TEST REPORT

TEST OF A NON-CATALYTIC WOOD BURNING STOVE FOR EMISSIONS AND EFFICIENCY

PER EPA METHODS ALT-125, ASTM E2515, ASTM E3053 and CSA B415.1,

Client:

Jotul

55 Hutcherson Dr,
Gorham, USA
04038

Model Name: F 45 V2

Attention: Rafael Sanchez

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

TEST DATES: April 30th and May 1st 2019
REPORT DATE: May 9th 2019
Project number: PI-20194

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St-jean-sur-Richelieu, May 9th 2019
Client: Jotul
Project: PI-20194
Model: F45 V2

SUMMARY

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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 cord wood
- Test dates: April 30th and May 1st 2019
- Test methods used:
    - Particulate emissions: ASTM E3053-17; ASTM E2515-11 methods ALT-125 as referred into 40 CFR Part 60 Subpart AAA
    - Efficiency: CSA B415.1-10

1.2 Test unit information

General

- Manufacturer: Jotul
- Product type: wood heater,
- Combustion system: non-catalytic
- Unit tested: F 45 V2

Particularities

- The F 45 V2 is a unique model to the Jøtul wood heater product line.

In Summary:

- A small north /south loading adjustable rate free standing non-catalytic wood heater employing a stepped baffle secondary combustion technology. The unit is composed of primarily a steel fire box and cast-iron exterior construction.

1.3 Results

Emission results obtained

- Weighted Average Emissions Rate: 1.75 g/hr
- Weighted Average Overall Efficiency: 71.15 %

Conformity: NSPS Phase 2020, cord wood test method

1.4 Pretest information

Unit condition: The unit was received by carrier during April 2019 in good condition. The 50hrs of aging was made by the manufacturer's representative R&D Laboratory.

Set up

- Venting system type: 6 inches diameter inch steel pipe and insulated chimney
- System height from floor: 15 feet
- Particularities: this unit as been tested with the optional fan for high, medium and low burn rate.

2 Summary of test results

2.1 Model identification

Model name number	F 45 V2
Manufacturer	JOTUL
address	55 Hutcherson Dr, Gorham, USA,04038
appliance category	WOODSTOVE
Usable Firebox Volume – ft3	2.37
Catalytic/Non-Cat	Non-Cat
convection air fan (no, standard, Optional)	OPTIONAL

2.2 Laboratory information

Testing laboratory	Polytests Services
address	695-B Gaudette, St-jean-sur-richelieu
ISO/ Accreditation info	17025
Dates tested	April 30th and May 1st 2019
Test Methods / Standard	ALT-125
Dilution Tunnel Inside diameter – in	8
Filter diameter	47
Filter material	PTFE Pall

2.3 Test condition Summary

Model Name(s) / number(s)	F 45 V2		
Usable firebox Volume-ft3	2.37		
Convection Air Fan (No, Standard, Optional)	optional		
Test runs #	1,1	1,1	2.1
Date tested	April 30th 2019	April 30th 2019	May 1st 2019
test run category (L,M,H)	H	M	L
average barometric pressure – in Hg	30,08	30,08	30,30
Max observe Ambient temp. °F	75,08	78,76	79,31
Min observe Ambient Temp °F	66,27	72,58	71,50
Max observe Filter temp °F	89,17	89,28	89,74
Run air settings			
Primary (measured up from minimum)	full open	medium setting	minimum setting
Secondary (measured up from minimum)	fix	fix	fix
Convection air setting	auto high	auto low	auto low
Test fuel load			
Cordwood fuel species	Oak	Oak	Oak
specific Gravity (from Table 1)	0,66	0,66	0,66
Higher heating value - Btu/lb (from Annex A1)	8690	8690	8690
Nom. Test fuel piece length - in	16	16	16
Number of test fuel pieces	5	5	5
Test fuel Weight			
Kindling - as fired lb.	3,82	NA	NA
Kindling Wt. - as % of test fuel load	16,2%	NA	NA
Kindling Moisture % Db	9,0	NA	NA
Kindling Kg DB	1,59	NA	NA
SU Fuel Wt- as fired lb	6,84	NA	NA
SU Fuel wt. - as % of test fuel load	29,0%	NA	NA
SU Fuel moisture - % DB	19,0	NA	NA
SU fuel- Kg DB	2,61	NA	NA
Test Fuel Load - As Fired lb	23,58	27,08	28,08
Ave. Test Fuel Load MC % DB	20,16	19,85	20,02
Test Fuel Load - kg DB	8,90	10,25	10,61
Test fuel Loading density lb./ft3	10,25	11,77	12,21
Residual SU fuel wt. - as fired lb.	3,4	NA	NA
Residual SU fuel wt.- as % of test fuel load	14,4%	NA	NA
Test run duration - minutes	128	418	497
Test run duration - h	2,13	6,97	8,28
Test fuel load wt at the end of the test - as fired lb	2,16	0	0
total fuel burned kg Db	10,58	10,25	10,61
% test fuel load wt at end of the test	9,2%	0,0%	0,0%

2.4 TEST RUN RESULTS SUMMARY

Model name / number	F 45 V2		
Usable Firebox volume	2.37		
Convection air Fan (no, Standard, option)	optional		
Test runs nu.	1,1	1,2	2,1
Date tested	30-04-2019	30-04-2019	01-05-2019
Test run category	H	M	L
Burn rate - Kg/hr DB	5,40	1,47	1,28
Burn rate as % of low to high Midpoint	NA	27,2%	23,70%
Burn duration - h	2,13	6,97	8,3
Heat output btu/hr	58 657	19 620	16 748
Average Dilution Tunnel Flow Rate - dscfm	321,1	339,2	331,7
Average Sample Flow Rates - dscfm			
Train 1	0,1882	0,1981	0,1899
train 2	0,1826	0,1898	0,1819
Total PM Emissions - g			
Train 1 g	5,83	5,79	17,65
train 2 g	6,01	6,06	17,61
Average	5,92	5,92	17,63
PM emission train precision %	1,55%	2,29%	0,09%
PM emission g/kg	0,56	0,58	1,66
PM emission rate g/h	2,77	0,85	2,13
Total Co Emission g	168,2	487,7	664,2
Co emission Rate g/h	116,0	70,0	80,2
1st hour emission rate g/h	4,3	4,8	2,8
Overall Efficiency - CSA B415,1			
% HHV Basis	68,5%	69,6%	74,0%
% LHV Basis	73,8%	74,8%	79,7%

2.5 Weighted average summary

Model name / number	F 45 V2		
Usable Firebox volume	2.37		
Convection air Fan (no, Standard, option)	optional		
average for each test run category	L	M	H
burn rate kg/h DB	1,28	1,47	5,40
PM Emission rate - g/h	2,13	0,85	2,77
Co emission rate - g/h	80,18	70,00	115,97
Overall Efficiency - CSA B 415,1			
% HHV Basis	74,0%	69,6%	68,5%
% LHV Basis	79,7%	74,8%	73,8%
Heat output - Btu/hr	16748	19620	58657
Category weighting	0,4	0,4	0,2

2.6 Weighted average Final results

ASTM E 3053 Weighted averages			
PM Emission Rate - g/h	1,75		
CO Emission Rate g/h	83,3		
Overall Efficiency - CSA B415,1			
% HHV Basis	71,15%		
% LHV Basis	76,55%		
Heat output range - Btu/h	16 748	to	58657
Co Arithmetic average g/min	1,48		

2.7 Test facility conditions

Run Number	*Room Temperature*		*Barometric pressure*		*Relative humidity*		*Air Velocity*	
	Before	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
	(F)	*(F)*	*(in.Hg)*	*(in.Hg)*	*(%)*	*(%)*	*(ft/min)*	*(ft/min)*
1	74	81	30,27	29,88	26	23,1	0	0
2	71	73	30,39	30,21	22,3	26,3	0	0

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

Average dilution tunnel measurements				*Sample Data*			
Run Number/ test category	*Burn Rate (Min)*	*Volumetric Flow Rate (dscf/min)*	*Total Temperatures (°R)*	*Volume sampled (DSCF)*		*Particulate catch (mg)*	
				1	*2*	*1*	*2*
1.1	128	321,06	595,06	24,089	23,369	3,50	3,50
1.2	418	339,23	560,54	82,824	79,338	3,60	3,60
2.1	497	331,68	558,77	94,370	90,394	10,25	9,80

2.9 DILUTION TUNNEL DUAL TRAIN PRECISION

Run Number / test category	*Sample Ratio*		*Total Emission (g)*		
	Train 1	*Train 2*	*Train 1*	*Train 2*	*% Deviation*
1.1	1705,98	1758,56	5,83	6,01	1,55%
1.2	1712,03	1787,25	5,79	6,06	2,29%
2.1	1746,82	1823,65	17,65	17,61	0,09%

3 PROCESS DESCRIPTION

3.1 DISCUSSION

The wood heater has been received in a good shape by a carrier in April 2019. Maximum burn rate has been done on April 30th 2019 followed by a medium burn rate. On May 1st 2019 The minimum burn rate as been done. There's was a lot of stick filters on the gaskets, the overall catch is the weight of filters + weight of the gaskets. We notice overtime that some gaskets stick more than others with filters. The high burn was only 128 minutes moreover a small firebox tested with an 8 inches dilution tunnel, can reduce significantly the catch weight on filters. The negative filter weight of this run is explained by the above comments.

3.2 UNIT DIMENSIONS

Baffle

- Location: between top of combustion chamber and hearth
- Restriction: 2 ½ inches at the front of unit
- Dimensions: covers the hearth area minus the restriction at front
- Material: Steel and Stainless Steel

Firebox material

- Firebrick 1 ¼ thick lining cover all back and sides and bottom

Flue gas exhaust

- Location: Top or back
- Dimensions: 6 inches
- Material: Cast Iron

Gasket

- Door: Fiberglass rope. 5/8" dia. Low density
- Glass: Fiberglass rope. 1/4" dia. Low density
  Refer to appendix 6 for all details and location

Overall unit dimension

- Firebox dimensions: 15.6-inch-wide x 21.5-inch-deep x 11 to 14 inch high
- Usable volume: 2.37 cuft.
- Overall heater dimension: 23-inch-wide 26-inch-deep 29 inch high

Convection fan

- Optional Part Number 156431

Catalyst

- None

3.3 AIR SUPPLY SYSTEM

Description

- Primary air: from the bottom through an air wash above the door.
- Secondary air: From the bottom of the stove through the back and sides and into three stainless tubes with holes.

Characterization

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

AIR INTRODUCTION SYSTEM		INLET (1) sq. in.			OUTLET
Identification	Type	Imin	Imax	Controlled	(sq. in.)
A *	Primary	.725	2.693	Yes	3.042
B *	Secondary	2.764	2.764.	No	2.159
C *	Pilot	NA	NA	NA	NA

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

<u>Legend</u>
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 #1.1

This run was performed on April 30th 2019. It lasted 128 minutes and a maximum burn rate was obtained at 5.4 kg/hr & emission at 2.8 gr/hr. The air inlet damper was at the maximum setting and the convection fan was at high position on auto start.

Run #1.2

This run was performed on April 30th 2019. It lasted 418 minutes and a medium burn rate was obtained at 1.47 kg/hr & emission at 0.85 gr/hr. The air inlet damper was at the medium setting and the convection fan was at low position on auto start.

Run #2.1

This run was performed on May 1st 2019. It lasted 497 minutes and a maximum burn rate was obtained at 1.28 kg/hr & emission at 2.13 gr/hr. The air inlet damper was at the minimum setting and the convection fan was at low position on auto start.

- 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 load

- Type of wood: Red Oak, 18 to 25% dry basis moisture content
- Description: for each test, description of the fuel load is found on the front page of each test run data sheet together with photograph in appendix.

3.5 START-UP OPERATION

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

3.6 SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 15 feet from the tunnel entrance. The tunnel has two elbows in the system ahead of the sampling section. The sampling section is a continuous 20-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 24 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 6.

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 EMFAB TX40H 120-WW Pall 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.

POLYTESTS Services inc.

SFBA EMISSIONS AND EFFICIENCY TESTING LABORATORY OPERATING PROCEDURE

INTRODUCTION

This document provides a step by step guide for the technician conducting tests to EPA standard requirements. Procedures outlined here, when followed, will result in tests in conformance with EPA Methods 28R, ASTME2780, ASTME2515, ASTM E2618, Method 28WHH, Method 28 PTS, Method ALT-125, ASMTE 3053.

The primary measurements to be made are particulate emissions rates. The technician's duties include the following steps.

1. Incoming inspection of test units.
2. Set-up of test units.
3. Preliminary testing to establish unit operating procedures and familiarity with operating controls.
4. Calibration of test equipment.
5. Set-up, checking and operation of sampling apparatus.
6. Conduct of tests including complete record keeping and data recording for non-automated functions.
7. Operation of hardware and software included in automatic data acquisition system.
8. Review and analysis of data at test completion to ensure test validity.

The technician running this test must be familiar with the following documents, which are to be kept in the laboratory at all, times.

EPA METHODS

1. EPA METHODS 28R
2. ASTME2780
3. ASTME2515
4. ASTM E2618
5. METHOD 28WHH
6. METHOD 28 PTS
7. ALT-125
8. ASMTE 3053

I. APPLIANCE INSPECTION AND SET-UP

A. INCOMING INSPECTION

1. Check for completeness of unit including parts, accessories, installation and operating instructions, drawings and specifications etc. Note any discrepancies or missing parts or information.
2. Check for shipping damage. If damage has occurred, notify the laboratory manager. In some cases, repairs may be made, provided the manufacturer and laboratory manager concur that repairs will not affect the unit's performance. If damage is irrepairable, a new unit will need to be obtained.
3. Note whether unit is catalytic of non-catalytic.
4. Mark unit with manufacturer's name, model number, work order number and date received.
5. If unit is safety listed, note label data including listing agency and serial number. If unit is not listed, mark all data sheets "UNLISTED". Test results will not be released until unit passes safety tests without modification unless authorized by laboratory manager.

B. UNIT SET-UP

1. All new units must be operated for a breaking in period as follows.

   a) Non-catalytic units: Ten (48) hours at medium burn rate with Douglas Fir scrap or cordwood.
   b) Catalytic units: Fifty (50) hours at medium burn rate with Douglas Fir scrap or cordwood.

