135	542,1	542,4	100,42	100,13	0,155	0,152	162	0,2262753
15,033	542,2	542,4	101,24	101,14	0,155	0,152	163	0,2247007
15,211	542,2	542,5	99,86	99,93	0,155	0,152	164	0,2273939
15,290	542,2	542,5	99,42	99,64	0,155	0,152	165	0,228507
15,217	542,2	542,5	99,91	100,13	0,155	0,152	166	0,2273946
15,244	542,2	542,5	99,74	99,94	0,155	0,152	167	0,2278394
15,287	542,2	542,5	99,31	99,49	0,155	0,152	168	0,2285068
15,213	542,2	542,5	99,86	99,87	0,155	0,152	169	0,227394
15,244	542,2	542,5	99,67	100,04	0,155	0,152	170	0,2278395
15,395	542,2	542,5	98,72	99,16	0,155	0,152	171	0,2300564
15,240	542,3	542,6	99,71	99,60	0,155	0,152	172	0,2277871
15,287	542,3	542,6	99,27	99,59	0,155	0,152	173	0,2285068
15,207	542,4	542,6	99,98	99,84	0,155	0,152	174	0,2272952
15,109	542,3	542,7	100,48	100,56	0,155	0,152	175	0,2258698
15,315	542,3	542,7	99,27	99,48	0,155	0,152	176	0,2289502
15,313	542,3	542,7	99,35	99,07	0,155	0,152	177	0,2289501

15,206	542,3	542,6	99,86	100,04	0,155	0,152	178	0,2273942
15,277	542,2	542,6	99,23	99,48	0,155	0,152	179	0,2285069
15,280	542,3	542,6	99,41	99,35	0,155	0,152	180	0,2285069
15,027	542,3	542,7	101,06	101,00	0,155	0,152	181	0,2247014
15,228	542,2	542,6	99,52	99,51	0,155	0,152	182	0,2278395
15,126	542,2	542,6	100,31	100,36	0,155	0,152	183	0,2262747
15,122	542,2	542,6	100,28	100,17	0,155	0,152	184	0,2262748
15,267	542,3	542,6	99,30	99,30	0,155	0,152	185	0,2285063
15,085	542,2	542,6	100,29	100,10	0,155	0,152	186	0,2258269
15,010	542,3	542,6	100,84	100,80	0,154	0,151	187	0,2247003
15,114	542,3	542,6	100,18	100,26	0,155	0,152	188	0,2262747
15,217	542,3	542,6	99,61	99,60	0,155	0,152	189	0,227839
15,036	542,3	542,7	100,58	100,92	0,155	0,152	190	0,2251512
15,259	542,3	542,7	99,07	99,01	0,154	0,152	191	0,2285064
15,225	542,3	542,7	99,50	99,56	0,154	0,152	192	0,227839
15,181	542,3	542,6	99,62	99,55	0,155	0,152	193	0,2273933
15,176	542,3	542,7	99,72	99,94	0,155	0,152	194	0,2273935
15,281	542,3	542,7	99,11	98,93	0,155	0,152	195	0,2289494
15,278	542,3	542,7	99,06	99,02	0,155	0,152	196	0,2289501
15,202	542,3	542,7	99,41	99,22	0,155	0,152	197	0,2278389
15,350	542,3	542,7	98,50	98,77	0,155	0,152	198	0,2300564
15,347	542,3	542,7	98,43	98,26	0,155	0,152	199	0,230056
15,197	542,3	542,7	99,28	99,47	0,155	0,152	200	0,2278385
15,190	542,3	542,7	99,35	99,55	0,154	0,152	201	0,2277604
14,985	542,4	542,7	100,68	100,51	0,155	0,152	202	0,2246998
15,013	542,4	542,8	100,42	100,40	0,154	0,151	203	0,2251505
15,231	542,4	542,8	98,97	99,31	0,154	0,152	204	0,2285067
15,273	542,4	542,7	98,83	98,87	0,155	0,152	205	0,2290728
15,187	542,3	542,7	99,37	99,30	0,155	0,152	206	0,2278391
15,353	542,4	542,7	98,12	98,33	0,155	0,152	207	0,2304136
15,356	542,3	542,7	98,13	98,63	0,155	0,152	208	0,2304963
15,176	542,3	542,7	99,21	99,19	0,155	0,152	209	0,227839
15,250	542,4	542,8	98,82	98,98	0,155	0,152	210	0,2289497
15,175	542,4	542,7	99,26	99,40	0,155	0,152	211	0,2278385
15,214	542,3	542,7	98,77	99,06	0,155	0,152	212	0,2285062
15,449	542,3	542,7	97,24	97,31	0,154	0,152	213	0,232032
15,167	542,3	542,7	99,22	99,10	0,155	0,152	214	0,2278381
15,134	542,3	542,6	99,20	99,27	0,155	0,152	215	0,2273933
15,265	542,3	542,7	98,36	98,59	0,154	0,152	216	0,2293923
15,265	542,3	542,6	98,48	98,50	0,155	0,152	217	0,2293929
15,249	542,3	542,6	98,48	98,35	0,155	0,152	218	0,2291713
15,263	542,2	542,6	98,45	98,36	0,155	0,152	219	0,2293927
15,307	542,2	542,6	98,09	98,28	0,155	0,152	220	0,230055
15,260	542,2	542,6	98,62	98,48	0,155	0,152	221	0,2293929
15,197	542,2	542,6	98,83	99,04	0,155	0,152	222	0,2285062
15,152	542,2	542,6	99,04	99,10	0,155	0,152	223	0,2278358
15,222	542,2	542,6	98,61	98,83	0,155	0,152	224	0,2289497
15,148	542,2	542,6	99,08	98,94	0,155	0,152	225	0,2278383
15,190	542,1	542,6	98,74	98,96	0,155	0,152	226	0,2285062
15,217	542,2	542,6	98,59	98,53	0,155	0,152	227	0,2289501
15,247	542,2	542,6	98,31	98,38	0,155	0,152	228	0,2293931
15,286	542,2	542,6	97,85	98,18	0,154	0,152	229	0,2300554
15,217	542,2	542,6	98,71	98,58	0,155	0,152	230	0,2289498
14,933	542,2	542,6	100,37	100,51	0,155	0,152	231	0,2246998
15,183	542,2	542,6	98,74	98,62	0,155	0,152	232	0,2285061
15,182	542,2	542,6	98,59	98,78	0,155	0,152	233	0,2285063
15,311	542,2	542,6	97,82	97,62	0,155	0,152	234	0,2304956
15,135	542,1	542,5	98,92	99,10	0,155	0,152	235	0,2278383
15,236	542,1	542,5	98,29	98,39	0,155	0,152	236	0,2293929
15,129	542,1	542,5	99,09	99,15	0,155	0,152	237	0,2278388
15,204	542,1	542,5	98,51	98,55	0,155	0,152	238	0,2289491

15,201	542,1	542,5	98,57	98,66	0,155	0,152	239	0,2289494
15,449	542,1	542,5	96,78	96,92	0,155	0,152	240	0,2326868
15,200	542,1	542,5	98,48	98,56	0,155	0,152	241	0,2289493
15,168	542,1	542,5	98,67	98,68	0,155	0,152	242	0,228506
15,272	542,0	542,5	97,77	97,82	0,155	0,152	243	0,2300551
14,992	542,0	542,4	99,83	99,80	0,154	0,152	244	0,2258258
15,220	542,0	542,4	98,23	98,32	0,155	0,152	245	0,2293921
15,112	542,0	542,4	98,95	98,98	0,155	0,152	246	0,2277462
15,294	541,9	542,4	97,88	97,89	0,155	0,152	247	0,2304953
15,222	541,9	542,4	98,24	98,17	0,155	0,152	248	0,2293921
15,219	541,9	542,3	98,20	98,19	0,155	0,152	249	0,2293925
15,184	541,9	542,3	98,43	98,23	0,155	0,152	250	0,2289491
15,329	541,9	542,3	97,42	97,52	0,155	0,152	251	0,2311546
15,258	541,9	542,3	97,89	97,84	0,155	0,152	252	0,2300555
15,357	542,0	542,3	97,22	97,27	0,155	0,152	253	0,2315933
15,330	542,0	542,3	97,46	97,74	0,155	0,152	254	0,2311554
15,213	542,0	542,3	98,21	98,43	0,155	0,152	255	0,2293844
15,215	542,0	542,3	98,27	98,14	0,155	0,152	256	0,2293919
15,332	542,0	542,4	97,56	97,69	0,155	0,152	257	0,2311552
15,215	542,1	542,4	98,28	98,35	0,155	0,152	258	0,2293924
15,006	542,1	542,4	99,43	99,85	0,155	0,152	259	0,2262738
15,184	542,1	542,4	98,50	98,29	0,155	0,152	260	0,2289488
15,258	542,0	542,3	97,86	97,88	0,155	0,152	261	0,230055
15,154	542,0	542,3	98,68	98,25	0,155	0,152	262	0,2285058
15,181	542,0	542,3	98,31	98,38	0,155	0,152	263	0,2289489
15,151	542,0	542,3	98,54	98,74	0,155	0,152	264	0,2285058
15,211	542,0	542,3	98,12	97,98	0,155	0,152	265	0,2293924
15,211	541,9	542,3	98,11	98,39	0,155	0,152	266	0,2293926
15,210	541,9	542,3	98,06	98,26	0,155	0,152	267	0,2293924
15,211	542,0	542,4	98,15	98,31	0,155	0,152	268	0,2293924
15,106	542,1	542,4	98,98	98,69	0,155	0,152	269	0,2278384
15,281	542,1	542,4	97,84	97,75	0,155	0,152	270	0,2304951
15,179	542,1	542,4	98,31	98,67	0,155	0,152	271	0,2289494
15,269	542,0	542,4	97,76	97,80	0,155	0,152	272	0,2303212
15,104	542,0	542,3	98,79	98,99	0,155	0,152	273	0,2278381
15,351	542,0	542,3	97,26	97,23	0,155	0,152	274	0,2315932
15,207	542,0	542,3	98,17	98,30	0,155	0,152	275	0,2293918
15,230	542,0	542,3	98,06	98,04	0,155	0,152	276	0,2297563
15,206	542,0	542,3	98,08	98,23	0,155	0,152	277	0,2293928
15,105	542,0	542,4	98,94	98,85	0,155	0,152	278	0,227838
15,175	542,0	542,3	98,22	98,29	0,155	0,152	279	0,2289489
15,250	541,9	542,3	97,99	97,98	0,155	0,152	280	0,2300549
15,174	542,0	542,3	98,18	98,22	0,155	0,152	281	0,2289488
15,247	541,9	542,3	97,83	97,92	0,155	0,152	282	0,2300548
15,173	541,9	542,3	98,40	98,53	0,155	0,152	283	0,228949
15,247	541,9	542,3	97,91	98,04	0,155	0,152	284	0,2300549
15,175	541,9	542,3	98,28	98,58	0,155	0,152	285	0,2289488
15,204	541,8	542,2	98,22	98,05	0,155	0,152	286	0,2293925
15,249	541,8	542,2	97,97	97,94	0,155	0,152	287	0,2300548
15,177	541,8	542,2	98,38	98,53	0,155	0,152	288	0,2289487
15,250	541,8	542,2	97,99	97,91	0,155	0,152	289	0,2300548
15,250	541,8	542,2	97,94	98,10	0,155	0,152	290	0,2300547
15,205	541,7	542,1	98,21	98,37	0,155	0,152	291	0,229392
15,246	541,7	542,1	97,80	98,03	0,155	0,152	292	0,2300545
15,175	541,7	542,1	98,47	98,73	0,155	0,152	293	0,2289483
15,320	541,7	542,1	97,56	97,74	0,155	0,152	294	0,2311391
15,203	541,7	542,1	98,20	98,20	0,155	0,152	295	0,2293918
15,275	541,7	542,0	97,77	97,79	0,155	0,152	296	0,2304872
15,274	541,7	542,0	97,83	97,75	0,155	0,152	297	0,2304949
15,375	541,7	542,0	97,10	97,19	0,155	0,152	298	0,232031
14,919	541,6	542,0	100,10	99,93	0,155	0,152	299	0,2251492

15,198	541,6	542,0	98,32	98,44	0,155	0,152	300	0,2293914
15,199	541,6	542,0	98,19	98,04	0,155	0,152	301	0,2293915
15,097	541,6	541,9	99,04	98,90	0,155	0,152	302	0,2278371
15,170	541,6	541,9	98,27	98,28	0,155	0,152	303	0,2289489
15,241	541,6	541,9	97,92	98,10	0,155	0,152	304	0,2300545
15,167	541,6	541,9	98,45	98,26	0,155	0,152	305	0,2289481
15,197	541,6	541,9	98,22	98,35	0,155	0,152	306	0,2293917
15,198	541,5	541,9	98,14	98,19	0,155	0,152	307	0,2293914
15,198	541,5	541,9	98,11	98,38	0,155	0,152	308	0,2293915
15,242	541,5	541,8	98,02	98,06	0,155	0,152	309	0,2300538
15,269	541,5	541,8	97,66	97,56	0,155	0,152	310	0,2304944
15,137	541,5	541,8	98,61	98,77	0,155	0,152	311	0,2285048
15,199	541,5	541,8	98,26	98,30	0,155	0,152	312	0,2293913
15,197	541,5	541,8	98,31	98,17	0,155	0,152	313	0,2293914
15,139	541,5	541,8	98,62	98,52	0,155	0,152	314	0,2285047
15,316	541,5	541,8	97,46	97,51	0,155	0,152	315	0,2311544
15,200	541,5	541,8	98,23	98,38	0,155	0,152	316	0,2293912
15,316	541,5	541,8	97,48	97,42	0,155	0,152	317	0,2311541
15,199	541,5	541,8	98,22	98,14	0,155	0,152	318	0,2293912
15,170	541,5	541,8	98,39	98,53	0,155	0,152	319	0,228948
15,199	541,5	541,8	98,35	98,51	0,155	0,152	320	0,2293915
15,315	541,4	541,7	97,51	97,74	0,155	0,152	321	0,2311546
15,140	541,5	541,7	98,63	98,62	0,155	0,152	322	0,2285047
15,199	541,5	541,7	98,25	98,49	0,155	0,152	323	0,2293918
15,168	541,5	541,7	98,43	98,56	0,155	0,152	324	0,228948
15,196	541,4	541,7	98,18	98,10	0,155	0,152	325	0,2293911
15,093	541,4	541,7	98,83	99,06	0,155	0,152	326	0,2278371
15,416	541,4	541,7	96,86	97,03	0,155	0,152	327	0,2326856
15,148	541,4	541,7	98,66	98,55	0,155	0,152	328	0,2286788
15,093	541,4	541,7	98,95	99,22	0,155	0,152	329	0,2278372
15,165	541,4	541,7	98,39	98,53	0,155	0,152	330	0,2289483
15,238	541,4	541,7	97,96	97,81	0,155	0,152	331	0,2300539
15,163	541,4	541,7	98,54	98,52	0,155	0,152	332	0,2289482
15,194	541,4	541,7	98,21	98,06	0,155	0,152	333	0,2293909
15,193	541,4	541,7	98,34	98,38	0,155	0,152	334	0,2293913
14,988	541,4	541,7	99,59	99,53	0,155	0,152	335	0,2262728
15,090	541,4	541,6	99,05	98,84	0,155	0,152	336	0,2278371
15,307	541,3	541,6	97,41	97,52	0,155	0,152	337	0,231154
15,237	541,3	541,6	97,87	97,99	0,155	0,152	338	0,2300534
15,193	541,3	541,6	98,20	98,35	0,155	0,152	339	0,229391
15,234	541,3	541,6	97,96	97,99	0,155	0,152	340	0,2300539
15,161	541,3	541,6	98,55	98,41	0,155	0,152	341	0,2289476
15,133	541,3	541,5	98,59	98,43	0,155	0,152	342	0,2285044
15,233	541,2	541,5	97,98	98,09	0,155	0,152	343	0,2300538
15,232	541,2	541,5	97,97	97,92	0,155	0,152	344	0,2300539
15,158	541,2	541,5	98,35	98,37	0,155	0,152	345	0,2289476
15,187	541,2	541,5	98,18	98,34	0,155	0,152	346	0,229391
14,983	541,2	541,5	99,52	99,69	0,155	0,152	347	0,2262728
15,363	541,2	541,5	97,20	97,16	0,155	0,152	348	0,2320298
15,085	541,1	541,4	98,77	98,78	0,155	0,152	349	0,2278367
15,053	541,1	541,4	99,02	99,05	0,155	0,152	350	0,2273916
15,355	541,1	541,4	97,10	97,34	0,155	0,152	351	0,2319757
15,053	541,1	541,4	99,10	99,18	0,155	0,152	352	0,2273836
15,156	541,1	541,4	98,57	98,34	0,155	0,152	353	0,2289473
15,255	541,1	541,4	97,79	97,83	0,155	0,152	354	0,2304937
15,257	541,1	541,4	97,85	97,75	0,155	0,152	355	0,2304938
15,256	541,0	541,3	97,69	97,64	0,155	0,152	356	0,230494
15,184	541,0	541,3	98,20	98,32	0,155	0,152	357	0,229391
15,125	541,0	541,3	98,63	98,70	0,155	0,152	358	0,2285045
14,950	541,0	541,3	99,88	99,64	0,155	0,152	359	0,2258245
15,081	541,0	541,3	98,87	99,06	0,155	0,152	360	0,2278364

15,153	541,0	541,3	98,41	98,60	0,155	0,152	361	0,228947
15,122	540,9	541,3	98,50	98,68	0,155	0,152	362	0,2285044
15,226	540,9	541,3	98,03	97,95	0,155	0,152	363	0,2300533
15,226	540,9	541,2	97,98	98,04	0,155	0,152	364	0,2300534
15,182	540,9	541,2	98,34	98,15	0,155	0,152	365	0,2293902
15,124	540,9	541,2	98,45	98,72	0,155	0,152	366	0,2285039
15,180	540,9	541,2	98,22	98,46	0,155	0,153	367	0,2293911
15,152	540,9	541,2	98,44	98,38	0,155	0,152	368	0,2289446
15,118	540,9	541,2	98,67	98,88	0,155	0,152	369	0,228504
15,180	540,8	541,2	98,35	98,10	0,155	0,152	370	0,229391
15,121	540,8	541,1	98,68	98,78	0,155	0,152	371	0,2285038
15,251	540,8	541,1	97,91	97,80	0,155	0,152	372	0,2304936
15,148	540,8	541,1	98,43	98,36	0,155	0,152	373	0,228947
15,147	540,8	541,1	98,54	98,74	0,155	0,152	374	0,228947
15,118	540,8	541,1	98,56	98,60	0,155	0,153	375	0,2285038
15,293	540,7	541,1	97,33	97,24	0,155	0,152	376	0,2311529
15,145	540,7	541,0	98,39	98,49	0,155	0,152	377	0,2289471
15,215	540,7	541,0	97,99	98,18	0,155	0,153	378	0,2299947
15,248	540,7	541,0	97,63	97,68	0,155	0,152	379	0,2304933
15,219	540,7	541,0	97,88	98,31	0,155	0,153	380	0,2300529
15,219	540,6	541,0	97,93	97,77	0,155	0,152	381	0,2300529
15,348	540,6	540,9	97,11	97,03	0,155	0,152	382	0,2320299
15,072	540,6	540,9	98,84	99,12	0,155	0,152	383	0,2278469
15,217	540,6	540,9	97,78	97,94	0,155	0,152	384	0,2300528
15,173	540,6	540,9	98,15	98,54	0,155	0,153	385	0,2293918
15,140	540,6	540,9	98,33	98,33	0,155	0,153	386	0,2289471
15,111	540,5	540,9	98,53	98,97	0,155	0,153	387	0,228482
15,215	540,5	540,8	98,08	97,90	0,155	0,153	388	0,2300525
15,048	540,5	540,8	99,16	99,10	0,155	0,152	389	0,2275442
15,315	540,5	540,8	97,28	97,22	0,155	0,152	390	0,2315906
15,244	540,4	540,8	97,67	97,42	0,155	0,152	391	0,2304924
15,038	540,4	540,8	99,05	99,33	0,155	0,152	392	0,2273901
15,285	540,4	540,8	97,63	97,68	0,155	0,153	393	0,2311521
15,241	540,4	540,7	97,71	97,65	0,155	0,152	394	0,2304924
15,169	540,4	540,7	98,18	98,11	0,155	0,152	395	0,2293895
15,139	540,4	540,7	98,36	98,73	0,155	0,153	396	0,2289461
15,210	540,3	540,7	97,84	98,02	0,155	0,153	397	0,2300525
15,139	540,3	540,7	98,45	98,54	0,155	0,153	398	0,2289464
15,137	540,3	540,6	98,30	98,44	0,155	0,152	399	0,2289461
15,211	540,3	540,6	97,91	98,24	0,155	0,153	400	0,230052
14,960	540,3	540,6	99,56	99,39	0,155	0,152	401	0,2262709
15,240	540,3	540,6	97,84	97,76	0,155	0,152	402	0,230492
15,107	540,2	540,6	98,48	98,64	0,155	0,152	403	0,2285022
15,163	540,2	540,6	98,35	98,21	0,155	0,152	404	0,2293888
15,033	540,2	540,6	99,13	99,09	0,155	0,152	405	0,22739
15,238	540,2	540,5	97,74	97,79	0,155	0,152	406	0,2304923
15,033	540,2	540,5	99,01	99,08	0,155	0,152	407	0,2273897
15,237	540,2	540,5	97,90	97,74	0,155	0,152	408	0,2304918
15,163	540,1	540,5	98,33	98,58	0,155	0,153	409	0,229389
15,135	540,1	540,5	98,37	98,39	0,155	0,153	410	0,2289456
15,032	540,1	540,4	99,06	99,20	0,155	0,152	411	0,2273892
15,237	540,1	540,4	97,64	98,02	0,155	0,153	412	0,2304917
15,134	540,0	540,4	98,56	98,43	0,155	0,153	413	0,2289455
14,852	540,0	540,4	100,43	99,85	0,155	0,152	414	0,2246959
15,132	540,0	540,4	98,36	98,27	0,155	0,152	415	0,2289453
15,132	540,0	540,4	98,61	98,40	0,155	0,152	416	0,2289401
15,130	540,0	540,4	98,39	98,58	0,155	0,153	417	0,2289449
15,275	540,0	540,3	97,42	97,57	0,155	0,153	418	0,2311514
15,157	539,9	540,3	98,08	98,18	0,155	0,153	419	0,2293888
15,203	539,9	540,3	98,17	97,93	0,155	0,152	420	0,2300512
15,056	539,9	540,3	98,92	98,86	0,155	0,152	421	0,227835

15,274	539,9	540,3	97,40	97,44	0,155	0,152	422	0,2311509
15,203	539,9	540,3	97,87	97,82	0,155	0,152	423	0,2300515
15,025	539,9	540,3	98,98	99,19	0,155	0,152	424	0,2273893
15,302	539,9	540,3	97,26	97,45	0,155	0,153	425	0,231587
15,229	539,9	540,3	97,83	97,64	0,155	0,153	426	0,2304911
15,199	539,9	540,3	97,87	97,99	0,155	0,152	427	0,2300512
15,301	539,9	540,3	97,29	97,22	0,155	0,152	428	0,2315897
15,021	539,8	540,3	99,02	99,11	0,155	0,152	429	0,2273861
15,271	539,8	540,3	97,51	97,57	0,155	0,153	430	0,2311513
15,153	539,8	540,2	98,22	98,20	0,155	0,153	431	0,2293812
15,153	539,8	540,3	98,22	98,26	0,155	0,153	432	0,2293876
15,155	539,8	540,2	98,21	98,00	0,155	0,152	433	0,2294255
15,092	539,8	540,2	98,52	98,60	0,155	0,152	434	0,2285018
15,195	539,8	540,2	97,97	97,82	0,155	0,152	435	0,2300513
15,193	539,8	540,2	97,94	98,02	0,155	0,153	436	0,2300508
15,210	539,8	540,2	97,87	97,95	0,155	0,153	437	0,2302729
15,195	539,7	540,2	97,97	97,96	0,155	0,153	438	0,2300512
15,324	539,7	540,2	96,99	97,03	0,155	0,152	439	0,2320276
14,945	539,7	540,1	99,54	99,64	0,155	0,153	440	0,2262703
15,151	539,7	540,1	98,06	98,40	0,155	0,153	441	0,2293879
15,122	539,7	540,1	98,43	98,40	0,155	0,153	442	0,2289451
15,149	539,7	540,1	98,22	98,42	0,155	0,153	443	0,2293881
15,192	539,7	540,2	97,89	98,12	0,155	0,153	444	0,2300508
15,192	539,7	540,1	97,80	97,94	0,155	0,153	445	0,2300558
15,294	539,7	540,1	97,15	97,25	0,155	0,153	446	0,2315886
15,263	539,6	540,1	97,53	97,39	0,155	0,152	447	0,2311509
15,120	539,6	540,1	98,53	98,19	0,156	0,152	448	0,2289444
15,146	539,6	540,1	98,11	98,16	0,155	0,152	449	0,2293877
15,190	539,6	540,1	97,97	98,07	0,155	0,153	450	0,2300502
15,088	539,6	540,1	98,52	98,32	0,155	0,152	451	0,228501
15,086	539,6	540,0	98,45	98,65	0,155	0,152	452	0,2285013
15,013	539,6	540,0	98,93	99,04	0,155	0,153	453	0,2273885
15,115	539,5	540,0	98,33	98,63	0,155	0,153	454	0,2289439
15,013	539,5	540,0	99,14	98,91	0,155	0,153	455	0,2273875
15,361	539,5	540,0	96,71	96,74	0,155	0,152	456	0,23268
15,318	539,5	540,0	96,97	97,11	0,155	0,153	457	0,2320259
15,144	539,5	540,0	98,08	98,35	0,155	0,153	458	0,2293874
15,187	539,5	540,0	97,90	97,88	0,155	0,153	459	0,2300498
15,263	539,5	540,0	97,38	97,50	0,155	0,153	460	0,2312074
15,011	539,5	540,0	99,12	98,60	0,155	0,152	461	0,22739
15,142	539,5	540,0	98,10	97,81	0,155	0,152	462	0,229387
15,082	539,5	540,0	98,55	98,37	0,155	0,152	463	0,2285002
15,140	539,5	540,0	98,13	98,32	0,155	0,153	464	0,2293869
15,139	539,5	540,0	98,01	98,11	0,155	0,153	465	0,229387
15,255	539,5	540,0	97,28	97,67	0,155	0,153	466	0,2311499
15,183	539,4	539,9	97,72	97,73	0,155	0,153	467	0,2300493
15,140	539,4	539,9	98,27	98,10	0,155	0,152	468	0,2293871
15,183	539,4	539,9	97,84	98,07	0,155	0,153	469	0,2300498
15,210	539,4	539,9	97,57	97,56	0,155	0,153	470	0,2304893
15,355	539,4	539,9	96,75	96,86	0,155	0,153	471	0,2326812
15,139	539,4	539,8	98,05	98,12	0,155	0,153	472	0,2293864
15,138	539,4	539,8	98,18	98,24	0,155	0,153	473	0,2293861
15,034	539,4	539,8	98,85	98,39	0,155	0,152	474	0,2278323
15,080	539,3	539,8	98,45	98,35	0,155	0,152	475	0,2284996
15,180	539,3	539,8	97,64	97,79	0,155	0,152	476	0,2300488
15,279	539,3	539,8	97,29	97,11	0,155	0,152	477	0,2315869

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	99,86	98,45	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
15,845	537,8	538,2			0,165	0,163	0	0,2367846
15,744	537,9	538,2	101,20	99,79	0,165	0,163	1	0,2399773
15,476	537,9	538,3	102,17	100,63	0,165	0,162	2	0,2367845
15,509	537,9	538,3	101,81	100,42	0,165	0,162	3	0,2374263
15,681	537,9	538,3	100,83	99,21	0,165	0,162	4	0,2399774
15,558	538,0	538,3	100,79	99,45	0,165	0,162	5	0,2389075
15,652	538,0	538,3	99,91	98,45	0,165	0,162	6	0,240822
15,442	538,0	538,3	101,20	99,65	0,166	0,163	7	0,2378544
15,596	538,0	538,4	99,86	98,70	0,166	0,163	8	0,2404008
15,612	538,0	538,4	99,74	98,40	0,166	0,163	9	0,2408221
15,614	538,0	538,4	99,78	98,38	0,166	0,163	10	0,2408221
15,651	538,0	538,4	99,34	98,08	0,166	0,163	11	0,2414543
15,674	538,0	538,4	99,27	97,98	0,166	0,163	12	0,2418737
15,647	538,0	538,4	99,49	97,92	0,166	0,163	13	0,241454
15,603	538,0	538,4	99,49	98,11	0,166	0,162	14	0,2408222
15,671	538,0	538,4	99,20	97,66	0,165	0,162	15	0,2418737
15,742	538,0	538,4	98,73	97,55	0,166	0,163	16	0,2429231
15,548	538,0	538,4	99,83	98,68	0,165	0,163	17	0,2399771
15,547	538,0	538,4	99,96	98,47	0,165	0,163	18	0,239978
15,573	538,0	538,4	99,79	98,19	0,166	0,162	19	0,2403974
15,668	538,1	538,4	99,10	97,73	0,165	0,162	20	0,2418737
15,584	538,0	538,4	99,66	98,48	0,165	0,163	21	0,2405914
15,605	538,0	538,4	99,57	98,56	0,165	0,163	22	0,2408225
15,607	538,0	538,4	99,64	98,37	0,165	0,163	23	0,2408217
15,608	538,0	538,4	99,41	98,23	0,165	0,163	24	0,2408225
15,647	538,1	538,4	99,38	98,06	0,165	0,163	25	0,2414538
15,547	538,1	538,4	99,90	98,66	0,165	0,163	26	0,2399778
15,475	538,0	538,4	100,45	98,89	0,166	0,163	27	0,2389184
15,642	538,0	538,4	99,21	97,83	0,165	0,162	28	0,2414538
15,596	538,0	538,4	99,62	98,34	0,165	0,163	29	0,2408219
15,598	538,0	538,4	99,61	98,27	0,166	0,163	30	0,2408219
15,477	538,0	538,4	100,40	99,13	0,166	0,163	31	0,2389187
15,576	538,0	538,4	99,80	98,08	0,166	0,162	32	0,2404007
15,643	538,0	538,4	99,36	97,86	0,166	0,162	33	0,2414537
15,550	538,0	538,4	99,89	98,64	0,165	0,163	34	0,2399772
15,647	538,0	538,4	99,39	97,91	0,165	0,163	35	0,2414533
15,606	538,0	538,4	99,61	98,33	0,166	0,163	36	0,2408219
15,649	538,0	538,4	99,26	97,84	0,165	0,163	37	0,241454
15,578	538,0	538,4	99,71	98,30	0,165	0,162	38	0,2404
15,647	538,0	538,4	99,40	97,90	0,165	0,162	39	0,2414541
15,741	538,0	538,4	98,71	97,30	0,166	0,162	40	0,2429207
15,730	538,0	538,4	98,66	97,67	0,165	0,163	41	0,2427246
15,483	538,0	538,4	100,38	98,98	0,165	0,163	42	0,2389216
15,650	538,0	538,4	99,25	97,91	0,165	0,162	43	0,2414533
15,560	538,0	538,4	100,11	98,57	0,165	0,162	44	0,2399772
15,560	538,0	538,4	100,10	98,63	0,166	0,162	45	0,2399773
15,550	538,0	538,4	100,26	98,99	0,166	0,163	46	0,2397407
15,592	538,1	538,4	99,96	98,53	0,166	0,163	47	0,2404002
15,597	538,1	538,4	99,91	98,51	0,166	0,163	48	0,2404008
15,569	538,1	538,4	100,03	98,44	0,165	0,162	49	0,2399771
15,460	538,1	538,5	100,73	99,27	0,165	0,162	50	0,2382767
15,530	538,1	538,5	100,20	98,73	0,165	0,162	51	0,239342
15,623	538,1	538,5	99,75	98,29	0,165	0,162	52	0,2408222
15,528	538,1	538,5	100,12	98,94	0,165	0,163	53	0,2393424
15,597	538,1	538,5	99,78	98,44	0,165	0,162	54	0,2404011
15,525	538,2	538,5	100,24	98,93	0,165	0,162	55	0,2393422

15,690	538,2	538,5	99,30	98,00	0,165	0,163	56	0,241873
15,688	538,2	538,5	99,30	97,77	0,166	0,163	57	0,2418724
15,593	538,2	538,5	99,96	98,50	0,166	0,162	58	0,2404004
15,569	538,2	538,5	99,93	98,62	0,165	0,163	59	0,2399775
15,597	538,2	538,5	99,76	98,50	0,165	0,162	60	0,2404007
15,597	538,2	538,5	99,88	98,42	0,165	0,162	61	0,2404006
15,625	538,2	538,5	99,57	98,26	0,165	0,162	62	0,2408223
15,597	538,2	538,5	99,92	98,57	0,165	0,163	63	0,2404016
15,761	538,2	538,5	98,80	97,38	0,165	0,162	64	0,2429208
15,599	538,2	538,5	99,94	98,60	0,165	0,163	65	0,2404007
15,789	538,2	538,5	98,54	97,26	0,165	0,163	66	0,2433517
15,628	538,2	538,5	99,66	98,57	0,165	0,163	67	0,2408221
15,526	538,2	538,5	100,39	98,86	0,165	0,163	68	0,239345
15,569	538,2	538,5	100,09	98,47	0,166	0,162	69	0,2399779
15,659	538,2	538,5	99,39	97,93	0,165	0,162	70	0,2414539
15,622	538,2	538,5	99,86	98,25	0,166	0,162	71	0,2408218
15,659	538,2	538,5	99,46	98,14	0,166	0,163	72	0,2414538
15,332	538,2	538,5	101,61	100,34	0,166	0,163	73	0,2363561
15,526	538,2	538,5	100,34	99,04	0,166	0,163	74	0,2393423
15,598	538,2	538,6	100,04	98,61	0,166	0,163	75	0,2404004
15,600	538,2	538,6	99,92	98,36	0,166	0,162	76	0,2404005
15,699	538,3	538,6	99,32	98,17	0,165	0,163	77	0,2418736
15,608	538,2	538,5	99,95	98,54	0,165	0,163	78	0,2404004
15,684	538,2	538,5	99,63	98,01	0,166	0,162	79	0,2414538
15,590	538,2	538,5	100,13	98,96	0,165	0,163	80	0,2399774
15,618	538,2	538,6	99,98	98,57	0,165	0,163	81	0,2404009
15,624	538,3	538,6	100,13	98,62	0,165	0,162	82	0,2404002
15,627	538,3	538,6	100,17	98,63	0,166	0,162	83	0,2404002
15,723	538,3	538,6	99,41	98,12	0,165	0,163	84	0,2418738
15,659	538,3	538,6	99,76	98,43	0,165	0,162	85	0,2408225
15,733	538,3	538,6	99,53	97,97	0,165	0,162	86	0,2418738
15,706	538,3	538,6	99,75	98,07	0,165	0,162	87	0,2414548
15,670	538,4	538,7	100,08	98,44	0,166	0,162	88	0,2408223
15,643	538,4	538,7	100,11	99,01	0,165	0,163	89	0,2404011
15,549	538,3	538,7	100,71	99,41	0,165	0,163	90	0,2389188
15,554	538,3	538,7	100,67	99,23	0,165	0,162	91	0,2389192
15,581	538,3	538,7	100,60	99,26	0,165	0,162	92	0,2393429
15,563	538,3	538,7	100,72	99,56	0,165	0,163	93	0,2389186
15,465	538,2	538,7	101,44	100,01	0,165	0,162	94	0,2374274
15,591	538,2	538,6	100,77	99,21	0,165	0,162	95	0,2393434
15,719	538,2	538,6	99,77	98,40	0,165	0,162	96	0,2412222
15,569	538,3	538,6	100,87	99,62	0,165	0,162	97	0,2389186
15,573	538,3	538,6	100,87	99,47	0,165	0,163	98	0,2389184
15,642	538,3	538,7	100,48	99,19	0,165	0,162	99	0,239952
15,653	538,3	538,7	100,69	98,94	0,165	0,162	100	0,2399778
15,514	538,3	538,7	101,46	100,18	0,166	0,162	101	0,237855
15,685	538,4	538,7	100,46	99,06	0,165	0,163	102	0,2404016
15,617	538,4	538,8	100,70	99,59	0,165	0,163	103	0,2393428
15,717	538,4	538,8	100,11	98,83	0,165	0,163	104	0,2408226
15,688	538,4	538,8	100,36	99,16	0,165	0,163	105	0,2404011
15,663	538,4	538,8	100,58	99,08	0,165	0,162	106	0,2399781
15,429	538,4	538,8	102,23	100,60	0,165	0,162	107	0,2363569
15,456	538,5	538,9	101,95	100,41	0,165	0,162	108	0,2367846
15,629	538,5	538,9	100,70	99,27	0,165	0,162	109	0,2393427
15,700	538,5	538,9	100,40	99,09	0,165	0,162	110	0,2404013
15,676	538,5	538,9	100,58	98,95	0,165	0,162	111	0,2399775
15,728	538,6	539,0	100,29	98,97	0,165	0,162	112	0,2408225
15,537	538,6	539,0	101,57	100,30	0,165	0,163	113	0,2378547
15,634	538,6	539,0	101,02	99,44	0,165	0,162	114	0,2393426
15,642	538,6	539,0	100,89	99,38	0,165	0,162	115	0,2393429
15,685	538,6	539,0	100,79	99,31	0,165	0,162	116	0,2399781

15,551	538,6	539,0	101,60	100,19	0,165	0,162	117	0,2378546
15,684	538,6	539,0	100,76	99,33	0,165	0,162	118	0,2399783
15,716	538,6	539,0	100,48	99,04	0,165	0,162	119	0,240401
15,618	538,6	539,0	101,08	99,62	0,165	0,162	120	0,2389175
15,481	538,6	539,0	102,13	100,73	0,165	0,162	121	0,2367845
15,621	538,6	539,0	101,42	99,90	0,166	0,163	122	0,2389182
15,654	538,6	539,0	101,16	99,73	0,166	0,163	123	0,2393424
15,627	538,6	539,1	101,29	99,62	0,165	0,162	124	0,2389181
15,653	538,6	539,1	101,13	99,38	0,165	0,162	125	0,2393424
15,486	538,6	539,1	102,22	100,70	0,165	0,162	126	0,2367845
15,655	538,6	539,1	101,20	99,60	0,165	0,162	127	0,239298
15,662	538,6	539,1	101,21	99,78	0,165	0,162	128	0,2393422
15,566	538,6	539,1	101,72	100,33	0,165	0,162	129	0,2378547
15,639	538,6	539,1	101,25	99,78	0,165	0,162	130	0,2389191
15,545	538,6	539,1	102,00	100,70	0,165	0,162	131	0,2374269
15,514	538,6	539,1	102,41	100,60	0,165	0,162	132	0,2367844
15,584	538,6	539,2	101,76	100,29	0,165	0,162	133	0,2378544
15,586	538,7	539,2	101,84	100,32	0,165	0,162	134	0,2378547
15,590	538,7	539,2	101,84	100,34	0,165	0,162	135	0,2378543
15,583	538,7	539,2	101,94	100,42	0,165	0,162	136	0,2378549
15,554	538,7	539,2	101,85	100,49	0,165	0,162	137	0,2374264
15,649	538,7	539,2	101,42	99,97	0,165	0,162	138	0,2389185
15,687	538,7	539,2	101,22	99,89	0,165	0,162	139	0,2393429
15,487	538,7	539,2	102,53	101,18	0,165	0,162	140	0,2363559
15,559	538,7	539,2	102,04	100,39	0,165	0,162	141	0,2374266
15,686	538,7	539,2	101,31	99,59	0,165	0,162	142	0,2393426
15,655	538,7	539,2	101,27	99,89	0,165	0,162	143	0,2389185
15,554	538,7	539,3	102,10	100,59	0,165	0,162	144	0,2374265
15,489	538,7	539,3	102,52	100,84	0,165	0,162	145	0,2363557
15,554	538,7	539,3	102,10	100,46	0,165	0,162	146	0,237427
15,655	538,7	539,3	101,41	99,98	0,165	0,162	147	0,2389188
15,586	538,8	539,3	102,00	100,33	0,165	0,162	148	0,2378542
15,580	538,8	539,3	101,81	100,13	0,165	0,162	149	0,2378544
15,648	538,8	539,3	101,46	100,02	0,165	0,162	150	0,2389187
15,578	538,8	539,3	101,96	100,31	0,166	0,162	151	0,2378555
15,724	538,8	539,3	100,85	99,59	0,165	0,162	152	0,239978
15,677	538,8	539,4	101,21	99,90	0,165	0,162	153	0,2393433
15,549	538,8	539,3	101,96	100,66	0,165	0,163	154	0,2374275
15,571	538,8	539,3	101,77	100,43	0,165	0,163	155	0,2378546
15,431	538,8	539,3	102,77	101,04	0,165	0,162	156	0,2357108
15,502	538,8	539,3	102,23	100,74	0,165	0,162	157	0,2367846
15,581	538,8	539,4	101,72	100,04	0,165	0,162	158	0,2380136
15,663	538,8	539,4	101,03	99,71	0,165	0,162	159	0,2393428
15,562	538,9	539,4	101,60	100,07	0,165	0,162	160	0,2378542
15,421	538,9	539,4	102,59	100,78	0,165	0,162	161	0,2357111
15,717	538,9	539,4	100,64	99,11	0,165	0,162	162	0,2404005
15,518	538,9	539,4	101,84	100,15	0,165	0,162	163	0,2374273
15,514	538,9	539,4	101,62	100,03	0,165	0,162	164	0,237432
15,621	538,9	539,5	100,96	99,53	0,165	0,162	165	0,2390978
15,635	538,9	539,5	100,83	99,37	0,165	0,162	166	0,2393429
15,397	538,9	539,5	102,56	101,02	0,165	0,162	167	0,2357106
15,669	538,9	539,5	100,71	99,19	0,165	0,162	168	0,2399782
15,627	538,9	539,5	100,84	99,23	0,165	0,162	169	0,2393426
15,696	538,9	539,5	100,37	98,96	0,165	0,162	170	0,2404009
15,524	538,9	539,4	101,32	99,74	0,165	0,162	171	0,2378548
15,608	538,9	539,4	100,81	99,19	0,165	0,162	172	0,2393426
15,515	538,9	539,4	101,41	99,64	0,165	0,162	173	0,2378545
15,657	538,9	539,4	100,60	99,12	0,165	0,162	174	0,239978
15,490	538,9	539,4	101,49	100,21	0,165	0,162	175	0,237427
15,511	538,9	539,4	101,25	99,89	0,165	0,162	176	0,2378546
15,577	538,9	539,4	100,91	99,24	0,165	0,162	177	0,238919

15,511	538,9	539,4	101,31	100,07	0,165	0,162	178	0,237855
15,512	538,9	539,4	101,38	99,82	0,165	0,162	179	0,2378545
15,506	538,9	539,4	101,15	99,73	0,165	0,162	180	0,2378543
15,365	538,9	539,4	102,32	100,87	0,165	0,162	181	0,2357116
15,597	538,9	539,4	100,80	99,06	0,165	0,162	182	0,2393429
15,669	538,9	539,4	100,23	98,85	0,165	0,162	183	0,2404013
15,568	538,9	539,4	100,78	99,38	0,165	0,162	184	0,2389189
15,593	538,9	539,4	100,72	99,06	0,165	0,162	185	0,2393429
15,513	538,9	539,4	101,25	99,78	0,165	0,162	186	0,2381425
15,657	538,9	539,4	100,04	98,78	0,165	0,162	187	0,2404012
15,683	538,9	539,4	99,84	98,25	0,165	0,162	188	0,2408227
15,706	538,9	539,4	99,84	98,44	0,165	0,162	189	0,2411307
15,555	538,9	539,4	100,74	99,40	0,165	0,162	190	0,2389191
15,678	538,9	539,4	99,93	98,60	0,165	0,162	191	0,2408226
15,488	538,9	539,4	101,15	99,49	0,165	0,162	192	0,2378572
15,578	538,9	539,4	100,41	99,20	0,165	0,162	193	0,2393429
15,549	538,9	539,3	100,80	99,03	0,165	0,162	194	0,2389191
15,453	538,9	539,4	101,32	99,95	0,165	0,162	195	0,2374272
15,666	538,9	539,4	99,95	98,36	0,165	0,162	196	0,2408228
15,635	538,9	539,4	100,15	98,42	0,165	0,162	197	0,2404012
15,705	538,9	539,4	99,58	98,02	0,165	0,162	198	0,241455
15,702	538,9	539,4	99,54	98,16	0,165	0,162	199	0,2414544
15,660	538,9	539,4	99,79	98,42	0,165	0,162	200	0,2408224
15,563	538,9	539,4	100,43	99,15	0,165	0,162	201	0,2393431
15,472	538,9	539,4	100,99	99,55	0,165	0,162	202	0,2379899
15,559	538,9	539,3	100,23	98,64	0,165	0,162	203	0,2393428
15,592	538,9	539,4	100,01	98,66	0,165	0,162	204	0,2399776
15,551	538,9	539,3	100,38	98,72	0,165	0,162	205	0,2393426
15,615	538,9	539,3	99,88	98,50	0,165	0,162	206	0,2404007
15,541	538,8	539,3	100,46	98,97	0,165	0,162	207	0,2393424
15,420	538,8	539,3	101,16	99,76	0,165	0,162	208	0,2374266
15,579	538,8	539,3	100,03	98,41	0,165	0,162	209	0,2400251
15,601	538,9	539,3	99,87	98,08	0,165	0,162	210	0,2404012
15,698	538,9	539,3	99,14	97,59	0,165	0,162	211	0,2418739
15,531	538,8	539,3	100,17	98,92	0,165	0,162	212	0,2393427
15,599	538,8	539,3	99,85	98,55	0,165	0,163	213	0,2404012
15,623	538,8	539,3	99,70	98,30	0,165	0,163	214	0,2408228
15,663	538,8	539,3	99,39	97,73	0,165	0,162	215	0,2414546
15,513	538,8	539,3	100,11	98,98	0,165	0,162	216	0,239188
15,563	538,7	539,2	99,77	98,26	0,165	0,162	217	0,2399956
15,523	538,8	539,3	100,13	98,92	0,165	0,162	218	0,2393434
15,660	538,8	539,3	99,33	98,20	0,165	0,163	219	0,2414546
15,613	538,8	539,2	99,53	98,27	0,165	0,163	220	0,2408228
15,679	538,8	539,2	98,98	97,63	0,165	0,162	221	0,2418744
15,587	538,8	539,2	99,52	98,30	0,165	0,162	222	0,2404014
15,652	538,7	539,2	99,23	97,81	0,165	0,162	223	0,2414547
15,645	538,7	539,2	99,21	97,86	0,165	0,162	224	0,2414543
15,580	538,7	539,2	99,79	97,98	0,165	0,162	225	0,2404009
15,606	538,7	539,2	99,30	98,27	0,165	0,162	226	0,2408229
15,607	538,7	539,2	99,61	98,08	0,165	0,162	227	0,2408223
15,506	538,7	539,2	99,99	98,83	0,165	0,162	228	0,2393426
15,509	538,7	539,2	100,15	98,92	0,165	0,163	229	0,2393429
15,549	538,7	539,2	99,91	98,55	0,165	0,163	230	0,2399782
15,602	538,7	539,2	99,40	98,22	0,165	0,163	231	0,2408222
15,476	538,7	539,2	100,23	98,89	0,165	0,163	232	0,2389215
15,595	538,7	539,1	99,34	97,92	0,165	0,162	233	0,2408225
15,594	538,7	539,2	99,50	97,83	0,165	0,162	234	0,2408227
15,542	538,7	539,1	99,72	98,49	0,165	0,162	235	0,239978
15,566	538,7	539,1	99,58	98,19	0,165	0,162	236	0,2404103
15,591	538,7	539,1	99,42	98,08	0,165	0,162	237	0,240821
15,586	538,7	539,1	99,53	98,07	0,165	0,162	238	0,2408223

15,657	538,7	539,1	98,75	97,52	0,165	0,162	239	0,241874
15,324	538,7	539,1	101,12	99,60	0,165	0,162	240	0,2367844
15,585	538,7	539,1	99,36	97,64	0,165	0,162	241	0,2408222
15,588	538,7	539,1	99,43	97,85	0,165	0,162	242	0,2408224
15,652	538,6	539,1	98,99	97,42	0,165	0,162	243	0,241874
15,655	538,6	539,1	98,98	97,64	0,165	0,162	244	0,2418738
15,651	538,7	539,1	98,86	97,61	0,165	0,162	245	0,2418736
15,584	538,6	539,1	99,38	97,83	0,165	0,162	246	0,2408221
15,489	538,6	539,1	99,90	98,51	0,165	0,162	247	0,2393426
15,487	538,6	539,1	99,91	98,41	0,165	0,162	248	0,239343
15,488	538,6	539,1	99,86	98,31	0,165	0,162	249	0,2393816
15,531	538,6	539,1	99,72	98,20	0,165	0,162	250	0,2399778
15,525	538,7	539,1	99,60	98,26	0,165	0,162	251	0,2399776
15,613	538,7	539,1	99,04	97,58	0,165	0,162	252	0,2414543
15,626	538,7	539,1	99,01	97,77	0,165	0,162	253	0,2414541
15,527	538,7	539,1	99,64	98,38	0,165	0,162	254	0,2399778
15,624	538,7	539,1	99,00	97,65	0,165	0,162	255	0,2414543
15,623	538,7	539,1	98,94	97,67	0,165	0,162	256	0,2414543
15,584	538,7	539,1	99,34	97,89	0,165	0,162	257	0,2408223
15,493	538,7	539,1	99,99	98,62	0,165	0,162	258	0,2393433
15,652	538,7	539,2	99,00	97,69	0,165	0,162	259	0,2418742
15,529	538,7	539,1	99,75	98,26	0,165	0,162	260	0,2399779
15,583	538,7	539,1	99,45	97,83	0,165	0,162	261	0,2408223
15,654	538,8	539,2	98,80	97,38	0,165	0,162	262	0,2418743
15,629	538,8	539,2	98,96	97,36	0,165	0,162	263	0,2414546
15,723	538,8	539,2	98,43	97,30	0,165	0,162	264	0,2429215
15,585	538,8	539,2	99,21	97,92	0,165	0,162	265	0,2408229
15,551	538,8	539,2	99,56	97,84	0,165	0,162	266	0,2403409
15,523	538,8	539,2	99,57	98,27	0,165	0,162	267	0,2399784
15,715	538,8	539,2	98,40	96,99	0,165	0,162	268	0,2429222
15,647	538,8	539,2	98,75	97,28	0,165	0,162	269	0,2418631
15,680	538,8	539,2	98,76	97,23	0,165	0,162	270	0,2423029
15,584	538,9	539,3	98,97	97,90	0,165	0,162	271	0,2408229
15,485	538,9	539,3	99,97	98,53	0,165	0,162	272	0,2393435
15,527	538,9	539,3	99,57	98,18	0,165	0,162	273	0,2399785
15,582	538,9	539,3	99,36	97,90	0,165	0,162	274	0,2408216
15,620	538,9	539,3	98,93	97,61	0,165	0,162	275	0,2414547
15,712	538,9	539,3	98,47	97,00	0,165	0,162	276	0,242922
15,549	538,8	539,2	99,38	98,00	0,165	0,162	277	0,2404013
15,650	538,8	539,2	98,77	97,44	0,165	0,162	278	0,2418742
15,526	538,8	539,2	99,72	98,44	0,165	0,162	279	0,2399788
15,527	538,8	539,2	99,71	98,33	0,165	0,163	280	0,2399785
15,646	538,8	539,2	98,84	97,27	0,165	0,162	281	0,2418744
15,623	538,8	539,2	98,96	97,79	0,165	0,162	282	0,241455
15,383	538,8	539,2	100,27	99,11	0,165	0,162	283	0,2378543
15,577	538,8	539,3	99,33	97,94	0,165	0,162	284	0,2408222
15,547	538,8	539,3	99,44	97,83	0,165	0,162	285	0,2404012
15,520	538,8	539,3	99,58	98,38	0,165	0,162	286	0,2399563
15,545	538,8	539,3	99,44	97,97	0,165	0,162	287	0,2404016
15,539	538,8	539,3	99,37	97,85	0,165	0,162	288	0,240401
15,707	538,8	539,3	98,45	96,95	0,165	0,162	289	0,242922
15,576	538,8	539,2	99,24	97,80	0,165	0,162	290	0,2408232
15,713	538,8	539,3	98,39	96,86	0,165	0,162	291	0,2429246
15,542	538,8	539,2	99,40	98,01	0,165	0,162	292	0,2404014
15,526	538,8	539,2	99,59	98,14	0,165	0,162	293	0,2401783
15,637	538,7	539,2	98,82	97,32	0,165	0,162	294	0,2418744
15,639	538,7	539,2	98,84	97,34	0,165	0,162	295	0,2418743
15,517	538,7	539,1	99,61	98,25	0,165	0,162	296	0,2399785
15,561	538,7	539,1	99,12	97,75	0,165	0,162	297	0,2408226
15,634	538,7	539,1	98,74	97,43	0,165	0,162	298	0,241874
15,635	538,6	539,1	98,74	97,44	0,165	0,162	299	0,2418745

15,514	538,6	539,1	99,52	98,05	0,165	0,162	300	0,2399783
15,606	538,6	539,1	98,86	97,53	0,165	0,162	301	0,2414551
15,607	538,6	539,1	99,10	97,64	0,165	0,162	302	0,2414549
15,345	538,6	539,1	100,58	99,20	0,165	0,162	303	0,2374269
15,515	538,6	539,0	99,67	98,19	0,165	0,162	304	0,2399788
15,539	538,6	539,0	99,45	97,89	0,165	0,162	305	0,2404013
15,471	538,6	539,0	99,77	98,30	0,165	0,162	306	0,2393428
15,579	538,5	539,0	99,17	97,76	0,165	0,162	307	0,2410263
15,538	538,5	539,0	99,48	97,87	0,165	0,162	308	0,2404014
15,633	538,5	539,0	98,84	97,50	0,165	0,162	309	0,2418741
15,478	538,5	539,0	99,91	98,39	0,165	0,162	310	0,2394507
15,514	538,5	539,0	99,51	98,17	0,165	0,162	311	0,2401106
15,606	538,5	539,0	99,11	97,33	0,165	0,162	312	0,2414546
15,468	538,5	539,0	99,80	98,21	0,165	0,162	313	0,239343
15,634	538,5	538,9	98,83	97,43	0,165	0,162	314	0,2418747
15,537	538,5	539,0	99,48	98,04	0,165	0,162	315	0,2404003
15,564	538,5	538,9	99,25	97,68	0,165	0,162	316	0,240823
15,560	538,5	539,0	99,20	97,88	0,165	0,162	317	0,2408229
15,505	538,5	538,9	99,56	97,88	0,165	0,162	318	0,2399784
15,603	538,5	539,0	98,95	97,49	0,165	0,162	319	0,2414551
15,606	538,5	538,9	98,95	97,63	0,165	0,162	320	0,2414551
15,603	538,5	538,9	98,93	97,40	0,165	0,162	321	0,2414544
15,530	538,5	538,9	99,17	97,89	0,165	0,162	322	0,2404016
15,722	538,5	538,9	98,12	96,57	0,165	0,162	323	0,2433389
15,694	538,5	538,9	98,33	96,86	0,165	0,162	324	0,242922
15,692	538,5	538,9	98,31	96,72	0,165	0,162	325	0,2429217
15,558	538,4	538,9	99,12	97,85	0,165	0,162	326	0,2408229
15,501	538,4	538,9	99,33	98,18	0,165	0,162	327	0,2399781
15,690	538,4	538,8	98,30	96,81	0,165	0,162	328	0,2429216
15,625	538,4	538,8	98,72	97,52	0,165	0,162	329	0,2418743
15,623	538,4	538,8	98,68	97,41	0,165	0,163	330	0,2418744
15,597	538,4	538,8	99,00	97,43	0,165	0,162	331	0,2414547
15,623	538,4	538,8	98,81	97,41	0,165	0,162	332	0,2418742
15,600	538,4	538,8	98,92	97,45	0,165	0,162	333	0,2414552
15,552	538,4	538,8	99,17	97,44	0,165	0,162	334	0,2408223
15,599	538,4	538,8	98,99	97,64	0,165	0,162	335	0,2414544
15,500	538,4	538,8	99,49	97,97	0,165	0,162	336	0,2399776
15,626	538,4	538,8	98,74	97,24	0,165	0,162	337	0,2418739
15,556	538,4	538,8	99,05	97,90	0,165	0,162	338	0,2408227
15,462	538,4	538,8	99,86	98,40	0,165	0,162	339	0,239343
15,460	538,4	538,8	99,82	98,28	0,165	0,162	340	0,239343
15,594	538,4	538,8	98,86	97,43	0,165	0,162	341	0,2414545
15,552	538,4	538,8	99,33	97,79	0,165	0,162	342	0,2408222
15,689	538,3	538,8	98,18	96,62	0,165	0,162	343	0,2429212
15,294	538,4	538,8	100,91	99,43	0,165	0,162	344	0,2367851
15,620	538,4	538,8	98,59	97,17	0,165	0,162	345	0,2418741
15,495	538,4	538,8	99,44	98,12	0,165	0,162	346	0,2399784
15,552	538,4	538,8	99,19	97,65	0,165	0,162	347	0,2408219
15,497	538,4	538,8	99,57	98,07	0,165	0,162	348	0,2399783
15,592	538,4	538,8	98,81	97,40	0,165	0,162	349	0,2414746
15,553	538,3	538,7	99,16	97,63	0,165	0,162	350	0,2408228
15,496	538,3	538,7	99,50	98,13	0,165	0,162	351	0,239978
15,590	538,3	538,7	98,84	97,40	0,165	0,162	352	0,2414545
15,493	538,3	538,7	99,53	98,01	0,165	0,162	353	0,2399777
15,616	538,3	538,7	98,73	97,64	0,165	0,163	354	0,2418738
15,454	538,3	538,7	99,69	98,67	0,165	0,163	355	0,239343
15,495	538,2	538,6	99,46	98,00	0,165	0,163	356	0,239978
15,606	538,2	538,6	98,81	97,39	0,165	0,162	357	0,2417021
15,494	538,2	538,6	99,39	98,22	0,165	0,162	358	0,2399784
15,425	538,2	538,6	99,76	98,69	0,165	0,163	359	0,2389191
15,329	538,2	538,6	100,48	99,11	0,165	0,162	360	0,2374264

15,520	538,2	538,5	99,19	98,00	0,165	0,162	361	0,2404008
15,547	538,2	538,5	98,96	98,00	0,165	0,163	362	0,2408283
15,590	538,2	538,5	98,94	97,66	0,165	0,163	363	0,2414545
15,548	538,1	538,5	99,23	97,45	0,165	0,162	364	0,2408228
15,489	538,1	538,5	99,36	97,88	0,165	0,162	365	0,2399785
15,585	538,1	538,5	98,93	97,53	0,165	0,162	366	0,2414541
15,422	538,1	538,4	99,93	98,65	0,165	0,163	367	0,2389196
15,614	538,0	538,4	98,74	97,35	0,165	0,163	368	0,2418735
15,540	538,0	538,4	99,21	97,85	0,165	0,162	369	0,2406968
15,517	538,0	538,4	99,27	98,00	0,165	0,162	370	0,2404002
15,543	538,0	538,4	99,17	97,70	0,165	0,162	371	0,2408223
15,544	538,0	538,4	99,22	97,68	0,165	0,162	372	0,2408518
15,706	538,0	538,4	97,92	97,01	0,165	0,163	373	0,2433379
15,610	538,0	538,3	98,71	97,28	0,165	0,163	374	0,2418731
15,586	538,0	538,3	98,96	97,57	0,165	0,162	375	0,2414541
15,680	537,9	538,3	98,45	96,92	0,166	0,162	376	0,2429208
15,585	537,9	538,3	98,87	97,46	0,165	0,162	377	0,241454
15,682	537,9	538,3	98,32	96,86	0,165	0,162	378	0,2429211
15,488	537,9	538,3	99,47	98,06	0,165	0,162	379	0,2399777
15,583	537,9	538,3	98,78	97,43	0,165	0,162	380	0,2414537
15,516	537,9	538,3	99,16	97,90	0,165	0,162	381	0,2404403
15,586	537,9	538,3	98,96	97,40	0,165	0,162	382	0,2414543
15,583	537,9	538,3	98,88	97,35	0,165	0,162	383	0,2414542
15,514	537,9	538,3	99,24	97,96	0,165	0,162	384	0,240401
15,514	537,9	538,2	99,35	98,01	0,165	0,163	385	0,2404011
15,581	537,8	538,2	98,99	97,63	0,166	0,163	386	0,2414542
15,443	537,8	538,2	99,74	98,54	0,166	0,163	387	0,2393662
15,538	537,8	538,2	99,11	97,41	0,165	0,162	388	0,2408223
15,506	537,8	538,2	99,24	97,91	0,165	0,162	389	0,2403425
15,482	537,8	538,2	99,49	98,12	0,165	0,162	390	0,2399778
15,483	537,8	538,2	99,64	98,18	0,166	0,163	391	0,2399776
15,577	537,8	538,1	98,71	97,65	0,165	0,163	392	0,2414522
15,537	537,8	538,1	99,06	97,75	0,165	0,163	393	0,2408226
15,537	537,8	538,1	99,20	97,53	0,165	0,162	394	0,2408217
15,577	537,7	538,1	99,03	97,73	0,166	0,163	395	0,2414535
15,766	537,7	538,1	97,70	96,33	0,166	0,163	396	0,2443782
15,480	537,7	538,1	99,57	98,12	0,166	0,163	397	0,2399812
15,673	537,7	538,1	98,22	97,08	0,165	0,163	398	0,2429207
15,672	537,7	538,1	98,21	96,94	0,165	0,163	399	0,2429215
15,579	537,7	538,0	98,84	97,60	0,165	0,163	400	0,2414544
15,512	537,7	538,0	99,24	97,86	0,165	0,163	401	0,2404013
15,512	537,7	538,0	99,39	97,95	0,165	0,162	402	0,2403999
15,607	537,7	538,0	98,85	97,40	0,166	0,163	403	0,2418736
15,579	537,6	538,0	98,71	97,56	0,165	0,163	404	0,2414543
15,511	537,6	538,0	99,23	97,95	0,165	0,163	405	0,2404007
15,442	537,6	538,0	99,66	98,31	0,165	0,162	406	0,2393425
15,536	537,6	538,0	99,13	97,82	0,165	0,163	407	0,2408226
15,536	537,6	538,0	99,23	97,81	0,166	0,163	408	0,2408222
15,581	537,6	538,0	98,98	97,52	0,166	0,163	409	0,2414531
15,515	537,6	538,0	99,37	98,06	0,166	0,163	410	0,2404005
15,586	537,6	537,9	98,90	97,62	0,165	0,163	411	0,2414541
15,610	537,6	537,9	98,75	97,22	0,165	0,162	412	0,2418733
15,747	537,6	537,9	98,13	96,45	0,166	0,162	413	0,2439637
15,350	537,6	537,9	100,44	99,01	0,166	0,162	414	0,2378535
15,516	537,6	537,9	99,26	98,31	0,165	0,163	415	0,2404004
15,515	537,6	537,9	99,27	97,85	0,165	0,163	416	0,2404001
15,581	537,5	537,9	98,84	97,66	0,165	0,163	417	0,2414537
15,543	537,5	537,9	99,29	97,82	0,165	0,163	418	0,2408219
15,613	537,5	537,9	98,76	97,55	0,166	0,163	419	0,2418728
15,745	537,5	537,9	98,00	96,59	0,166	0,163	420	0,2439629
15,611	537,5	537,9	98,78	97,14	0,166	0,162	421	0,2418736