During these break-in runs the unit may be connected to a lab chimney and fuel additions noted into the corresponding data acquisition file. For catalytic units, a thermocouple must be installed in the catalyst.

Record catalyst temperature at 1-hour intervals or on chart recorder. Operating should continue until data shows at least fifty (50) hours of operation with catalyst temperature in excess of 500 degrees Fahrenheit (active range).

For non-catalytic units a stack thermocouple should be installed and stack temperature recorded at 1-hour intervals. Fourthy-height (48) hours minimum burn time with a stack temperature of at least 250 degrees Fahrenheit is required.

Once break-in is completed, allow unit to cool. Clean unit thoroughly.

2. Unit is to be placed on scale for testing. Prior to proceeding with verification process, scale should be turned on and allowed to warm up for one (1) hour minimum. Zero scale and check calibration with standard weights. One (1) 1 kg weight and one (1) 2 kg weight are provided for this purpose. Use scale verification test form no. EPA-7-TP to record results. If scale fails to reproduce weights within tolerance, check with laboratory manager before proceeding.
3. If scale checks out, place unit on scale and align so chimney will be centered in hood.
4. Attach chimney connector and chimney. Be sure all joints are sealed below sampling points. Chimney and connector should be cleaned with a wire brush. Be sure chimney connector terminates and chimney starts at proper level above scale platform. Chimney must be supported from scale so that it does not touch test enclosure or hood walls.
5. Thermocouples should be attached to surfaces of unit prior to testing. EPA requires a thermocouple on the bottom of the firebox. This must be installed prior to putting the unit on the scale. In some cases, the required thermocouple locations will be inaccessible on finished units. These units should have thermocouples installed by the manufacturer during construction. Check with the laboratory manager if problems are encountered in proper thermocouple attachment.
6. Measure firebox dimensions and record on data forms nos. EPA-2-TP. Make a three-dimensional sketch of the firebox including firebrick, baffles and obstructions. Calculate firebox volume in cubic feet with both addition and subtraction methods using forms nos. EPA-3-TP and EPA-4-TP. See Section 6.2.4 of EPA Method 28 for details of firebox volume determination.
7. If unit is catalytically equipped, additional thermocouples must be installed upstream and downstream of catalyst. Thermocouples should also be placed in the primary and secondary combustion chambers of all units.
8. Plug thermocouples into data acquisition system jacks making a check of locations and jack numbers for each test on data form no. EPA-5-TP.
9. Note that inserts are tested as if they are freestanding stoves.
10. Dilution tunnel should be cleaned prior to each certification test series and at anytime a higher burn rate follows a lower test burn rate.

II. SAMPLING SYSTEM – SET-UP

A. GAS ANALYSIS

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

2. Calibrate analyzers as follows:

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

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

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

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

3. Check for response time synchronization.

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

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

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

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

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

e. Leak check system as follows.

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

f) Just prior to starting test, fill impinger container with water and ice and record ambiant conditions on data form no. EPA-8-TP.

B. DILUTION TUNNEL SAMPLE TRAIN SET-UP

1. Filters and holders.

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

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

c) Weigh desiccated filters and probe-filter units on analytical balance. Record weights data form no. EPA-10-TP. Note that probe and front half of front filter are to be weighed as a unit.

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

2. Leak checking.

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

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

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

d) Calculate leakage rate as follows.

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

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

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

If CFM_1 or CFM_2 is greater than 0.04 X sample rate, leakage is unacceptable. For most tests, the sample rate will be about 0.15 CFM, thus leakage rates in excess of 0.04 X 0.15 = 0.006 CFM are not acceptable. Record leakage rates on form no. EPA-5-TP

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

III. TEST CONDUCT

A. FUEL LOAD

1. Determine optimum load weight by multiplying firebox volume in cubic feet by 7 or (10 and 12 for cordwood method). This is the load weight on an as-fired basis.
2. Determine piece size to obtain the requested load configuration and meet the test load weight criteria. The load should consist of the following: **TO BE DETERMINED**
3. Weigh out test load and adjust weight by shortening all pieces equally if necessary. Record individual piece load on form no. EPA-11-TP.

4. Measure and record moisture content of each fuel piece using Delmhorst moisture meter. Determine if fuel load moisture content is in required range. If not, construct new load using wood with required moisture content. All wood in the humidity chamber should be within range. Contact project manager if you cannot find suitable pieces. Record moisture of each individual piece load on form no. EPA-11-TP.

B. UNIT START-UP

1. Before lighting a fire, turn on dilution tunnel and set tunnel velocity to 500ft/min Record readings on data form no. EPA-9-TP.
2. Check draft imposed on cold stove with all inlets closed and a draft gauge in the chimney. If draft is greater than 0.005 inches water column, adjust tunnel to stack gap until draft is less than 0.005.
3. Check for ambient airflow around unit with hot wire anomometer. Must be less than 50 ft/min.
4. Check all equipment for proper operation. Analyzers should be on and in sample mode. Computer should be loaded with test program and awaiting test start command.
5. Zero scale and start fire with uncolored newspaper and kindling representing 10 % of test load with the same type of fuel.
6. Once kindling is burning well after 5 minutes, add splitted pieces having a bottom surface around 4 sq. inches and representing 25% of test load weight. Operate at high fire for 15 minutes. Then adjust settings to intended test run levels as per the manufacturer's.
7. Following addition of pretest fuel load (splitted pieces), start computer for data logging.
8. All fuel additions, air intake settings and operational characteristics shall be noted with associated time stamp on form no. EPA-1-TP.

C. TEST RUN

1. Once the targeted test fuel bed weight is obtained, the test is to be started as follows:

   a) Insert the sample probes into the tunnel being careful not to hit sides of tunnel with probe tip.
   b) Check tunnel pitot tube for proper position. (Pitot should be carefully cleaned prior to each test.)
   c) Turn on probe sample systems and stack sampler.
   d) Open stove door, rake coals and load stove as follows: **TO BE DETERMINED**
   e) Close door or follow manufacturer's start-up procedures. (Five (5) minutes maximum time before all doors and controls must be set to final positions for duration of test. 15 minutes allowed for ALT-125 method))
   f) An alarm will sound an audible signal at the (10) minutes intervals. This signal a reading interval. You must verify at each interval that the following readings are correctly logged by the data acquisition system and make observations of any unusual or non-routine events that could occur.

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

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

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

IV. POST TEST PROCEDURES

A. SAMPLE RECOVERY – FILTER TRAINS

1. Carefully clean outside of probes and filter housings with alcohol.
2. Disassemble filter holder and transfer filters to clean petri dish. Scrape gasket with scalpel and collect any loose material on filters.
3. Place probe and front half of first filter holders (still assembled) and filters in desiccator. Allow 24-hour desiccation before weighing.
4. Weigh probe filter holder units and filters at six (6) hour intervals until weight change between weighings is less than 0.2 mg. Record all weights taken on data form no. EPA-10-TP.

B. CALCULATION OF RESULTS

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

GENERAL

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

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

APPENDIX 11: Sample calculations

Validation du fichier de calcul avec les équations provenant des normes:
ASTM E2515-11
ASTME3053-17

Equation 9,2 (1)

$$M_{fldb} = \sum (M_{flnwb})\,(100)/(100 + MC_{fln}))$$

Nomenclature

M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{FLnwb}	Weight of each test fuel pieces, n, in test fuel load per 8,4,1, wet basis, lb (kg)
MC_{FLn}	Average fuel moisture of test fuel piece, n , in test fuel load % dry basis
n	individual test fuel pieces that comprise the test fuel load, as applicable

Sample calculation

Data

M_{FLnwb}	23,58	lbs
MC_{FLn}	20,16	%
n		
M_{FLdb}	19,62	lbs

Equation 9,2 (2)

$$M_{SUdb} = \sum (M_{SUnwb})\,(100)/(100 + MC_{SUn}))$$

Nomenclature

M_{SUdb}	Weight of startup fuel, dry basis, lb (Kg)
M_{SUnwb}	Weight of each start-up fuel pieces, n, per 8,5,7, wet basis, lb (Kg)
MC_{SUn}	Average fuel moisture of start-up fuel piece, n % bry basis
n	individual startup fuel pieces, as applicable

Sample calculation

Data

M_{SUnwb}	6,84	lbs
MC_{SUn}	19	%
n		
M_{SUdb}	5,75	lbs

Equation 9,2 (3) $$M_{kdb} = (M_{kwb})(100)/(100 + MC_k)$$

Nomenclature

M_{kdb}	Weight of kindling, dry basis lb (kg)
M_{kwb}	Weight of kindling per 8,5,6, wet basis, lb (kg)
MC_k	Average moisture of kindling % dry basis

Sample calculation

Data

M_{kwb}	3,82	lbs
MC_k	9,00	%
M_{kdb}	3,50	lbs

Equation 9,2 (4) $$M_{FREHdb} = M_{RSUBdb} + M_{FLEHdb}$$

Nomenclature

M_{FREHdb}	Total weight of all remaining fuel at end of high fire test run, lb (kg)
M_{RSUBDb}	Weight of risidual start-up fuel bed when high fire test load added, lb(kg)
M_{FLEHdb}	Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation

Data

M_{RSUBDb}	3,40	lbs
M_{FLEHdb}	2,16	lbs
M_{FREHdb}	5,56	lbs

Equation 9,2 (5) $$M_{TFBHdb} = M_{Kdb} + M_{SUdb} + M_{FLdb} - M_{FREHdb}$$

Nomenclature

M_{TBFHdb}	Total weight of all fuel burned during high fire test run lb (kg), dry basis
M_{FREHdb}	Total weight of all remaining fuel at end of high fire test run, lb (kg)
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{SUdb}	Weight of startup fuel, dry basis, lb (Kg)
M_{kdb}	Weight of kindling, dry basis lb (kg)

Sample calculation

Data

M_{FREHdb}	5,56	lbs
M_{FLdb}	19,62	lbs
M_{SUdb}	5,75	lbs
M_{kdb}	3,50	lbs
M_{TBFHdb}	23,32	lbs

Equation 9,2 (6) $$BR_H = 60(M_{FLdb} - M_{FLEHdb})/\theta_{H1}$$

Nomenclature

BR_H	Dry burn rate for high fire test run, from time when test fuel load added to end of test run
θ_{H1}	Total duration of high fire test run, from time when test fuel load is added to end of test r
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{FLEHdb}	Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation

Data

θ_{H1}	88	min
M_{FLdb}	19,62	lbs
M_{FLEHdb}	2,16	lbs
BR_H	5,40	kg/hr

For low and medium burn fire test run
Equation 9,2 (7) $$M_{TFBdb} = M_{FLdb} - M_{FREdb}$$

Nomenclature

M_{TFBdb}	Total weight of fuel burned during low or medium fire test run, lb (kg),dry basis
M_{FREdb}	Weight of remaining fuel at end of low or medium fire test run, lb (kg)
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)

Sample calculation

Data

M_{FREdb}	0,00	lbs
M_{FLdb}	22,59	lbs
M_{TFBdb}	22,59	lbs

Equation 9,2 (8) $$\mathrm{BR} = 60(M_{MTBdb})/\,\theta$$

Nomenclature

BR	Dry burn rate for low and medium fire test run. lb/hr (kg/hr)
θ	Total duration of low or medium fire test run, min.
M_{TFBdb}	Total weight of fuel burned during low or medium fire test run, lb (kg),dry basis

Sample calculation

Data

θ	418	min
M_{TFBdb}	22,59	lbs
BR_H	1,47	kg/hr

For high test run
Equation 9,2 (9)

$$PM_{RH} = 60(E_{TH}/\theta_{H2})$$

Nomenclature

PM_{RH}	Paticulate emission rate for high fire test run, gr/hr
E_{TH}	Total particulate emissions for high fire test run including kindling and start-uo
θ_{H2}	Total test duration of high fire test run, from ignition of kindling to end of test run

Sample calculation

Data

E_{TH}	6	gr
θ_{H2}	128,00	min
PM_{RH}	2,77	kg/hr

Equation 9,2 (10)

$$PM_{FH} = E_{TH}/M_{TFBHdb}$$

Nomenclature

PMF_H	Paticulate emission rate for high fire test run, gr/hr

Sample calculation

Data

E_{TH}	6	gr
M_{TFBHdb}	23,32	dry lb
PM_{RH}	0,56	gr/dry kg

for high fire test run
Equation 9,2 (11)

$$PM_{btuH} = E_{TH} / (M_{TFBHdb} * (HHV)\left(\frac{n_1}{100}\right)) * (10^6)$$

Nomenclature

PM_{btuH}	Particulate per heat output unit for high fire test run, lb/ MMbtu
HHV	Higher heating value of test fuel, dry basis, btu/lb
n_r	CSA B415,1 overall Efficiency, HHV (hot to hot)

Sample calculation

Data

E_{TH}	5,9	gr
M_{TFBHdb}	23,32	dry lb
HHV	8690	btu/lb
n_r	68,54%	
PM_{btuH}	0,0940	lb/Mmbtu

Equation 9,2 (12) $PM_R = 60(E_T/\theta)$

Nomenclature

PM_R	Paticulate emission rate for low or medium fire test run, gr/hr
E_T	Total particulate emission for low or medium fire test run, from ASTME 2515 (g)
θ	Total duration of low or medium fire test run, min.