15,542	537,5	537,9	99,30	97,78	0,166	0,162	422	0,2408218
15,541	537,5	537,9	99,19	97,93	0,166	0,163	423	0,2408213
15,485	537,5	537,9	99,55	98,14	0,165	0,163	424	0,2399733
15,484	537,5	537,8	99,65	98,21	0,166	0,163	425	0,239977
15,516	537,5	537,8	99,22	97,99	0,165	0,163	426	0,2404001
15,581	537,5	537,8	98,97	97,50	0,165	0,162	427	0,2414534
15,512	537,5	537,8	99,31	98,20	0,165	0,163	428	0,2404005
15,702	537,5	537,8	98,18	96,80	0,165	0,163	429	0,2433378
15,540	537,5	537,8	99,33	97,70	0,166	0,162	430	0,2408218
15,587	537,5	537,8	98,93	97,64	0,166	0,163	431	0,2415792
15,579	537,5	537,8	98,99	97,60	0,166	0,163	432	0,2414536
15,676	537,5	537,8	98,49	97,00	0,166	0,163	433	0,2429205
15,520	537,5	537,8	99,27	97,80	0,166	0,162	434	0,2404931
15,445	537,4	537,8	99,78	98,39	0,165	0,162	435	0,2393427
15,581	537,4	537,8	99,00	97,52	0,166	0,162	436	0,2414538
15,583	537,4	537,8	98,92	97,57	0,166	0,163	437	0,2414539
15,541	537,4	537,8	99,28	97,79	0,166	0,163	438	0,2408214
15,321	537,4	537,8	100,70	99,27	0,166	0,163	439	0,237426
15,581	537,4	537,8	98,89	97,58	0,166	0,163	440	0,2414536
15,514	537,4	537,8	99,49	97,85	0,166	0,162	441	0,2404001
15,430	537,4	537,7	99,95	98,65	0,166	0,163	442	0,2390677

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,81	98,76	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
16,037	544,0	544,7			0,151	0,147	0	0,2342106
15,762	544,1	544,7	101,05	101,01	0,151	0,148	1	0,2348597
15,751	544,1	544,7	100,12	100,35	0,150	0,148	2	0,2357229
15,619	544,1	544,6	100,59	100,83	0,150	0,148	3	0,2342102
15,787	544,1	544,6	99,58	99,08	0,150	0,148	4	0,2367972
15,684	544,1	544,7	99,64	99,62	0,150	0,147	5	0,2357227
15,675	544,1	544,7	99,69	99,67	0,150	0,148	6	0,2357229
15,708	544,1	544,7	99,34	99,21	0,150	0,148	7	0,2363681
15,734	544,1	544,7	99,10	98,87	0,150	0,147	8	0,2367967
15,698	544,1	544,7	99,27	99,27	0,150	0,148	9	0,2363683
15,655	544,1	544,7	99,63	99,25	0,150	0,147	10	0,2357224
15,655	544,0	544,7	99,61	99,75	0,151	0,148	11	0,2357226
15,700	544,0	544,7	99,38	99,10	0,151	0,148	12	0,2363684
15,662	544,0	544,7	99,46	99,67	0,150	0,148	13	0,2357237
15,734	544,1	544,7	99,20	99,24	0,150	0,148	14	0,2367973
15,737	544,1	544,8	99,25	99,09	0,150	0,148	15	0,2367969
15,715	544,2	544,8	99,29	99,46	0,150	0,148	16	0,2363581
15,750	544,2	544,8	99,21	99,17	0,150	0,148	17	0,236797
15,585	544,2	544,8	100,26	100,00	0,150	0,147	18	0,2342116
15,762	544,1	544,8	99,26	99,15	0,150	0,147	19	0,2367975
15,444	544,1	544,8	101,44	101,27	0,150	0,148	20	0,2320346
15,696	544,1	544,8	99,72	99,79	0,150	0,148	21	0,2357227
15,696	544,1	544,8	99,76	99,62	0,150	0,148	22	0,2357232
15,741	544,1	544,8	99,57	99,61	0,150	0,148	23	0,2363687
15,667	544,2	544,8	99,93	99,90	0,150	0,148	24	0,2352926
15,745	544,2	544,8	99,43	99,43	0,150	0,148	25	0,2364873
15,669	544,2	544,8	99,90	99,96	0,150	0,148	26	0,2352924
15,737	544,2	544,8	99,48	99,53	0,150	0,148	27	0,2363683
15,566	544,1	544,7	100,67	100,61	0,150	0,148	28	0,2337776
15,742	544,1	544,7	99,57	99,32	0,150	0,148	29	0,2363686
15,747	544,1	544,7	99,54	99,41	0,150	0,147	30	0,2363682
15,681	544,1	544,7	99,98	100,02	0,150	0,148	31	0,2352924
15,711	544,1	544,7	99,82	100,12	0,150	0,148	32	0,2357223
15,714	544,1	544,7	99,83	100,01	0,150	0,148	33	0,2357231
15,758	544,1	544,7	99,82	99,58	0,150	0,148	34	0,236368
15,666	544,2	544,7	100,22	100,25	0,150	0,148	35	0,2348595
15,770	544,2	544,8	99,69	99,43	0,150	0,147	36	0,236368
15,526	544,2	544,8	101,45	101,25	0,150	0,147	37	0,2326898
15,774	544,3	544,8	99,72	99,69	0,150	0,148	38	0,2363679
15,735	544,3	544,8	100,00	100,09	0,150	0,148	39	0,2357224
15,736	544,3	544,8	100,00	100,07	0,150	0,148	40	0,2357227
15,676	544,3	544,9	100,22	100,10	0,150	0,147	41	0,2348598
15,706	544,3	544,9	100,22	100,46	0,150	0,148	42	0,2352922
15,741	544,4	544,9	99,85	100,31	0,150	0,148	43	0,2357232
15,741	544,4	544,9	99,93	99,80	0,150	0,148	44	0,2357228
15,813	544,4	544,9	99,52	99,36	0,150	0,147	45	0,2367972
15,818	544,4	544,9	99,54	99,53	0,150	0,147	46	0,2367968
15,715	544,4	544,9	100,22	100,56	0,150	0,148	47	0,2352926
15,637	544,4	545,0	100,65	100,73	0,150	0,148	48	0,2342198
15,773	544,4	544,9	99,70	99,56	0,150	0,148	49	0,2363684
15,728	544,4	544,9	100,10	99,73	0,150	0,147	50	0,2357231
15,796	544,4	544,9	99,49	99,50	0,150	0,147	51	0,2367969
15,778	544,4	544,9	99,62	99,65	0,150	0,148	52	0,2363682
15,784	544,5	544,9	99,94	99,86	0,150	0,148	53	0,236368
15,719	544,5	544,9	100,26	100,19	0,150	0,148	54	0,2352925
15,722	544,5	545,0	100,16	100,06	0,150	0,147	55	0,2352969

15,647	544,4	544,9	100,63	100,77	0,150	0,148	56	0,2342051
15,749	544,3	544,8	100,07	99,80	0,150	0,147	57	0,2357235
15,718	544,2	544,7	100,33	100,36	0,150	0,148	58	0,2352923
15,790	544,0	544,6	99,94	99,81	0,150	0,148	59	0,2363682
15,759	543,9	544,5	100,11	100,22	0,150	0,148	60	0,2358758
15,745	543,8	544,4	100,17	99,84	0,150	0,148	61	0,2357233
15,751	543,7	544,3	100,03	100,09	0,150	0,147	62	0,2357228
15,789	543,7	544,3	99,79	99,83	0,150	0,148	63	0,2363673
15,788	543,6	544,2	99,89	99,65	0,150	0,148	64	0,2363679
15,744	543,6	544,2	100,33	100,00	0,151	0,147	65	0,2357226
15,788	543,6	544,2	99,87	99,71	0,151	0,148	66	0,2363676
15,746	543,6	544,2	100,22	100,19	0,150	0,148	67	0,2357219
15,787	543,6	544,1	99,99	99,79	0,151	0,148	68	0,236367
15,643	543,5	544,1	100,67	100,58	0,150	0,148	69	0,2342099
15,745	543,5	544,1	100,22	100,15	0,150	0,148	70	0,2357215
15,743	543,5	544,1	100,18	100,03	0,151	0,148	71	0,2357224
15,741	543,5	544,1	100,09	100,23	0,150	0,148	72	0,2357219
15,784	543,6	544,1	99,80	99,78	0,150	0,148	73	0,2363673
15,778	543,6	544,1	99,78	99,53	0,150	0,147	74	0,2363673
15,800	543,6	544,1	99,77	99,53	0,151	0,148	75	0,2367956
15,776	543,6	544,1	99,84	99,83	0,151	0,148	76	0,236367
15,732	543,6	544,1	100,16	100,06	0,151	0,148	77	0,2357218
15,730	543,7	544,2	100,30	100,19	0,151	0,148	78	0,2357212
15,777	543,7	544,2	99,87	99,84	0,151	0,148	79	0,2363667
15,737	543,7	544,2	100,23	100,00	0,151	0,148	80	0,2357213
15,742	543,8	544,3	100,26	100,29	0,151	0,148	81	0,2357216
15,810	543,8	544,3	99,68	99,62	0,151	0,148	82	0,2367957
15,739	543,8	544,4	100,19	100,05	0,151	0,148	83	0,2357389
15,777	543,8	544,4	99,76	99,62	0,150	0,148	84	0,236367
15,810	543,8	544,4	99,61	99,73	0,150	0,148	85	0,2367957
15,949	543,9	544,5	98,80	98,62	0,150	0,148	86	0,2389296
15,848	543,9	544,5	99,36	99,21	0,150	0,148	87	0,237438
15,736	543,9	544,5	100,12	100,26	0,150	0,148	88	0,2357222
15,735	543,9	544,5	100,16	100,03	0,151	0,148	89	0,2357221
15,777	544,0	544,6	99,89	99,77	0,151	0,148	90	0,236368
15,774	544,0	544,6	99,90	99,76	0,151	0,148	91	0,2363516
15,775	544,1	544,7	99,77	99,81	0,150	0,148	92	0,2363681
15,845	544,1	544,7	99,37	99,41	0,150	0,148	93	0,2374387
15,777	544,1	544,7	99,84	99,92	0,150	0,148	94	0,2363683
15,779	544,1	544,7	99,93	99,73	0,151	0,148	95	0,2363684
15,733	544,1	544,8	100,02	100,05	0,150	0,148	96	0,2357226
15,774	544,2	544,8	99,80	99,81	0,150	0,148	97	0,2363682
15,844	544,2	544,8	99,15	99,13	0,150	0,148	98	0,2374383
15,802	544,3	544,8	99,49	99,77	0,150	0,148	99	0,2367966
15,847	544,3	544,9	99,31	99,20	0,150	0,148	100	0,2374389
15,731	544,3	544,9	100,10	100,06	0,150	0,148	101	0,2357225
15,699	544,3	545,0	100,21	100,29	0,150	0,148	102	0,2352917
15,697	544,3	545,0	100,32	99,98	0,151	0,148	103	0,2352925
15,763	544,3	545,0	99,72	99,64	0,151	0,148	104	0,236368
15,793	544,3	545,0	99,63	99,58	0,151	0,148	105	0,2367966
15,723	544,4	545,0	100,07	100,00	0,151	0,148	106	0,2357226
15,719	544,4	545,0	100,07	100,04	0,151	0,148	107	0,2357228
15,764	544,4	545,0	99,82	99,72	0,151	0,148	108	0,2363683
15,795	544,5	545,1	99,42	99,66	0,150	0,148	109	0,236797
15,726	544,5	545,1	99,80	99,79	0,150	0,148	110	0,2358489
15,834	544,4	545,0	99,22	99,00	0,150	0,147	111	0,237439
15,768	544,4	545,0	99,60	99,52	0,150	0,147	112	0,2365093
15,832	544,4	545,0	99,46	99,18	0,151	0,148	113	0,2374392
15,781	544,3	545,0	99,47	99,57	0,151	0,148	114	0,2367967
15,781	544,3	544,9	99,46	99,07	0,150	0,148	115	0,2367963
15,772	544,2	544,9	99,40	99,48	0,150	0,148	116	0,2367968

15,792	544,2	544,8	99,42	99,20	0,151	0,148	117	0,2371081
15,696	544,2	544,8	99,82	99,66	0,151	0,148	118	0,2357226
15,690	544,2	544,8	99,75	100,09	0,150	0,148	119	0,2357227
15,731	544,2	544,8	99,63	99,54	0,150	0,148	120	0,236368
15,684	544,1	544,8	99,85	99,75	0,151	0,148	121	0,2357227
15,756	544,1	544,7	99,47	99,26	0,151	0,148	122	0,2367961
15,794	544,1	544,8	99,19	99,05	0,151	0,148	123	0,237439
15,785	544,1	544,7	98,95	98,89	0,151	0,148	124	0,2374389
15,708	544,0	544,7	99,52	99,34	0,151	0,148	125	0,2363674
15,702	543,9	544,7	99,40	99,30	0,151	0,148	126	0,2363685
15,657	543,9	544,6	99,67	99,77	0,151	0,148	127	0,2357224
15,621	543,8	544,6	99,78	99,63	0,151	0,148	128	0,2352918
15,757	543,8	544,5	98,94	98,72	0,151	0,148	129	0,2374391
15,707	543,7	544,5	99,19	99,20	0,151	0,148	130	0,2367964
15,676	543,8	544,4	99,32	99,41	0,151	0,148	131	0,2363676
15,769	543,7	544,4	98,50	98,58	0,151	0,148	132	0,2378658
15,764	543,8	544,4	98,53	98,50	0,150	0,148	133	0,2378665
15,728	543,8	544,4	98,86	98,72	0,151	0,148	134	0,2374387
15,653	543,8	544,4	99,19	99,24	0,151	0,148	135	0,2363682
15,802	543,7	544,4	98,05	97,96	0,151	0,148	136	0,2387576
15,746	543,7	544,4	98,56	98,49	0,151	0,148	137	0,2378663
15,642	543,7	544,4	99,05	99,07	0,151	0,148	138	0,2363682
15,832	543,7	544,3	97,86	97,49	0,151	0,148	139	0,2393546
15,630	543,6	544,3	99,07	98,96	0,151	0,148	140	0,2363687
15,628	543,6	544,3	98,81	98,84	0,151	0,148	141	0,2363679
15,702	543,6	544,3	98,49	98,53	0,150	0,148	142	0,2374386
15,655	543,6	544,3	98,84	98,64	0,151	0,148	143	0,2367961
15,624	543,6	544,2	99,06	99,08	0,151	0,148	144	0,2363668
15,789	543,6	544,2	97,90	97,68	0,151	0,148	145	0,23893
15,575	543,5	544,2	99,26	99,27	0,151	0,148	146	0,2357501
15,613	543,5	544,1	98,81	98,72	0,151	0,148	147	0,2363676
15,710	543,4	544,1	98,32	98,19	0,151	0,148	148	0,2378663
15,681	543,4	544,0	98,55	98,41	0,151	0,148	149	0,2374384
15,778	543,4	544,1	97,93	97,79	0,151	0,148	150	0,2389302
15,708	543,5	544,1	98,26	98,14	0,151	0,148	151	0,2378659
15,632	543,5	544,1	98,81	98,78	0,151	0,148	152	0,2367964
15,679	543,5	544,1	98,30	98,42	0,151	0,148	153	0,237508
15,628	543,5	544,1	98,53	98,63	0,151	0,148	154	0,2367961
15,670	543,4	544,0	98,48	98,35	0,151	0,148	155	0,2374383
15,700	543,5	544,0	98,09	98,26	0,151	0,148	156	0,2378693
15,668	543,5	544,1	98,26	98,39	0,150	0,148	157	0,2374387
15,692	543,4	544,0	98,14	98,25	0,151	0,148	158	0,2378659
15,765	543,4	544,0	97,65	97,58	0,151	0,148	159	0,2389303
15,792	543,3	544,0	97,60	97,39	0,151	0,148	160	0,2393545
15,696	543,3	544,0	98,29	98,13	0,151	0,148	161	0,2378658
15,623	543,3	543,9	98,55	98,71	0,151	0,148	162	0,2367957
15,690	543,3	543,9	98,11	97,98	0,151	0,148	163	0,2378655
15,854	543,2	543,9	97,00	96,85	0,151	0,148	164	0,2404123
15,759	543,2	543,8	97,69	97,75	0,151	0,148	165	0,23893
15,688	543,1	543,8	98,15	98,20	0,151	0,148	166	0,2378653
15,657	543,1	543,8	98,38	98,20	0,151	0,148	167	0,237438
15,658	543,1	543,8	98,40	98,42	0,151	0,148	168	0,237438
15,657	543,1	543,8	98,33	98,27	0,151	0,148	169	0,2374375
15,486	543,1	543,8	99,38	99,31	0,151	0,148	170	0,2348592
15,780	543,1	543,7	97,43	97,49	0,151	0,148	171	0,239354
15,777	543,0	543,7	97,58	97,29	0,151	0,148	172	0,2393538
15,610	543,0	543,7	98,62	98,43	0,151	0,148	173	0,2367956
15,654	542,9	543,6	98,35	98,12	0,151	0,148	174	0,2374375
15,579	542,9	543,6	98,78	98,71	0,151	0,148	175	0,2363674
15,678	542,9	543,6	97,97	98,16	0,151	0,148	176	0,2378653
15,748	543,0	543,6	97,71	97,56	0,151	0,148	177	0,2389297

15,650	543,0	543,6	98,13	98,37	0,151	0,148	178	0,2374377
15,746	542,9	543,6	97,86	97,54	0,151	0,148	179	0,2389295
15,674	542,9	543,6	98,15	98,02	0,151	0,148	180	0,2378651
15,676	542,8	543,5	98,04	98,20	0,151	0,148	181	0,2378656
15,845	542,8	543,5	97,15	97,05	0,151	0,148	182	0,2403934
15,609	542,8	543,5	98,65	98,59	0,151	0,148	183	0,2367952
15,803	542,8	543,5	97,31	97,43	0,151	0,148	184	0,2398014
15,814	542,7	543,5	97,17	97,14	0,151	0,148	185	0,2399879
15,762	542,7	543,4	97,58	97,52	0,151	0,148	186	0,2392089
15,770	542,7	543,4	97,35	97,55	0,151	0,148	187	0,2393535
15,742	542,7	543,4	97,69	97,67	0,151	0,148	188	0,2389292
15,840	542,6	543,4	97,12	97,23	0,151	0,148	189	0,2404114
15,673	542,6	543,3	98,12	98,03	0,151	0,148	190	0,2378646
15,600	542,7	543,3	98,63	98,61	0,151	0,148	191	0,2367951
15,767	542,6	543,3	97,54	97,44	0,151	0,148	192	0,2393534
15,686	542,6	543,3	98,18	97,65	0,151	0,148	193	0,2380914
15,737	542,6	543,3	97,62	97,46	0,151	0,148	194	0,2389289
15,600	542,5	543,2	98,49	98,46	0,151	0,148	195	0,2368508
15,806	542,4	543,2	97,44	97,11	0,151	0,148	196	0,2399881
15,663	542,4	543,1	98,08	97,97	0,151	0,148	197	0,2378647
15,832	542,4	543,2	97,17	97,08	0,151	0,148	198	0,2404114
15,801	542,4	543,2	97,15	97,00	0,151	0,148	199	0,2399881
15,809	542,4	543,1	97,24	97,19	0,151	0,148	200	0,2399884
15,604	542,4	543,1	98,44	98,42	0,151	0,148	201	0,2369303
15,738	542,4	543,1	97,81	97,63	0,151	0,148	202	0,2389287
15,735	542,4	543,1	97,72	97,54	0,151	0,148	203	0,2389287
15,633	542,4	543,1	98,18	98,29	0,151	0,148	204	0,2374368
15,563	542,4	543,1	98,71	98,74	0,151	0,148	205	0,2363658
15,803	542,4	543,0	97,16	96,90	0,151	0,148	206	0,2399881
15,759	542,3	543,0	97,46	97,40	0,151	0,148	207	0,239353
15,731	542,2	542,9	97,60	97,24	0,151	0,148	208	0,2389287
15,794	542,2	542,9	97,23	97,01	0,151	0,148	209	0,239988
15,792	542,2	542,9	97,23	97,03	0,151	0,148	210	0,2399876
15,729	542,4	543,0	97,57	97,59	0,151	0,148	211	0,2389284
15,661	542,4	543,0	97,98	97,94	0,151	0,148	212	0,2378643
15,563	542,4	543,0	98,64	98,69	0,151	0,148	213	0,2363659
15,664	542,3	543,0	98,21	98,21	0,151	0,148	214	0,2378646
15,807	542,3	542,9	97,28	97,10	0,151	0,148	215	0,240026
15,733	542,3	542,9	97,75	97,55	0,151	0,148	216	0,2389289
15,761	542,2	542,9	97,50	97,56	0,151	0,148	217	0,2393532
15,633	542,2	542,8	98,22	98,31	0,151	0,148	218	0,2374363
15,860	542,2	542,8	96,73	96,87	0,151	0,148	219	0,2408324
15,763	542,2	542,8	97,45	97,38	0,151	0,148	220	0,2393527
15,665	542,2	542,8	98,04	98,11	0,151	0,148	221	0,237864
15,633	542,2	542,8	98,33	98,40	0,151	0,148	222	0,2374368
15,761	542,2	542,8	97,61	97,26	0,151	0,148	223	0,2393527
15,829	542,2	542,8	97,12	97,05	0,151	0,148	224	0,2404108
15,801	542,2	542,8	97,29	97,15	0,151	0,148	225	0,2399879
15,764	542,2	542,8	97,54	97,45	0,151	0,148	226	0,2393527
15,764	542,2	542,8	97,46	97,36	0,151	0,148	227	0,2393527
15,637	542,2	542,8	98,37	98,24	0,151	0,148	228	0,2374369
15,665	542,2	542,8	98,03	98,12	0,151	0,148	229	0,2378644
15,735	542,2	542,8	97,85	97,70	0,151	0,148	230	0,2389292
15,734	542,2	542,8	97,75	97,53	0,151	0,148	231	0,2389283
15,759	542,2	542,8	97,46	97,43	0,151	0,148	232	0,2393526
15,759	542,2	542,8	97,38	97,42	0,151	0,148	233	0,2393529
15,795	542,2	542,8	97,17	97,13	0,151	0,148	234	0,2399879
15,631	542,2	542,8	98,15	98,23	0,151	0,148	235	0,2374368
15,589	542,2	542,8	98,52	98,58	0,151	0,148	236	0,2367946
15,726	542,1	542,8	97,66	97,42	0,151	0,148	237	0,2389289
15,659	542,2	542,8	98,02	97,96	0,151	0,148	238	0,2378643

15,825	542,1	542,8	96,92	97,09	0,151	0,148	239	0,2404108
15,828	542,2	542,8	97,11	97,03	0,151	0,148	240	0,2404103
15,659	542,2	542,8	98,04	97,92	0,151	0,148	241	0,2378531
15,798	542,2	542,8	97,14	97,20	0,151	0,148	242	0,2399873
15,728	542,2	542,8	97,48	97,50	0,151	0,148	243	0,2389282
15,802	542,2	542,8	97,24	97,07	0,151	0,148	244	0,2399874
15,824	542,2	542,8	97,07	97,05	0,151	0,148	245	0,2404107
15,632	542,1	542,7	97,93	98,10	0,151	0,148	246	0,2374721
15,754	542,1	542,7	97,26	97,46	0,150	0,148	247	0,2393524
15,795	542,1	542,7	97,09	97,31	0,151	0,148	248	0,2399876
15,654	542,1	542,6	98,00	97,95	0,151	0,148	249	0,2378635
15,747	542,1	542,6	97,35	97,30	0,151	0,148	250	0,2393516
15,557	542,1	542,6	98,71	98,45	0,151	0,148	251	0,2363659
15,726	542,1	542,6	97,53	97,52	0,151	0,148	252	0,2389285
15,627	542,1	542,6	98,19	98,36	0,151	0,148	253	0,2374363
15,624	542,1	542,6	98,16	98,18	0,151	0,148	254	0,237436
15,886	542,0	542,6	96,63	96,63	0,151	0,148	255	0,2414636
15,793	542,0	542,6	97,04	97,01	0,151	0,148	256	0,2399873
15,648	542,0	542,6	98,16	98,09	0,151	0,148	257	0,2378637
15,618	542,0	542,6	98,16	98,20	0,151	0,148	258	0,2374361
15,713	542,0	542,5	97,68	97,29	0,151	0,148	259	0,2389275
15,811	542,0	542,5	96,80	96,80	0,151	0,148	260	0,24041
15,719	542,0	542,5	97,58	97,58	0,151	0,148	261	0,2389279
15,747	542,0	542,5	97,36	97,32	0,151	0,148	262	0,2393517
15,502	542,0	542,5	99,03	98,63	0,151	0,148	263	0,2357197
15,743	542,0	542,5	97,33	97,35	0,151	0,148	264	0,2393516
15,782	542,0	542,5	97,12	97,00	0,151	0,148	265	0,2399873
15,644	542,0	542,5	98,04	97,95	0,151	0,148	266	0,237863
15,815	542,0	542,5	96,64	96,91	0,151	0,148	267	0,2404105
15,788	542,0	542,5	97,24	96,85	0,151	0,148	268	0,2399869
15,812	542,0	542,5	96,86	96,56	0,151	0,148	269	0,2404103
15,906	542,0	542,4	96,14	96,14	0,151	0,148	270	0,2418827
15,838	542,0	542,4	96,76	96,55	0,151	0,148	271	0,2408317
15,609	541,9	542,4	98,11	97,86	0,151	0,148	272	0,2374354

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,92	98,01	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
16,067	544,4	545,0			0,149	0,146	0	0,229396
16,601	544,5	545,0	101,01	100,37	0,149	0,146	1	0,2439772
16,358	544,5	545,0	101,26	100,26	0,149	0,146	2	0,241888
16,466	544,4	544,9	100,25	99,22	0,149	0,146	3	0,2439777
16,492	544,4	544,9	99,89	99,33	0,149	0,146	4	0,2443931
16,480	544,4	544,9	100,29	99,26	0,149	0,146	5	0,2442225
16,496	544,4	544,9	100,03	99,00	0,149	0,146	6	0,2443933
16,397	544,4	544,9	100,76	99,67	0,149	0,146	7	0,2429357
16,329	544,4	544,9	101,28	100,15	0,149	0,146	8	0,2418878
16,392	544,4	544,9	100,64	99,71	0,149	0,146	9	0,2429356
16,482	544,4	544,9	100,21	99,04	0,149	0,146	10	0,2443933
16,413	544,4	545,0	100,44	99,67	0,149	0,146	11	0,2433524
16,451	544,4	545,0	100,09	99,37	0,149	0,146	12	0,2439782
16,554	544,4	545,0	99,61	98,73	0,149	0,146	13	0,2454301
16,483	544,4	545,0	100,24	99,17	0,149	0,146	14	0,2443943
16,492	544,5	545,0	100,02	99,40	0,149	0,146	15	0,2443929
16,426	544,5	545,1	100,68	99,78	0,149	0,147	16	0,2433217
16,475	544,6	545,1	100,40	99,54	0,149	0,146	17	0,2439783
16,436	544,6	545,1	100,70	99,78	0,149	0,146	18	0,243353
16,412	544,7	545,2	100,91	100,16	0,149	0,147	19	0,242936
16,445	544,7	545,2	100,89	100,09	0,149	0,147	20	0,2433528
16,440	544,7	545,2	100,64	99,68	0,149	0,147	21	0,2433533
16,405	544,5	545,1	100,74	100,11	0,149	0,146	22	0,2429358
16,470	544,3	544,9	100,50	99,47	0,149	0,147	23	0,2439783
16,332	543,9	544,7	101,50	100,45	0,149	0,147	24	0,2418875
16,499	543,6	544,5	100,55	99,31	0,150	0,147	25	0,2443926
16,462	543,3	544,2	100,61	99,65	0,150	0,147	26	0,2439772
16,418	542,9	544,0	100,72	99,77	0,150	0,147	27	0,2433515
16,391	542,6	543,6	101,15	100,02	0,150	0,147	28	0,2429341
16,317	542,3	543,4	101,52	100,53	0,150	0,147	29	0,2418904
16,395	542,1	543,2	101,15	100,02	0,150	0,147	30	0,2429335
16,298	541,9	543,0	101,88	100,57	0,150	0,147	31	0,2414666
16,268	541,9	542,8	102,12	101,18	0,150	0,147	32	0,2408346
16,340	541,8	542,7	101,79	100,78	0,150	0,147	33	0,2418852
16,267	541,8	542,7	102,20	100,98	0,150	0,147	34	0,2408337
16,307	541,8	542,7	101,89	100,90	0,150	0,147	35	0,241466
16,266	541,7	542,7	102,20	101,13	0,150	0,147	36	0,2408334
16,334	541,7	542,6	101,65	100,78	0,150	0,147	37	0,2418847
16,265	541,6	542,5	101,99	101,29	0,150	0,147	38	0,2408326
16,441	541,5	542,3	101,27	100,12	0,150	0,147	39	0,2433496
16,268	541,4	542,3	102,19	101,23	0,150	0,147	40	0,2408326
16,313	541,4	542,2	102,03	101,03	0,150	0,147	41	0,2414645
16,171	541,4	542,2	102,88	101,99	0,150	0,147	42	0,2393528
16,416	541,3	542,2	101,36	100,33	0,150	0,147	43	0,2429311
16,247	541,3	542,1	102,51	101,23	0,150	0,147	44	0,240411
16,317	541,2	542,1	101,94	100,97	0,150	0,147	45	0,2414637
16,446	541,2	542,1	101,06	100,40	0,150	0,147	46	0,2433474
16,448	541,1	542,0	101,25	100,09	0,150	0,147	47	0,2433477
16,211	541,0	541,9	102,38	101,65	0,150	0,147	48	0,2399868
16,302	540,9	541,8	101,89	100,91	0,150	0,147	49	0,2414631
16,396	540,7	541,6	101,26	100,13	0,150	0,147	50	0,2429302
16,493	540,6	541,5	100,75	99,85	0,150	0,147	51	0,2443876
16,395	540,4	541,4	101,23	100,46	0,150	0,147	52	0,2429301
16,226	540,3	541,3	102,42	101,42	0,150	0,147	53	0,2404122
16,423	540,2	541,2	101,22	100,27	0,150	0,147	54	0,2433462
16,420	540,2	541,1	101,20	100,04	0,150	0,147	55	0,2433458

16,391	540,2	541,1	101,23	100,27	0,150	0,147	56	0,242929
16,281	540,3	541,1	101,80	100,76	0,150	0,147	57	0,2414622
16,213	540,3	541,1	102,33	101,30	0,150	0,147	58	0,2404082
16,453	540,3	541,1	100,85	100,26	0,150	0,147	59	0,2439708
16,280	540,2	541,0	101,78	101,01	0,150	0,148	60	0,2414616
16,309	540,3	541,0	101,66	100,90	0,150	0,147	61	0,2418804
16,300	540,3	541,0	101,58	100,41	0,150	0,147	62	0,2418812
16,294	540,3	541,1	101,50	100,35	0,150	0,147	63	0,2418807
16,293	540,3	541,1	101,63	100,29	0,150	0,147	64	0,2418989
16,262	540,3	541,1	101,68	100,88	0,150	0,147	65	0,2414609
16,428	540,4	541,2	100,61	99,52	0,150	0,147	66	0,2439702
16,295	540,5	541,2	101,57	100,32	0,150	0,147	67	0,2418801
16,528	540,5	541,2	99,91	99,18	0,150	0,147	68	0,2454221
16,423	540,5	541,2	100,54	99,54	0,150	0,147	69	0,2439704
16,419	540,5	541,2	100,63	99,39	0,150	0,147	70	0,2439699
16,511	540,5	541,2	99,90	99,08	0,150	0,147	71	0,2454221
16,506	540,5	541,2	99,93	99,06	0,150	0,147	72	0,2454221
16,571	540,5	541,2	99,43	98,71	0,150	0,147	73	0,2464539
16,395	540,4	541,2	100,44	99,69	0,150	0,147	74	0,2439697
16,511	540,3	541,1	99,67	98,45	0,150	0,147	75	0,2458344
16,556	540,2	541,0	99,22	98,35	0,150	0,147	76	0,2464536
16,389	540,2	541,0	100,45	99,59	0,150	0,147	77	0,2439695
16,480	540,2	540,9	99,73	98,65	0,150	0,147	78	0,2454222
16,479	540,2	540,9	99,75	98,79	0,150	0,147	79	0,2454215
16,613	540,2	541,0	98,86	97,91	0,150	0,147	80	0,2474807
16,565	540,2	541,0	99,21	97,94	0,150	0,147	81	0,2468649
16,394	540,3	541,0	100,17	99,31	0,150	0,147	82	0,244385
16,387	540,3	541,0	99,96	99,01	0,150	0,147	83	0,2443846
16,478	540,2	541,0	99,38	98,63	0,150	0,147	84	0,2458343
16,543	540,2	540,9	98,97	97,96	0,150	0,147	85	0,2468637
16,304	540,2	540,9	100,42	99,35	0,150	0,147	86	0,2433445
16,438	540,2	540,9	99,53	98,53	0,150	0,147	87	0,2454214
16,431	540,2	541,0	99,43	98,66	0,150	0,147	88	0,2454207
16,519	540,2	541,0	98,85	97,54	0,150	0,147	89	0,2468644
16,485	540,2	541,0	98,98	97,96	0,150	0,147	90	0,2464537
16,549	540,2	540,9	98,53	97,65	0,150	0,147	91	0,2474799
16,422	540,1	540,9	99,15	98,03	0,150	0,147	92	0,2457175
16,488	539,9	540,7	98,66	97,68	0,150	0,147	93	0,2468635
16,425	539,7	540,6	98,92	98,24	0,150	0,147	94	0,2460628
16,453	539,6	540,5	98,72	98,01	0,150	0,147	95	0,2464524
16,405	539,6	540,4	99,05	98,16	0,150	0,147	96	0,2458337
16,509	539,5	540,3	98,36	97,59	0,150	0,147	97	0,2474777
16,500	539,4	540,2	98,45	97,36	0,150	0,147	98	0,2474797
16,286	539,4	540,2	99,49	98,63	0,150	0,147	99	0,2443834
16,425	539,4	540,2	98,61	97,86	0,150	0,147	100	0,2464519
16,419	539,4	540,1	98,72	98,08	0,150	0,148	101	0,2464521
16,559	539,4	540,1	97,88	96,94	0,150	0,148	102	0,2485027
16,348	539,5	540,1	98,87	98,15	0,150	0,147	103	0,2454202
16,441	539,6	540,2	98,51	97,56	0,150	0,147	104	0,2468648
16,436	539,6	540,2	98,46	97,48	0,150	0,147	105	0,2468633
16,401	539,7	540,3	98,61	97,51	0,150	0,147	106	0,2464519
16,350	539,7	540,3	98,77	97,87	0,150	0,147	107	0,2458328
16,316	539,7	540,3	98,79	97,97	0,150	0,147	108	0,2454201
16,404	539,6	540,3	98,21	97,49	0,150	0,147	109	0,2468629
16,563	539,5	540,2	97,28	96,18	0,150	0,147	110	0,2493188
16,603	539,5	540,2	97,09	96,06	0,150	0,147	111	0,2499286
16,595	539,5	540,2	96,97	96,01	0,150	0,147	112	0,2499285
16,430	539,5	540,2	97,91	97,28	0,150	0,147	113	0,2474791
16,358	539,5	540,2	98,28	97,48	0,150	0,148	114	0,2464516
16,547	539,4	540,1	97,09	96,46	0,150	0,148	115	0,2493182
16,519	539,4	540,1	97,39	96,65	0,150	0,148	116	0,2489108

16,420	539,5	540,1	98,03	97,10	0,150	0,148	117	0,247399
16,590	539,5	540,1	97,08	95,98	0,150	0,147	118	0,2499275
16,489	539,5	540,1	97,51	96,67	0,150	0,147	119	0,2485025
16,423	539,5	540,1	97,93	97,00	0,150	0,147	120	0,247479
16,519	539,6	540,2	97,40	96,42	0,150	0,147	121	0,248911
16,491	539,6	540,2	97,47	96,68	0,150	0,147	122	0,2485024
16,415	539,6	540,2	97,85	97,02	0,150	0,147	123	0,2474792
16,481	539,6	540,2	97,36	96,55	0,150	0,147	124	0,2485027
16,412	539,7	540,2	97,73	96,82	0,150	0,147	125	0,2474791
16,411	539,7	540,2	97,83	96,98	0,150	0,147	126	0,2474793
16,537	539,6	540,2	97,04	96,20	0,150	0,147	127	0,2493182
16,409	539,6	540,2	97,71	97,07	0,150	0,147	128	0,2474786
16,498	539,5	540,2	97,30	96,29	0,150	0,147	129	0,2489115
16,473	539,6	540,2	97,30	96,45	0,150	0,147	130	0,2485025
16,471	539,5	540,1	97,44	96,68	0,150	0,147	131	0,2485023
16,397	539,4	540,1	97,76	97,15	0,150	0,148	132	0,2474787
16,423	539,3	540,0	97,64	96,63	0,150	0,148	133	0,2478897
16,114	539,3	539,9	99,25	98,45	0,150	0,147	134	0,2433428
16,462	539,1	539,9	97,49	96,65	0,150	0,148	135	0,248503
16,401	539,0	539,7	97,77	96,88	0,150	0,148	136	0,2474897
16,423	539,0	539,7	97,63	96,97	0,150	0,148	137	0,2478891
16,424	539,0	539,7	97,71	96,66	0,150	0,148	138	0,2478895
16,487	539,0	539,7	97,25	96,24	0,150	0,147	139	0,2489113
16,459	539,0	539,6	97,53	96,74	0,150	0,148	140	0,2485024
16,416	538,9	539,6	97,66	96,75	0,150	0,148	141	0,2478895
16,576	538,9	539,5	96,82	95,66	0,150	0,147	142	0,2503341
16,512	538,8	539,5	97,11	96,41	0,150	0,148	143	0,2493175
16,482	538,7	539,4	97,25	96,14	0,150	0,148	144	0,2489109
16,455	538,7	539,4	97,28	96,64	0,150	0,147	145	0,2485017
16,483	538,7	539,3	97,31	96,43	0,150	0,148	146	0,2489104
16,511	538,7	539,3	97,00	96,14	0,150	0,148	147	0,2493175
16,514	538,7	539,3	97,12	96,21	0,150	0,147	148	0,2493465
16,483	538,7	539,3	97,21	96,37	0,150	0,148	149	0,2489099
16,457	538,7	539,3	97,59	96,56	0,150	0,148	150	0,2485018
16,487	538,7	539,3	97,25	96,07	0,150	0,147	151	0,2489104
16,509	538,7	539,3	97,09	96,29	0,150	0,147	152	0,2493173
16,509	538,7	539,3	97,00	96,32	0,150	0,148	153	0,2493179
16,453	538,7	539,2	97,41	96,75	0,150	0,148	154	0,248502
16,501	538,6	539,2	97,08	96,08	0,150	0,148	155	0,2493181
16,450	538,6	539,2	97,55	96,42	0,150	0,147	156	0,2485019
16,473	538,6	539,2	97,25	96,42	0,150	0,148	157	0,2489106
16,550	538,6	539,2	96,92	95,87	0,150	0,148	158	0,2499278
16,346	538,6	539,2	98,07	97,02	0,150	0,147	159	0,2468625
16,474	538,6	539,2	97,26	96,48	0,150	0,148	160	0,2489103
16,499	538,7	539,2	97,11	96,13	0,150	0,148	161	0,2493176
16,544	538,7	539,3	96,80	95,97	0,150	0,148	162	0,2499281
16,476	538,6	539,2	97,23	96,24	0,150	0,147	163	0,2489106
16,543	538,6	539,2	96,96	95,95	0,150	0,147	164	0,249928
16,508	538,6	539,2	97,23	96,20	0,151	0,148	165	0,2493175
16,454	538,7	539,3	97,45	96,61	0,150	0,148	166	0,2485017
16,495	538,6	539,2	96,98	96,20	0,150	0,148	167	0,2493179
16,530	538,6	539,2	96,79	96,02	0,150	0,148	168	0,2499275
16,481	538,5	539,1	97,01	96,18	0,150	0,148	169	0,249318
16,497	538,3	539,0	96,91	96,18	0,150	0,148	170	0,2494683
16,431	538,2	538,9	97,25	96,44	0,150	0,148	171	0,2485015
16,460	538,2	538,8	97,20	96,46	0,150	0,148	172	0,2489109
16,533	538,1	538,8	96,83	95,84	0,150	0,148	173	0,2499278
16,562	538,2	538,8	96,79	95,98	0,150	0,148	174	0,2503347
16,530	538,2	538,8	96,87	96,03	0,151	0,148	175	0,2499279
16,531	538,2	538,8	96,75	95,99	0,150	0,148	176	0,2499275
16,559	538,2	538,7	96,85	95,91	0,150	0,148	177	0,2503334

16,556	538,2	538,7	96,79	95,96	0,151	0,148	178	0,2503335
16,435	538,2	538,7	97,61	96,54	0,151	0,148	179	0,2485017
16,560	538,2	538,7	96,65	95,74	0,151	0,148	180	0,2503333
16,467	538,2	538,8	97,33	96,71	0,150	0,148	181	0,2489101
16,396	538,2	538,7	97,66	96,75	0,151	0,148	182	0,2478887
16,655	538,1	538,7	96,15	95,41	0,150	0,148	183	0,2517489
16,466	538,1	538,7	97,27	96,26	0,150	0,148	184	0,2489104
16,558	538,1	538,7	96,57	95,98	0,150	0,148	185	0,2503498
16,528	538,2	538,7	96,78	95,88	0,150	0,148	186	0,2499271
16,622	538,1	538,7	96,21	95,39	0,150	0,148	187	0,2513451
16,482	538,1	538,7	97,10	96,35	0,150	0,148	188	0,2493169
16,520	538,0	538,7	96,91	95,99	0,151	0,148	189	0,2499267
16,482	538,0	538,6	97,22	96,14	0,151	0,148	190	0,2493171
16,427	537,9	538,5	97,36	96,50	0,151	0,148	191	0,2485007
16,512	537,8	538,5	97,00	95,79	0,151	0,148	192	0,249927
16,516	537,8	538,5	96,83	95,85	0,151	0,148	193	0,2499265
16,460	537,7	538,4	97,20	96,44	0,151	0,148	194	0,2490838
16,451	537,6	538,4	97,28	96,49	0,151	0,148	195	0,2489089
16,607	537,6	538,3	96,31	95,34	0,151	0,148	196	0,2513445
16,544	537,5	538,3	96,78	96,02	0,151	0,148	197	0,2503324
16,381	537,5	538,2	97,75	96,71	0,151	0,148	198	0,2478868
16,533	537,5	538,2	96,85	96,05	0,151	0,148	199	0,2500996
16,551	537,5	538,2	96,66	95,86	0,151	0,148	200	0,2503326
16,649	537,6	538,2	96,15	95,26	0,150	0,148	201	0,2517474
16,483	537,7	538,3	97,07	96,27	0,150	0,148	202	0,2493162
16,458	537,8	538,3	97,30	96,40	0,151	0,148	203	0,2489095
16,525	537,8	538,4	96,88	95,89	0,151	0,148	204	0,2499264
16,483	537,9	538,4	97,21	96,08	0,151	0,148	205	0,2493169
16,522	537,9	538,4	96,99	96,02	0,151	0,148	206	0,2499257
16,553	537,9	538,5	96,66	96,00	0,151	0,148	207	0,2503324

APPENDIX 4: Unit pre burn



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
8/24/2018	11:15 AM	0	23.31	374	837
		5	22.84	402	1020
		10	22.13	408	956
		15	21.31	423	1091
		20	20.23	444	1135
		25	19.13	459	1210
		30	18.03	478	1247
		35	16.83	489	1253
		40	15.76	495	1263
		45	14.53	500	1272
		50	13.41	502	1244
		55	12.42	497	1254
		60	11.42	489	1257
		65	10.49	479	1225
		70	9.71	469	1172
		75	9.02	460	1128
		80	8.21	450	1099
		85	7.5	443	1091
		90	6.81	438	1093
		95	6.21	436	1127
		100	5.59	426	1095
		105	5.2	409	981
		110	4.91	393	940
		115	4.61	381	913
		120	4.39	369	892
		125	4.2	359	878
		130	4.08	351	873
		135	3.9	345	858



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		140	3.8	339	849
		145	3.6	336	845
		150	3.5	333	851
		155	3.29	331	852
		160	3.2	329	841
		165	3.11	330	840
		170	3	330	835
		175	2.8	329	825
		180	2.7	327	825
		185	2.6	325	817
		190	2.49	324	829
		195	2.3	323	826
		200	2.18	321	800
		205	2.1	318	799
		210	2.01	316	803
		215	1.9	315	808
		220	1.8	315	806
		225	1.7	314	809
		230	1.5	314	810
		235	1.39	313	795
		240	1.3	308	768
		245	1.18	307	783
		250	1.1	309	788
		255	0.99	310	786
		260	0.9	310	784
		265	0.79	308	774
		270	0.6	309	781
		275	0.5	307	763



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

280	0.5	307	761
285	0.38	307	745
290	0.29	306	742
295	0.19	306	737
300	0.1	305	741
305	0	304	729

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0	22.12	259	615
5	21.83	317	729
10	21.51	280	675
15	21.33	273	694
20	20.93	276	687
25	20.53	276	841
30	20.25	288	1052
35	19.93	306	1131
40	19.63	318	1173
45	19.13	319	832
50	18.53	313	914
55	18.03	308	952
60	17.53	308	875
65	16.91	310	876
70	16.33	314	915
75	15.72	318	948
80	15.12	322	925
85	14.52	322	904
90	13.92	319	898
95	13.32	316	891



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		100	12.71	316	913
		105	12.01	321	1000
		110	11.4	328	1015
		115	10.72	334	955
		120	9.99	337	896
		125	9.32	329	888
		130	8.51	326	878
		135	7.7	322	874
		140	7.1	314	873
		145	6.81	306	918
		150	6.53	296	914
		155	6.2	290	907
		160	6	280	852
		165	5.8	273	847
		170	5.7	266	836
		175	5.5	258	799
		180	5.4	252	796
		185	5.2	247	804
		190	5.1	243	810
		195	5.01	241	825
		200	4.9	239	824
		205	4.8	237	828
		210	4.69	236	832
		215	4.6	235	841
		220	4.4	236	855
		225	4.3	234	824
		230	4.2	232	808
		235	4.1	229	796



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		240	4.11	226	791
		245	3.98	225	788
		250	3.9	223	789
		255	3.81	222	791
		260	3.71	222	801
		265	3.59	222	811
		270	3.5	222	817
		275	3.4	223	823
		280	3.29	223	824
		285	3.19	224	828
		290	3.13	225	833
		295	3	225	801
		300	2.89	224	793
		305	2.79	222	788
		310	2.7	222	792
		315	2.7	221	793
		320	2.58	221	779
		325	2.49	220	777
		330	2.4	220	769
		335	2.3	218	766
		340	2.18	218	761
		345	2.19	217	758
		350	2.09	216	754
		355	2	215	758
		360	1.9	215	765
		365	1.79	214	766
		370	1.8	215	778
		375	1.73	216	786



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

380	1.58	217	793
385	1.5	218	788
390	1.4	217	794
395	1.29	217	791
400	1.29	217	791
405	1.2	217	793
410	1.09	217	820
415	1	218	821
420	1	219	816
425	0.89	218	795
430	0.8	216	793
435	0.83	215	752
440	0.7	213	740
445	0.59	211	742
450	0.59	210	746
455	0.49	208	742
460	0.39	207	734
465	0.4	207	736
470	0.3	206	733
475	0.29	205	730
480	0.19	205	720
485	0.19	203	717
490	0.1	202	709
495	0	200	704

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11:30 AM

0	20.84	268	639
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Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		5	20.53	323	678
		10	20.23	300	720
		15	20.03	287	835
		20	19.63	297	999
		25	19.33	309	974
		30	18.83	325	898
		35	18.33	318	895
		40	17.73	324	873
		45	17.12	333	994
		50	16.61	339	965
		55	16.02	337	1130
		60	15.42	337	1066
		65	14.92	335	961
		70	14.22	341	996
		75	13.52	353	1651
		80	12.9	395	1762
		85	12.34	418	1747
		90	11.61	428	1658
		95	10.91	415	1135
		100	10.23	385	1030
		105	9.71	362	987
		110	9.11	391	1796
		115	8.49	411	1195
		120	7.92	376	979
		125	7.3	355	985
		130	6.91	334	931
		135	6.5	314	881
		140	6.19	300	851



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		145	5.89	290	840
		150	5.6	281	833
		155	5.39	277	835
		160	5.1	271	833
		165	4.87	266	893
		170	4.7	264	901
		175	4.61	258	853
		180	4.4	252	856
		185	4.28	249	859
		190	4.2	247	864
		195	4.11	245	869
		200	4	243	875
		205	3.8	243	884
		210	3.73	243	892
		215	3.6	243	895
		220	3.5	243	896
		225	3.4	243	901
		230	3.31	242	899
		235	3.2	241	892
		240	3.09	240	887
		245	3	238	889
		250	2.9	237	893
		255	2.8	238	918
		260	2.69	237	834
		265	2.6	235	828
		270	2.61	232	823
		275	2.5	230	823
		280	2.41	230	829



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		285	2.31	230	828
		290	2.2	230	846
		295	2.11	231	834
		300	1.99	228	797
		305	1.9	226	818
		310	1.79	226	827
		315	1.8	227	834
		320	1.7	228	838
		325	1.6	228	823
		330	1.49	226	832
		335	1.38	227	850
		340	1.39	227	840
		345	1.29	228	842
		350	1.2	227	826
		355	1.1	226	823
		360	1.1	225	824
		365	0.99	224	834
		370	0.89	226	854
		375	0.79	227	847
		380	0.7	228	842
		385	0.7	228	844
		390	0.6	226	818
		395	0.5	225	803
		400	0.4	224	801
		405	0.3	224	829
		410	0.29	226	826
		415	0.19	226	800
		420	0.1	224	801



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

425	0.1	223	790
430	0	223	791

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0	22.77	270	682
5	22.54	316	698
10	22.33	280	653
15	22.02	272	648
20	21.82	273	679
25	21.33	280	766
30	21.03	275	667
35	20.63	277	734
40	20.02	290	839
45	19.79	289	867
50	19.32	294	816
55	18.73	299	898
60	18.22	302	883
65	17.72	301	891
70	17.12	307	912
75	16.62	310	915
80	16.05	313	908
85	15.42	312	875
90	14.93	310	878
95	14.33	308	870
100	13.8	307	911
105	13.25	308	910
110	12.72	306	884



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

115	12.14	304	872
120	11.62	301	860
125	11.11	299	870
130	10.61	301	906
135	10.01	307	975
140	9.4	320	909
145	8.8	319	875
150	8.21	317	862
155	7.7	312	876
160	7.31	305	919
165	6.99	292	857
170	6.71	282	846
175	6.4	275	821
180	6.2	265	815
185	6	270	929
190	5.91	269	900
195	5.71	265	900
200	5.56	261	878
205	5.37	255	845
210	5.3	248	822
215	5.21	243	802
220	5.1	238	793
225	5	233	787
230	4.9	230	789
235	4.81	227	794
240	4.81	224	796
245	4.7	222	791
250	4.59	220	794



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		255	4.55	219	794
		260	4.4	218	772
		265	4.3	216	773
		270	4.2	215	777
		275	4.11	215	786
		280	4.1	214	786
		285	4	214	789
		290	3.89	213	803
		295	3.8	214	811
		300	3.69	214	825
		305	3.59	215	833
		310	3.49	215	831
		315	3.5	215	829
		320	3.4	215	819
		325	3.29	215	816
		330	3.21	214	821
		335	3.09	215	822
		340	2.99	215	829
		345	3	215	827
		350	2.89	215	836
		355	2.79	216	832
		360	2.69	215	828
		365	2.7	214	826
		370	2.6	214	815
		375	2.5	214	800
		380	2.4	213	804
		385	2.39	213	815
		390	2.29	215	870



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		395	2.19	218	870
		400	2.19	219	865
		405	2.1	219	867
		410	2	220	880
		415	1.9	222	874
		420	1.89	223	898
		425	1.79	224	905
		430	1.69	225	904
		435	1.7	225	897
		440	1.58	225	841
		445	1.5	220	802
		450	1.39	218	805
		455	1.39	217	803
		460	1.29	217	814
		465	1.29	216	814
		470	1.2	216	800
		475	1.09	214	749
		480	1.1	209	740
		485	1.04	206	728
		490	0.89	204	751
		495	0.9	204	755
		500	0.79	204	760
		505	0.79	204	757
		510	0.69	204	752
		515	0.63	203	722
		520	0.6	202	734
		525	0.49	202	721
		530	0.49	199	717



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

535	0.4	198	715
540	0.29	197	716
545	0.29	197	702
550	0.19	195	677
555	0.19	193	672
560	0.1	193	687
565	0	194	693

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0	21.43	263	634
5	21.12	317	878
10	20.93	271	732
15	20.74	252	726
20	20.52	245	727
25	20.23	242	751
30	20.03	245	801
35	19.63	255	825
40	19.23	254	806
45	18.93	255	932
50	18.63	265	1038
55	18.33	270	789
60	17.82	261	797
65	17.43	260	862
70	17.02	263	877
75	16.62	265	880
80	16.12	267	850
85	15.55	276	851
90	14.92	282	922



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

95	14.42	282	873
100	13.82	285	932
105	13.32	323	1473
110	12.71	357	1498
115	12.01	361	1042
120	11.31	343	988
125	10.71	324	934
130	10.21	312	926
135	9.62	304	885
140	9.22	293	876
145	8.61	293	935
150	8.11	290	942
155	7.71	287	919
160	7.11	288	952
165	6.6	293	937
170	5.99	291	918
175	5.7	279	839
180	5.42	265	813
185	5.1	283	1429
190	4.89	310	1504
195	4.7	303	953
200	4.5	284	926
205	4.4	280	1158
210	4.31	271	905
215	4.1	260	891
220	4.01	253	897
225	3.89	248	896
230	3.81	243	899



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		235	3.71	241	900
		240	3.61	238	894
		245	3.5	237	893
		250	3.4	235	896
		255	3.3	234	896
		260	3.2	233	880
		265	3.1	231	884
		270	2.97	230	891
		275	2.9	231	910
		280	2.8	233	928
		285	2.7	235	927
		290	2.6	235	924
		295	2.49	235	918
		300	2.4	235	915
		305	2.29	234	906
		310	2.31	233	900
		315	2.2	232	893
		320	2.08	230	886
		325	1.99	229	873
		330	1.9	229	868
		335	1.79	227	861
		340	1.79	226	853
		345	1.7	224	841
		350	1.6	222	785
		355	1.5	219	780
		360	1.4	216	766
		365	1.3	211	760
		370	1.19	208	760



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

375	1.08	207	753
380	1.09	204	747
385	0.99	203	751
390	0.9	203	762
395	0.79	203	740
400	0.69	201	737
405	0.6	200	731
410	0.48	199	726
415	0.39	198	718
420	0.26	195	702
425	0.2	194	693
430	0.2	192	693
435	0.1	191	700
440	0	191	701

9/4/2018 11:15 AM

0	22.39	246	613
5	22.13	294	786
10	21.93	264	716
15	21.74	244	741
20	21.53	237	742
25	21.23	236	775
30	21.03	237	780
35	20.83	238	794
40	20.63	237	791
45	20.33	235	798
50	20.14	236	834
55	19.93	240	883



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		60	19.62	246	918
		65	19.22	255	916
		70	18.73	265	987
		75	18.22	266	957
		80	17.73	275	1017
		85	17.21	274	877
		90	16.73	267	850
		95	16.22	261	823
		100	15.82	260	829
		105	15.32	262	826
		110	14.72	266	841
		115	14.21	267	811
		120	13.7	265	809
		125	13.31	264	812
		130	12.8	264	788
		135	12.32	269	803
		140	11.72	277	838
		145	11.21	283	833
		150	10.6	288	850
		155	10.11	292	867
		160	9.51	297	915
		165	8.91	305	998
		170	8.29	307	1003
		175	7.71	305	972
		180	7.21	302	945
		185	6.81	293	850
		190	6.5	278	778
		195	6.31	264	746



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		200	6.1	252	728
		205	5.91	241	729
		210	5.71	236	844
		215	5.6	253	1204
		220	5.41	268	1210
		225	5.3	274	1204
		230	5.11	276	1185
		235	5	276	1161
		240	4.9	274	1139
		245	4.8	272	1116
		250	4.7	268	1096
		255	4.48	265	1079
		260	4.4	261	1060
		265	4.29	258	1043
		270	4.2	254	1033
		275	4.1	252	902
		280	4	238	804
		285	3.91	228	789
		290	3.81	221	782
		295	3.7	215	772
		300	3.61	210	771
		305	3.51	207	772
		310	3.41	205	762
		315	3.31	202	756
		320	3.2	201	761
		325	3.2	200	777
		330	3.1	199	763
		335	3.03	198	762



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

340	2.9	196	768
345	2.8	195	773
350	2.7	195	777
355	2.7	195	775
360	2.6	194	776
365	2.49	194	779
370	2.39	195	787
375	2.32	197	806
380	2.31	200	821
385	2.19	201	816
390	2.1	203	819
395	1.99	203	815
400	1.87	203	807
405	1.9	203	807
410	1.79	203	801
415	1.7	203	799
420	1.6	204	824
425	1.59	204	825
430	1.5	204	820
435	1.4	204	818
440	1.4	204	814
445	1.3	203	814
450	1.2	203	812
455	1.09	203	810
460	1.09	203	809
465	0.99	203	824
470	0.89	203	812
475	0.8	203	807



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date **Time** **ET (min)** **Scale (lbs)** **Flue Temp (°F)** **Cat Temp (°F)**

480	0.79	203	800
485	0.69	203	798
490	0.6	203	792
495	0.6	202	788
500	0.5	201	786
505	0.38	201	779
510	0.39	200	775
515	0.3	200	773
520	0.19	199	764
525	0.19	199	763
530	0.19	197	759
535	0.05	197	756
540	0	196	744

9/4/2018 10:30 AM

0	50.49	409	804
10	49.38	405	1023
20	48.38	388	998
30	47.69	308	1022
40	46.57	323	1054
50	45.07	326	1080
60	43.27	351	1079
70	41.37	354	1065
80	39.76	350	977
90	38.36	348	1084
100	36.86	354	1032
110	35.45	346	981
120	34.16	340	964



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		130	32.85	338	973
		140	31.55	335	978
		150	30.25	331	950
		160	29.05	328	953
		170	27.75	328	967
		180	26.55	331	1000
		190	25.24	334	1010
		200	24.13	325	960
		210	23.03	320	948
		220	21.94	319	964
		230	20.82	319	999
		240	19.83	318	1031
		250	18.82	316	988
		260	17.83	315	997
		270	16.9	307	954
		280	16.12	301	910
		290	15.62	283	861
		300	15.12	267	848
		310	14.83	255	863
		320	14.32	289	1287
		330	13.91	294	1010
		340	13.62	264	921
		350	13.32	245	884
		360	13.12	234	842
		370	12.81	222	790
		380	12.61	214	769
		390	12.41	208	747
		400	12.21	203	724



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		410	12.02	199	707
		420	11.8	194	682
		430	11.62	190	683
		440	11.43	190	692
		450	11.32	187	690
		460	11.11	185	669
		470	10.92	183	668
		480	10.82	181	663
		490	10.61	180	661
		500	10.41	179	648
		510	10.32	177	643
		520	10.11	176	645
		530	10.01	175	641
		540	9.82	175	640
		550	9.71	175	644
		560	9.51	174	640
		570	9.3	173	641
		580	9.21	174	636
		590	9.01	173	634
		600	8.9	172	631
		610	8.7	172	629
		620	8.6	171	621
		630	8.41	171	625
		640	8.31	170	617
		650	8.09	169	612
		660	8.01	168	613
		670	7.9	167	607
		680	7.71	166	591



Wood Stove Preconditioning

Model: GM80

Date: 12:00 AM

Test Engineer: D. Bryant

Total Hours: 61

All fuel is natural untreated wood, 15% to 25% moisture (wet)

Date	Time	ET (min)	Scale (lbs)	Flue Temp (°F)	Cat Temp (°F)
		690	7.6	164	576
		700	7.51	162	576
		710	7.31	163	599
		720	7.19	163	596
		730	7.11	163	591
		740	7	162	581
		750	6.91	161	573
		760	6.69	160	571
		770	6.6	159	570
		780	6.51	158	562
		790	6.4	157	555
		800	6.31	156	546
		810	6.2	154	540
		820	6.1	153	542
		830	6	152	533
		840	5.91	151	527
		850	5.8	150	525
		860	5.71	149	517
		870	5.6	147	511

APPENDIX 5: Participants

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

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

Dave Bryant
Product Development Engineer
Hearthstone QHHP
317 Stafford Ave
Morrisville, VT 05661
802 851 4259

APPENDIX 6: Drawings and specifications

APPENDIX 7: Operator's manual



Green Mountain 80

(Model 8680)

Woodstove

OWNER'S MANUAL

Installation And Operating Instructions



We recommend that our products be installed and serviced by professionals who are certified in the U.S. by NFI (National Fireplace Institute).

www.nficertified.org



**SAVE THIS OWNER'S MANUAL
FOR FUTURE REFERENCE**

**PLEASE READ THIS ENTIRE OWNER'S MANUAL BEFORE YOU INSTALL AND USE YOUR
NEW GREEN MOUNTAIN 80 WOOD STOVE.**

If this room heater is not properly installed, a house fire may result.