Sample calculation

<u>Data</u>

E_T	6	gr
θ	418	min
PM_{RH}	0,85	gr/hr

Equation 9,2 (13) $PM_F = E_T/M_{TFBdb}$

Nomenclature

PM_F	Paticulate emission factor rate for low or medium fire test run, gr/dry kg

Sample calculation

<u>Data</u>

E_T	5,9	gr
M_{TFBdb}	22,59	dry lb
PM_F	0,58	gr/dry kg

for high fire test run

Equation 9,2 (14)

$$PM_{btu} = E_T / (M_{TFBdb}(HHV)(\frac{n_r}{100})) * (10^6)$$

Nomenclature

Pmbtu	Particulate per heat output unit for low and medium test run, lb/ MMbtu
HHV	Higher heating value of test fuel, dry basis, btu/lb
n_r	CSA B415,1 overall Efficiency, HHV (hot to hot)

Sample calculation

Data

E_{TH}	5,9	gr
M_{TFBHdb}	22,59	dry lb
HHV	8690	btu/lb
n_r	69,56%	
PM_{btuH}	0,0957	lb/Mmbtu

Volume of gas sample corrected to dry standard conditions ($V_{m(std)}$)

Equation used

ASTM 2515, equation 6

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

Nomenclature

$V_{m\,(std)}$	Volume of gas sample , corrected to standard conditions, $dscm^3$ (dscf)
K_1	17.64 R/in Hg
V_m	Volume of gas sample
Y	DGM calibration factor
P_{bar}	Barometric pressure mmHg (in Hg)
Δ H	Average pressure at the outlet of the dry gas meter mm water (in. Water)

T_m Absolute average dry gas meter temperature K (R)

Sample calculation

Data

V_m	85,08	dcf
Y	0,98730288	
P_{bar}	30,08	in Hg
Δ H	-1,0678	in Hg
T_m	542,0	R

Calculation

$V_{m(std)}$	79,31	dscf

Calculation based of train 2 data Low fire

Total amount of particulate matter collected (m_n)

Equation used

ASTM 2515, equation 12

$$m_n = F_1 + F_2 + \Delta PF$$

Nomenclature

m_n	Total amount of particulate matter collected, mg
F_1	Particulate matter collected on front filter, mg
F_2	Particulate matter collected on second filter, mg
ΔPF	Post-test weight gain of probe and filter holder assembly, mg

Sample calculation

Data

F_1	0	g
F_2	-0,003	g
ΔPF	0,007	g

Calculation

m_n	3,600	mg

Calculation based of train 2 data Low fire

Particulate concentration (C_S)

Equation used

ASTM 2515, equation 13

$$C_S = (0{,}001\ g/mg) \times \left(\frac{m_n}{V_{m\,(std)}}\right)$$

Nomenclature

C_S	Concentration of particulate matter in stack gas or dilution tunnel, dry basis, corrected to standard conditions, g/dsm^3 (g/dscf)
m_n	Total amount of particulate matter collected in the sampling train, mg
$V_{m(std)}$	Volume of gas sample measured corrected to dry standard conditions, dsm^3 (dscf)

Sample calculation

Data

m_n	3,600	mg
$V_{m(std)}$	79,31	dscf

Calculation

C_s	0,000045	g/dscf

Calculation based of train 2 data Low fire

Particulate concentration for room air (C_r)

Equation used

ASTM 2515, equation 14

$$C_r = (0{,}001\ g/mg) \times \left(\frac{m_r}{V_{mr\,(std)}}\right)$$

Nomenclature

C_r	Concentration of particulate matter in room air, dry basis, corrected to standard conditions, g/dsm^3 (g/dscf)
m_r	Total amount of particulate matter collected in the sampling train, mg
$V_{mr(std)}$	Volume of room air sample measured corrected to dry standard conditions, dsm^3 (dsc

Sample calculation

Data

m_r	0,300	mg
$V_{mr(std)}$	113,43	dscf

Calculation

C_r	0,000003	g/dscf

Calculation based of train 2 data low

Adjustment factor for alternative pitot tube placement (FP)

Equation used

ASTM 2515, equation 1

$$F_P = \frac{V_{strav}}{V_{scent}}$$

Nomenclature

V_{strav} Average gas velocity caclulated after the Pitot tube traverse

V_{scent}	Average gas velocity at the center of the dilution tunnel cacluated after the multi-point Pitot traverse
F_P	Adjustment factor for center of tunnel pitot tube placement

Sample calculation

Data

V_{strav}	0,255740195
V_{scent}	0,267393205

Calculation

F_P	0,956420

Average dilution tunnel gas velocity (V_S)

Equation used

ASTM 2515, equation 9

$$V_S = F_p K_P C_P \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_S}{P_S M_S}}$$

Nomenclature

V_S	Average dilution tunnel gas velocity, m/s (ft/s)

K_P	Pitot tube constant For the metric units: $34.97\ m/sec \left[\frac{\left(\frac{g}{g-mole}\right)(mm\ Hg)}{(°K)(mm\ H_2O)}\right]^{1/2}$ For English units: $85.49\ ft/sec \left[\frac{\left(\frac{lb}{lb-mole}\right)(in\ Hg)}{(°R)(in\ H_2O)}\right]^{1/2}$
C_P	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
F_P	Pitot tube correction factor
$\left(\sqrt{\Delta P}\right)_{avg}$	Average square root of each individual velocity head (ΔP)
P_{bar}	Barometric pressure at measurement site, mm H_2O (in. H_2O)
P_g	Stack static pressure, mm Hg (in. Hg)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or P_{bar} + P_g
M_S	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78 or 29 for CSA B415
t_S	Dilution tunnel temperature, °C (°F)
T_S	Absolute dilution tunnel temperature, °K (°R), or 273 + t_s for metric units, 460 + t_s for English units

Sample calculation

Data

K_P	85,49				
C_P	0,99				
F_P	0,956				
$\left(\sqrt{\Delta P}\right)_{avg}$	0,2678	in $H_20^{1/2}$			
P_{bar}	30,08	in Hg			
P_g	0,27	in H_20	**Calculation**		
P_S	30,10	in Hg			
M_S	28,78	lb/lb-mol	V_S	17,4390	ft/s
t_S	100,54	F	Calculation based of data low		
T_S	560,54	R			

Average dilution tunnel gas flow rate (Qstd)

Equation used

ASTM 2515, equation 3

$$Q_{std} = 60(1 - B_{WS})V_S A \left(\frac{T_{std}}{T_S}\right)\left(\frac{P_S}{P_{std}}\right)$$

Nomenclature

Q_{std}	Total gas flow rate corrected to dry standard conditions, dsm^3/min (dscf/min)
60	Conversion factor minutes per hour
B_{WS}	Water vapour in the dilution tunnel stream, proportion by volume (may be assumed to be 2%)
V_S	Average dilution tunnel gas velocity, m/s (ft/s)
A	Cross-sectional area of dilution tunnel, m^2 (ft^2)
T_{std}	Standard absolute temperature, 293 °K (528°R)
T_S	Absolute average dilution tunnel temperature, °K (°R), or 273 + t_s for metric units, 460 + t_s for English units
t_S	Dilution tunnel temperature, °C (°F)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or P_{bar} + P_g
P_{bar}	Barometric pressure at measurement site, mm Hg (in. Hg)
P_g	Dilution tunnel static pressure, mm Hg (in. Hg)
P_{std}	Standard absolute pressure, 760 mm Hg (29.92 in. Hg)

Sample calculation

Data

B_{WS}	0,02	
V_S	17,439	
A	0,349	ft^2
T_{std}	528	R
T_S	560,54	R
P_S	30,096	in Hg
P_{std}	29,92	in Hg

Calculation

Q_{std}	339,14	dscf/min

Calculation based of data low

Particulate emission rate (E)

Equation used

$$E = (C_S - C_r)Q_{std}$$

Nomenclature

E	Particulate emission rate, g/hr
C_S	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, g/dscm^3 (g/dscf)
C_r	Concentration of particulate matter in room air, g/dscm^3 (g/dscf)
Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm^3/min (dscf/min)

Sample calculation

Data

C_S	0,000045	g/dscf
C_r	0,000003	g/dscf
Q_{std}	339,14	dscf/min

Calculation

E	0,01	g/min
E	0,87	g/h

Calculation based on train 2 data low

Total particulate emission rate (E_T)

Equation used

ASTM 2515, equation 15

$$E_T = (C_S - C_r)Q_{std}\theta$$

Nomenclature

E_T	Total particulate emission, g
C_S	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, g/dscm^3 (g/dscf)
C_r	Concentration of particulate matter in room air, g/dscm^3 (g/dscf)
Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm^3/min (dscf/min)
θ	Total sampling time, min

Sample calculation

Data

C_S	0,000045	g/dscf
C_r	0,000003	g/dscf
Q_{std}	339,14	dscf/min
θ	418	min

Calculation

E	6,06	g

Calculation based on train 2 data Low

Average gas velocity in dilution tunnel during each min interval, i, of the test run

Equation used

ASTM 2515, equation 10

$$v_{si} = F_p K_p C_p \sqrt{\Delta p_i} \sqrt{\frac{T_{si}}{P_s M_s}}$$

Nomenclature

v_{si}	Average gas velocity in dilution tunnel during each min interval, i of the test run m/sec (ft/sec)
F_P	Pitot tube correction factor
K_P	Pitot tube constant For the metric units: $34.97\ m/sec \left[\frac{\left(\frac{g}{g-mole}\right)(mm\ Hg)}{(°K)(mm\ H_2O)}\right]^{1/2}$ For English units: $85.49\ ft/sec \left[\frac{\left(\frac{lb}{lb-mole}\right)(in\ Hg)}{(°R)(in\ H_2O)}\right]^{1/2}$
C_P	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
Δp_i	interval, i, of the test run
T_{Si}	Absolute average gas temperature in the dilution tunnel during the i[th] minutes
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
M_S	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78

Sample calculation

Data

i=1			i=2		
F_P	0,956		F_P	0,956	
K_P	85,49		K_P	85,49	
C_P	0,99		C_P	0,99	
Δp_i	0,072	in H_20	Δp_i	0,073	in H_20
T_{Si}	571,4	R	T_{Si}	573,1	R
P_S	30,10	in Hg	P_S	30,10	in Hg
M_S	28,78	lb/lb-mol	M_S	28,78	lb/lb-mol

Calculation

i=1			i=2		
v_{si}	17,65	ft/sec	v_{si}	17,84	ft/sec

Percent of proportional sampling rate (PR)

Equation used

B415, equation 13.1

$$PR = \left(\frac{\theta V_{mi(std)} V_S T_m T_{Si}}{\theta_i V_m V_{Si} T_{mi} T_S} \right) \times 100$$

Nomenclature

PR	Percent of proportional sampling rate (%)
θ	Total sampling time, min
θ_i	Time of interval, 1 min
V_m	Volume of gas sample measured by the DGM, dsm^3 (dscf)
$V_{mi(std)}$	Volume of gas sample measured by the digital mass flow controller during the ith 1 minutes interval, dsm^3 (dscf)
V_S	Average gas velocity in the dilution tunnel, ft/min
V_{Si}	Average gas velocity in the dilution tunnel during the ith 10 minutes interval, ft/min
T_m	Absolute average digital mass flow controller temperature, K (R)
T_{mi}	Absolute average digital mass flow controller temperature during the ith 1 minutes
T_S	Absolute average gas temperature in the dilution tunnel, K (R)
T_{Si}	Absolute average gas temperature in the dilution tunnel during the ith 1 minutes

Sample calculation

Data

train =1			train =2		
θ	418	min	θ	418	min
θ_i	1	min	θ_i	1	min
V_m	82,82	dcf	V_m	79,34	dcf
$V_{mi(std)}$	0,197	cuft	$V_{mi(std)}$	0,1891	cuft
V_S	17,44	ft/sec	V_S	17,44	ft/sec
V_{Si}	17,658	ft/sec	V_{Si}	17,658	ft/sec
T_m	540,9	R	T_m	542,0	R
T_{mi}	538,16	R	T_{mi}	538,93	R
T_S	560,54	R	T_S	560,54	R
T_{Si}	571,4	R	T_{Si}	571,4	R

Calculation

train=1		**train=2**	
PR	100,6 %	PR	100,9 %

Filter face velocity check

Equation used

$$FV_{max} = \frac{V_{mL}}{1} \times \frac{1}{F_A}$$

Nomenclature

FV_{max}	Maximum filter face velocity during the test run, m/min (ft/min)
V_{mL}	Largest 1 minute interval metered gas volume value recorded during the test run, dm^3 (dcf)
F_A	Filter area exposed to gas sample during train operation, m2 (ft^2)

Sample calculation

<u>Data</u>

V_{mL}	0,185 dcf
F_A	0,0116 ft^2

<u>Calculation</u>

FV_{max}	15,91 ft/min

Dual train precision

Equation used

$$\frac{Train\ 1 - average\ train\ 1\ and\ train\ 2}{average\ train\ 1\ and\ train\ 2} \times 100 \leq 7.5\%$$

Nomenclature

Dual train precision	Deviation between emission's train 1 and 2
Train 1	Total emission for train 1
Train 2	Total emission for train 2

Sample calculation

Data

Train 1	5,79	g
Train 2	6,06	g

Calculation

Dual train precision	2,29	%

Analyzer drift checks

Equation used

$$Drift = \frac{\Delta R}{span} \times 100$$

Nomenclature

Drift	The change in analyzer response to calibration gas over the duration of the test run
ΔR	The difference between the analyzer response at the end of the test run and the
Span	The upper limit of the instrument range, ppmv or %

Sample calculation

Data

ΔR	0,015	%
Span	5	%

Calculation

Drift	0,30	%

Calculated with CO concentration values.