To reduce the risk of fire, follow the installation instructions.

Failure to follow these instructions can result in property damage, bodily injury, or even death.

Conforms to UL Std. 1482

Certified to ULC Std. S627

**CONTACT LOCAL AUTHORITIES WITH JURISDICTION (BUILDING DEPARTMENT or FIRE
OFFICIALS), ABOUT PERMITS REQUIRED, RESTRICTIONS AND INSTALLATION
INSPECTION IN YOUR AREA.**

California Prop 65



WARNING: This product can expose you to chemicals including glass wool fiber and carbon monoxide which are known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

NOTES ON STOVE OPERATION AND EFFICIENCY

Rating:

You have purchased a Hearthstone Green Mountain 80 tested to EPA Method 28R 40 CFR Part 60 where applicable. This stove is certified to comply with the U.S. Environmental Protection Agency 2020 particulate emissions standard using crib wood. It is certified at 0.6 gr/hr. emission rate and under specific test conditions has been shown to deliver heat at rates ranging from 15,070 to 33,400 Btu (output).

This wood heater has a manufacturer-set minimum allowable 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.

Please refer to the Warranty section of this manual for registration instructions. In case of warranty claims, please contact the point of original sale or the nearest authorized Hearthstone dealer. Our dealer network processes all warranty claims. Authorized Hearthstone dealers can be located at www.hearthstonestoves.com.

This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air-dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods. **DO NOT BURN:** *Garbage, lawn clippings, material containing rubber (including tires), materials containing plastic, waste petroleum products paints or paint thinners, asphalt products, materials containing asbestos, construction or demolition debris, railroad ties, pressure treated wood, manure or animal remains, salt water driftwood or other previously salt water saturated materials, unseasoned wood, paper products, cardboard, plywood or particleboard.* This prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, sawdust, wax and similar substances for the purpose of starting a fire in an affected wood heater. Burning these materials may result in a release toxic fumes or render the heater ineffective and cause smoke.

Following the maintenance guidelines set forth in this manual will help insure the efficient use of your wood heater and minimize visible emissions. Having your stove inspected by a trained professional on a regular basis will greatly increase the potential for recognizing potential impacts to efficiency.

Proper draft is important to the efficient operation of your heater. Refer to the Normal Operation section of this manual for information regarding adequate draft. Both excessive and sub-minimum draft can affect the efficiency of your wood heater. Excessive draft can lead to over-consumption of fuel, lower overall heating capacity of the stove and potential over firing. Low draft can result in inefficient burns, low heat output, expulsion of smoke into the living area when stove doors are opened and an increased potential for build-up of flammable materials in the flue.

Efficiency:

Efficiency was measured and weighted using EPA Method 28R and CSA B415-10 methodology. A weighted average was used to calculate the overall efficiency across all of the 4 burn rate categories using the higher heating value (HHV). The weighted average efficiency is 81% (HHV).

To maximize the efficiency of your wood stove make sure it is sized properly for the space you plan to heat. An oversized stove will often be forced to burn at a lower and dirtier burn rate. Consult with your dealer for sizing and correctly placing the stove in your home. An incorrectly placed stove can greatly reduce efficiency. Maximizing the efficiency of your stove will heat your house quickly, burn cleaner and use less wood.

Refer to the Choosing Firewood section of this manual for appropriate fuel selection. Seasoned firewood is typically at or near 20% moisture content. This can be measured with any number of hand-held moisture meters available through your local hearth shop. Follow instructions included in the meter you purchase to measure fuel wood moisture content. Burn only dry, seasoned wood as using wet wood will greatly reduce your efficiency.

CO Emissions:

The Green Mountain 60 has the following CO emission rates by burn level: Category 1 (low) –12.6 g/hr., Category 2 (med. low) – 13.8 g/hr., Category 3 (med. high) – 9.6 g/hr. and Category 4 – 18.0 g/hr. Wet wood or unapproved fuel described above can greatly affect the emissions of a wood burning stove.

Smoke/Fire/CO Detectors:

It is highly recommended that smoke and CO detectors be installed throughout the heated space when a wood burning heater is installed. Be certain to install these devices not only in the area where the wood appliance is located, but also in bedrooms, hallways leading to other areas of the house and all common areas of the heated space. Check the batteries in these devices and assure operation by performing whatever test operations are recommended by the manufacturer.

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INTRODUCTION

Thank you for purchasing a Green Mountain 80 woodstove from Hearthstone Quality Home Heating Products. This stove will provide years of comfortable heat. This stove combines the warmth and comfort of soapstone and cast iron with the efficiency of advanced catalytic technology. The Green Mountain 80 blends modern technology with the unique beauty and qualities of cast iron. We trust that you will appreciate the quality of this handcrafted product.

Your Green Mountain 80 woodstove burns very efficiently, and produces a large amount of heat. However, you should not consider your Green Mountain 80 the primary heat source for your home. The Green Mountain 80's large glass window allows you to enjoy the fire from a variety of locations in the room.

Please read this manual in its entirety. Its purpose is to familiarize you with your stove's safe installation, proper break-in, operation and maintenance. It contains extremely important information so keep it handy and refer to it often.

A qualified heating technician may need this owner's manual as a reference when installing this stove in your home. There are national, state, and local building codes that direct the technician on how to install your stove. These codes stipulate the dimension of stovepipe and clearances to walls, ceilings, hearth, and other combustible surfaces. The codes exist to reduce the risk of fire. Failure to follow these instructions can result in fire, property damage, bodily injury, and even death.

Install the stove in a safe, open area, away from traffic flow, doors, and hallways. If possible, try to install the stove near an existing chimney and chimney connector. It is extremely important to install this stove with the proper clearance from combustible surfaces. You can purchase specific connector pipe and special wall coverings as specified by this manual and the NFPA 211 code to protect combustible surfaces. As a general rule, keep furniture, drapes, curtains, wood, paper, and other combustibles at least 36 inches (92 cm) away from the stove. Never install the stove in or near a storage location for gasoline, kerosene, charcoal lighter fluid or any other flammable liquids.

Install the stove in your central living area to allow heat to radiate naturally to distant rooms. Do not install your stove in a poorly insulated area. This is inefficient and would likely result in higher fuel usage.

- **SAFETY NOTICE:**

AN IMPROPERLY INSTALLED STOVE CAN RESULT IN A HOUSE FIRE. FOR YOUR SAFETY, CAREFULLY FOLLOW THE INSTALLATION DIRECTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.

The safety of your stove will depend on many factors, some of which include: distance to combustible objects, correct venting, and adequate chimney maintenance. Should you have any questions, do not hesitate to contact your dealer for additional information.

Contact your dealer for any necessary warranty service.

This Green Mountain 80 Model 8680 stove is warranted by:

Hearthstone Quality Home Heating Products, Inc®

317 Stafford Ave.

Morrisville, Vermont 05661, USA

www.Hearthstonestoves.com

CODES

When you install your Green Mountain 80 woodstove, it is imperative that you adhere to all Federal and local codes. Obtain these codes from either of the following sources:

American National Standards Institute, Inc. (ANSI)
1430 Broadway
New York, NY 10018
www.ansi.org

National Fire Protection Association, Inc. (NFPA)
Battery March Park
Quincy, MA 02269
www.nfpa.org

If you are installing your Green Mountain 80 in a mobile or manufactured home, follow the guidelines described in the Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 (United States).

SAFETY INFORMATION

Read and understand this Owner's Manual thoroughly before installing and using this stove.

Make sure to install your stove:

- According to the manufacturer's recommendations
- In accordance with all applicable codes
- With the proper sized chimney

When using your stove, follow these safety precautions:

- **Never** modify this stove in any way.
- **Never** burn kiln dried, painted or treated wood in this stove.
- **DO NOT BURN GARBAGE.** Never burn garbage or trash, colored or glossy paper, solvents, plywood, artificial logs, cardboard, or driftwood, in this stove.
- **Never** burn coal in this stove.
- **DO NOT BURN FLAMMABLE FLUIDS.**
- **DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.** Never use gasoline, kerosene, charcoal lighter fluid, or other flammable fluids to start or invigorate the fire. These fuels will cause dangerous burning conditions in the stove. Keep all such materials away from the stove.

- **Never** use a wood grate or other device to elevate the fire.
- **Never** allow logs in the firebox to hit the glass when the door is closed.
- **Never** slam the door or use the door to force wood in to the stove.
- **Never** over-fire your stove. (See page 24)
- **Never** put articles of clothing or candles on a hot stove.
- **Never** connect the stove to a flue used by another appliance.

Other safety guidelines:

- Keep all combustible items such as furniture, drapes, clothing, and other items, at least 36" (0.92 m) from the stove (See page 9)
- Install a smoke detector, preferably in an area away from your wood stove.
- Keep a fire extinguisher handy. We recommend the type rated "A B C."
- Dispose of ashes properly. (See page 23)
- Keep children and pets away from the stove when it is burning; they could be seriously injured by touching a hot stove.
- Clean your chimney system as needed. (See page 29)
- Outside combustion air may be required if:
 1. This solid-fuel-fired appliance does not draw steadily, smoke rollout occurs, fuel burns poorly, or back-drafts occur whether or not there is combustion present.
 2. Existing fuel-fired equipment in the house, such as fireplaces or other heating appliances, smell, do not operate properly, suffer smoke roll-out when opened, or back-draft whether or not there is combustion present.
 3. Opening a window slightly on a calm (windless) day alleviates any of the above symptoms.
 4. The house is equipped with a well-sealed vapor barrier and tight fitting windows and/or has any powered devices that exhaust house air.
 5. There is excessive condensation on windows in the winter.
 6. A ventilation system is installed in the house.

If these or other indications suggest that infiltration air is inadequate, additional combustion air should be provided from the outdoors. Outside combustion air can be provided to the appliance by using the optional outside air kit #96-53400

PERIODIC CHECKLIST

Perform each of these tasks at the specified intervals.

At the End of Every Week:

- Empty ashes from the firebox, sooner if the firebox is full.

At the Beginning of Every Other Month:

- Depending upon your use of the stove, visually inspect the chimney connector and chimney for creosote. (see page 29)
- Check door seals using the "dollar bill test." - When the stove is cool, shut the door on a dollar bill. If the bill pulls out without any resistance, then your stove's door is not sealing properly. To tighten the seal, adjust the door latch mechanism or change the door gasket. (Refer to page 29.)
- Inspect the face of the catalytic combustor for fly ash and soot. Use a soft-bristled brush to remove if present. It is recommended to visually inspect the catalytic combustor at least 3 times during the heating season, or every 2-3 months.

At the End of Every Season:

- Dismantle the chimney connector and clean it thoroughly. Replace any pieces that show signs of rust or deterioration.
- Inspect and, if necessary, clean your chimney.
- Clean out the inside of the stove thoroughly.
- Check and clean the catalytic combustor, if necessary
- Inspect all door gasket material and replace if worn, frayed, cracked or extremely hard.

EMERGENCY PROCEDURES

If you have a stovepipe or chimney fire, follow these instructions:

1. If the fire is too threatening, leave the area and call the fire department immediately! If not, perform the next three steps.
2. Close the primary air control.
3. Close the stovepipe damper (if present).
4. Close the bypass damper
5. Keep the stove front door closed!

- **WARNING: DO NOT ATTEMPT TO PUT OUT A STOVEPIPE OR CHIMNEY FIRE BY THROWING WATER ONTO THE STOVE, STOVEPIPE, OR CHIMNEY. THE EXTREMELY HIGH TEMPERATURE OF SUCH FIRES CAN CAUSE INSTANTANEOUS STEAM AND SERIOUS BODILY HARM.**

Once the chimney fire expires, leave the primary air control and bypass handle closed and let the fire in the stove die out completely. Inspect the stove, stovepipe, and chimney thoroughly for any sign of damage before firing the stove again. You must correct any damage before using your stove again.

Establish a routine for the fuel, wood burner and firing technique. Check daily for creosote build-up until experience shows how often you need to clean to be safe. Be aware that the hotter the fire the less creosote is deposited, and weekly cleaning may be necessary in mild weather even though monthly cleaning may be enough in the coldest months. Contact your local municipal or provincial fire authority for information on how to handle a chimney fire. Have a clearly understood plan to handle a chimney fire.

SPECIFICATIONS

Maximum Heat Output:

80,000 BTUs per hour of cordwood (based on independent laboratory test results).

Floor Size of Heated Area:

Up to a maximum of 2,500 square feet. Factors unique to your home can reduce the square footage the stove will heat. Home insulation value, number and efficiency of windows, floor plan, stove placement, quality of the fuel and other conditions may limit the heating ability of the stove.

Firebox Capacity:

3.1 cubic feet.

Maximum Log Length: Up To 23" (58.4cm).

Emissions: 0.7 g/hr.

Burn Time: Up to 24+ hrs. (*Heat Life*™: Up to 30 hours) Note: The amount and weight of wood contained per cubic foot of firebox volume can vary from 10 to 25 lbs. per cubic foot depending on type of wood, moisture content, packing density and other factors.

Stove Dimensions:

Height: 31 1/2" (80.0cm)
Width: 26" (66.0cm)
Depth: 21 1/4" (54.0cm)
Weight: 494 lbs. (269 kg)

Connector Size: 8" (152 mm) diameter
Metal Chimney: 8" (152 mm) inside diameter
Masonry Chimney: 8" (152 mm) inside diameter (round flue), 8" x 8" (203 x 203 mm) (square flue)

Crate Dimensions: H-40" W-41" L-31" or 102x104x 79cm

Optional Equipment:

Outside Air Kit 96-53400
 Blower Kit 96-57800

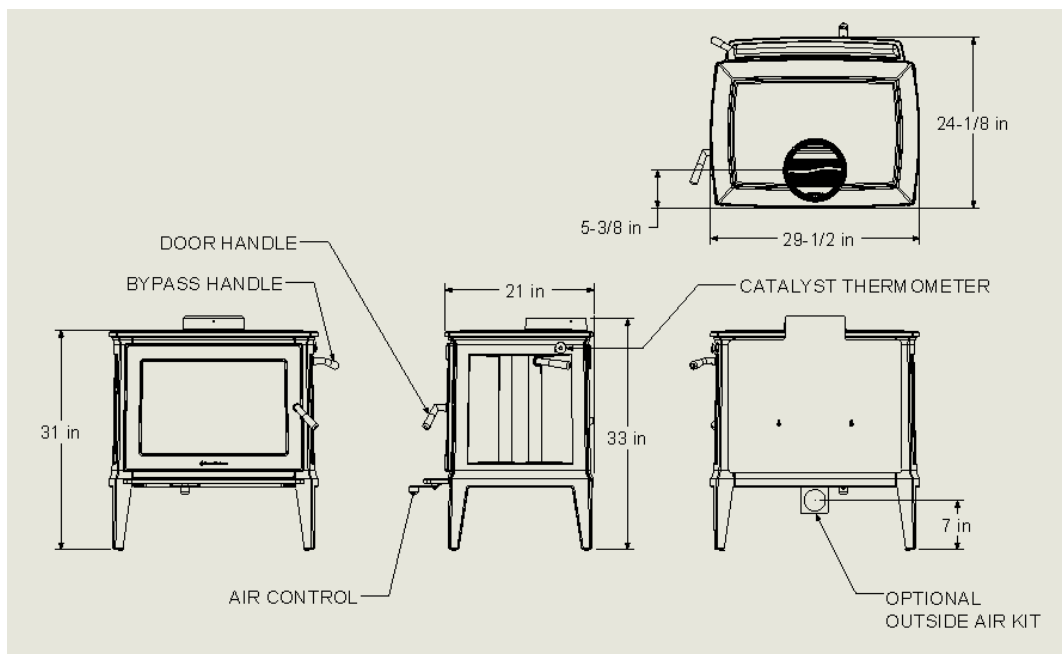


Figure 1 – Green Mountain 60 Dimensions

INSTALLATION

UNPACKING

Hearthstone packages your Green Mountain 80 woodstove with the greatest care so that it ships safely. Under certain circumstances, however, damage may occur during transit and handling. When you receive the Green Mountain 80, carefully unpack and inspect the stove and all accompanying parts. Ensure that all parts are included with the stove. If any parts are damaged or missing, please contact your authorized Hearthstone dealer immediately.

Be sure to remove the packaging material in the flue collar before installing the chimney.

A separate box underneath the stove contains some of the internal parts. There is an instruction sheet for installing these parts inside the box.

PACK LIST

Green Mountain 80 Model 8660 Woodstove
Owner's Manual
Parts Box

The label is attached by a cable to the bottom of the stove. Take care when lifting the stove not to damage the label or cable. After final positioning of the stove, the label may be stored in the holding clip on the bottom shield of the stove.



Figure 2 - Label Location

INSTALLING YOUR STOVE

Choose a place to install your Green Mountain 80 woodstove. Consider the location of your stove for optimum heating efficiency. In general, it is better to place your stove in a main living area, rather than in a basement or other confined space.

Inspect this location to make sure that the stove and stovepipes will have the required clearance from combustible materials that are near the stove. Combustibles include walls, floor, ceiling, and chimney chase. You must carefully consider the clearances to all of these combustibles before actually connecting your stove.

If the floor is made of combustible material, then a non-combustible floor protector is required between the floor and the stove. An example of a non-combustible floor protector is a hearth constructed with a continuous layer of tile, brick, slate, glass or another non-combustible facing. There is no R-value requirement.

If you use a rear connector pipe, ensure it is listed with Underwriter's Laboratories. Check the listing of your pipe with UL for the correct clearances.

The diagrams in this manual represent typical installations, but are specific to the Simpson Dura-Vent DVL brand.

Clearances to NFPA Code 211 Protected Surfaces

You can reduce the clearances to combustible surfaces by using any National Fire Protection Agency (NFPA) approved wall protection system with additional approval of the regulatory authority having jurisdiction in your area. Please refer to NFPA Code 211 for specifications and complete details. You can obtain this information directly from the NFPA.

National Fire Protection Agency

Batterymarch Park
Quincy, MA 02269
1-800-344-3555
1-617-770-3000
www.nfpa.org

HEARTH REQUIREMENTS & FLOOR PROTECTION

Ensure you protect combustible flooring with a covering of noncombustible material. The Green Mountain 80 does not require an insulated hearth pad. The minimum floor protection must be met under the stove and extend beyond the stove as follows:

The minimum floor protection for US installations is 33 1/4in x 31-1/2in.

The minimum floor protection for installations in Canada is 42in x 43 1/2in.

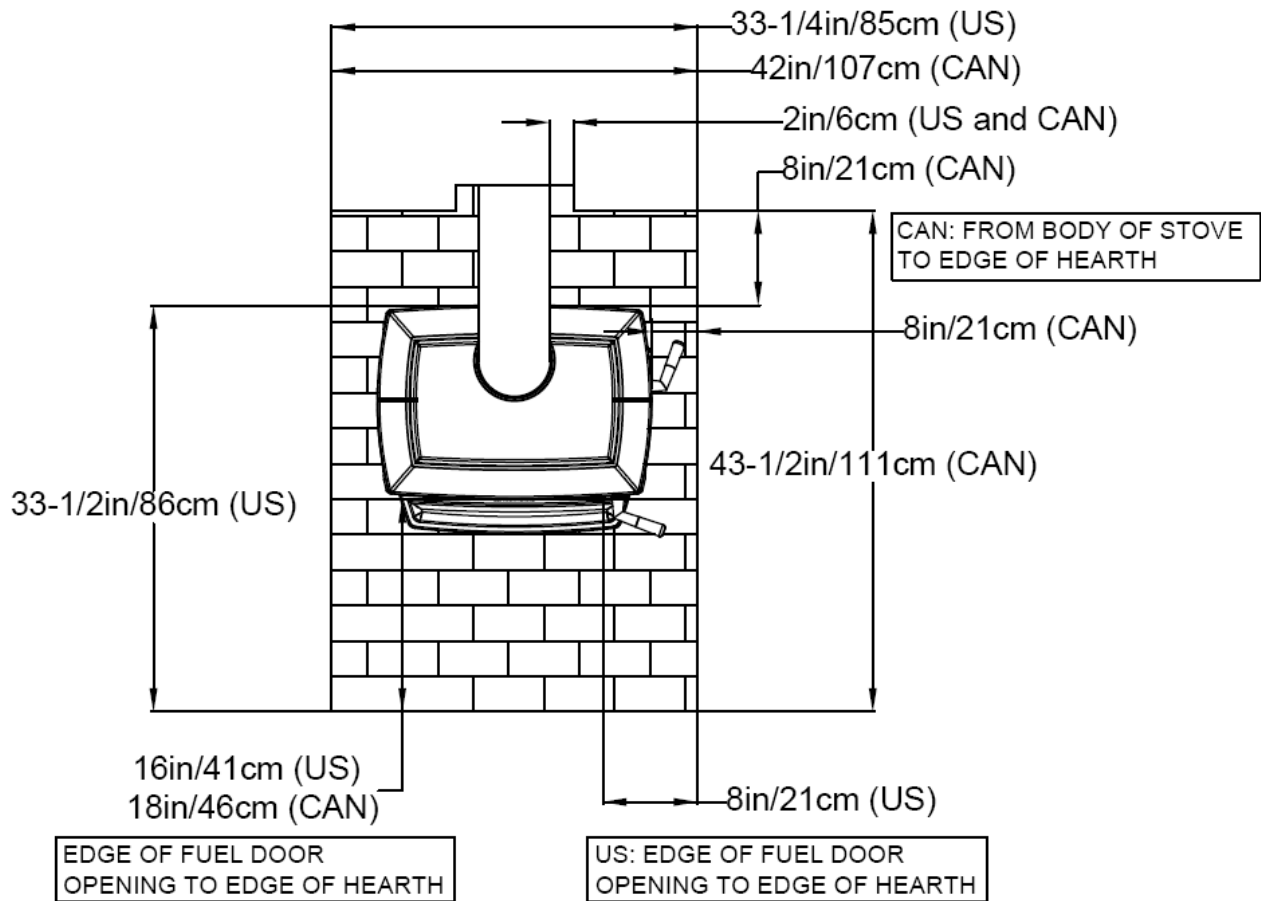


Figure 3 – Hearth Dimensions

COMBUSTIBLE SURFACE REQUIRED CLEARANCES

Note: Dimensions shown in the following figures are from the body of the stove unless otherwise indicated.

It is very important to follow minimum clearances for chimney connectors to combustibles such as walls and ceilings when installing the stove near combustible surfaces.

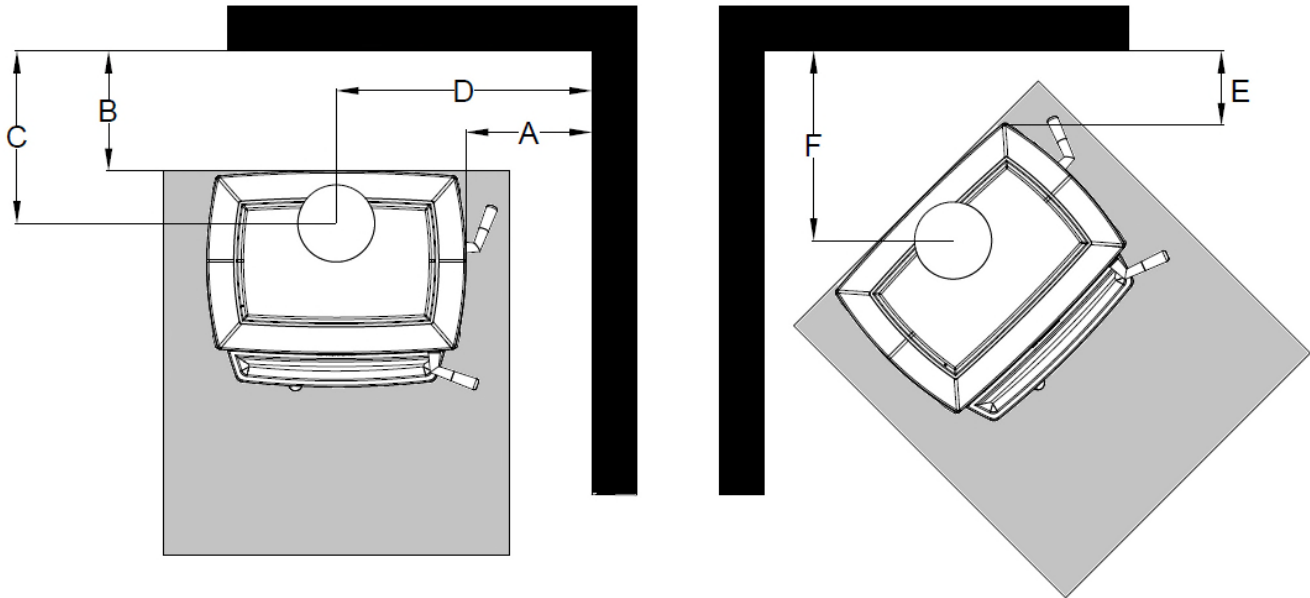


Figure 4 – Clearance to Combustibles

	Parallel				Corner	Corner
Clearances	A	B	C	D	E	F
Single wall Connector – Inc. Rear Heat Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Single Wall Connector – With Blower Kit Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Double Wall Connector – Inc. Rear Heat Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Double Wall Connector – With Blower Kit Shield	13"-33cm	5"-13cm	10"-26cm	26"-66cm	7"-18cm	18.5"-47cm
Alcove W/Single Wall Conn – Inc. Rear Heat Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Alcove W/Single Wall Conn – With Blower Kit Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Alcove W/DbI Wall Conn – Inc. Rear Heat Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm
Alcove W/DbI Wall Conn – With Blower Kit Shield	13"-33cm	11"-28cm	16"-41cm	26"-66cm	7"-18cm	18.5"-47cm

Alcove Clearances (inches)	Unprotected Surfaces	Protected Surfaces (NFPA-211)
Minimum alcove width	52" – 132.1cm	See NFPA-211
Min. Alcove ceiling from floor with single wall connector	61.5" – 156.2cm	See NFPA-211
Min. Alcove ceiling from floor with double wall connector	61.5" – 156.2cm	See NFPA-211

FOR BLOWER KIT, USE KIT #96-57400

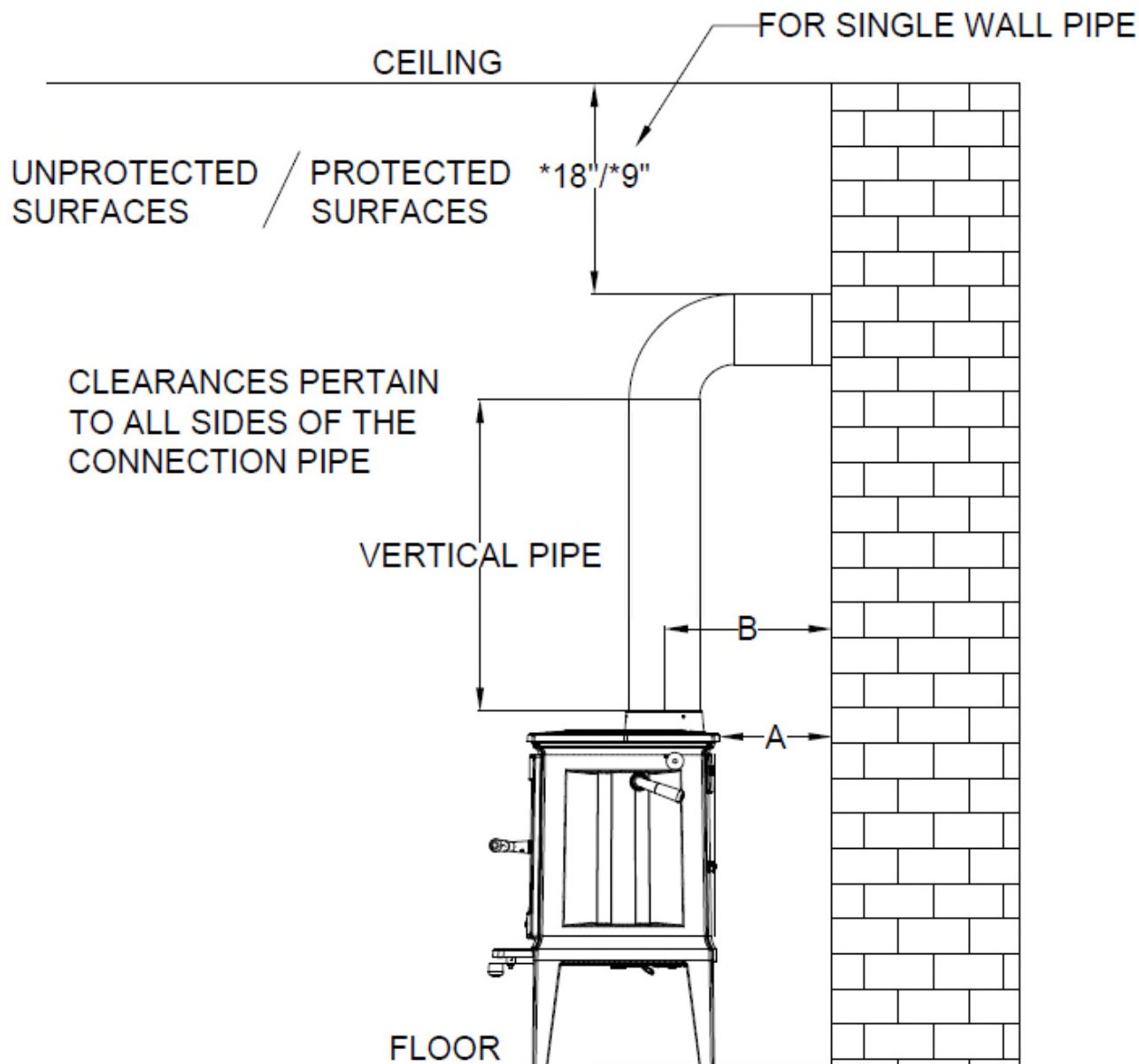


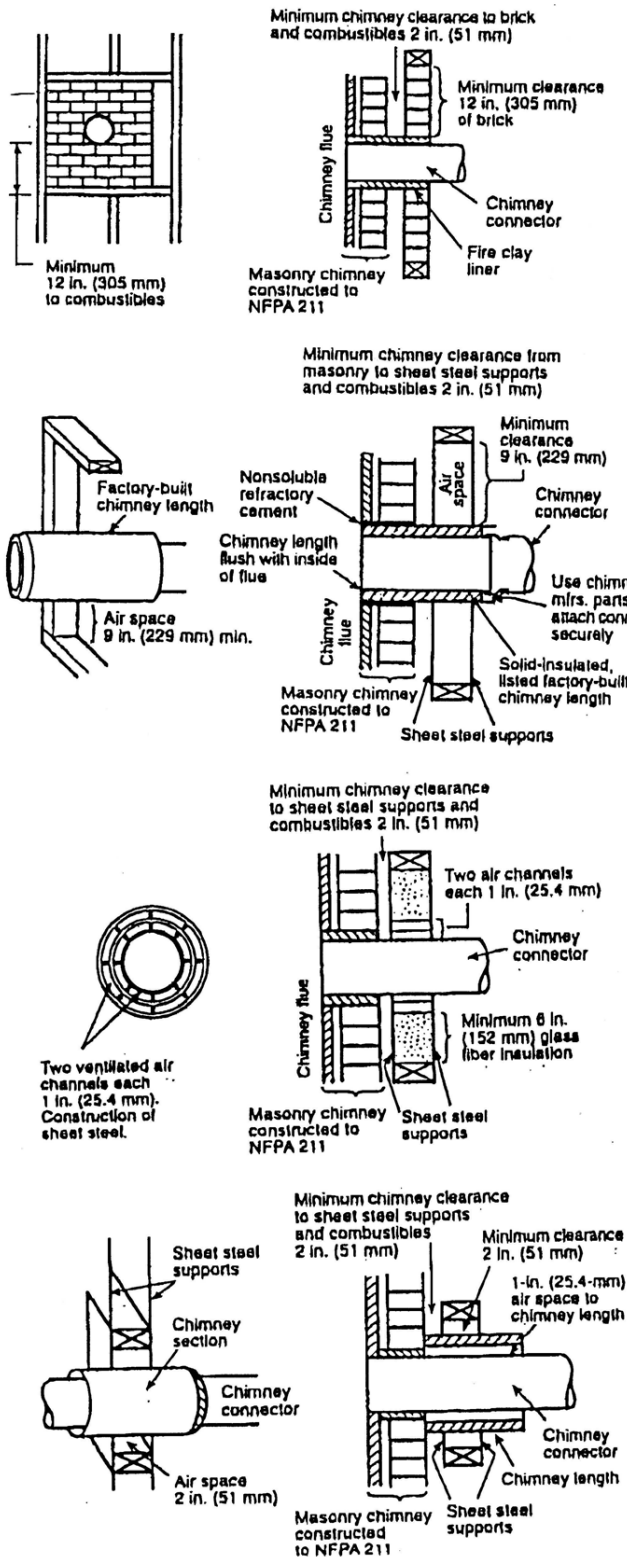
Figure 5 Chimney Connector Clearances

Through the wall top flue exit	Single Wall Pipe		Double Wall Pipe	
	With Blower Kit Shield**	Inc. Rear Heat Shield	With Blower Kit Shield**	Inc. Rear Heat Shield
A	11" (28cm)	11" (28cm)	5" (13 cm)	11" (28 cm)
B	16" (41 cm)	16" (41 cm)	10" (26cm)	16" (41cm)

*For double wall pipe clearance to ceiling, refer to pipe manufacturer specifications.

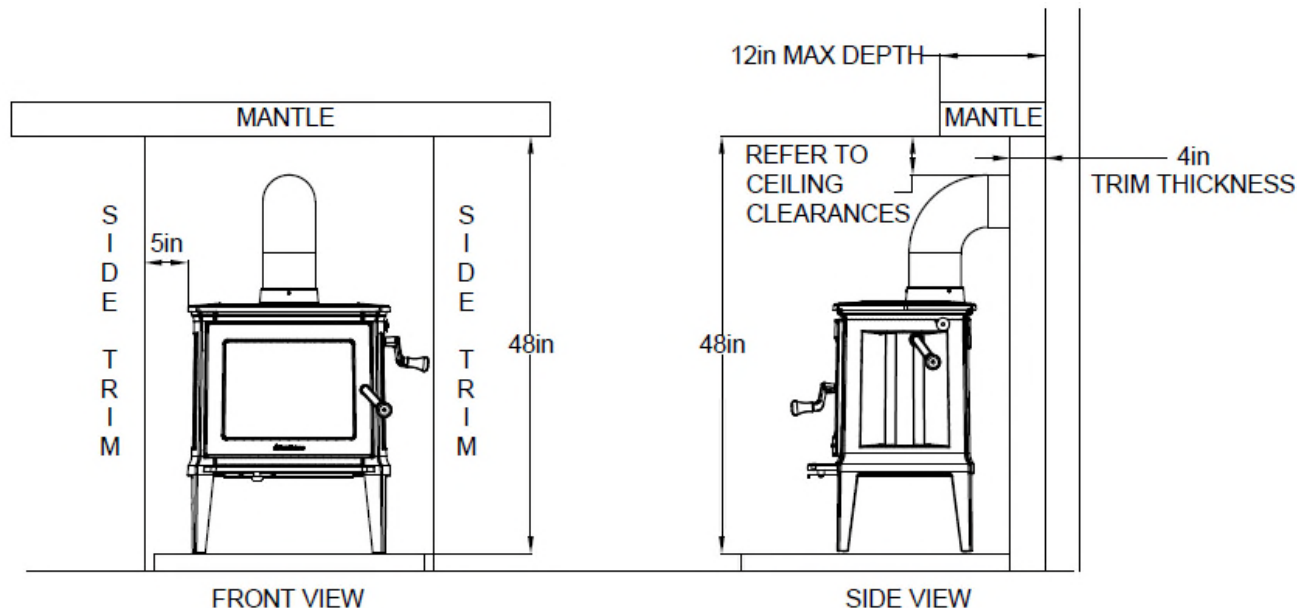
** FOR BLOWER KIT, USE KIT #96-57800

See Parallel Clearance to Combustibles for clearances to the sides of the stove.



CHIMNEY CONNECTOR SYSTEMS AND CLEARANCES FROM COMBUSTIBLE WALLS FOR RESIDENTIAL HEATING APPLIANCES

- A. Minimum 3.5in thick brick masonry all framed into combustibile wall with a minimum of 12in. brick separation from clay liner to combustibles. The fire clay liner shall run from outer surface of brick wall to, but not beyond, the inner surface of chimney flue liner and shall be firmly cemented in place.
- B. Solid-insulated, listed factory-built chimney length of the same inside diameter as the chimney connector and having 1in. or more of insulation with a minimum 9in. air space between the outer wall of the chimney length and combustibles.
- C. Sheet steel chimney connector, minimum 24 gauge in thickness, with a ventilated thimble, minimum 24 gauge in thickness, having two 1in. air channels, separated from combustibles by a minimum of 6in of glass fiber insulation. Opening shall be covered, and thimble supported with a sheet steel support, minimum 24 gauge in thickness.
- D. Solid insulated, listed factory-built chimney length with an inside diameter 2in. larger than the chimney connector and having 1in. or more of insulation, serving as a pass-through for a single wall sheet steel chimney connector of minimum 24 gauge thickness, with a minimum 2in. air space between the outer wall of chimney section and combustibles. Minimum length of chimney section shall be 12in. chimney section spaced 1in. away from connector using sheet steel support plates on both ends of chimney section. Opening shall be covered, and chimney section supported on both sides with sheet steel supports securely fastened to wall surfaces of minimum 24-gauge thickness. Fasteners used to secure chimney section shall not penetrate chimney flue liner.



CLEARANCES APPLY WITH STOVE IN FIREPLACE ALSO

Figure 6 Trim and Mantle Clearances

OUTSIDE AIR SUPPLY

(Optional Kit #96-53400)

You can connect an outside air source directly to this stove using an optional outside air kit. The advantage of providing outside air directly to the stove is that the air used by the stove for combustion is taken from outside the residence rather than from within the room where the stove is located.

The outside air kit for this stove allows for the direct connection of the stove's air intake to a minimum 3" (76 mm) diameter duct (supplied by others)* which leads to the outside of the house. When considering placement of the duct from the outside of the house to the hearth, keep in mind the need to avoid structural members of the house. The outside air kit attaches to the underside of the stove. Refer to the instructions provided with the kit for installation.

When using an outside air kit in Canada, the stove must be attached to your home's floor. Use the shipping clips that came with the stove and fasteners long enough to attach securely to the subfloor. (The clips and fastener heads may be painted to minimize visibility).

*An adaptor for 4" duct is available if needed. KIT #90-53308

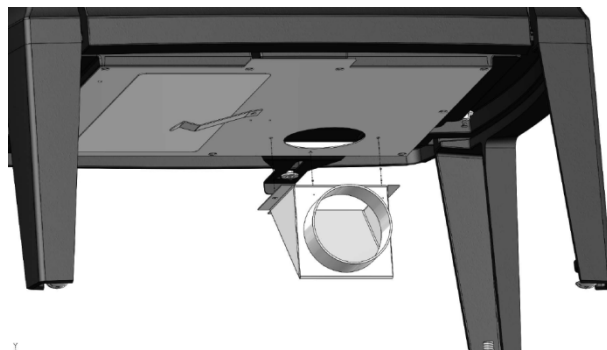


Figure 7 – Outside Air Kit Detail

The International Residential Code (IRC) does not allow the outside air duct to terminate higher than the appliance. Some building officials restrict vertical rise in the duct's termination. Hearthstone recommends the termination be at the same level, or lower than the air intake on the stove.

Locate the termination of the duct on the outside wall of the home in such a manner to avoid the possibility of obstruction by snow, leaves or other material. Screen the termination using $\frac{1}{4}$ " x $\frac{1}{4}$ " mesh rodent screen and cover it with a rain/wind proof hood (flex pipe, outside termination, mesh, and hood supplied by others) Contact your dealer for availability.

VENTING COMPONENTS & CONFIGURATION REQUIREMENTS

- **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE USED BY ANOTHER APPLIANCE**
- Single wall connector that is at least 24 MSG or 25 MSG blued steel stovepipe.
- Double wall connector (Rear pipe) which is used with a listed, factory-built "Type HT" chimney or with a masonry chimney to reduce clearances, is available from several manufacturers, your dealer can help you choose. Some air insulated connector pipe models available are Simpson Dura Vent DVL and Metalbestos DS. Security, GSW and Ameritec also have acceptable Rear connector pipe.
- When used in a mobile home, a spark arrester is required. (See page 17)
- The chimney connector cannot pass through a floor or ceiling, nor any attic or roof space, closet or similar concealed space. Where venting requires passage through a wall or partition of combustible construction, the installation must conform to NFPA Code 211 or CAN/CSA - B365.
- Be sure to follow the manufacturer's instructions to maintain an effective vapor barrier at the location where the chimney or other component penetrates the exterior of the structure
- It is very important to follow minimum clearances for chimney connectors to combustibles such as walls and ceilings when installing the stove. Typical chimney connector clearances are outlined below. The single wall clearances are generic; the double wall clearances shown are specifically for Simpson DuraVent DVL and may vary with other brands. **Check the specifications from the manufacturer of your connector.**

COMPONENTS OF A VENTING SYSTEM

The complete venting system consists of several components: chimney connector, wall thimble, wall pass-through, chimney, and liner. It is *absolutely necessary* that you install all of these components and maintain the clearances to combustibles discussed earlier to ensure a safe stove installation.

To protect against the possibility of a house fire, you *must properly install and constantly maintain the*

venting system in good condition. Be sure to inspect the chimney and chimney connector and keep it clean. Upon inspection, immediately replace rusted, cracked, or broken components. Failure to follow these instructions and specified components or using make-shift compromises can result in fire, property damage, bodily injury, and even death.

- The *chimney connector* is the stovepipe from the woodstove to the chimney. The chimney connector stovepipe is 8" (152 mm) diameter, 24 MSG or 25 MSG blued steel connector pipe. *Do not use aluminum or galvanized steel pipe* - they cannot withstand the extreme temperatures of a wood fire.
- The *thimble* is a manufactured (or site-constructed) device installed in combustible walls through which the chimney connector passes to the chimney. It keeps the walls from igniting. You must use a wall thimble when installing a chimney connector through a combustible wall to the chimney.
- A *wall pass-through* (or chimney support package) also keeps the walls from igniting. You must use one when connecting through a wall or ceiling to a prefabricated chimney.
- Only install this stove to a *lined masonry chimney* or an *approved high temperature prefabricated residential* type building heating appliance chimney. *Do not* connect this stove to a chimney serving another appliance; you will compromise the safe operation of both the wood stove and the connected appliance.
- A *liner* is the UL 1777 or ULC S635 (for factory built fireplace or masonry) chimney.

You must connect your stove to a chimney comparable to those recommended in this manual. *Do not use stovepipe as a chimney.* Use stovepipe for freestanding installations only to connect the stove to a proper chimney.

- **WARNING: DO NOT CONNECT THIS APPLIANCE TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.**

INSTALLING A VENTING SYSTEM

Attach stovepipe sections to the flue collar and to each other with the crimped end toward the stove. If creosote builds up, this allows the creosote to run into the stove and not on the outside of the stovepipe or onto the stove.

Secure all joints, including attaching the stovepipe to the stove's flue collar, with three sheet metal screws. Install #10 x 1/2" (3 mm x 13 mm) sheet metal screws into the holes pre-drilled in the flue collar. Disregarding the screws can cause joints to separate from the vibrations that result from a creosote chimney fire.

You can simplify connecting stovepipe by using additional accessories such as telescoping pipes, slip-connectors or clean-out tees. These accessories ease the periodic inspection of your chimney, as well as allow you to dismantle the stovepipe easily (without moving the stove).

Install the stove as close as practical to the chimney, while maintaining all proper clearances. Install stovepipe that is as short and as straight as possible. Horizontal runs of stovepipe must always rise away from the stove at a minimum of 1/4" per foot (21mm/m).

We do not recommend long runs of stovepipe to increase heat dispersal. Longer lengths of stovepipe, or more connecting elbows, than necessary increase the chances of draft resistance and the accumulation of creosote buildup.

In general, you do not need to install a stovepipe damper with the Green Mountain 80. Some installations, however, could benefit from a stovepipe damper, such as a tall chimney which can create a higher than normal draft. In such cases, a damper can help regulate the draft. The Green Mountain 60 requires a draft between 0.06" and 0.1" WC. For drafts above 0.1" WC, install a stovepipe damper. Check the draft at stove installation time.

Remember, the NFPA recommends minimum clearances for chimney connectors to combustibles such as walls and ceilings. Once the stove is installed at safe distances from these combustible surfaces, it is also important to maintain these connector clearances for the remainder of the installation.

CONNECTING THE STOVE TO A CHIMNEY

You can install your Green Mountain 80 to a prefabricated metal chimney, or to a masonry chimney.

This room heater must be connected to (1) a listed Type HT (2100° F) chimney per UL 103 or ULC S629, or (2) a code-approved masonry chimney with a flue liner. The chimney size should not be less than the flue collar, or more than three times greater than the cross-sectional area of the flue collar.

We recommend installing a cleanout tee where possible to simplify chimney cleaning and maintenance.

Connecting to a Prefabricated Metal Chimney

There are two ways to install a prefabricated metal chimney:

- An *interior* installation where the chimney passes inside the residence through the ceiling and roof.
- An *exterior* installation where the chimney passes through the wall behind the stove then up the outside of the residence.

Whenever possible, choose an interior chimney. An interior chimney heats up quickly and retains its heat; thus promotes a better draft and discourages the formation of creosote. An exterior chimney does not benefit from the warmth of the building, so it typically operates at lower flue temperatures than an interior chimney and may experience increased creosote accumulation.

When connecting the Green Mountain 60 to a prefabricated metal chimney, you must follow, precisely, the manufacturer's installation instructions. Use only Type HT (2100° F), prefabricated metal chimneys listed per UL 103 or ULC S629 standards.

Ensure the size of the prefabricated chimney's flue is appropriate for the Green Mountain 60. The Green Mountain 80 requires a 8" (152 mm) inside diameter flue for new installations. A 8" diameter flue provides adequate draft and performance. You can use an 8" (203 mm) diameter existing flue with a reducer. An oversized flue contributes to creosote accumulation. (In this case, bigger is NOT better.)

When purchasing a prefabricated chimney to install with your stove, Ensure you also purchase from the same manufacturer the wall pass-through (or ceiling support package), "T" section package, fire-stops (when needed), insulation shield, roof flashing, chimney cap, and any other required accessories. Follow the manufacturer's instructions when installing the chimney and accessories. In addition, ensure you maintain all manufacturers' recommendations for the proper clearances to the chimney.

Connection to a Masonry Chimney

Consider two primary elements when connecting your stove to a masonry chimney: the chimney itself and the thimble where the stovepipe connects to the

chimney. **Use only code approved masonry chimneys containing a proper flue liner.**

Before connecting to a masonry chimney, hire a professional to examine the chimney for cracks, loose mortar, and other signs of deterioration and blockage. If the chimney needs repair, complete them before installing and using your stove. Do not install your stove until the chimney is safe for use.

Ensure the chimney's cleanout is complete and working properly. To avoid a loss of draft, the cleanout door must close completely and provide a tight seal. If the cleanout door leaks, the chimney will cool, your stove will perform poorly, and creosote can form.

Ensure the size of the chimney's flue is appropriate for this stove and that it is not too large. Use a masonry chimney with a maximum 6" Diameter or 8" x 8" (203 mm x 203 mm) tile size for best results. An oversized flue contributes to the accumulation of creosote.

Use the following checklist to ensure that your masonry chimney meets these minimum requirements:

MASONRY CHIMNEY WALL CONSTRUCTION:

- Mortared brick or modular block at least 4" (102 mm) thick – must use liner
- A mortared rubble or stone wall – must use liner

FLUE LINER OPTIONS:

- Tile - minimum wall thickness of 5/8" (16 mm), installed with refractory mortar, and with at least 1" (25 mm) air space around the liner

- Stainless steel - UL listed 8" diameter, insulated or wrapped liner, or the space around the liner filled with vermiculite or suitable material (these keep the liner warmer for better performance)
- Ensure any equivalent flue liner is a listed chimney liner system meeting type HT requirements or other approved material.

INTERIOR CHIMNEY REQUIREMENTS:

- Must have at least 2" (51 mm) clearance to combustible materials
- Must install fire stops at the spaces where the chimney passes through floors and/or ceiling
- Any insulation material must be at least 2" (51 mm) from the chimney

EXTERIOR CHIMNEY REQUIREMENTS:

- At least 1" (25 mm) clearance to combustible materials

CHIMNEY HEIGHT REQUIREMENTS (SEE FIGURE 9):

- At least 3 feet (0.9 m) higher than the highest part of the roof opening through which it passes.
- At least 2 feet (0.6 m) higher than any part of the roof within 10 feet (3 m) measured horizontally from the top of the chimney.

The recommended minimum chimney height is 10 feet (3 m) off the floor. The recommended maximum chimney height is 30 feet (9m). The Green Mountain 80 requires a draft between 0.06" and 0.1" water column. Ensure your chimney is long enough to provide the minimum draft, and use a damper if your installation has a required chimney height that provides too much draft.

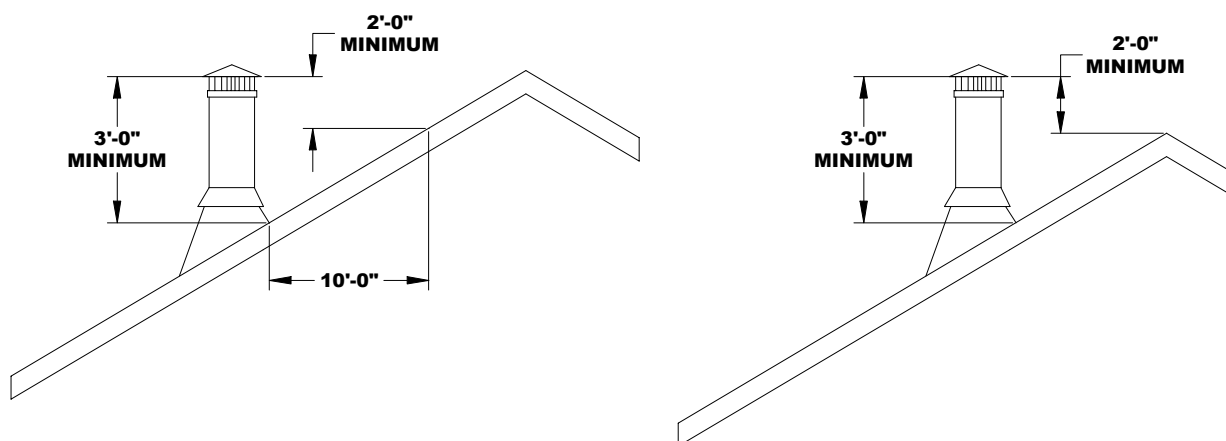
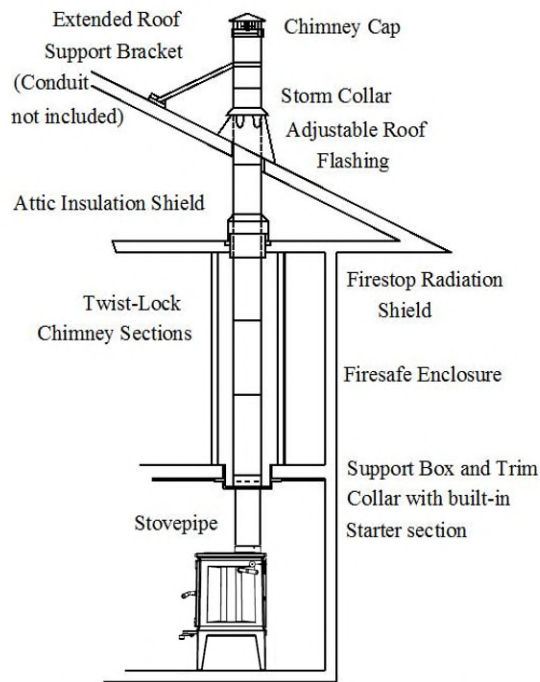
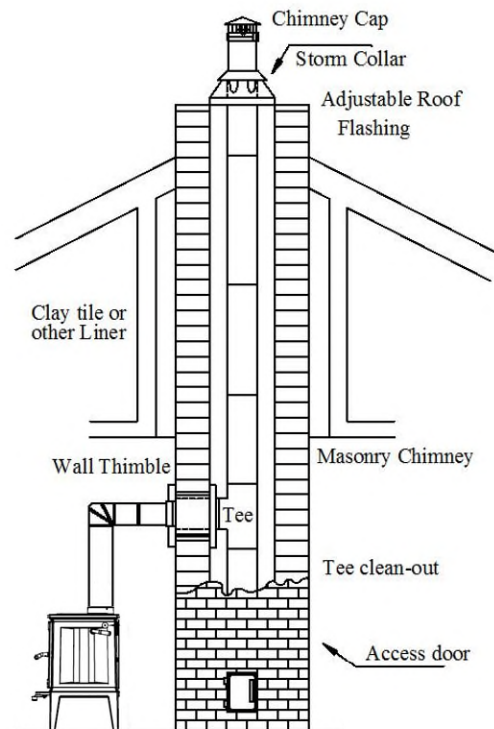


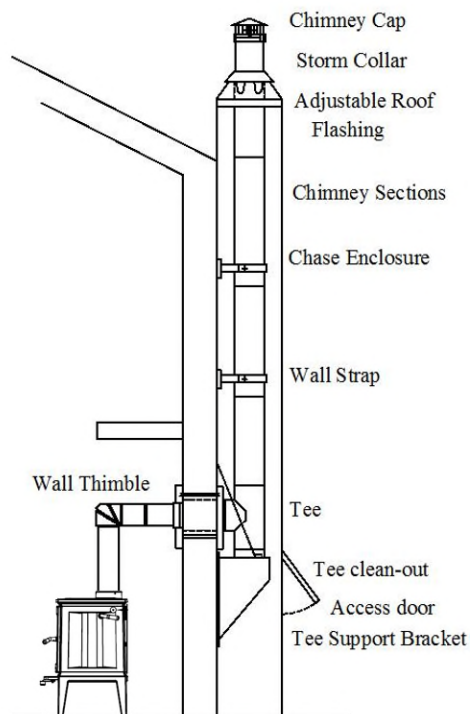
Figure 8 – Chimney Height Requirements



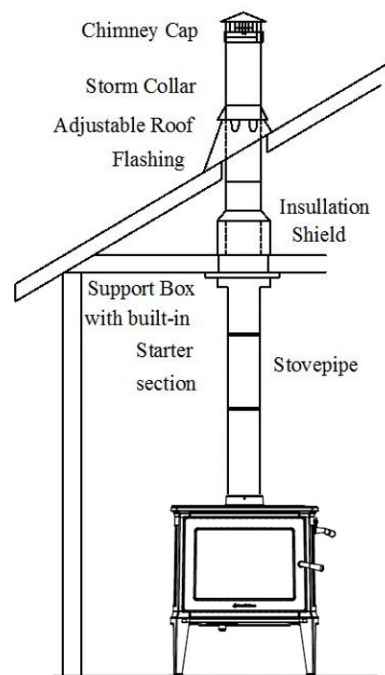
Two story house installation with attic.



Chimney pipe through Clay tile or other Lined Masonry Chimney



Chimney through outer wall with enclosed chase.



One story house installation with attic.

Figure 9 – Typical Chimney Configurations

INSTALLING IN A MOBILE HOME

Follow these special requirements for installing your stove in a mobile home.

- Install the stove in accordance with 24 CFR, Part 3280 (HUD)
- An outside air kit must be used in all mobile home installations. See page 12 for details.
- Permanently attach the stove to your mobile home's floor. Use the shipping clips that came with the stove and fasteners long enough to attach securely to the subfloor. (The clips and fastener heads may be painted to minimize visibility).

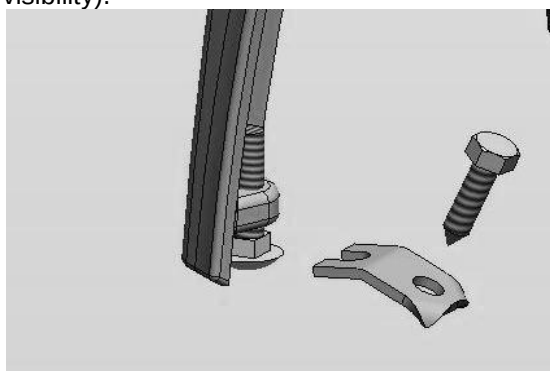


Figure 8 - Lock Down Detail

- Install a Mobile Home Chimney & Connector Kit*.
Each kit must include:
Stainless spark arrester cap, storm collar, Adjustable vented flashing – 0/12 – 6/12, Two 24" chimney pipes, 24" support box with built-in starter section and trim.
* Install a Mobile Home Chimney and Connector Kit conforming to US/UL103 or CAN/ULC-S629, Standard for Factory-Built Chimneys.
- **WARNING: DO NOT INSTALL IN A SLEEPING ROOM IN A MOBILE HOME.**
- **CAUTION: MAINTAIN THE STRUCTURAL INTEGRITY OF THE MOBILE HOME WALLS, FLOOR, CEILING, AND ROOF WHEN INSTALLING AND USING YOUR STOVE.**
- **FAILURE TO FOLLOW THESE INSTRUCTIONS AND SPECIFIED COMPONENTS OR USING MAKE-SHIFT COMPROMISES CAN RESULT IN FIRE, PROPERTY DAMAGE, BODILY INJURY, AND EVEN DEATH.**

- Burning any fuel other than wood in this unit could generate dangerous levels of carbon monoxide within the living space.
- **THE FRONT DOOR MUST REMAIN CLOSED WHEN IN OPERATION EXCEPT FOR START UP AND LOADING.** Leaving the door open during use could cause any smoke or fire detectors in the home to be set off or a fire could escape the firebox and start the room on fire.
- If this unit is installed in a mobile home, care must be taken to ensure adequate air is available. If not enough air is available it could starve the room of all the oxygen. (See page 29 for more details)

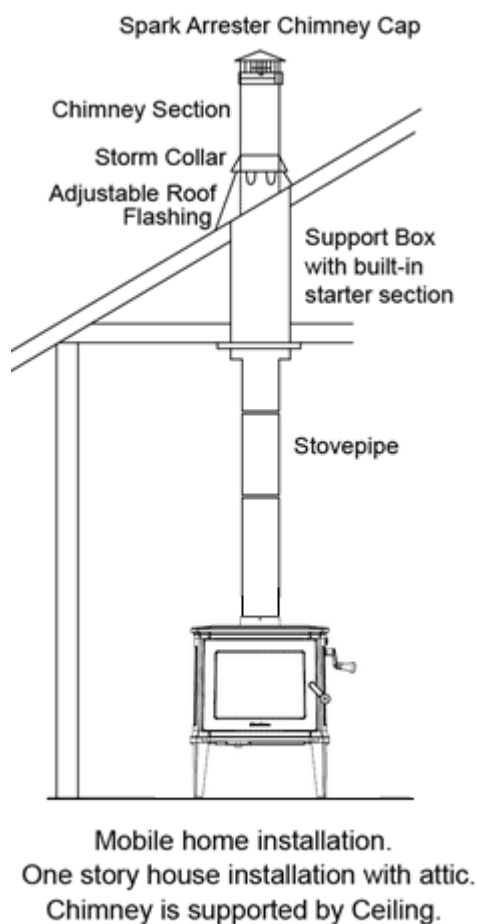


Figure - 9

- **CAUTION: REMOVE THE CHIMNEY WHEN TRANSPORTING THE MOBILE HOME!**
- Be sure to follow the manufacturer's instructions to maintain an effective vapor barrier at the location where the chimney or other component penetrates the exterior of the structure

OPERATION

Once your Green Mountain 80 is installed, you are ready to light a fire.

Every installation, season's firewood, and operator's technique varies. Learn how to use your stove most efficiently for your installation. We can give you the basic principles, but only you can ensure maximizing the potential of your stove while also operating it safely.

- **WARNING: HOT WHILE IN OPERATION! KEEP CHILDREN, PETS, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.**

Read this entire chapter before lighting your first fire. It explains the controls and features of your wood stove, how to choose firewood, and how to use your stove on a daily basis.

CONTROLS AND FEATURES

Before lighting any fires, become familiar with the location and operation of your stove's controls and features and learn how to use them (See Figure 10). For your own safety, do not modify these features in any way. We recommend you use fireplace gloves when the stove is in operation and hot.

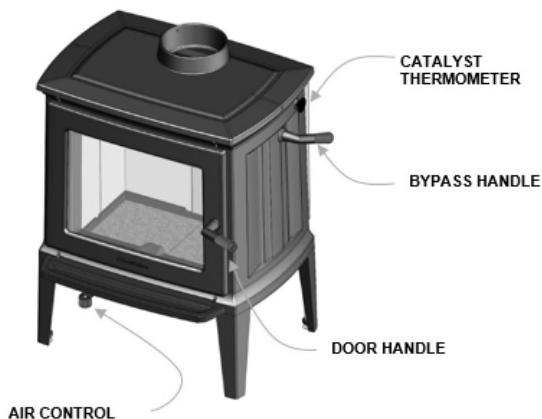


Figure 10 - Controls & Features

FRONT DOOR HANDLE: The firebox door allows you to load wood into your stove; a wood handle operates the door. To open the door, pull up on the handle and swing the door away from the stove. To latch the door, push the door tightly towards the firebox then continue to push the handle in and down until it latches shut. Gently pull on the door handle to make sure it is properly latched.