APPENDIX 12: Volume calculations

F 45 V2 Firebox Volume Calculation

General Dimensions volume calculation:

15.636 (W) x 12.582 (H) x 21.519 (D) = 4233.48 cu. in

(H) is the average of rear height of 11.149 and front height of 14.014

Minus volume calculation of air manifold at bottom front of firebox:

15.636 (W) x 2.527 (H) x 3.158 (D) = 124.77 cu. in

General volume minus air manifold volume:

4233.48 – 124.77 = 4108.71 cu. in useable firebox volume

4108.71 / 1728 = 2.37 cu. ft. useable firebox volume

Fuel load weight ranges:

10 Lbs / cu. ft range is 21.33 - 26.07

12 lb/cu.ft range is 25.595 - 31.284

ExceLINX KEITHLEY A Greater Measure of Confidence

Task: Scan DMM Channels		
Task	Name	DMM Scan
	Description	
	Created By	Gaetan Piedalue
	Company	Services POLYTESTS
	Date Created	12/19/16
	Date Modified	4/30/19
	Status/Cmds	Collecting data...
Configuration	Worksheet	DMM Config
Trigger	Model	Scan
	Source	Timer
	Delay	Auto sec
	Reading Count	2000
	Timer	60 sec
	Monitor	None
	Monitor Limits	None
Data Location	Worksheet	Acquisition
	Starting Col	b
	Starting Row	5
	Organize By	Rows
	Autoincrement	Extend existing table
	Auto Wrap	On
	Log File	
	Format	Delimited text (comma)
Data Display	Add Channel Tags	Yes
	Add Channels	No
	Add Units	No
	Scroll Display	No
	Limits	None
	Timestamp	None
	Update Interval	10 sec

Task Data

ExceLINX — KEITHLEY — A Greater Measure of Confidence

Task: Configure Scanning DMM Channels

Task	Name	DMM Config
	Description	
	Created By	Gaetan Piedalue
	Company	Services POLYTESTS
	Date Created	12/19/16
	Date Modified	5/1/19
	Status/Cmds	Task stopped successfully
Instrument	Device	MODEL_2700_at_COM4*
	Password	
	Slot 1 Module	M7700*
	Slot 2 Module	M7700*
	Slot 3 Module	
	Slot 4 Module	
	Slot 5 Module	
	Front Panel Lockout	On
Setup	Line Sync	Off
	Autozero	On
	Display Digits	6½
	DCV Input Divider	Off
	Open TC Detection	Off
	Temp Scale	°F
Limits	Digital Outputs	Off
	Pulse Output	Off
	Polarity	High
	Duration	0.02 sec
	Master Latch	Off

Channel Scan List

Channel			Measurement		Scaling					Alarm Limits						Rep Filter		Sampling		Optic	
Enb	List	Tag	Function	Range	Rel	Math	m/ref	b	U	En1	Hi1	Lo1	En2	Hi2	Lo2	Enb	Count	Rate	AC BW	Opt 1	Opt 2
On	201	Flue	TEMP	K	Off	None				Off			Off			Off		SLOW		INT	
On	114	Room	TEMP	J	Off	None				Off			Off			Off		SLOW		INT	

On	113	Tunnel	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	208	catlist down	TEMP	K									INT
On	209	catalyst cent	TEMP	K									INT
On	207	catalyst up	TEMP	K									INT
On	214	MFC 1	DCV	10 V	Off	None		0 X	Off	Off	Off	SLOW	Volts
On	215	DGM 1 in	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	216	DGM 1 out	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	111	Filter 1	TEMP	T	Off	None			Off	Off	Off	SLOW	INT
On	219	MFC 2	DCV	10 V	Off	None		0 X	Off	Off	Off	SLOW	Volts
On	217	DGM 2 in	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	218	DGM 2 out	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	112	Filter 2	TEMP	T	Off	None			Off	Off	Off	SLOW	INT
On	104	weight	DCV	10 V	Off	MXB	30	0 X	Off	Off	Off	SLOW	Volts
On	102	vel. Tunnel	DCV	10 V	Off	MXB	1	0 x	Off	Off	Off	SLOW	Volts
On	105	draft	DCV	10 V	Off	MXB	1	0 x	Off	Off	Off	SLOW	Volts
On	221	co	DCI	20 mA	Off	None			Off	Off	Off	SLOW	
On	222	co2	DCI	20 mA	Off	None			Off	Off	Off	SLOW	
On	121	na	DCI	20 mA	Off	None			Off	Off	Off	SLOW	
On	202	right	TEMP	K	Off	None			Off	Off	Off	SLOW	INT
On	203	back	TEMP	K	Off	None			Off	Off	Off	SLOW	INT
On	204	bottom	TEMP	K	Off	None			Off	Off	Off	SLOW	INT
On	205	top	TEMP	K	Off	None			Off	Off	Off	SLOW	INT
On	206	left	TEMP	K	Off	MXB	1	0 X	Off	Off	Off	SLOW	INT
On	115	na	DCV	10 V	Off	MXB	1	0 X	Off	Off	Off	SLOW	Volts
On	101	press. Stat	DCV	10 V	Off	None			Off	Off	Off	SLOW	Volts
On	116	an gaz 1	TEMP	J	Off	None			Off	Off	Off	SLOW	INT
On	212	Vacuum 1	DCV	10 V	Off	MXB	1	0 X	Off	Off	Off	SLOW	Volts
On	213	Vacuum 2	DCV	10 V	Off	MXB	1	0 X	Off	Off	Off	SLOW	Volts

ons

Opt 3	Opt 4	# equipment

EM-132

EM-133

EM-137+ EM-114 (factor30) or EM-020+EM021 (factor 5)
EM-249
EM-125
EM-118
EM-118

EM-006

EM-126
EM-127

Paramètres

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

Code verrouillage:	JOT	

Description du test

Test standard	EPA	
Run #	1	
Date	30-04-2019	
Technicien	M.M	
Project #	PI 20194	

Description de l'unité

Manufacturier	JOTUL	
Modèle	F45 V2	
Combustion system	Non-Cat	
Appliance type	WOOD STOVE	
Firebox volume	2.37	cu ft.
Appliance weight empty	n.a	lbs
Fan (no, Standard, Option)	OPTION	

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):	1.010	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0.987	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	300	scfm
Tunnel diameter	8	in.
Molecular weight	28.78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0.99	Dimensionless

Project nu.	PI 20194
Date	30-04-2019
Technicien	m.m

Fuel data

Fuel type	Cord	
Fuel specie	Oak	
HHV	20207.0	kJ/kg
%C	49.5	
%H	6.6	
%O	43.7	
%Ash	0.2	
HHV	8689.9	Btu/lb
LHV	7600.4	Btu/lb

Default Fuel Values

	D. Fir	Oak/Maple
HHV	19,810	20,207
%C	48.73	49.5
%H	6.87	6.62
%O	43.9	43.7
%Ash	0.5	0.2
HHV (Btu/lb)	8519	8690
LHV (Btu/lb)	7451	7600

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)		10	lb/ft^3			
Usable Firebox Volume		2.37	ft^3			
Total Nom. Load Wt. Target		23.70	lb			
Total Load Wt. Allowable Range	22.50	to	24.90	lb		
Core Target Wt. Allowable Range	10.70	to	15.40	lb		
Remainder Load Wt. Allowable Range	8.30	to	13.00	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	3.60	to	5.90	lb		4.75
Remainder Load Pc. Wt. Allowable Range	2.40	to	13.00	lb		7.70
	Pc. #					
Core Load Piece Wt. Actual	1	3.60	lb	In Range		
	2	4.35	lb	In Range		
	3	5.42	lb	In Range		
Core Load Total. Wt. Actual		13.37	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3.77	lb	In Range		
(1 to 3 Pcs.)	2	6.49	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		10.26	lb	In Range		
Total Load Wt. Actual		23.63	lb	In Range		
Core % of Total Wt.		57%		In Range	45-65%	
Remainder % of Total Wt.		43%		In Range	35-55%	
Actual Load % of Nominal Target		100%		In Range	95-105%	
Actual Fuel Load Density		10.0	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4.73	lb			
Actual Kindling Wt.		3.82	lb	In Range	16.2%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		7.09	lb			
Actual Start-up Fuel Wt.		6.84	lb	In Range	28.9%	
Allowable Residual Start-up Fuel Wt. Range	2.4	to	4.7	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		3.4	lb	In Range		3.5
Total Wt. All Fuel Added (wet basis)		34.29	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	2.1	to	2.6	lb		2.4
Actual Fuel Load Ending Wt.		2.2	lb	In Range		

Load pieces Length in. 16 in.

Fuel Piece Moisture Reading (%-dry basis) 1	2	3	Ave.		Pc. Wt. Dry Basis			
19.6	19.3	20	19.6	In Range	3.01	lb	1.36	kg
19.9	20	19.1	19.7	In Range	3.63	lb	1.65	kg
20.6	20	19.4	20.0	In Range	4.52	lb	2.05	kg
20.3	20.4	20.8	20.5	In Range	3.13	lb	1.42	kg
21.1	20.8	20.3	20.7	In Range	5.38	lb	2.44	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC (%-dry basis)			20.2	In Range				
Total Load Ave. MC % (wet basis)			16.8					
Total Test Load Weight (dry basis)					19.67	lb	8.92	kg
Kindling Moisture (%-dry basis)								
9	9	9	9.0	In Range	3.50	lb	1.59	kg
Start-up Fuel Moisture Readings (%-dry basis)								
19	19	19	19.0	In Range	5.75	lb	2.61	kg
Total Wt. All Fuel Added (dry basis)					28.92	lb	13.12	kg
Total Wt. All Fuel Burned (dry basis)					23.4	lb	10.6	kg

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3			
Usable Firebox Volume	2.37	ft^3			
Total Nom. Load Wt. Target	28.44	lb			
Total Load Wt. Allowable Range	27.02	to	29.86	lb	
Core Target Wt. Allowable Range	12.798	to	18.49	lb	
Remainder Load Wt. Allowable Range	9.95	to	15.64	lb	
					Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	4.27	to	7.11	lb	5.69
Remainder Load Pc. Wt. Allowable Range	2.84	to	8.53	lb	5.69
	Pc. #				
Core Load Piece Wt. Actual	1	4.88	lb	In Range	
	2	5.98	lb	In Range	
	3	6.50	lb	In Range	
Core Load Total. Wt. Actual		17.36	lb	In Range	
	Pc. #				
Remainder Load Piece Wt.	1	3.54	lb	In Range	
(2 or 3 Pcs.)	2	6.48	lb	In Range	
	3		lb	NA	
Remainder Load Piece Weight Ratio - Small/Large		55%		In Range	≤ 67%
Remainder Load Tot. Wt. Act		10.02	lb	In Range	
Total Load Wt. Actual		27.38	lb	In Range	
Core % of Total Wt.		63%		In Range	45-65%
Remainder % of Total Wt.		37%		In Range	35-55%
Actual Load % of Nominal Target		96%		In Range	95-105%
Actual Fuel Load Density		11.6	lb/ft^3		
Allowable Charcoal Bed Wt. Range (lb)	2.8	to	5.4		Mid-Point
Actual Charcoal Bed Wt.		2.9	lb	In Range	4.1
Actual Fuel Load Ending Wt.		0.0	lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		27.4	lb		
Load pieces Length in.		16	in.		

Fuel Piece Moisture Reading (%-dry basis)

	1	2	3	Ave.		Pc. Wt. Dry Basis			
	19.2	19.8	19.3	19.4	In Range	4.09	lb	1.85	kg
	19.1	22.1	19.6	20.3	In Range	4.97	lb	2.26	kg
	19.3	19.3	19.6	19.4	In Range	5.44	lb	2.47	kg
	19.6	19.4	19.8	19.6	In Range	2.96	lb	1.34	kg
	22.1	19.3	19.8	20.4	In Range	5.38	lb	2.44	kg
				NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)				19.9	In Range				
Total Load Ave. MC % (wet basis)				16.6					
Total Test Load Weight (dry basis) →						22.84	lb	10.36	kg
Total Fuel Weight Burned During Test Run (dry basis)						22.8	lb	10.36	kg

For Usable Firebox Volumes above 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3			
Usable Firebox Volume		ft^3			
Total Nom. Load Wt. Target	0	lb			
Total Load Wt. Allowable Range	0.00	to	0.00	lb	
Core Target Wt. Allowable Range	0.00	to	0.00	lb	
Remainder Load Wt. Allowable Range	0.00	to	0.00	lb	
					Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	0.00	to	0.00	lb	0.00
Remainder Load Pc. Wt. Allowable Range	0.00	to	0.00	lb	0.00
	Pc. #				
Core Load Piece Wt. Actual	1		lb	In Range	
	2		lb	In Range	
	3		lb	In Range	
Core Load Total. Wt. Actual		0.00	lb	In Range	
	Pc. #				
Remainder Load Piece Wt.	1		lb	In Range	
(3 or 4 Pcs.)	2		lb	In Range	
	3		lb	In Range	
	4		lb	NA	
Remainder Load Piece Weight Ratio - Small/Large		#NUM!		#NUM!	≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb	In Range	
Total Load Wt. Actual		0.00	lb	In Range	
Core % of Total Wt.		#DIV/0!		#DIV/0!	45-65%
Remainder % of Total Wt.		#DIV/0!		#DIV/0!	35-55%
Actual Load % of Nominal Target		#DIV/0!		#DIV/0!	95-105%
Actual Fuel Load Density		#DIV/0!	lb/ft^3		
Allowable Charcoal Bed Wt. Range (lb)	0.1	to	-0.1		Mid-Point
Actual Charcoal Bed Wt.			lb	Out of Range	0.0
Actual Fuel Load Ending Wt.			lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0.0	lb		

Fuel Piece Moisture Reading (%-dry basis)

	1	2	3	Ave.		Pc. Wt. Dry Basis			
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
				NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)				#DIV/0!	#DIV/0!				
Total Load Ave. MC % (wet basis)				#DIV/0!					
Total Test Load Weight (dry basis) →						#DIV/0!	lb	#DIV/0!	kg
Total Fuel Weight Burned During Test Run (dry basis)						#DIV/0!	lb	#DIV/0!	kg

	Start	End
Barometer (kPa):	102.5	101.2
Barometer (in.Hg):	30.2682386	29.88434875
Dry Bulb (F):	74.3	80.6
Humidity (%):	26	23.1
Air velocity (ft/min)	0	0

High fire test						
DGM #1	Final:	32015.114	cuft	Final:	906567.040	Liter
	Initial:	31990.123	cuft	Initial:	905859.390	Liter
DGM #2	Final:	30231.417	cuft	Final:	856058.390	Liter
	Initial:	30206.611	cuft	Initial:	855355.940	Liter
DGM room				Final:	689.390	cuft
				Initial:	660.980	cuft

min or med burnrate						
DGM #1	Final:	32101.859	cuft	Final:	909023.390	Liter
	Initial:	32015.204	cuft	Initial:	906569.590	Liter
DGM #2	Final:	30316.610	cuft	Final:	858470.790	Liter
	Initial:	30231.535	cuft	Initial:	856061.720	Liter
DGM room				Final:	804.220	cuft
				Initial:	689.390	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	71
Numéro de la ligne dans "Raw data" à partir duquel les données du highfire test commence	111
Numéro de la ligne dans "Raw data" à partir duquel les données du min ou medium fire test commence	258

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

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

Validation du fichier de calcul avec les équations provenant des normes:
ASTM E2515-11
ASTME3053-17