PRIMARY AIR CONTROL: The primary air control lever is located under the ash lip. The primary air control allows you to regulate the amount of air

entering the firebox. Generally, the more air allowed into the firebox, the faster the rate of burn and the higher the heat output; conversely, less air creates a slower burn, with lower heat output. For maximum airflow, pull the lever out as far as possible; move the lever inwards as far as possible for minimum airflow (does not close completely).

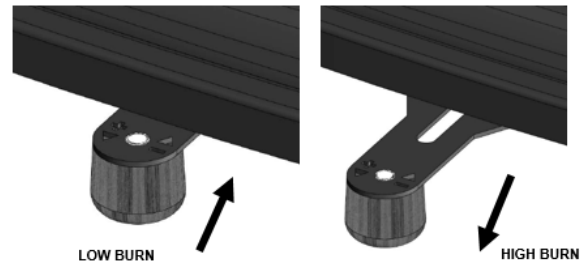


Figure 11 – Air Control

BYPASS HANDLE: The bypass handle controls the bypass door inside the stove. When the handle is pointed towards the front of the stove, the bypass door is open, and when the handle is pointed towards the rear of the stove, the bypass door is closed. The bypass door directs the flow of combustion products through or around the catalytic combustor. When the bypass handle is open, combustion products are directed around the catalytic combustor. The bypass handle should be open when first starting a fire until the catalytic combustor heats up to activation temperature, and whenever opening the front door to load the stove. When the bypass handle is closed, combustion products are directed through the catalytic combustor. The bypass handle should be closed once the catalytic combustor heats up to activation temperature, and remain closed whenever the stove is burning and in the active temperature range.

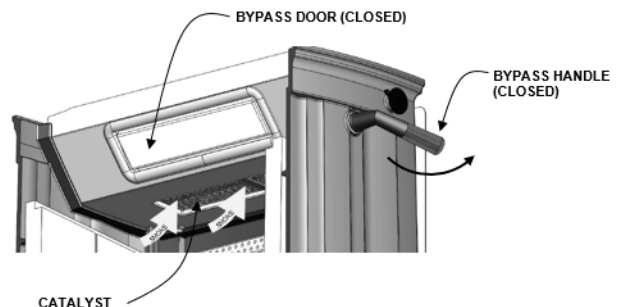


Figure 12 – Bypass Closed

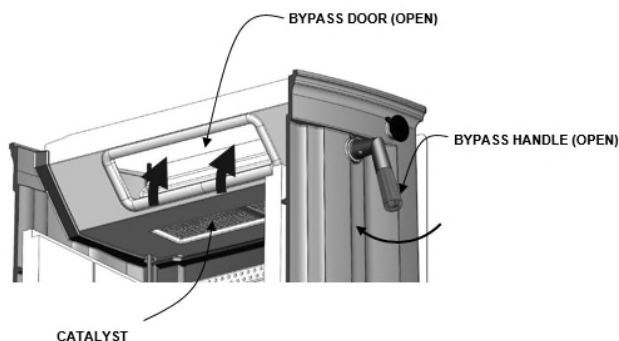


Figure 13 – Bypass Open

CATALYST THERMOMETER: The catalyst thermometer monitors the downstream temperature of the catalysts, and indicates when the stove is in the active range for the catalysts. When the stove is in the “active” range, the bypass handle should be closed. When the stove is in the “Inactive” range, the bypass handle should be opened until the stove heats up. If the thermometer is in the “Too Hot” range, keep the door closed, fully close the air control, and allow the stove to cool down until the thermometer falls into the “Active” Range. Once the catalyst thermometer has reached the active range, heat generated from burning smoke keeps the catalysts warm and active as long as fuel remains in the stove. The Green Mountain 80 typically operates in the 800 °F to 1300 °F range.



Figure 14 – Catalyst Thermometer

CHOOSING FIREWOOD

Burn only natural firewood (known as cordwood) in the Green Mountain 80 Model 8680 Wood Heater. This stove is not designed to burn other fuels.

- **CAUTION: DO NOT USE CHEMICALS OR FLAMMABLE FLUIDS TO START THE FIRE. DO NOT USE CHARCOAL, PELLETS, COAL, ARTIFICIAL LOGS OR ANY OTHER MATERIALS AS FUEL; THEY ARE NOT SAFE. DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS.**
- **THE USE OF UNAUTHORIZED FUEL SUCH AS COAL COULD PRODUCE HIGH LEVELS OF CARBON DIOXIDE IN THE LIVING SPACE. AT HIGH LEVELS CARBON DIOXIDE COULD RESULT IN PERSONAL INJURY OR DEATH.**

The quality of your firewood directly affects heat output, duration of burn and performance of your stove. Softwoods generally burn hotter and faster, while hardwoods burn longer and produce better coals. Density and moisture content are two critical factors to consider when purchasing wood.

The following is a list of some wood species and their relative BTU (British Thermal Unit) content. The higher the BTU content, the longer the burn. Firewood with higher BTUs is generally ideal for a wood stove.

Burn untreated wood only. Other materials such as wood preservatives, metal foils, coal, plastic, garbage, sulphur, or oil may damage the catalysts.

Wood Heat Value: Sorted By Btu Content

Common Name	Lb/ cord	MBTU/ cord
High		
Osage Orange (Hedge)	4,728	32.9
Hickory, Shagbark	4,327	27.7
Hop Hornbeam (Ironwood)	4,267	27.3
Beech, Blue (Ironwood)	3,890	26.8
Birch, Black	3,890	26.8
Locust, Black	3,890	26.8
Hickory, Bitternut	3,832	26.7
Locust, Honey	3,832	26.7
Apple	4,100	26.5
Mulberry	3,712	25.8
Oak, White	4,012	25.7
Medium High		
Beech, European	3,757	24
Maple, Sugar	3,757	24
Oak, Red	3,757	24
Ash, White	3,689	23.6
Birch, Yellow	3,689	23.6

Medium		
Juniper, Rocky Mtn	3,150	21.8
Elm, Red	3,112	21.6
Coffee tree, Kentucky	3,112	21.6
Hackberry	3,247	20.8
Tamarack	3,247	20.8
Birch, Gray	3,179	20.3
Birch, White (Paper)	3,179	20.3
Walnut, Black	3,192	20.2
Cherry	3,120	20
Ash, Green	2,880	19.9
Cherry, Black	2,880	19.9
Elm, American	3,052	19.5
Elm, White	3,052	19.5
Sycamore	2,808	19.5
Ash, Black	2,992	19.1
Maple, Red	2,924	18.7
Fir, Douglas	2,900	18.1
Medium Low		
Boxelder	2,797	17.9
Alder, Red	2,710	17.2
Pine, Jack	2,669	17.1
Pine, Norway (Red Pine)	2,669	17.1
Pine, Pitch	2,669	17.1
Catalpa	2,360	16.4
Hemlock	2,482	15.9
Spruce, Black	2,482	15.9
Pine, Ponderosa	2,380	15.2
Low		
Aspen, American	2,290	14.7
Butternut (Walnut, White)	2,100	14.5
Spruce	2,100	14.5
Willow	2,100	14.5
Fir, Balsam	2,236	14.3
Pine, White (Eastern, Western)	2,236	14.3
Fir, Concolor (White)	2,104	14.1
Basswood (Linden)	2,108	13.8
Buckeye, Ohio	1,984	13.8
Cottonwood	2,108	13.5
Cedar, White	1,913	12.2

Moisture content also plays a key role in the performance of your stove. Wood freshly cut from a

living tree (green wood) contains a great deal of moisture. As you might expect, green wood burns poorly. You must season green wood before using it in your wood stove. To season green wood properly, split, stack, and allow it to air dry for a period of one year. Green wood may provide less than 2000 Btu per pound, whereas dry wood can provide up to 7000 Btu per pound.

Stack the firewood on skids or blocks to keep it off the ground, cover only the top of the stack. Plastic or tarps that cover the sides of the woodpile trap moisture and prevent the wood from drying. As for stacking, an old Vermonter said, "The spaces between the logs should be large enough for a mouse to get through, but not for the cat that's chasing it."

- **CAUTION: DO NOT STORE FIREWOOD WITHIN THE STOVE'S SPECIFIED CLEARANCES TO COMBUSTIBLE MATERIALS.**

BUILDING A FIRE

Once you understand the controls of your wood stove and have the appropriate firewood, you are ready to start a fire.

- **WARNING: NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR 'FRESHEN UP' A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER WHILE IT IS IN USE.**

BREAKING IN YOUR WOOD STOVE

It is imperative that your stove is "broken in" gradually. Soapstone must be "seasoned"; over-firing a new stove may cause soapstone to crack or may damage other stove parts. Natural moisture in the freshly quarried soapstone must be driven out slowly to minimize the "shock" to the stone of its first exposure to high firebox temperatures. In addition, the asbestos-free furnace cement must be cured slowly to ensure adequate sealing and bonding.

When you light your first fires, the woodstove will emit some smoke and fumes. This is normal "off-gassing" of the paints and oils used when manufacturing the woodstove. If you find it necessary, open a few windows to vent your room. The smoke and fumes will usually subside after 10 to 20 minutes of operation. The odor and smoke will end once the stove is "cured".

The first few fires of the season may produce other odors from impurities that exist in the area immediately surrounding the stove. Some potential impurities are cleaning solvents, paint solvents,

cigarette smoke, and soot from scented candles, pet hair, dust, adhesives, a new carpet, and new textiles. These odors will dissipate over time. You can alleviate these odors by opening a few windows or otherwise creating additional ventilation around your stove. If any odor persists, contact your dealer or an authorized service technician.

If you adhere to the operating procedures in this manual, the steel, cast iron, and soapstone components of your stove will give you many years of trouble-free use. With use, the color of the soapstone may change and small fractures may appear on the surface. These changes do not affect the function of the stove. If a panel breaks completely, it must be replaced.

Avoid the following conditions that can cause the glass, soapstone, steel or cast iron pieces to break:

- Do not throw wood into the stove.
- Do not use the door as a lever to force wood into the stove.
- Do not load wood encrusted with ice into a burning stove - the thermal shock can cause damage.
- Do not use a manufactured log grate or otherwise support the fuel. Burn the fire directly on the floor of the firebox.

BUILDING A BREAK IN FIRE

- 1) Open the bypass handle. Open the front door and place five or six double sheets of tightly twisted newspaper in the center of the firebox. Arrange kindling in a crisscross pattern over the newspaper. Kindling should be approximately ten pieces, 1/2" (13 mm) in diameter and 10" to 16" (254 mm to 406 mm) long.
- 2) Fully open the primary air control by pulling the control handle towards you, away from the firebox.
- 3) Light the paper under the kindling. Leave the door slightly ajar momentarily until the kindling has started to burn and draft begins to pull.
- 4) Close the door and allow the fire to burn. Keep the door closed while the stove is in use.
- 5) KEEP A WATCHFUL EYE ON YOUR STOVE to maintain a steady, low-heat fire. Your first fire should make the stove warm but **not hot to the touch**. Visible steam, or boiling moisture and hissing indicate the soapstone is too hot. At most, a few small chunks of wood should be added to the fire to reach safe break-in temperatures.

- 6) Once the stove is warm but **not hot to the touch**, close the primary air control by pushing it fully inward toward the stove to allow the fire to die out completely.

- 7) Let the stove return to room temperature.

Your first fire and first fire each season thereafter should be built and maintained as outlined above. Your patience will be rewarded by a properly seasoned stove.

- NOTE: The cool flue gas temperatures present during the break-in procedure may cause rapid creosote build-up. The door glass may also get dirty. A good hot fire will clean it. We recommend a visual inspection (and cleaning if necessary) of your stovepipe and chimney once the break-in procedure is completed.

NORMAL OPERATION

BUILDING A FIRE FOR EVERYDAY USE

- 1) Open the bypass handle. Open the front door and place five or six double sheets of tightly twisted newspaper in the center of the firebox. Arrange kindling in a tee-pee configuration over the newspaper. Use approximately 10 pieces of kindling, 1/2" (13 mm) in diameter and 10" to 16" (254 mm to 406 mm) long.
- 2) Fully open the primary air control by pulling the lever completely out, away from the firebox.
- 3) Light the paper under the kindling. Leave the front door slightly ajar momentarily until the kindling begins to burn and draft begins to pull.
- 4) Close the door and allow the fire to burn.
- 5) Once the kindling is burning, open the front door and add logs, small at first, to build the fire up. Ensure you keep the logs away from the glass in front in order for the air-wash system to work properly. Keep the front door closed while the stove is in use.

CAUTION: DO NOT BUILD THE FIRE TOO CLOSE TO THE GLASS. KEEPING THE FIRE TOWARDS THE CENTER OF THE FIRE BOX WILL KEEP COALS FROM BUILDING UP AGAINST THE GLASS DURING RELOADING.
- 6) Once the fire is burning well, and the catalyst thermometer indicates that the stove is in the active range, close the bypass handle. Now the combustion products are passing through the catalytic combustor, and your stove will be burning at its optimal efficiency.

- 7) After closing the bypass door, allow the stove to run on a high setting for around 20 minutes to ensure the catalytic combustor stays in the active range. This will also allow the fire to burn off any residue on the door glass from any previous low-burn fires
- 8) Use the primary air control to regulate the desired rate of burn. Pull the handle towards you for a higher burn rate, and push the handle towards the stove for a lower burn rate. The air control does not close completely.

Note: Always remember to open the bypass handle before opening the front door. When opening the front door to reload or re-arrange logs, it is advisable to open the door just a crack, pause for a moment then open the door completely. This procedure allows the firebox to clear of smoke before the door is open fully. In addition, reloading on a bed of hot, red coals reduces smoking time and brings fresh fuel up to a high temperature rapidly. During the refueling and rekindling of a cool fire, or a fire that has burned down to the charcoal phase, operate the stove at a medium to high firing rate for about 10 minutes to ensure that the catalysts reach approximately 600 °F. Once the catalysts reach operating temperature, the bypass handle can be closed. When reloading the stove, try to keep an open path behind the Lower Primary Air Opening (LPAO). It is helpful to leave a small valley in the coal bed behind the LPAO to insure faster re-lighting.

CATALYTIC COMBUSTOR OPERATION

The Green Mountain 80 uses a catalytic combustor to ensure highly clean and efficient burns. The catalytic combustor is made from a stainless steel corrugation that is coated with a catalytic material. The catalytic combustor becomes active around 500 °F (260°C), helping to burn up smoke and any remaining particles that were not fully burned in the firebox. During the startup of a cold stove, a medium to high firing rate must be maintained for about 20 minutes. This ensures that the stove, catalysts, and fuel are all stabilized and at proper operating temperatures. Even though it is possible to have gas temperatures reach 500 °F (260°C) within 2 to 3 minutes after a fire is started, if the fire is allowed to die down immediately, it may go out or the combustor may stop working. Once the stove and catalytic combustor heat up, heat generated from burning smoke keeps the catalysts warm and active as long as fuel remains in the stove. Your stove will burn the cleanest and most efficiently when the catalysts are in the active range. There should be

little to no visible smoke from your chimney when the catalysts are in the active zone and fully functional.

BURN RATE

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

LOW BURN: Move the air control lever all the way inward toward the stove. (See figure 13). This closes the air shutter to its minimum opening. A low burn rate over extended periods is not advisable as it can promote the accumulation of creosote. Inspect the venting system frequently if using low burn rates consistently.

MEDIUM LOW BURN: With the primary air control in the low position, pull the air control forward (a little less than 1/4"). A medium-low burn rate is the typical setting and is preferable if the stove is unattended. At this burn rate, a little goes a long way.

MEDIUM HIGH BURN: With the primary air control in the low position, pull the air control forward (a little less than 1/2")

HIGH BURN: Completely open the primary air control by moving it all the way outward toward the operator. Fully load the firebox with wood on a bed of hot coals or on an actively flaming fire. To minimize creosote accumulation, run the stove on high once or twice daily for 35 to 45 minutes to fully heat the stovepipe and chimney.

CAUTION: Do not burn fuel other than cordwood in your stove.

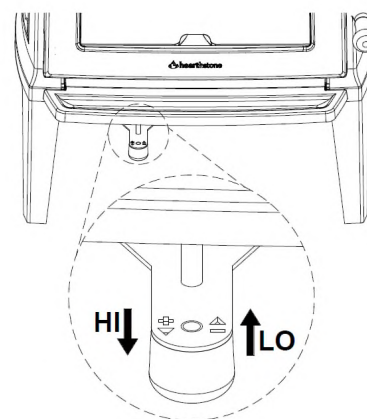


Figure 15 – Air Control Position

OVER-FIRE CAUTION

Over-firing means the stove is operating at temperatures above normal temperatures reached during High Burns outlined in the *BURN RATE* section. Carefully avoid over-firing, as it will damage the stove. Symptoms of chronic over-firing can include warped components, short burn times, a roaring sound in the stove or stovepipe, and discoloration of the stovepipe. A properly installed stove using fuel and following operating procedures as outlined in this manual should not over-fire.

Excessive draft, inappropriate fuel, and operator error can cause over-firing. Correct an over-fire situation as follows:

- **EXCESSIVE DRAFT:** Contact your local dealer to have a draft reading taken. Any draft in excess of 0.1 WC requires a damper in the stovepipe. Some installations may require more than one damper.
- **INAPPROPRIATE FUEL:** Do not burn coal; kiln dried lumber, wax logs, compressed wood, highly volatile fuels or combustibles, or anything other than natural cordwood.
- **OPERATOR ERROR:** Ensure all the gaskets are in good condition. Replace worn out or compressed gaskets. Only burn the stove with the firing and ash doors in the closed position.

If you suspect your stove is over-firing, discontinue use and contact your dealer immediately. **Damage caused by over-firing is not covered by your warranty.** Results of over-firing can include warped or burned out internal parts, cracked refractory panels, discolored or warped external parts, and damaged finish.

- **ANY SIGNS OF OVER-FIRING WILL VOID YOUR WARRANTY!**
- **THE FRONT DOOR MUST REMAIN CLOSED WHEN IN OPERATION**

REMOVAL AND DISPOSAL OF ASHES

You can leave a thin layer of ashes in the firebox if preferred. Allow fire to die down or go out

completely. It is important to prevent ashes from building up around the front door opening or they will spill out, or they can pack into the gasket channel and prevent proper sealing. To remove ashes, use a fireplace shovel. Avoid removing large live coals by pushing them to the side and removing only the finer ash with a shovel.

Disposal of ashes - Ashes should be placed directly into a **metal** container with a tight fitting lid. Do not place any other items or trash into the metal container. Do not pour water into the container. Replace the container's lid and allow the ashes to cool. Never place the ash disposal container on a combustible surface or vinyl flooring, as the container could be **hot!**

Pending disposal, place the closed ash container on a noncombustible floor or on the ground outside, well away from all combustible materials, liquid fuels, or vehicles. Retain ashes in the closed container until all coals thoroughly cool.

If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

NEVER place ashes in wooden or plastic containers, in trashcans with other trash, or in paper or plastic bags, no matter how long the fire has been out. Coals within a bed of ashes can remain hot for several days once removed from the firebox.

MAINTENANCE

CATALYTIC COMBUSTOR INSPECTION AND REPLACEMENT PROCEDURES

- **WARNING: THIS WOOD HEATER CONTAINS A CATALYTIC COMBUSTOR, WHICH NEEDS PERIODIC INSPECTION AND REPLACEMENT FOR PROPER OPERATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL, OR IF THE CATALYTIC ELEMENT IS DEACTIVATED OR REMOVED**

It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis

-Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. If any of these conditions exists, refer to Catalyst Troubleshooting section of this owner's manual.

-This catalytic (or hybrid) heater is equipped with a thermometer to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500 °F, and often reach temperatures in excess of 1,000 °F. If catalyst temperatures are not in excess of 500 °F, refer to the

Catalyst Troubleshooting section of this owner's manual.

-You can get an indication of whether the catalysts are working by comparing the amount of smoke leaving the chimney when the smoke is going through the combustor and catalysts light-off has been achieved, to the amount of smoke leaving the chimney when the smoke is not routed through the combustor (bypass mode).

1. Light stove in accordance with operator's instructions
2. With smoke routed through the catalysts, go outside and observe the emissions leaving the chimney.
3. Engage the bypass mechanism and again observe the emissions leaving the chimney. Significantly more smoke will be seen when the exhaust is not routed through the combustor (bypass mode)

INSPECTING THE CATALYSTS AND REMOVING/REPLACING THE BAFFLE

1. Allow the stove and ashes to fully cool.
2. Remove the metal baffle protector by sliding it to the left or right, and then rotating it towards you.
3. Lift up on the right side baffle, and gently pull the left side baffle down and out of the stove

CAUTION - Do not force the baffle pieces. Gently adjust the baffle orientation until each side can be removed freely from the stove.



Figure 16 - Removing/Replacing the Baffle for Inspection



Figure 18 (cont.) - Removing/Replacing the Baffle for Inspection

4. Use a small vacuum nozzle or soft bristled brush to remove any accumulated ash or soot on the face of the catalysts.
5. Inspect the catalysts for any unusual warping, corrosion, or plugged openings.
6. If any unusual conditions are found, remove the catalyst blocks – See replacing the catalysts.
7. Replace the baffles and baffle protector. Installation is the opposite of removal.
8. Ensure that the baffle pieces are pushed together at the center joint.

REMOVING OR REPLACING THE CATALYSTS

Refer to the Catalytic combustor warranty on page 35 for catalyst replacement information. **DO NOT OPERATE UNIT WITHOUT CATALYSTS.** Only remove the catalysts if required. In general, the less you handle the catalysts, the better. If any unusual conditions are found, remove the catalyst blocks

1. Allow the stove and ashes to fully cool.
2. Loosen, but do not remove the screws securing the rear heatshield. (If stove is so equipped).
3. Remove the heat shield by sliding the screw heads through the slots in the heatshield.
4. Remove the 2 bolts securing the cast iron catalyst access cover, and remove the cover.

ash. If fly ash exists, gently brush the catalysts off with a narrow soft-bristle brush, or vacuum with a crevice tool.

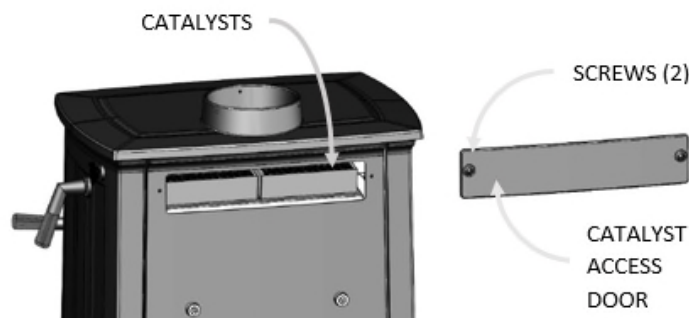
6. If fly ash exists, or if there are suspected catalyst performance issues, fully remove the catalysts by gently pulling upwards from the ribs in the cast iron, and then pulling outwards through the catalyst access opening.
7. Remove any remaining gasket material from the opening and from the catalysts.
8. Inspect the catalysts for any fly ash or clogging, and remove with a soft bristled brush or vacuum crevice tool. If extra cleaning is needed, follow the guidelines below:

-You may use compressed air under 35 psi, air only, no chemicals.

-You may soak the catalysts in a hot water mix (not boiling), 4 parts water, 1 part vinegar. Rinse with cold water until vinegar smell is mostly gone.

-No metal tools such as gun cleaners should be used.

-No detergents or chemicals.



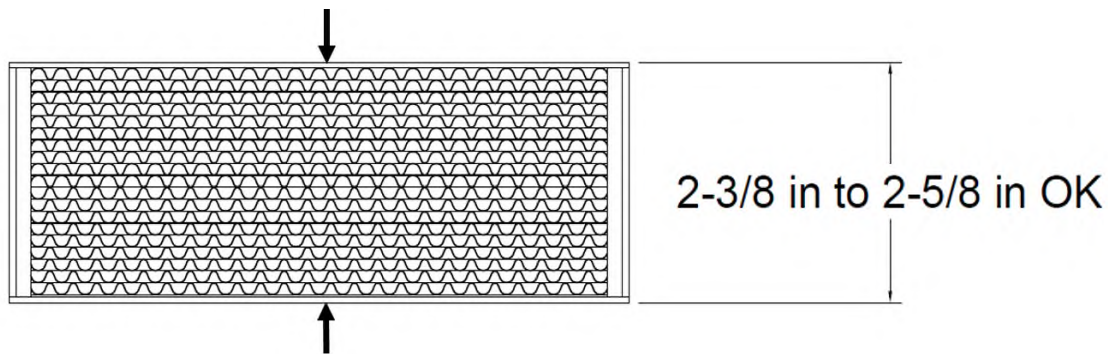
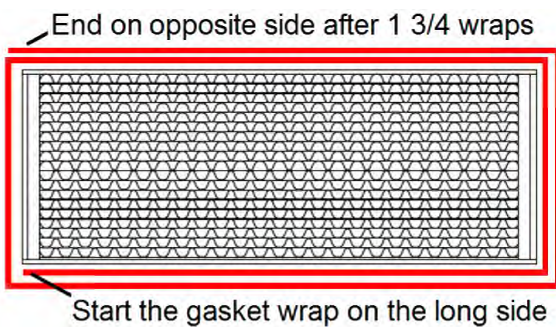


Figure 20 - Acceptable Catalytic Distortion

9. Some warping or bowing of the catalysts over time is acceptable, as long as the catalyst gasket continues to seal. Measure the catalysts in the middle section – if the dimensions are outside the range shown in Figure 20 on the next page, replace the catalysts.
10. Beginning at one corner, re-install fiberglass gasket material on the catalysts.

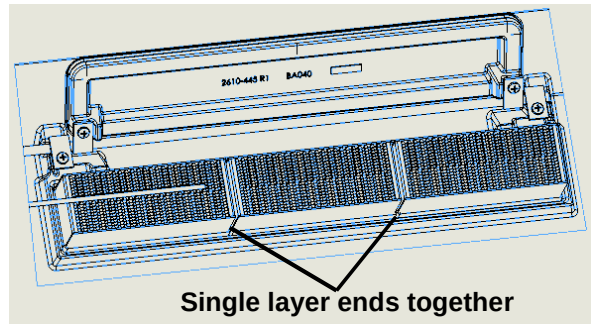


11. Wrap the gasket tape around the catalysts so it is reasonably tight. Double layer the material on three sides of the individual catalyst cartridges as shown in the following picture.



12. Once the gasket is installed on the catalysts, gently push the catalysts into the catalyst

opening until the catalysts hit against the bottom wall of the cavity. Take care to ensure the gasket is not damaged and position the



three cartridges so that the single layer gasket edges touch one another in the center.

13. Replace the catalyst access door.
14. Heat the stove slowly during your next fire to allow the fiberglass gasket to properly seat and seal the catalysts.

REPLACING THE REFRACTORY STONE AND SECONDARY RISER ASSEMBLY

1. Allow the stove and ashes to fully cool.
2. Open the front door of the stove and fully clean any ash in the firebox
3. Remove the baffle following the instructions in "Inspecting the Catalysts and Removing/Replacing the baffle."
4. Remove the side stones one at a time by tipping them towards the inside of the firebox from the top.
5. With side stones and baffle removed, the secondary riser assembly and rear stones can be lifted up and out of the stove.

6. Installation is the reverse of disassembly. Make sure that the secondary riser tube is seated in the pocket at the rear of the bottom casting.

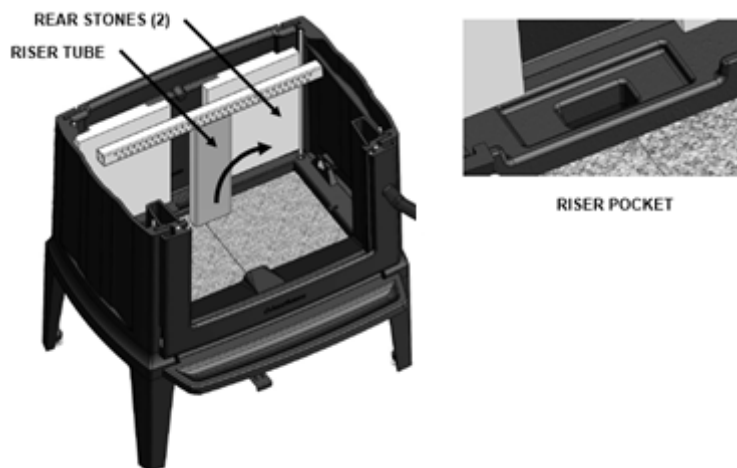


Figure 21 - REMOVING RISER AND REAR STONES

GLASS REPLACEMENT PROCEDURES

- **WARNING: DO NOT OPERATE THIS APPLIANCE WITH THE GLASS PANEL REMOVED, CRACKED, OR BROKEN. DO NOT SUBJECT THE DOOR TO ABUSE, SUCH AS STRIKING OR SLAMMING SHUT. ONLY A QUALIFIED SERVICE PERSON SHOULD REPLACE THE GLASS PANEL.**

Required Glass Kit: Part Number: 96-58805. Use only 4mm x 368mm x 549mm Ceramic, or Neoceram glass. Contact your Hearthstone dealer.

1. Follow the instructions included with the replacement glass kit.
2. Remove the door.
3. Remove the screws from the glass clips (use penetrating oil if necessary) – Set aside for reinstallation.
4. Carefully lift the damaged glass off the door and discard.
5. Remove any remaining glass and old gasket material.
6. Clean the screw holes and place a small amount of anti-seize compound in each one.
7. Install a new glass gasket in the glass gasket groove.
8. Place the new glass onto the door.
9. **Important! Center the glass** and ensure that the edges of the glass are parallel with the edges of the opening.
10. Check glass position again (centered, and parallel), then screw the glass retainer clips with the glass pads back on the door using a crisscross pattern. Tighten the screws no more than 1/8th of a turn after they seat. The glass will break at this point if not positioned correctly.
11. Apply a light film of anti-seize lubricant on the door's hinge pins if needed.
12. Install the door.
13. After 5 or 6 fires, check the glass retainer screws, and retighten if necessary.

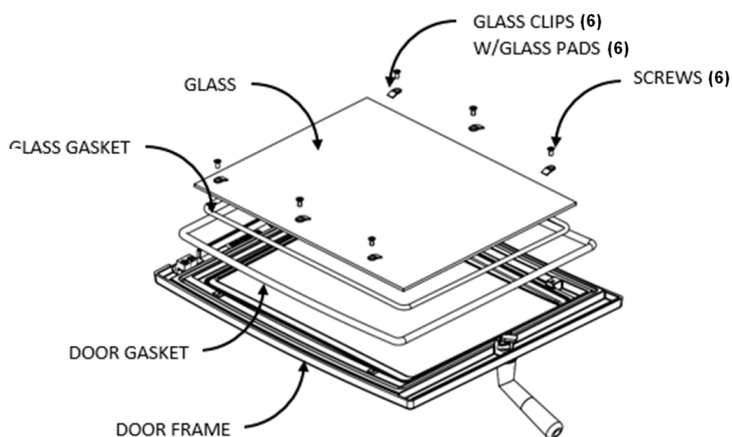


Figure 22: Front Door assembly

CREOSOTE FORMATION & REMOVAL

When wood burns slowly at low temperatures, it may produce tar and other organic vapors, which combine with expelled moisture to form creosote. These creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire, which may damage the chimney or even destroy the house. When burning wood, inspect the chimney connector and chimney at least once every two months during the heating season to determine if there is a creosote buildup.