Equation 9,2 (1)

$$M_{fldb} = \sum (M_{flnwb})(100)/(100 + MC_{fln}))$$

Nomenclature

M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{FLnwb}	Weight of each test fuel pieces, n, in test fuel load per 8,4,1, wet basis, lb (kg)
MC_{FLn}	Average fuel moisture of test fuel piece, n , in test fuel load % dry basis
n	individual test fuel pieces that comprise the test fuel load, as applicable

Sample calculation

Data

M_{FLnwb}	23.63	lbs
MC_{FLn}	20.16	%
n		
M_{FLdb}	19.67	lbs

Equation 9,2 (2)

$$M_{SUdb} = \sum (M_{SUnwb})(100)/(100 + MC_{SUn}))$$

Nomenclature

M_{SUdb}	Weight of startup fuel, dry basis, lb (Kg)
M_{SUnwb}	Weight of each start-up fuel pieces, n, per 8,5,7, wet basis, lb (Kg)
MC_{SUn}	Average fuel moisture of start-up fuel piece, n % bry basis

n	individual startup fuel pieces, as applicable

Sample calculation

Data

M_{SUnwb}	6.84	lbs
MC_{SUn}	19	%
n		
M_{SUdb}	5.75	lbs

Equation 9,2 (3) $$M_{kdb} = (M_{kwb})(100)/(100 + MC_k)$$

Nomenclature

M_{kdb}	Weight of kindling, dry basis lb (kg)
M_{kwb}	Weight of kindling per 8,5,6, wet basis, lb (kg)
MC_k	Average moisture of kindling % dry basis

Sample calculation

Data

M_{kwb}	3.82	lbs
MC_k	9.00	%
M_{kdb}	3.50	lbs

Equation 9,2 (4) $$M_{FREHdb} = M_{RSUBdb} + M_{FLEHdb}$$

Nomenclature

M_{FREHdb}	Total weight of all remaining fuel at end of high fire test run, lb (kg)
M_{RSUBDb}	Weight of risidual start-up fuel bed when high fire test load added, lb(kg)
M_{FLEHdb}	Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation

Data

M_{RSUBDb}	3.40	lbs
M_{FLEHdb}	2.16	lbs
M_{FREHdb}	5.56	lbs

Equation 9,2 (5) $$M_{TFBHdb} = M_{Kdb} + M_{SUdb} + M_{FLdb} - M_{FREHdb}$$

Nomenclature

M_{TBFHdb}	Total weight of all fuel burned during high fire test run lb (kg), dry basis
M_{FREHdb}	Total weight of all remaining fuel at end of high fire test run, lb (kg)
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{SUdb}	Weight of startup fuel, dry basis, lb (Kg)
M_{kdb}	Weight of kindling, dry basis lb (kg)

Sample calculation

Data

M_{FREHdb}	5.56	lbs
M_{FLdb}	19.67	lbs
M_{SUdb}	5.75	lbs
M_{kdb}	3.50	lbs
M_{TBFHdb}	23.36	lbs

Equation 9,2 (6) $$BR_H = 60(M_{FLdb} - M_{FLEHdb})/\theta_{H1}$$

Nomenclature

BR_H	Dry burn rate for high fire test run, from time when test fuel load added to end of test ru
θ_{H1}	Total duration of high fire test run, from time when test fuel load is added to end of test
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)
M_{FLEHdb}	Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation

Data

θ_{H1}	88	min
M_{FLdb}	19.67	lbs
M_{FLEHdb}	2.16	lbs
BR_H	5.42	kg/hr

For low and medium burn fire test run
Equation 9,2 (7) $M_{TFBdb} = M_{FLdb} - M_{FREdb}$

Nomenclature

M_{TFBdb}	Total weight of fuel burned during low or medium fire test run, lb (kg),dry basis
M_{FREdb}	Weight of remaining fuel at end of low or medium fire test run, lb (kg)
M_{FLdb}	Weight of test fuel load, dry basis lb (kg)

Sample calculation

Data

M_{FREdb}	0.00	lbs
M_{FLdb}	22.84	lbs
M_{TFBdb}	22.84	lbs

Equation 9,2 (8) $$BR = 60(M_{MTBdb})/\theta$$

Nomenclature

BR	Dry burn rate for low and medium fire test run. lb/hr (kg/hr)
θ	Total duration of low or medium fire test run, min.
M_{TFBdb}	Total weight of fuel burned during low or medium fire test run, lb (kg),dry basis

Sample calculation

Data

θ	418	min
M_{TFBdb}	22.84	lbs
BR_H	1.49	kg/hr

For high test run

Equation 9,2 (9) $PM_{RH} = 60(E_{TH}/\theta_{H2})$

Nomenclature

PM_{RH}	Paticulate emission rate for high fire test run, gr/hr
E_{TH}	Total particulate emissions for high fire test run including kindling and start-uo
θ_{H2}	Total test duration of high fire test run, from ignition of kindling to end of test run

Sample calculation

Data

E_{TH}	6	gr
θ_{H2}	128.00	min
PM_{RH}	2.77	kg/hr

Equation 9,2 (10) $PM_{FH} = E_{TH}/M_{TFBHdb}$

Nomenclature

PMF_H	Paticulate emission rate for high fire test run, gr/hr

Sample calculation

Data

E_{TH}	6	gr
M_{TFBHdb}	23.36	dry lb
PM_{RH}	0.56	gr/dry kg

for high fire test run
Equation 9,2 (11)

$$PM_{btuH} = E_{TH} / (M_{TFBHdb} * (HHV)\left(\frac{n_1}{100}\right)) * (10^6)$$

Nomenclature

PM_{btuH}	Particulate per heat output unit for high fire test run, lb/ MMbtu
HHV	Higher heating value of test fuel, dry basis, btu/lb
n_r	CSA B415,1 overall Efficiency, HHV (hot to hot)

Sample calculation

Data

E_{TH}	5.9	gr
M_{TFBHdb}	23.36	dry lb
HHV	8690	btu/lb
n_r	68.54%	

PM_{btuH}	0.0938 lb/Mmbtu

Equation 9,2 (12) $$PM_R = 60(E_T/\theta)$$

Nomenclature

PM_R	Paticulate emission rate for low or medium fire test run, gr/hr
E_T	Total particulate emission for low or medium fire test run, from ASTME 2515 (g)
θ	Total duration of low or medium fire test run, min.

Sample calculation

Data

E_T	6	gr
θ	418	min
PM_{RH}	0.85	gr/hr

Equation 9,2 (13) $$PM_F = E_T/M_{TFBdb}$$

Nomenclature

PM_F	Paticulate emission factor rate for low or medium fire test run, gr/dry kg

Sample calculation

Data

E_T	5.9	gr
M_{TFBdb}	22.84	dry lb
PM_F	0.57	gr/dry kg

for high fire test run
Equation 9,2 (14)

$$PM_{btu} = E_T / (M_{TFBdb}(HHV)(\frac{n_r}{100})) * (10^6)$$

Nomenclature

Pmbtu	Particulate per heat output unit for low and medium test run, lb/ MMbtu
HHV	Higher heating value of test fuel, dry basis, btu/lb
n_r	CSA B415,1 overall Efficiency, HHV (hot to hot)

Sample calculation

Data

E_{TH}	5.9	gr
M_{TFBHdb}	22.84	dry lb
HHV	8690	btu/lb
n_r	69.56%	
PM_{btuH}	0.0946	lb/Mmbtu

Volume of gas sample corrected to dry standard conditions ($V_{m(std)}$)

Equation used

ASTM 2515, equation 6

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

Nomenclature

$V_{m\ (std)}$	Volume of gas sample , corrected to standard conditions, dscm^3 (dscf)
K_1	17.64 R/in Hg
V_m	Volume of gas sample
Y	DGM calibration factor
P_{bar}	Barometric pressure mmHg (in Hg)
Δ H	Average pressure at the outlet of the dry gas meter mm water (in. Water)
T_m	Absolute average dry gas meter temperature K (R)

Sample calculation

Data

V_m	85.08	dcf
Y	0.98730288	
P_{bar}	30.08	in Hg
ΔH	-1.0678	in Hg
T_m	542.0	R

Calculation

$V_{m(std)}$	79.31	dscf

Calculation based of train 2 data Low fire

Total amount of particulate matter collected (m_n)

Equation used

ASTM 2515, equation 12

$$m_n = F_1 + F_2 + \Delta PF$$

Nomenclature

m_n	Total amount of particulate matter collected, mg
F_1	Particulate matter collected on front filter, mg
F_2	Particulate matter collected on second filter, mg
ΔPF	Post-test weight gain of probe and filter holder assembly, mg

Sample calculation

Data

F_1	0	g
F_2	-0.003	g
ΔPF	0.007	g

Calculation

m_n	3.600	mg

Calculation based of train 2 data Low fire

Particulate concentration (C_S)

Equation used

ASTM 2515, equation 13

$$C_S = (0{,}001\ g/mg) \times \left(\frac{m_n}{V_{m(std)}}\right)$$

Nomenclature

C_S	Concentration of particulate matter in stack gas or dilution tunnel, dry basis, corrected to standard conditions, g/dsm^3 (g/dscf)
m_n	Total amount of particulate matter collected in the sampling train, mg
$V_{m(std)}$	Volume of gas sample measured corrected to dry standard conditions, dsm^3 (dscf)

Sample calculation

Data

m_n	3.600	mg
$V_{m(std)}$	79.31	dscf

Calculation

C_s	0.000045	g/dscf

Calculation based of train 2 data Low fire

Particulate concentration for room air (C_r)

Equation used

ASTM 2515, equation 14

$$C_r = (0{,}001\ g/mg) \times \left(\frac{m_r}{V_{mr\,(std)}}\right)$$

Nomenclature

C_r	Concentration of particulate matter in room air, dry basis, corrected to standard conditions, g/dsm^3 (g/dscf)
m_r	Total amount of particulate matter collected in the sampling train, mg
$V_{mr(std)}$	Volume of room air sample measured corrected to dry standard conditions, dsm^3 (dscf)

Sample calculation

Data

m_r	0.300	mg
$V_{mr(std)}$	113.43	dscf

Calculation

C_r	0.000003	g/dscf

Calculation based of train 2 data low

Adjustment factor for alternative pitot tube placement (FP)

Equation used

ASTM 2515, equation 1

$$F_P = \frac{V_{strav}}{V_{scent}}$$

Nomenclature

V_{strav}	Average gas velocity caclulated after the Pitot tube traverse
V_{scent}	Average gas velocity at the center of the dilution tunnel cacluated after the multi-point Pitot traverse
F_P	Adjustment factor for center of tunnel pitot tube placement

Sample calculation

Data

V_{strav}	0.255740195
V_{scent}	0.267393205

Calculation

F_P	0.956420

Average dilution tunnel gas velocity (V_S)

Equation used

ASTM 2515, equation 9

$$V_S = F_p K_P C_P \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_S}{P_S M_S}}$$

Nomenclature

V_S Average dilution tunnel gas velocity, m/s (ft/s)

K_P Pitot tube constant

For the metric units: $34.97\ m/sec \left[\frac{\left(\frac{g}{g-mole}\right)(mm\ Hg)}{(°K)(mm\ H_2O)}\right]^{1/2}$

For English units: $85.49\ ft/sec \left[\frac{\left(\frac{lb}{lb-mole}\right)(in\ Hg)}{(^{\circ}R)(in\ H_2O)}\right]^{1/2}$

C_P	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
F_P	Pitot tube correction factor
$(\sqrt{\Delta P})_{avg}$	Average square root of each individual velocity head (ΔP)
P_{bar}	Barometric pressure at measurement site, mm H_2O (in. H_2O)
P_g	Stack static pressure, mm Hg (in. Hg)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
M_S	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78 or 29 for CSA B415
t_S	Dilution tunnel temperature, °C (°F)
T_S	Absolute dilution tunnel temperature, °K (°R), or 273 + t_s for metric units, 460 + t_s for English units

Sample calculation

Data

K_P	85.49				
C_P	0.99				
F_P	0.956				
$(\sqrt{\Delta P})_{avg}$	0.2678	in $H_20^{1/2}$			
P_{bar}	30.08	in Hg			
P_g	0.27	in H_20	**Calculation**		
P_S	30.10	in Hg			
M_S	28.78	lb/lb-mol	V_S	17.4390	ft/s
t_S	100.54	F	Calculation based of data low		
T_S	560.54	R			

Average dilution tunnel gas flow rate (Qstd)

Equation used

ASTM 2515, equation 3

$$Q_{std} = 60(1 - B_{WS})V_S A \left(\frac{T_{std}}{T_S}\right)\left(\frac{P_S}{P_{std}}\right)$$

Nomenclature

Q_{std}	Total gas flow rate corrected to dry standard conditions, dsm^3/min (dscf/min)
60	Conversion factor minutes per hour
B_{WS}	Water vapour in the dilution tunnel stream, proportion by volume (may be assumed to be 2%)
V_S	Average dilution tunnel gas velocity, m/s (ft/s)
A	Cross-sectional area of dilution tunnel, m^2 (ft^2)
T_{std}	Standard absolute temperature, 293 °K (528°R)
T_S	Absolute average dilution tunnel temperature, °K (°R), or 273 + t_s for metric units, 460 +
t_S	Dilution tunnel temperature, °C (°F)
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
P_{bar}	Barometric pressure at measurement site, mm Hg (in. Hg)
P_g	Dilution tunnel static pressure, mm Hg (in. Hg)
P_{std}	Standard absolute pressure, 760 mm Hg (29.92 in. Hg)

Sample calculation

<u>Data</u>

B_{WS} 0.02

V_S	17.439	
A	0.349	ft^2
T_{std}	528	R
T_S	560.54	R
P_S	30.096	in Hg
P_{std}	29.92	in Hg

Calculation

Q_{std}	339.14	dscf/min

Calculation based of data low

Particulate emission rate (E)

Equation used

$$E = (C_S - C_r)Q_{std}$$

Nomenclature

E	Particulate emission rate, g/hr
C_S	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, $g/dscm^3$ (g/dscf)
C_r	Concentration of particulate matter in room air, $g/dscm^3$ (g/dscf)

Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm^3/min (dscf/min)

Sample calculation

Data

C_S	0.000045	g/dscf
C_r	0.000003	g/dscf
Q_{std}	339.14	dscf/min

Calculation

E	0.01	g/min
E	0.87	g/h

Calculation based on train 2 data low

Total particulate emission rate (E_T)

Equation used

ASTM 2515, equation 15

$$E_T = (C_S - C_r) Q_{std} \theta$$

Nomenclature

E_T	Total particulate emission, g
C_S	Concentration of particulate matter in stack gas or dilution tunnel gas, dry basis corrected to standard conditions, g/dscm^3 (g/dscf)
C_r	Concentration of particulate matter in room air, g/dscm^3 (g/dscf)
Q_{std}	Total gas flow rate, dry basis corrected to standard conditions, dsm^3/min (dscf/min)
θ	Total sampling time, min

Sample calculation

Data

C_S	0.000045	g/dscf
C_r	0.000003	g/dscf
Q_{std}	339.14	dscf/min
θ	418	min

Calculation

E	6.06	g

Calculation based on train 2 data Low

Average gas velocity in dilution tunnel during each min interval, i, of the test run

Equation used

ASTM 2515, equation 10

$$v_{si} = F_p K_p C_p \sqrt{\Delta p_i} \sqrt{\frac{T_{si}}{P_s M_s}}$$

Nomenclature

v_{si}	Average gas velocity in dilution tunnel during each min interval, i of the test run m/sec (ft/sec)
F_P	Pitot tube correction factor
K_P	Pitot tube constant
	For the metric units: $34.97\ m/sec \left[\frac{\left(\frac{g}{g-mole}\right)(mm\ Hg)}{(^{\circ}K)(mm\ H_2O)}\right]^{1/2}$

For English units: $85.49\ ft/sec \left[\frac{\left(\frac{lb}{lb-mole}\right)(in\ Hg)}{(°R)(in\ H_2O)}\right]^{1/2}$

C_P	Pitot tube coefficient (use 0.99 for standard pitot tube, 0.84 may be used for S-type tubes constructed according to Method 2 specifications)
Δp_i	Velocity pressure in the dilution tunnel as measured with the Pitot tube during each min interval, i, of
T_{Si}	Absolute average gas temperature in the dilution tunnel during the i[th] minutes interval, K
P_S	Absolute dilution tunnel static gas pressure, mm Hg (in. Hg), or $P_{bar} + P_g$
M_S	Molecular weight of dilution tunnel gas, wet basis, g/g-mole (lb/lb-mol) may be assumed to be 28.78

Sample calculation

Data

i=1			i=2		
F_P	0.956		F_P	0.956	
K_P	85.49		K_P	85.49	
C_P	0.99		C_P	0.99	
Δp_i	0.072	in H_20	Δp_i	0.073	in H_20
T_{Si}	571.4	R	T_{Si}	573.1	R
P_S	30.10	in Hg	P_S	30.10	in Hg
M_S	28.78	lb/lb-mol	M_S	28.78	lb/lb-mol

Calculation

i=1			i=2		
v_{si}	17.65	ft/sec	v_{si}	17.84	ft/sec

Percent of proportional sampling rate (PR)

Equation used

B415, equation 13.1

$$PR = \left(\frac{\theta V_{mi(std)} V_S T_m T_{Si}}{\theta_i V_m V_{Si} T_{mi} T_S} \right) \times 100$$

Nomenclature

PR	Percent of proportional sampling rate (%)
θ	Total sampling time, min
θ_i	Time of interval, 1 min
V_m	Volume of gas sample measured by the DGM, dsm^3 (dscf)
$V_{mi(std)}$	Volume of gas sample measured by the digital mass flow controller during the i^{th} 1 minutes interval, dsm^3 (dscf)
V_S	Average gas velocity in the dilution tunnel, ft/min
V_{Si}	Average gas velocity in the dilution tunnel during the i^{th} 10 minutes interval, ft/min
T_m	Absolute average digital mass flow controller temperature, K (R)
T_{mi}	Absolute average digital mass flow controller temperature during the i^{th} 1 minutes
T_S	Absolute average gas temperature in the dilution tunnel, K (R)
T_{Si}	Absolute average gas temperature in the dilution tunnel during the i^{th} 1 minutes interval,

Sample calculation

Data

train =1			train =2		
θ	418	min	θ	418	min
θ_i	1	min	θ_i	1	min

V_m	82.82	dcf	V_m	79.34	dcf
$V_{mi(std)}$	0.197	cuft	$V_{mi(std)}$	0.1891	cuft
V_S	17.44	ft/sec	V_S	17.44	ft/sec
V_{Si}	17.658	ft/sec	V_{Si}	17.658	ft/sec
T_m	540.9	R	T_m	542.0	R
T_{mi}	538.16	R	T_{mi}	538.93	R
T_S	560.54	R	T_S	560.54	R
T_{Si}	571.4	R	T_{Si}	571.4	R

Calculation

train=1			**train=2**		
PR	100.6	%	PR	100.9	%

Filter face velocity check

Equation used

$$FV_{max} = \frac{V_{mL}}{1} \times \frac{1}{F_A}$$

Nomenclature

FV_{max}	Maximum filter face velocity during the test run, m/min (ft/min)
V_{mL}	Largest 1 minute interval metered gas volume value recorded during the test run, dm^3 (dcf)
F_A	Filter area exposed to gas sample during train operation, m2 (ft^2)

Sample calculation

Data

V_{mL}	0.185	dcf
F_A	0.0116	ft^2

Calculation

FV_{max}	15.91	ft/min

Dual train precision

Equation used

$$\frac{Train\ 1 - average\ train\ 1\ and\ train\ 2}{average\ train\ 1\ and\ train\ 2} \times 100 \leq 7.5\%$$

Nomenclature

Dual train precision	Deviation between emission's train 1 and 2
Train 1	Total emission for train 1
Train 2	Total emission for train 2

Sample calculation

Data

Train 1	5.79	g
Train 2	6.06	g

Calculation

Dual train precision	2.29	%

Analyzer drift checks

Equation used

$$Drift = \frac{\Delta R}{span} \times 100$$

Nomenclature

Drift	The change in analyzer response to calibration gas over the duration of the test run
ΔR	The difference between the analyzer response at the end of the test run and the known
Span	The upper limit of the instrument range, ppmv or %

Sample calculation

Data

ΔR	0.015 %

Span	5 %

Calculation

Drift	0.30 %

Calculated with CO concentration values.

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure:		in. H20
Barometer:	30.268	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=
0.956

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0.072	65.1	0.2683
B center	0.071	65.71	0.2665
A1	0.065	65.33	0.2550
A2	0.080	65.41	0.2828
A3	0.058	65.63	0.2408
A4	0.060	65.67	0.2449
B1	0.059	65.810	0.2429
B2	0.072	65.910	0.2683
B3	0.061	66.030	0.2470
B4	0.058	66.030	0.2408
AVERAGE	0.0656	65.6630	0.2557

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

Filter set weight highfire

	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	438	439	18	32	440	441	28	33	442	443	29	444		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61.1001	0.0874	0.0868	34.9885	110.1779	0.0862	0.0872	34.5653	109.3625	0.0863	0.0869	35.1804	0.0861	4/29/19	17:00
Before (6)	61.1002	0.0873	0.0868	34.9884	110.1778	0.0863	0.0873	34.5654	109.3626	0.0864	0.0870	35.1805	0.0862	4/30/19	7:00
After (1)	61.1004	0.0884	0.0849	34.9935	110.1778	0.0861	0.0859	34.5699	109.3628	0.0870	0.0850	35.1862	0.0867	4/30/19	14:00
After (2)	61.1003	0.0882	0.0847	34.9930	110.1778	0.0861	0.0859	34.5686	109.3628	0.0867	0.0850	35.1855	0.0864	5/6/19	8:00
After (3)	61.1003	0.0882	0.0847	34.9920	110.1778	0.0861	0.0859	34.5680	109.3628	0.0867	0.0850	35.1855	0.0864	5/8/19	8:00
After (4)	61.1003	0.0882	0.0847	34.9920	110.1778	0.0861	0.0859	34.5680	109.3628	0.0867	0.0850	35.1855	0.0863	5/9/19	8:00
After (5)															
After (6)	61.1003	0.0882	0.0847	34.9920	110.1778	0.0861	0.0859	34.5680	109.3628	0.0867	0.0850	35.1855	0.0863	5/9/19	8:00
Difference	0.0001	0.0009	-0.0021	0.0036	0.0000	-0.0002	-0.0014	0.0026	0.0002	0.0003	-0.0020	0.0050	0.0001		
Total (mg)		2.5				3.5				3.5			0.1		
Total ajusté (mg)		**2.40**				**3.40**				**3.40**					

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

Filter set weight Low/ medium fire

	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	16	435	437	9	39	445	447	42	33	442	443	29	462		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108.7530	0.0863	0.0876	34.9175	110.2776	0.0870	0.0865	35.3299	109.1646	0.0822	0.0825	35.1250	0.0831	4/29/19	17:00
Before (6)	108.7531	0.0863	0.0877	34.9176	110.2775	0.0871	0.0866	35.3298	109.1647	0.0823	0.0826	35.1251	0.0832	4/30/19	7:00
After (1)	108.7534	0.0887	0.0841	34.9231	110.2777	0.0875	0.0854	35.3318	109.1649	0.0823	0.0793	35.132	0.0836	4/30/19	22:00
After (2)	108.7534	0.0887	0.0841	34.9223	110.2777	0.0875	0.0854	35.3318	109.1649	0.0823	0.0793	35.1318	0.0835	5/6/19	8:00
After (3)	108.7534	0.0887	0.0841	34.9213	110.2777	0.0875	0.0854	35.3312	109.1649	0.0823	0.0793	35.1318	0.0835	5/8/19	8:00
After (4)	108.7534	0.0887	0.0841	34.9213	110.2777	0.0875	0.0854	35.3312	109.1649	0.0823	0.0793	35.1318	0.0835	5/9/19	8:00
After (5)															
After (6)	108.7534	0.0887	0.0841	34.9213	110.2777	0.0875	0.0854	35.3312	109.1649	0.0823	0.0793	35.1318	0.0835	5/9/19	8:00
Difference	0.0003	0.0024	-0.0036	0.0037	0.0002	0.0004	-0.0012	0.0014	0.0002	0.0000	-0.0033	0.0067	0.0003		
Total (mg)		2.8				3.6				3.6			0.3		
Total ajusté (mg)		**2.50**				**3.30**				**3.30**					