If a creosote build-up occurs, inspect the stovepipe connector and chimney more often, at least monthly during the heating season to monitor the accumulation. If a creosote residue greater than 1/8" (3 mm) accumulates, remove it to reduce the risk of a chimney fire.

PREVENTION

Burn the stove with the primary air control fully open for 35 - 45 minutes daily to burn out creosote deposits from within the stove and the venting system.

After reloading with wood, burn the stove with the primary air control fully open for 15 to 20 minutes. This manner of operation ensures early engagement of the secondary combustion system that minimizes creosote buildup in the chimney.

If your glass always remains dirty, your operating temperatures are too low or your wood is wet; therefore, there is a higher risk of creosote buildup.

Inspect the venting system at the stove connection *and* at the chimney top. Cooler surfaces tend to build creosote deposits faster, so it is important to check the chimney at the top (where it is coolest) as well as from the bottom near the stove.

CLEANING

Remove accumulated creosote with a cleaning brush specifically designed for the type of chimney in use. We recommend you use a certified chimney sweep to perform this service. Contact your dealer for the name of a certified chimney sweep in your area (your dealer may be a certified sweep!).

We recommend that before each heating season you have the entire system professionally inspected, cleaned and repaired, if necessary.

GASKETS

Replace door gasket material every two to three seasons, or whenever it becomes deteriorated or loose, depending on stove use. If the door seal leaks, a new gasket will ensure a tight seal and improve stove performance.

We recommend you only use Hearthstone replacement gaskets when you need to replace your door gasket. Contact your dealer for a gasket kit that includes instructions, and the gasket for your stove.

GLASS

The glass used in our stoves is actually not plain glass, but a tough, clear ceramic material capable of operating at temperatures up to 2300° F. Do not operate the stove with a broken door glass. Do not abuse the front door by striking or slamming.

When necessary, clean the glass. For the inside surface of the glass, we recommend using a damp paper towel dipped in gray ash. Rub the inside of the glass with a circular motion. When all the deposits are removed, clean up with window cleaner or with commercial stove glass cleaners, which are available from your local dealer. Use this type of cleaner for the outside surface as well. Never attempt to clean the glass while the fire is burning or while the glass is hot. Remove deposits by following the instructions provided with the cleaner. Wipe the cleaner off with a soft cloth, or black & white newsprint.

Important: scratching or etching the glass will weaken the integrity of the glass. Do not use a razor blade, steel wool, or any other abrasive material to clean the glass. Use a cleaner specifically manufactured for woodstoves only.

The front door glass is a ceramic, thermal shock-resistant glass, made specifically for use in woodstoves. Do not use any replacement glass other than the ceramic glass manufactured and supplied for use in this woodstove. Replacement glass is available through your local dealer.

Replace the door glass immediately if broken or chipped. Contact your local dealer for replacement glass. The glass kit includes instructions and everything needed for the repair. If you replace the glass yourself, wear work gloves and safety glasses.

Required Glass Kit: PN: 96-58805.

TROUBLESHOOTING

COMMON ISSUES

Virtually all woodstove operators experience basic common problems at one time or another. Most are correctable and generally require only a minor adjustment of the stove, installation, or operating technique. In cases where weather conditions dramatically affect stove performance, the problems are typically temporary and solve themselves once the weather changes.

If you question whether your stove is producing adequate heat, the best way to troubleshoot the problem is to monitor the temperature of the stack no more than 12 inches (30 cm) above the flue collar. A 400° F (200° C) stovepipe confirms the stove is supplying sufficient heat. Keep in mind that your house itself will regulate room/house temperatures. How well the walls, floors and ceilings are insulated, the number and size of windows, the tightness of outside doors, and the construction or style of your house (vaulted ceilings or other open spaces which collect large percentages of heat, ceiling fans, etc.) all are determining factors of room temperature.

Your stove's performance is also dependent on its installation. One common cause of poor performance is an oversized chimney flue. Oversized chimney flues result in decreased draft, which prevents the smoke from rising out the chimney. Oversized flues are also more difficult to heat effectively, especially when burning a high efficiency stove. Cool flue temperatures inhibit the establishment of a strong draft (and encourage the accumulation of creosote). The lack of a strong draft will cause the fire to die down and may even force smoke to pour into the room.

If your chimney is the proper size and a strong draft is not easily established, there is the possibility that the chimney is too cold. Again, hot chimneys promote stronger drafts. Opening a window briefly in the room while lighting the stove may help.

Other draft guidelines are as follows:

An **"AIRTIGHT" HOUSE:** The air supply (infiltration) to the interior of the house may be inadequate if your home is super-insulated or especially well sealed. This phenomenon of air starvation within the

building is exacerbated if exhaust fans, such as clothes dryers, bathroom fans or cook stove exhaust fans, are in operation within the home. Outfitting your stove with the optional outside air adaptor connected to an air duct, which leads to the outside of the building, can correct this problem.

Tall Trees or Buildings: These obstructions, when located close to the top of the chimney can cause chronic or occasional downdrafts. When selecting a site for a new chimney, consider the placement of other objects near the proposed chimney location.

Wind Velocity: Generally, the stronger and steadier a wind, the stronger (better) the draft. However, "gusty" wind conditions can cause erratic downdrafts. For consistent problems, consider a high wind cap, such as the Vacu-Stack.

Barometric Pressure: Chimney drafts are typically sluggish on balmy, wet or muggy days (low barometric pressure). This is a weather-related phenomenon, which generally is self-correcting as the weather changes.

Briskness of Fire: The hotter the fire in your stove, the hotter your chimney and, therefore, the stronger the draft.

Breaks in the Venting System: An unsealed clean-out door at the bottom of the chimney, leaky stovepipe joints, a poor stovepipe-to-thimble connection, missing caps, or a leaky chimney all can cause inadequate draft.

Seasonal Factors: Early fall and late spring are generally difficult seasons in which to establish proper drafts. The colder the outside air is relative to room temperature, the stronger the draft.

OPERATING THE STOVE

As outlined above, there are days when a good draft is just not easy to establish. The causes are usually seasonal factors or a cold chimney. Try starting the fire by using small kindling and fuel to obtain a quick, hot fire. Tend the fire frequently with small fuel until the chimney is hot and the draft is well established. Sometimes, partially opening a first floor window briefly will help quickly get draft established.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
STOVE SMOKES	Operating Technique	Fully open the primary air control one minute before opening doors, and ensure the <u>bypass</u> is open before opening door.
	Cold Chimney or reverse draft	Preheat the chimney when first starting a fire. Briefly open a window in the room containing the stove.
	Blocked Chimney	Examine the chimney and stovepipe for blockage or creosote accumulations.
	Oversized Chimney	Reline the chimney to the appropriate diameter
	Undersized Chimney	Install a draft inducer or replace the chimney.
	Chimney Too Short	Lengthen the chimney.
	Air Infiltration Into The Chimney	Seal chimney connections and openings. Check clean-out doors.
	Bypass not closed	Ensure that the bypass door is closed when the catalysts are in the active range.
	Catalysts not functioning	Inspect catalysts for damage, ash build-up, or plugging. Brush catalysts with a soft-bristled brush, or vacuum lightly. Replace if required. Follow instructions to ensure catalyst light-off.
	Not burning proper fuel	Ensure cordwood is seasoned and dry.
	More Than One Appliance Connected to the Flue	Disconnect all other appliances and seal openings.
BACK-PUFFING OR GAS EXPLOSIONS	Operating Technique	Fully open the primary air control one minute before opening the door and keep it fully open for a few minutes after reloading. Ensure the <u>bypass</u> door is open before opening the door
	Extra Low Burn Rate	Burn the stove at a higher burn rate.
	Chimney Down-draft	Install a chimney cap.
	Excessive Ash Build-up	Empty the ash pan more frequently. Increase efficiency of burns, and avoid using poor quality or green wood.
UNCONTROLL- ED OR SHORT BURN	Unsealed or Open Door	Close the door tightly or replace the gaskets. Air leakage around glass gasket – replace gasket
	Excessive Draft	Check the installation. Operate at LOW BURN. Install stovepipe damper. Draft in excess of 0.1 wc should be corrected with a stovepipe damper(s)
	Extra Long Chimney	Shorten the chimney. Install stovepipe damper(s).
	Oversized Chimney	Reline the chimney to the proper diameter.
	High Winds or Hilltop Location:	Install a chimney cap.
INSUFFICIENT HEAT	Poor Quality, low Btu content, or Green Wood	Use only air-dried wood, preferably dried <u>at least</u> one year. Use a wood with a high Btu content if available.
	Low Burn Rate	Operate the stove at a higher burn rate.
	Cold Exterior Chimney	Reline or insulate the chimney.
	Leaky Stovepipe or Chimney	Check the installation. Replace with a pre-fabricated insulated chimney system or a properly sized masonry chimney.
	Too Much Heat Loss From House	Add insulation, use energy efficient windows, or caulk windows, and seal openings in home.
	Excessive Ash Build-up	Empty the ash pan more frequently. Increase efficiency of burns, and avoid using poor quality or green wood.
BLISTERING OF FINISH	Operating Technique	Do not over-fire the stove. Monitor stove temperatures. Use seasoned wood only.
	Excessive Draft	Check the DRAFT. A damper may be required. Operate the stove at a LOW BURN range.

ADDITIONAL CATALYST TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
FLY ASH BUILD UP ON CATALYSTS	Catalysts have not maintained light-off temperature	Brush cold combustor with soft-bristled brush or vacuum lightly. Follow instructions in the manual for a proper catalyst light-off
	Burning materials that cause a lot of char and fly-ash	Don't burn cardboard, gift wrap paper, or garbage. Burn only dry, seasoned wood, per the owner's manual.
	Bypass closed too soon	Follow instructions in the manual for a proper catalyst light-off
CATALYSTS PLUGGING OR MASKING (SOOT/CREOSOTE)	Burning wet, pitchy woods, or burning large loads of small diameter wood with the combustor in the operating position without catalyst light off occurring	Burn dry seasoned wood. Follow instructions in the manual for a proper catalyst light-off, and ensure catalyst light-off as occurred before closing bypass damper. It may be possible to burn the soot or creosote off by building a hot fire, and allowing the stove to run until the catalysts are well within the operating range before closing the bypass. Continue to run the stove at a high temperature for one hour, while ensuring the catalysts stay in the upper operating range, but not too hot.
WARPING OR BOWING OF THE CATALYSTS	Excessive catalyst temperatures for long periods of time.	Ensure that the catalysts remain in the operating zone, and does not get too hot. Reduce air control settings for a lower burn rate to ensure catalyst temperatures do not exceed the operating range.

REPLACEMENT PARTS & OPTIONAL ACCESSORIES

PART #	DESCRIPTION
	REPLACEMENT PARTS
5680-002	BOTTOM HEAT SHIELD
5640-008	HINGE PIN
5640-009	HINGE BLOCK
5680-010	SECONDARY AIR RISER ASSEMBLY
5680-012	TIE ROD
5680-016	BAFFLE GUARD
5640-018	BYPASS ROD RETAINER
5640-020	LATCH STRIKER PLATE
5640-022	DOOR LATCH
5680-024	REAR SHIELD (INCLUDED)
7200-520	CATALYST THERMOMETER
	REPLACEMENT KITS AND ACCESSORIES
96-58803	GASKET KIT
96-58805	GLASS KIT
96-71400	HANDLE KIT
96-73400	FRONT DOOR LATCH KIT
96-75800	CATALYST REPLACEMENT KIT
96-76800	BAFFLE KIT
96-57800	BLOWER KIT
96-53400	OUTSIDE AIR KIT

Refer to the Illustrated Parts list for further detail about stove components, available online at www.hearthstonestoves.com.

SAFETY LABEL



LIMITED WARRANTY

These warranties give you specific legal rights. You may also have other rights, which vary from State to State.

Hearthstone Quality Home Heating Products, Inc. (Hearthstone) warrants to the original retail purchaser only (the "Original Purchaser") the new appliance manufactured by Hearthstone, purchased by the Original Purchaser and installed by an authorized Hearthstone dealer or their designated representative against any of the occurrences listed in this document that result from defects in material or workmanship. This warranty is not transferrable. All obligations of Hearthstone under this document commence on the date of the Original Invoice (the "Purchase Date"). The term "Limited Lifetime" is defined as 10 years from the beginning of warranty coverage.

Hearthstone appliances are designed to be operated only with the fuels listed in your owner's manual.

Catalytic combustor LIMITED LIFETIME WARRANTY: The catalytic combustors are covered directly by the combustor manufacturer, Applied Ceramics. Included with your stove you will find the LIMITED LIFETIME WARRANTY for the catalysts, as well as a warranty card.

Catalyst Model Number: ACI-6M2 Catalyst Manufacturer: APPLIED CERAMICS

APPLIED CERAMICS warrants to the consumer who purchases a FIRECAT STEEL COMBUSTOR as a component in an EPA certified solid fuel appliance, to replace at no charge to the consumer the FIRECAT STEEL COMBUSTOR that ceases to function with two (2) years from the date of purchase by the original consumer, provided that the following conditions are met:

- (1) A copy of the original bill of sale that includes place and date of purchase must be submitted with the warranty claim.
- (2) The original FIRECAT STEEL COMBUSTOR must be returned to APPLIED CERAMICS
- (3) The FIRECAT STEEL COMBUSTOR must not have been mechanically abused, nor must the wrong fuels have been used in the appliance.

If after two years the FIRECAT STEEL COMBUSTOR fails to function, the prorated warranty will allow replacement at the following special price schedule:

Year 3	\$130.00
Year 4	\$140.00
Year 5	\$150.00
Year 6	\$160.00
Year 7 and after	at current retail price

Conditions 1, 2, and 3 also apply to the Prorated portion of the warranty. Any EPA certified solid fuel appliance will receive one replacement catalyst for each defective catalyst returned during the three year period. The consumer will be responsible for any removal, any servicing, and return of any items required for filing the warranty claim. This warranty is APPLIED CERAMIC'S exclusive warranty, and APPLIED CERAMICS, disclaims any other express or implied warranty for the FIRECAT STEEL COMBUSTOR, including any warranty or merchantability fitness for a particular use.

Ensure the catalyst is well wrapped and padded for shipment in bubble wrap, or similar material. Ship the catalyst with padding inside of a cardboard box.

All warranty claims must include \$12.50 for postage and handling within the continental U.S. Alaska and Canada claims must include \$35.00.
Please allow 2-3 weeks for delivery. Order online @ www.firecatcombustors.com

Please read and understand the full warranty. Please return the completed warranty card promptly to Applied Ceramics. The warranty card, and any warranty claims can be shipped to:

Applied Ceramics
55555 Pleasantdale Road
Doraville, GA, 30340

Stove components Limited Warranty

Warranty Period	Wood	Gas	Pellet	Covered Components
Limited Lifetime	X	X	X	Stone
	X	X	X	Cast iron not listed elsewhere
	X			Clean burning air supply system*
5 Year	X	X	X	Door handles and latches
	X	X	X	Steel Components and Firebox
		X		Burner and logs
3 Year			X	Burn Pot and Baffles
2 Year	X	X	X	Appliance Electrical and Gas Components
	X	X		Refractory, Vermiculite Panels, Baffles
1 Year	X	X	X	Enamel finish against peeling or fading
	X	X	X	Accessories
	X	X	X	Glass
	X			Ash Grate
	X	X	X	All components not listed elsewhere

Any parts repaired or replaced during the limited warranty period will be warranted under the terms of the limited warranty for a period not to exceed the remaining term of the original limited warranty or one year, whichever is longer.

Parts: Hearthstone will replace through an authorized dealer, defective parts covered by the foregoing warranty at no charge.

Labor: Within the first (1st) year after the Purchase Date, Hearthstone will pay for warranty labor performed by an authorized Dealer at Hearthstone's published labor rates in effect at the time the labor is performed only if the appliance is installed by an authorized dealer or their designated representative. Otherwise or thereafter, the Original Purchaser is responsible for the cost of labor.

Shipping cost for parts: Within the first ninety (90) days after the Purchase Date, Hearthstone will pay for the shipping of appliance parts covered by any of the foregoing warranties to and from Hearthstone or an authorized Dealer, as the case may be. Thereafter, the Original Purchaser is responsible for all shipping costs related to shipping appliance parts to and from Hearthstone or an authorized Dealer, as the case may be.

Shipping cost for the appliance: Within the first (1st) year after the Purchase Date, if the Original Purchaser is instructed to return the appliance to Hearthstone or an authorized Dealer for repair, Hearthstone will pay fifty percent (50%) and the Original Purchaser will pay fifty percent (50%) of the shipping costs related to shipping the appliance to and from Hearthstone or an authorized Dealer, as the case may be. Thereafter, the Original Purchaser is responsible for one hundred percent (100%) of all of the shipping costs related to shipping the appliance to and from Hearthstone or an authorized Dealer, as the case may be. Notwithstanding any other provision of this document, in no event will Hearthstone pay for any Dealer fees or other fees for pick up or delivery of the appliance returned for repair; the Original Purchaser shall be responsible for any such fees.

EXCLUSIONS & CONDITIONS

The warranties contained in this document do not cover, nor is Hearthstone responsible for:

1. Damages resulting from:
 - a. Failure to install, operate, or maintain the appliance in accordance with the owner's manual, operating instructions, installation instructions, or safety rating label provided with the appliance.
 - b. Over-firing the appliance. Over-firing can be identified by, but not limited to, warped cast iron or steel, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
 - c. Failure to install the appliance in accordance with all national or local building codes.
 - d. Shipping or improper handling.
 - e. Improper operation, abuse, misuse, continued operation with damaged, corroded, or failed components, accident, or improper/incorrect service or repairs.
 - f. Environmental conditions, inadequate ventilation, negative pressure, or improper drafting caused by tightly sealed constructions, insufficient make-up air supply, or air handling devices such as exhaust fans, forced air furnaces, or other such causes.
 - g. Damage caused by direct exposure to water.
 - h. Use of fuels other than those specified in the owner's manual.
 - i. Installation or use of components not supplied with the appliance, or any other components not expressly authorized and approved by Hearthstone.
 - J. Modifications of the appliance not expressly authorized and approved by Hearthstone in writing
 - K. Interruptions or fluctuations of electrical power supplied to the appliance.
2. All stones are warranted against cracking or breakage due to thermal stress, excluding surface and hairline cracks and scratches that do not affect the operation, or safety of the appliance.
3. Repair or replacement of wear parts. Such parts that are subject to normal wear and tear during the warranty period such as paint, gaskets, baffles, refractory materials, ash grates, and glass.
4. Damage resulting from installation, modification, alteration, repair or service of the appliance by any party other than an authorized Hearthstone dealer (a "Dealer") or their designated representative, or Hearthstone.
5. Damage due to water or condensation due to installation of the appliance in a high moisture area.
6. Damage due to installation of the appliance in an atmosphere contaminated by damaging chemicals, including but not limited to chlorine, fluorine or salts.
7. Scratches on glass, enameled surfaces or stones due to mechanical abrasion.
8. Noise caused by expansion or contraction caused by the heating and cooling of the appliance.
9. Odors caused by the heating of the appliance, or surrounding materials
10. Consequential damage caused by leaking of condensate during startup
11. A defect in any part of the appliance if the Original Purchaser fails to comply with Hearthstone's or a Dealer's request to ship the part or the appliance to Hearthstone or a Dealer, as the case may be.
12. Replacement stones and enameled parts are taken from current stock, and may not match originals in color, grain, or pattern. Hearthstone will supply replacement parts for discontinued parts in finishes or colors as available, or at their discretion.
13. Hearthstone's obligation under this warranty does not extend to the appliance's ability to heat the desired space. Information is provided to assist the customer and the dealer in selecting the appropriate appliance for the application. Consideration must be given to appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

THE WARRANTIES CONTAINED IN THIS DOCUMENT ARE EXCLUSIVE AND ARE GIVEN BY HEARTHSTONE AND ACCEPTED BY THE ORIGINAL PURCHASER IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND ANY OBLIGATIONS, LIABILITIES, RIGHTS, CLAIMS, OR REMEDIES IN CONTRACT OR TORT, WHETHER OR NOT ARISING FROM HEARTHSTONE'S NEGLIGENCE, ACTUAL OR IMPUTED. ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE GIVEN ONLY TO THE EXTENT REQUIRED BY FEDERAL OR STATE LAW. EXCEPT AS OTHERWISE REQUIRED BY STATE LAW, UPON THE EXPIRATION OF THE EXPRESS LIMITED WARRANTIES CONTAINED HEREIN, NO IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THE SUBJECT APPLIANCE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

THE WARRANTIES CONTAINED IN THIS DOCUMENT EXTEND ONLY TO THE ORIGINAL PURCHASER OF THE APPLIANCE WARRANTED HEREUNDER. THEY ARE NOT TRANSFERRABLE AND DO NOT EXTEND TO ANY SUBSEQUENT OWNERS.

UNDER NO CIRCUMSTANCES SHALL HEARTHSTONE BE LIABLE TO THE ORIGINAL PURCHASER OR ANY OTHER PERSON FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO DAMAGE TO PROPERTY OR PERSONAL INJURIES, WHETHER ARISING OUT OF LOSS OF USE, BREACH OF WARRANTY, TORT, OR OTHERWISE, EVEN IF HEARTHSTONE HAS BEEN APPRAISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

QUALIFYING FOR WARRANTY COVERAGE

To obtain performance of any obligation under this document, the Original Purchaser must, within the applicable warranty time period, contact their original Hearthstone dealer, or the current responsible local Hearthstone dealer, for instructions regarding the return of defective parts for repair, the return of the appliance for repair, or to schedule a Dealer service call. The Original Purchaser should refer to the Dealer Network search engine contained on Hearthstone's Web site (www.hearthstonestoves.com) if the original dealer is not available, to find a Hearthstone dealer nearest to the Original Purchaser's location.

REMEDY

The remedy for any breach of the foregoing warranties will consist of repair or replacement, at Hearthstone's option, of any covered defect in the appliance. When the Original Purchaser contacts a Hearthstone Dealer, the Dealer on behalf of Hearthstone, as the case may be, will instruct the Original Purchaser to either return the defective part, or the entire appliance (if requested), to the Dealer or Hearthstone or allow a Dealer to make a service call at the place where the appliance is located. Hearthstone may require that a digital picture be provided to support the claim. Notwithstanding any other provision of this document, the Original Purchaser shall pay for any fees and service charges related to a Dealer's service call or the shipping charges associated with the return.

WARRANTY REGISTRATION

The Original Purchaser can complete their warranty registration on our website at www.hearthstonestoves.com, or send a completed and signed Warranty Registration Form, which is enclosed in the appliance document packet, to the following address:

Hearthstone Quality Home Heating Products, Inc.
Warranty Department
317 Stafford Avenue
Morrisville, VT 05661

NOTE: SENDING IN THE SIGNED WARRANTY REGISTRATION FORM IS *NOT REQUIRED* AS A CONDITION OF WARRANTY COVERAGE OR HEARTHSTONE'S PERFORMANCE.

CONTACT YOUR LOCAL BUILDING OFFICIALS ABOUT
RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA

Listed Room Heater, Solid Fuel Type
Also Suitable for Mobile Home Installation Pursuant to (UM)84-HUD

8pts-cu copy.png

Conforms to UL STD 1482
Certified to ULC STD S627

Manufactured by:
LOGO.PNG
317 Stafford Ave.
Morrisville, VT 05661

MODEL NAME:
GREEN MOUNTAIN 80
MODEL NUMBER: 8680
SERIAL NUMBER:
[REDACTED]

CAUTION: HOT WHILE IN OPERATION.
DO NOT TOUCH. KEEP
CHILDREN, CLOTHING, AND FURNITURE AWAY.
CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE
AND INSTRUCTIONS. INSPECT AND CLEAN CHIMNEY
AND CONNECTOR FREQUENTLY. UNDER CERTAIN
CONDITIONS OF USE, CREOSOTE BUILDUP MAY
OCCUR RAPIDLY.

WARNINGS

Do not use grate or elevate fire. Build wood fire directly on hearth. Do not overfire. If the heater or chimney connector glows, you are overfiring.
(See Operator's Manual)

OPERATE ONLY WITH DOORS CLOSED. DO NOT OBSTRUCT SPACE UNDER HEATER.
TYPE OF FUEL: CORD WOOD ONLY - BURNING FUELS OTHER THAN CORDWOOD MAY DAMAGE THE APPLIANCE

"PREVENT HOUSE FIRES"

Install and use only in accordance with manufacturer's installation instructions and your local building codes.

CAUTION: Special methods are required when passing chimney through a wall or ceiling, refer to local building codes. Do not connect this unit to a
chimney flue serving another appliance.

NOTE: Replace glass only with 5mm ceramic glass.

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.

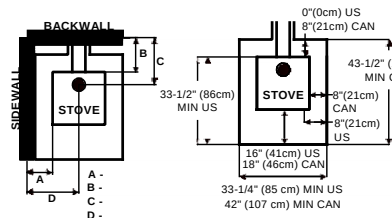
WARNING: (Mobile Home) An outside air inlet must be provided for combustion and be unrestricted while the unit is in use.

THIS APPLIANCE USES A CATALYTIC COMBUSTOR (PIN PIN WF-4150001076)

The performance of the catalytic device or its durability has not been evaluated as part of the certification
CAUTION: Burning materials other than the specified fuels may make the catalyst inactive

Minimum Clearance to Combustible Materials*

Floor Protection*



When installed on a combustible floor, non-combustible floor protection is required to cover the area beneath the heater, and extend at least 16" (41cm) [18" (46cm) CAN] to the front and 8" (21cm) beyond each side of the fuel loading and ash removal openings [side of stove in CAN], the floor protection must extend under the flue connector and extend 2" beyond each side of pipe.

VENT REQUIREMENTS: 6" diameter, single wall, minimum 24 MSG blue steel connector with listed factory-built Type HT chimney or masonry chimney.

OPTIONAL COMPONENTS:
Outside Air Kit Part # 96-53400
Blower Kit Part # 96-

*Refer to the installation Manual for additional clearance information, installation instructions, and operating instructions.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Particulate Emissions: 0.7 g/hr. Tested to: EPA Method 28R
Certified to comply with 2020 crib wood particulate emission standards.

Date of Manufacture



DO NOT REMOVE OR COVER THIS LABEL

MADE IN USA

3300-XXX

CONTACTEZ LES AUTORITÉS RESTRICTIONS ET L'INSPECTION LOCALES DES VOTRE INSTALLATION

Poêle à bois recommandé pour chauffage de pièce, utilisant un combustible solide
Convient aussi pour maisons mobiles conformes à la norme (UM)84 HUD

8pts-cu copy.png

Conforme à UL STD 1482
Certifié selon ULC STD S627

Fabrique par:
LOGO.PNG
317 Stafford Ave.
Morrisville, VT 05661

NCM DU MODELE:
GREEN MOUNTAIN 80
NUMERO DE MODELE: 8680
NUMÉRO DO SERIE:
[REDACTED]

ATTENTION: CHAUD QUAND IL EST EN
MARCHÉ. NE PAS TOUCHER.
TENIR LES ENFANTS, LES VETEMENTS ET MEUBLES
ÉLOIGNÉS. LE CONTACT PEUT CAUSER DES BRULURES.
VOIR LA PLAQUE SIGNALÉTIQUE ET INSTRUCTIONS.
INSPECTER ET NETTOYER FRÉQUEMMENT LA CHEMINÉE ET
LE CONDUIT DE RACCORDEMENT. DANS CERTAINES
CONDITIONS D'UTILISATION, LE CRÉOSOTE PEUT SE
FORMER RAPIDEMENT.

ADVERTISSEMENTS

N'utiliser pas de grille surélevée pour alimenter le feu. Faites le feu directement dans l'âtre. Ne surchauffez pas le poêle.
Si le poêle ou la cheminée devient rouge, vous surchauffez. (Voir le manuel de l'opérateur)

UTILISER SEULEMENT LES PORTES CLOSSES. NE PAS OBSTRUER L'ESPACE SOUS LE POÊLE.

COMBUSTIBLE: Bûches de bois seulement - LES COMBUSTIBLES ARTIFICIELS AUTRES QUE CORDWOOD PEUVENT ENDOMMAGER L'APPAREIL.

"PRÉVENTION DES INCENDIES"

Installer et utiliser seulement en accord avec les instructions d'installation du
manufacturieret les codes locaux du bâtiment.

ATTENTION: Des méthodes spécifiques sont nécessaires pour faire passer la cheminée à travers un mur ou un toit. Référez aux codes locaux du bâtiment. Ne pas brancher cette unité à un conduit de cheminée desservant déjà un autre appareil.

NOTE: Remplacer la vitre seulement avec une vitre de CÉRAMIQUE de 5 mm.

Ce chauffe-bois nécessite une inspection et des réparations périodiques pour un bon fonctionnement. Consultez le manuel du propriétaire pour plus d'informations. Il est contraire aux règlements fédéraux d'utilisation ce chauffe-bois d'une manière incompatible avec les instructions d'utilisation du manuel du propriétaire.

AVERTISSEMENT (MAISON MOBILE): Une prise d'air extérieur est nécessaire à la combustion et doit être effective sans restriction pendant que l'unité fonctionne.

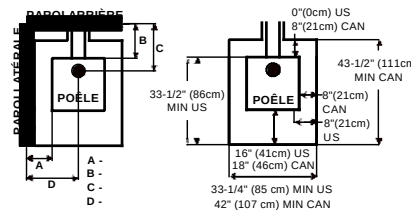
CET APPAREIL UTILISE UN COMBUSTE CATALYTIQUE (Part # WF-4150001076)

La performance du dispositif catalytique ou sa durabilité n'a pas été évaluée dans le cadre de la certification

ATTENTION: les matériaux brûlants autres que les carburants spécifiés peuvent rendre le catalyseur inactif

Dégagements minimum aux matériaux combustibles*

Protection du sol*



Quand le poêle est installé sur un plancher combustible, une protection de plancher non combustible doit être installée pour couvrir la surface sous la poêle. Elle doit dépasser d'au moins 16" (41cm) [18" (46cm) CAN] le devant du poêle, et 8" (21cm) au-delà du dos et des côtés du poêle (côté du poêle en CAN), et déborder de 2" (5 cm) de chaque côté du tuyau de raccordement de la cheminée.

PIÈCES DE VENTILATION REQUISES:
Diamètre de 6" (15,2 cm), tuyau simple, minimum 24 MSG, tuyau de raccord en acier noir pour cheminée homologuée préfabriquée de type HT ou pour cheminée de maçonnerie.

COMPOSANTES OPTIONNELLES:
Prise d'air extérieur Part # 96-53400
Soufflerie Part # 96-

* Référez au Manuel d'installation pour des informations supplémentaires sur les dégagements, les instructions d'installation et d'utilisation.

AGENCE AMÉRICAINE DE PROTECTION DE L'ENVIRONNEMENT

D'émissions des particules: 0,7 g/hr. Testé à: Méthode EPA 28R
Certifié pour se conformer aux normes d'émission de particules de bois structuré 2020

NE PAS ENLEVER OU NE PAS COUVRIR CETTE ÉTIQUETTE

FABRIQUÉ AUX ÉTATS-UNIS

3300-XXX

APPENDIX 9: Test load photographs

Run 1



Run 2



Run 3



Run 4



Run 5



Run 6