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

*		*	*	*	*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	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom								
min		lbs	%	%	ºF	ºF	ºF	ºF	ºF	ºF	ºF	ºF	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF
0.00	71.00	10.6	0.6	3.2	69.2	66.3	72.8	67.2	63.9	65.2	65.1	63.8	0.24	69.31	69.80	86.50	0.23	69.94	69.80	87.92
1.0	72.0	10.6	0.0	0.3	96.6	66.4	74.9	69.2	64.0	65.2	65.1	63.8	0.19	69.02	69.66	85.58	0.18	69.78	69.50	86.63
2.0	73.0	10.6	0.0	0.6	103.3	66.5	74.1	72.7	64.3	65.3	65.1	63.8	0.19	69.01	69.56	84.74	0.18	69.67	69.39	85.57
3.0	74.0	10.6	0.0	0.6	102.2	66.5	73.1	78.1	64.5	65.3	65.1	63.8	0.19	68.99	69.46	83.95	0.18	69.59	69.28	84.62
4.0	75.0	10.5	0.0	1.0	95.7	66.4	73.1	80.1	64.7	65.3	65.2	63.8	0.19	68.96	69.36	83.12	0.18	69.49	69.21	83.73
5.0	76.0	10.6	0.0	0.5	95.5	66.5	73.3	80.6	65.0	65.4	65.2	63.9	0.19	68.91	69.27	82.39	0.18	69.43	69.13	82.89
6.0	77.0	10.5	0.0	0.4	101.6	66.5	72.9	83.4	65.2	65.4	65.2	63.8	0.19	68.85	69.16	81.70	0.18	69.34	69.08	82.09
7.0	78.0	10.5	0.0	1.2	110.0	66.5	75.2	88.1	65.4	65.5	65.3	63.9	0.19	68.91	69.12	81.00	0.18	69.31	69.03	81.35
8.0	79.0	10.5	0.0	1.4	121.6	66.7	77.6	94.9	65.6	65.6	65.3	63.9	0.19	68.97	69.09	80.35	0.18	69.31	69.01	80.58
9.0	80.0	10.5	0.0	1.5	126.5	66.9	80.0	102.4	65.8	65.7	65.4	63.9	0.19	69.09	69.08	80.35	0.18	69.31	69.01	80.58
10.0	81.0	10.4	0.0	1.4	124.7	67.0	81.8	106.6	66.0	65.9	65.5	63.9	0.19	69.27	69.12	82.39	0.18	69.49	69.05	80.71
11.0	82.0	10.4	0.0	1.2	123.0	67.2	83.5	109.1	66.3	65.9	65.6	64.0	0.19	69.49	69.19	84.24	0.18	69.62	69.10	81.24
12.0	83.0	10.4	0.0	1.0	121.6	67.3	84.5	108.2	66.7	66.0	65.6	64.0	0.19	69.72	69.25	83.69	0.18	69.79	69.18	80.88
13.0	84.0	10.3	0.0	0.5	130.9	67.2	83.9	107.6	67.4	66.1	65.8	64.0	0.19	69.95	69.35	83.00	0.18	69.97	69.26	80.34
14.0	85.0	10.3	0.0	0.7	182.3	67.3	83.0	121.1	68.2	66.2	65.9	64.0	0.19	70.08	69.40	82.36	0.18	70.08	69.35	80.34
15.0	86.0	10.0	0.1	2.9	343.4	67.4	89.0	192.3	69.1	66.3	66.0	64.1	0.19	70.14	69.45	81.78	0.18	70.15	69.40	80.34
16.0	87.0	9.9	0.1	6.1	478.8	67.2	96.7	293.8	70.8	66.5	66.2	64.1	0.19	70.12	69.47	85.96	0.18	70.17	69.43	82.31
17.0	88.0	9.6	0.1	8.8	568.5	67.1	104.3	402.7	74.4	66.7	66.3	64.2	0.19	70.12	69.47	86.54	0.18	70.18	69.43	84.33
18.0	89.0	9.3	0.2	11.3	680.4	66.9	116.1	514.9	80.6	66.9	66.6	64.3	0.19	70.13	69.48	86.04	0.18	70.20	69.46	84.28
19.0	90.0	8.8	0.5	14.7	717.9	67.3	123.5	603.9	90.1	67.3	66.9	64.3	0.19	70.18	69.53	85.40	0.18	70.24	69.49	83.76
20.0	91.0	8.4	0.6	16.3	688.3	67.3	124.6	650.5	102.0	67.9	67.6	64.5	0.19	70.25	69.55	84.82	0.18	70.32	69.57	83.17
21.0	92.0	8.1	0.4	14.7	674.9	67.1	124.6	668.6	115.8	68.7	68.4	64.8	0.19	70.38	69.60	84.26	0.18	70.41	69.62	82.61
22.0	93.0	7.7	0.3	13.9	739.6	67.3	130.8	699.9	131.3	69.9	69.5	65.2	0.19	70.43	69.64	83.75	0.18	70.48	69.69	82.11
23.0	94.0	7.4	0.6	16.0	726.3	67.4	131.8	729.7	148.8	71.5	71.1	65.8	0.19	70.52	69.68	83.34	0.18	70.52	69.73	81.68
24.0	95.0	7.0	0.4	15.2	706.5	67.6	130.5	737.5	164.7	73.4	73.0	66.7	0.19	70.64	69.73	82.90	0.18	70.63	69.82	81.31
25.0	96.0	6.8	0.2	13.8	711.9	67.8	131.5	743.4	182.0	75.8	75.3	68.1	0.19	70.78	69.79	82.55	0.18	70.74	69.87	80.97
26.0	97.0	6.4	0.2	13.7	710.8	67.9	131.2	746.2	200.6	78.5	78.2	69.8	0.19	70.93	69.84	82.24	0.18	70.86	69.96	80.75
27.0	98.0	6.1	0.3	14.1	707.5	67.8	131.2	745.3	220.1	81.8	81.3	71.9	0.19	71.03	69.89	81.99	0.18	70.96	70.04	80.52
28.0	99.0	5.8	0.2	13.8	707.5	67.7	130.9	743.2	240.0	85.3	85.0	74.5	0.19	71.15	69.93	82.58	0.18	71.06	70.11	82.42
29.0	100.0	5.5	0.2	13.8	702.6	67.8	130.3	743.6	258.3	89.3	89.2	77.5	0.19	71.22	69.99	83.01	0.18	71.14	70.18	84.16
30.0	101.0	5.3	0.2	13.2	697.5	67.8	129.9	742.6	275.8	93.6	93.8	81.0	0.19	71.34	70.04	82.87	0.18	71.24	70.25	84.29
31.0	102.0	5.0	0.2	12.8	692.5	68.2	129.3	740.8	292.8	98.3	98.6	84.8	0.19	71.60	70.11	82.69	0.18	71.39	70.33	84.06
32.0	103.0	4.7	0.1	12.6	692.8	68.3	130.9	741.3	309.2	103.1	103.7	89.2	0.19	71.80	70.20	83.54	0.18	71.55	70.43	83.76
33.0	104.0	4.5	0.2	12.5	684.8	68.6	130.2	742.1	325.3	108.4	109.1	93.9	0.19	72.11	70.32	85.21	0.18	71.78	70.53	83.44
34.0	105.0	4.3	0.2	12.1	662.1	68.9	129.2	731.4	341.6	113.8	114.6	99.2	0.19	72.47	70.45	85.08	0.18	72.07	70.69	83.24
35.0	106.0	4.2	0.2	10.5	647.1	69.2	127.5	716.0	355.5	119.4	120.2	105.0	0.19	72.76	70.60	84.87	0.18	72.35	70.82	83.09
36.0	107.0	4.0	0.2	9.7	632.3	69.1	126.9	699.9	366.0	124.8	125.8	111.4	0.19	73.06	70.76	84.70	0.18	72.62	70.97	82.95
37.0	108.0	3.9	0.2	8.8	615.8	69.1	125.8	682.4	373.8	130.3	131.4	118.3	0.19	73.35	70.96	84.52	0.18	72.89	71.14	82.81
38.0	109.0	3.7	0.2	8.3	609.6	69.5	125.5	665.2	381.1	135.7	136.8	125.8	0.19	73.64	71.12	84.35	0.18	73.20	71.32	82.72
39.0	110.0	3.5	0.3	8.2	610.3	69.5	125.9	655.5	388.6	141.0	141.9	133.6	0.19	73.91	71.32	84.24	0.18	73.49	71.49	82.61
40.0	111.0	22.7	0.2	8.6	597.8	70.1	169.6	644.0	397.5	145.5	147.0	142.0	0.19	74.20	71.52	84.17	0.18	73.76	71.67	85.33
41.0	112.0	26.5	0.2	6.6	609.5	70.0	141.5	635.6	396.2	150.5	152.0	150.7	0.19	74.51	71.73	84.13	0.18	74.07	71.87	86.34
42.0	113.0	26.2	0.3	8.5	668.5	69.9	138.6	655.7	383.4	154.5	156.8	159.7	0.19	74.79	71.95	84.05	0.18	74.36	72.06	86.47
43.0	114.0	25.9	0.2	11.2	718.6	70.0	141.5	691.2	369.9	159.0	161.4	168.8	0.19	75.08	72.17	84.01	0.18	74.66	72.27	86.39
44.0	115.0	25.5	0.2	13.6	764.3	69.8	146.5	729.7	358.6	163.4	165.9	177.8	0.19	75.41	72.40	84.07	0.18	74.99	72.49	86.30
45.0	116.0	25.2	0.4	15.2	784.3	70.1	148.8	763.7	349.8	167.0	170.2	186.8	0.19	75.65	72.63	84.10	0.18	75.30	72.70	86.19
46.0	117.0	24.8	0.5	15.8	791.1	70.4	151.4	785.7	343.2	171.2	174.8	194.0	0.19	75.91	72.86	84.13	0.18	75.60	72.91	86.11
47.0	118.0	24.5	0.5	15.5	792.7	70.7	152.2	800.5	338.3	175.4	179.2	199.8	0.19	76.24	73.12	84.18	0.18	75.94	73.14	86.04
48.0	119.0	24.1	0.5	15.4	792.6	70.8	152.8	809.7	334.7	179.8	184.0	204.8	0.19	76.53	73.35	84.17	0.18	76.23	73.36	85.91
49.0	120.0	23.7	0.4	15.1	791.0	71.1	153.5	816.5	332.0	184.5	188.8	210.1	0.19	76.88	73.60	84.22	0.18	76.57	73.61	85.84
50.0	121.0	23.4	0.4	14.9	792.4	71.3	153.6	822.6	330.1	189.1	193.6	215.7	0.19	77.23	73.85	84.30	0.18	76.90	73.85	85.82
51.0	122.0	23.1	0.4	14.9	795.4	71.3	154.5	829.9	328.8	193.3	198.7	220.8	0.19	77.54	74.09	84.47	0.18	77.22	74.07	85.85
52.0	123.0	22.7	0.4	14.8	795.4	71.6	154.5	836.6	327.9	198.1	203.9	225.6	0.19	77.83	74.31	84.68	0.18	77.53	74.28	85.93
53.0	124.0	22.4	0.4	14.7	795.1	71.6	154.6	842.2	327.3	202.7	209.3	230.2	0.19	78.10	74.53	84.87	0.18	77.83	74.48	85.97
54.0	125.0	22.1	0.4	14.7	788.9	71.6	155.5	842.0	327.4	207.4	214.6	234.3	0.19	78.38	74.77	85.08	0.18	78.13	74.73	86.01
55.0	126.0	21.8	0.4	14.2	788.9	71.7	154.7	843.4	328.1	212.5	220.2	238.1	0.19	78.57	74.99	85.24	0.18	78.41	74.94	86.07
56.0	127.0	21.4	0.4	14.2	792.7	72.0	155.8	845.8	329.4	217.3	225.4	241.7	0.19	78.87	75.21	85.43	0.18	78.70	75.18	86.13
57.0	128.0	21.1	0.4	14.4	798.7	72.3	156.6	851.9	330.7	222.4	231.0	245.0	0.19	79.15	75.45	85.63	0.18	78.97	75.39	86.24
58.0	129.0	20.7	0.4	14.6	801.3	72.2	156.9	857.7	332.0	227.6	236.4	248.3	0.19	79.45	75.66	85.86	0.18	79.27	75.60	86.35
59.0	130.0	20.5	0.4	14.6	810.6	71.8	157.8	863.6	333.5	232.7	241.5	251.4	0.19	79.73	75.91	86.09	0.18	79.57	75.85	86.47
60.0	131.0	20.1	0.4	14.7	822.7	72.4	159.8	873.1	335.1	238.0	247.0	254.3	0.19	80.00	76.10	86.34	0.18	79.86	76.07	86.56
61.0	132.0	19.7	0.4	15.1	824.2	72.8	158.8	880.4	336.8	242.4	251.6	256.8	0.19	80.13	76.30	86.14	0.18	80.05	76.25	86.67
62.0	133.0	19.5	0.4	15.0	828.3	72.6	158.5	884.7	338.5	247.7	257.0	259.6	0.19	80.16	76.39	85.79	0.18	80.15	76.40	86.71
63.0	134.0	19.1	0.4	14.9	830.7	72.7	158.5	886.0	340.4	251.6	262.0	262.5	0.19	80.15	76.49	85.67	0.18	80.20	76.52	86.68
64.0	135.0	18.8	0.4	15.0	836.7	72.4	158.9	890.6	342.7	256.5	266.8	265.6	0.19	80.14	76.57	80.52	0.18	80.25	76.66	86.75
65.0	136.0	18.5	0.4	15.1	840.0	72.7	158.8	894.6	345.2	261.6	271.8	268.4	0.19	80.09	76.62	80.87	0.18	80.23	76.73	86.85
66.0	137.0	18.2	0.4	15.2	844.2	72.4	158.6	897.4	347.8	266.2	276.4	271.0	0.19	80.03	76.66	81.08	0.18	80.21	76.82	86.97
67.0	138.0	17.8	0.4	15.3	848.7	72.7	159.7	902.2	350.7	271.0	281.1	274.2	0.19	79.99	76.71	81.30	0.18	80.20	76.90	87.07
68.0	139.0	17.4	0.4	15.3	852.7	73.0	159.2	909.4	353.6	276.6	285.8	277.2	0.19	79.99	76.75	81.51	0.18	80.21	76.98	87.20
69.0	140.0	17.0	0.4	15.4	858.0	73.0	160.0	912.9	357.0	280.9	290.4	280.2	0.19	79.98	76.79	81.74	0.18	80.23	77.05	87.31
70.0	141.0	16.7	0.4	15.5	861.7	73.0	161.3	917.9	360.6	285.4	295.2	283.4	0.19	80.00	76.86	82.04	0.18	80.28	77.15	87.40
71.0	142.0	16.5	0.4	15.5	856.2	73.5	161.7	919.7	364.6	290.1	299.6	286.3	0.19	80.26	76.95	82.35	0.18	80.41	77.26	87.55
72.0	143.0	16.1	0.4	15.2	851.0	73.3	161.5	917.7	369.2	294.5	304.3	289.7	0.19	80.52	77.08	82.67	0.18	80.61	77.40	87.70
73.0	144.0	15.8	0.4	15.0	848.9	73.4	161.7	915.5	374.1	299.5	308.6	293.0	0.19	80.87	77.21	83.01	0.18	80.84	77.56	87.84
74.0	145.0	15.6	0.4	14.8	841.8	73.9	161.5	913.4	379.0	304.0	312.5	295.9	0.19	81.14	77.37	83.40	0.18	81.06	77.70	88.02
75.0	146.0	15.3	0.4	14.7	837.7	74.0	161.8	910.3	384.1	308.7	317.2	299.5	0.19	81.47	77.56	83.74	0.18	81.32	77.89	88.13
76.0	147.0	14.9	0.4	14.5	834.3	74.4	161.2	905.9	389.1	312.6	321.0	302.7	0.19	81.83	77.73	84.10	0.18	81.58	78.06	88.27
77.0	148.0	14.6	0.4	14.5	833.4	74.4	162.1	901.6	393.8	317.0	324.9	306.8	0.19	82.13	77.92	84.47	0.18	81.87	78.26	88.39
78.0	149.0	14.3	0.3	14.5	832.9	74.0	161.4	900.5	398.5	320.1	329.2	310.9	0.19	82.37	78.10	84.84	0.18	82.11	78.46	88.53
79.0	150.0	14.1	0.4	14.4	835.3	73.8	159.9	900.3	403.1	323.6	332.8	315.0	0.19	82.46	78.25	85.19	0.18	82.26	78.62	88.65
80.0	151.0	13.8	0.4	14.5	836.0	74.2	160.2	900.4	407.7	327.1	336.5	319.4	0.19	82.46	78.37	85.53	0.18	82.32	78.76	88.74
81.0	152.0	13.5	0.4	14.6	836.5	73.8	158.3	902.0	412.1	330.3	340.1	323.4	0.19	82.44	78.44	85.90	0.18	82.33	78.85	88.85
82.0	153.0	13.1	0.4	14.6	837.3	74.1	157.5	901.5	416.5	333.9	343.3	327.9	0.19	82.27	78.50	86.17	0.18	82.24	78.92	88.97
83.0	154.0	12.9	0.4	14.6	838.9	74.5	156.7	902.0	420.9	337.9	346.2	332.7	0.19	82.16	78.53	86.42	0.18	82.17	79.01	89.08
84.0	155.0	12.6	0.4	14.5	840.0	73.2	158.1	903.2	425.5	341.4	349.6	336.9	0.19	82.09	78.60	86.73	0.18	82.20	79.09	89.17
85.0	156.0	12.3	0.4	14.6	839.3	74.0	156.9	902.9	429.8	343.6	352.4	341.9	0.19	82.02	78.62	87.02	0.18	82.17	79.14	89.10

86.0	157.0	12.1	0.4	14.5	840.1	73.9	156.8	904.6	434.2	346.4	355.5	347.1	0.19	81.91	78.67	87.24	0.18	82.11	79.23	88.02
87.0	158.0	11.7	0.4	14.5	839.1	73.8	157.0	905.5	438.7	348.9	358.5	352.1	0.19	81.83	78.70	87.52	0.18	82.07	79.28	87.00
88.0	159.0	11.5	0.4	14.4	836.6	74.3	156.1	906.2	434.5	352.3	361.1	357.3	0.19	81.84	78.71	87.77	0.18	82.04	79.32	86.21
89.0	160.0	11.2	0.4	14.3	828.8	74.6	155.9	904.5	418.4	355.5	363.8	362.8	0.19	81.95	78.79	87.99	0.18	82.04	79.39	85.58
90.0	161.0	11.0	0.4	14.1	819.0	74.6	154.7	900.0	411.9	358.3	366.2	368.1	0.19	82.00	78.84	88.19	0.18	82.08	79.45	85.12
91.0	162.0	10.7	0.3	13.9	816.7	74.1	152.8	899.0	407.8	360.6	369.0	373.2	0.19	82.00	78.85	87.06	0.18	82.01	79.50	84.89
92.0	163.0	10.5	0.3	13.7	810.3	74.6	152.6	896.4	405.6	363.4	371.5	378.7	0.19	82.08	78.90	85.97	0.18	82.06	79.57	85.04
93.0	164.0	10.2	0.3	13.7	807.1	74.0	151.3	892.9	404.1	366.7	373.8	384.3	0.19	82.05	78.93	85.33	0.18	82.06	79.60	85.22
94.0	165.0	10.0	0.3	13.6	803.4	74.0	150.6	890.7	403.6	368.7	376.1	389.9	0.19	81.87	78.93	85.06	0.18	81.98	79.63	85.44
95.0	166.0	9.7	0.3	13.5	795.8	74.7	150.7	883.5	403.7	370.8	377.7	395.7	0.19	81.81	78.93	85.36	0.18	81.86	79.64	85.64
96.0	167.0	9.5	0.3	13.3	789.8	74.6	149.8	878.8	404.3	373.6	379.6	401.3	0.19	81.83	78.89	85.74	0.18	81.76	79.66	85.83
97.0	168.0	9.3	0.3	13.2	777.4	74.8	146.8	872.4	405.5	374.9	381.0	406.7	0.19	81.87	78.95	86.08	0.18	81.84	79.70	86.00
98.0	169.0	9.1	0.2	13.0	766.2	74.4	146.7	865.5	408.7	377.1	382.3	411.6	0.19	81.91	79.01	86.37	0.18	81.91	79.77	86.14
99.0	170.0	8.9	0.2	12.6	752.0	74.9	146.8	857.2	412.3	379.3	383.8	416.0	0.19	82.18	79.11	86.69	0.18	82.06	79.82	86.30
100.0	171.0	8.7	0.2	12.1	734.6	74.6	145.1	845.9	416.4	381.0	385.5	422.0	0.19	82.42	79.24	86.99	0.18	82.28	79.97	86.46
101.0	172.0	8.5	0.1	11.3	720.4	75.0	144.2	832.0	421.6	383.0	386.6	426.4	0.19	82.71	79.39	87.30	0.18	82.52	80.13	86.66
102.0	173.0	8.5	0.1	10.5	706.3	74.7	143.6	816.9	425.3	384.5	388.0	432.0	0.19	83.06	79.52	87.58	0.18	82.75	80.25	86.83
103.0	174.0	8.3	0.1	10.1	694.5	74.4	141.8	800.6	429.2	385.6	389.3	436.0	0.19	83.34	79.69	87.83	0.18	82.99	80.40	86.92
104.0	175.0	8.1	0.1	9.8	687.4	74.2	139.5	783.7	432.1	386.0	390.3	441.2	0.19	83.49	79.79	88.01	0.18	83.15	80.55	87.05
105.0	176.0	8.0	0.1	9.7	681.9	74.7	137.9	770.9	433.9	386.5	391.0	446.0	0.19	83.49	79.86	88.14	0.18	83.20	80.60	87.13
106.0	177.0	7.9	0.1	9.6	678.8	75.1	136.8	761.2	435.4	386.8	391.4	450.1	0.19	83.42	79.93	88.31	0.18	83.17	80.68	87.18
107.0	178.0	7.7	0.1	9.7	676.1	74.8	135.5	754.8	436.8	386.4	391.9	454.0	0.19	83.25	79.95	88.39	0.18	83.08	80.72	87.25
108.0	179.0	7.6	0.1	9.7	674.2	74.9	135.2	750.6	437.4	386.8	392.2	458.4	0.19	83.03	79.97	88.49	0.18	82.96	80.75	87.28
109.0	180.0	7.4	0.1	9.8	673.2	75.1	134.3	747.1	438.1	386.3	392.1	462.7	0.19	82.91	79.97	88.54	0.18	82.87	80.78	87.29
110.0	181.0	7.3	0.1	9.8	671.3	75.0	132.5	745.1	438.8	386.2	391.4	466.2	0.19	82.71	79.96	88.59	0.18	82.78	80.79	87.33
111.0	182.0	7.2	0.1	9.9	671.5	74.7	133.1	746.0	440.1	386.2	390.9	469.4	0.19	82.74	80.00	88.62	0.18	82.76	80.82	87.33
112.0	183.0	7.0	0.1	10.1	667.6	74.6	132.3	743.9	441.8	385.6	390.2	473.4	0.19	82.84	80.03	88.65	0.18	82.76	80.85	87.33
113.0	184.0	6.9	0.1	9.9	665.7	74.4	132.3	740.7	444.5	385.6	389.8	476.8	0.19	82.78	80.03	88.66	0.18	82.72	80.86	87.33
114.0	185.0	6.7	0.1	10.0	666.0	75.0	131.1	739.2	447.7	385.3	389.8	480.8	0.19	82.70	80.05	88.64	0.18	82.60	80.85	87.31
115.0	186.0	6.6	0.1	10.0	664.1	74.6	131.9	737.5	451.7	384.8	388.8	485.5	0.19	82.63	80.04	88.62	0.18	82.56	80.88	87.27
116.0	187.0	6.5	0.0	9.9	658.7	74.8	131.3	733.0	456.1	384.6	388.2	488.6	0.19	82.51	80.05	88.58	0.18	82.50	80.87	87.26
117.0	188.0	6.4	0.0	9.6	653.2	74.8	130.6	728.6	459.6	384.0	387.8	492.0	0.19	82.47	80.05	88.56	0.18	82.44	80.88	87.24
118.0	189.0	6.3	0.1	9.3	646.4	74.7	129.3	722.1	462.4	383.3	387.7	496.4	0.19	82.33	80.06	88.51	0.18	82.34	80.88	87.18
119.0	190.0	6.2	0.1	9.0	637.6	74.7	127.2	711.3	465.2	383.0	387.0	499.4	0.19	82.08	80.00	88.44	0.18	82.15	80.84	87.09
120.0	191.0	6.1	0.1	8.7	629.6	74.6	126.3	702.2	468.2	382.9	386.7	503.5	0.19	81.86	79.99	88.37	0.18	82.10	80.84	87.01
121.0	192.0	6.0	0.1	8.3	621.7	74.3	126.0	693.4	470.4	382.2	386.3	506.5	0.19	81.63	79.94	88.30	0.18	81.93	80.80	86.95
122.0	193.0	6.0	0.2	8.1	613.9	74.7	125.7	682.0	471.9	381.1	385.0	510.1	0.19	81.60	79.90	88.21	0.18	81.82	80.79	86.88
123.0	194.0	5.9	0.2	8.0	607.8	74.8	125.0	672.5	472.6	380.2	384.4	512.8	0.19	81.60	79.86	88.14	0.18	81.66	80.78	86.81
124.0	195.0	5.8	0.2	7.9	600.7	74.3	123.6	662.4	473.2	378.4	383.3	516.4	0.19	81.63	79.83	88.05	0.18	81.62	80.76	86.73
125.0	196.0	5.7	0.3	7.7	597.4	74.6	122.7	654.9	474.4	377.6	382.8	519.1	0.19	81.54	79.78	87.86	0.18	81.52	80.73	86.60
126.0	197.0	5.6	0.3	7.6	594.1	74.2	122.1	647.8	475.1	376.4	382.3	522.8	0.19	81.45	79.76	87.75	0.18	81.40	80.71	86.53
127.0	198.0	5.6	0.3	7.5	589.9	73.9	121.4	641.7	475.5	375.5	381.5	525.8	0.19	81.29	79.69	87.68	0.18	81.33	80.69	86.43
128.0	199.0	5.5	0.4	7.4	581.0	73.7	120.7	634.1	475.2	373.7	380.4	528.9	0.19	81.26	79.68	87.55	0.18	81.25	80.66	86.37

Summary

Manufacturer	JOTUL
Model Number	F45 V2
Test Technician	M.M
Run Number	1
Project #	PI 20194
Test Date	30-04-2019

Stack Static (neg):	0.000
Barometer:	30.07629368
Average Room Temp:	71.59
Initial Door Temp	86.50
Final Door Temp	79.68

Pre-test load

Weight (wet lb)	#REF!
Moisture (Dry %)	#REF!
Coal Bed weight	#REF!

Test load

Total Test Fuel Weight (lb)	#REF!
Avg. Test Fuel Moisture (% dry)	#REF!
Loading density	#REF!

Average dilution tunnel measurements

Velocity (ft/sec)	17.53
Flow rate (dscf/min)	321.06
Temp (R)	595.06

SFBA EPA ADJUSTED EMISSION RESULTS

Test Duration (minutes):	128	Average emission rate:(g
		0
		Burn Rate (Dry kg/hr):
PRESSURE FACTOR:	0.96944	BAROMETRIC PRESSURE
TEMPERATURE FACTORS		
DGM #1:	0.984	
DGM #2:	0.984	
		DRY GAS METER VALUES
VOLUMES SAMPLED		
DGM #1:	24.089	
DGM #2:	23.369	
TOTAL TUNNEL VOLUME (scf):	41095	
SAMPLE RATIOS		TEMPERATURES (DEG. RA
Sample Train 1:	1705.980	
Sample Train 2:	1758.557	
TOTAL EMISSIONS		CALIBRATION FACTORS
Sample Train 1 (g):	5.83	
Sample Train 2 (g):	6.01	
EMISSION RATES		TUNNEL FLOW RATE:
Sample Train 1 (g/hr):	2.73	
Sample Train 2 (g/hr):	2.82	PARTICULATE CATCH (mg
ADJUSTED EMISSION RATES		
Sample Train 1 (g/hr):	#REF!	
Sample Train 2 (g/hr):	0.00	

Dilution Tunnel Dual Train Precision	**Train 1**	**Train 2**
Sample ratios	1705.98	1758.56
Total emissions (g)	5.83	6.01

Average Temp catalyst	###############
Average temp surface	355.06
Change surface temperature	#REF!
Initial draft	0.004
Emission	2.774
Average draft	0.090
Comb Chamber	###############

Avg. Temp. of Water in load side (o F)	#REF!	
Temp. Diff. in/out of Heat Exchanger (o F)	#REF!	
Liquid Flow Rate (gal/min)	#REF!	
Emissions (g)	#REF!	
Beginning Dry Gas Meter Reading (ft3)	31990.12	30206.61058
Final Dry Gas Meter Reading (ft3)	32015.11	30231.41737
Average Barometric Pressure ("Hg)	30.08	
Average Delta p (inches of water)	#REF!	
Average Gas Velocity in Tunnel (feet/sec)	15.33	
Average Gas Flow Rate in Dilution Tunnel (Qsd) (dscfm)	321.06	
Water Density	#REF!	
Water Specific Heat	#REF!	
Total Output	#REF!	
Emissions g/MJ	#REF!	
Emissions lb/MMBtu Input	#REF!	
Emissions lb/MMBtu Output	#REF!	
Emissions g/hr/10,000 Btu Output	#REF!	
Efficiency	#REF!	
Temperatures		
Filter 1:	85.56	
Filter 2:	#REF!	

Tunnel:	135.06
DGM 1:	76.52
DGM 2:	#REF!
Water Collected:	0.0

Environment conditions	**Before**	**After**
Room Temp	66	81
Barometer (in.Hg):	30.26823861	29.88434875
Relative Humidity	26	23.1
Air velocity	0	0

Test Results in Accordance with CSA B415.1-10

	HHV Basis	**LHV Basis**
Overall Efficiency	0.70	0.75
Combustion Efficiency	0.97	0.97
Heat Transfer Efficiency	0.72	0.77

Output Rate (kJ/h)	20681.73	19,619
Burn Rate (kg/h)	1.47	3
Input (kJ/h)	487.63	28,204

Test Load Weight (dry kg)	10.2506	22.5924
MC wet (%)	16.57	
MC dry (%)	19.86	
Particulate (g)	5.92	
CO (g)	487.63	
Test Duration (h)	6.966666667	

Emissions	**Particulate**	**CO**
g/MJ Output	0.04111	3.38439
g/kg Dry Fuel	0.57788	47.57095

g/h	0.85029	69.99509
lb/MM Btu Output	0.09555	7.86557

Air/Fuel Ratio (A/F)	14.67

Fichiers résultats rapport EPA ALT-125

2.1 Test facility conditions

Run Number	Room Temperature	
	Before (F)	After (F)
1	74	81

2.2 Dilution tunnel flow rate measurements and sampling data (ASTME2515)

Average dilution tunnel measurements		
Run Number	Burn Rate (Min)	Volumetrie Flow Rate (dscf/min)
high Fire test	128	321.06
Low / medium fire test	418	339.23

2.3 Dilution tunnel dual train precision

Run Number	Sam pie Ratio	
	Train 1	Train 2
high Fire test	1705.98	1758.56
Low / medium fire test	1712.03	1787.25

Test run data and results	High fire test	med or Low fire test
Usuable Firebox Volume - ft3	2.37	2.37
Test Fuel load piece Lenght - in.	16	16
All measured Temperature		
Test fuel Weight	23.63	27.38
Kindling - as fired lb	3.82	NA
KindlingWt - as % of test fuel load	16.2%	NA
Kindling moisture % DB	9.0	NA
Kindling - Kg DB	1.59	NA
SU Fuel - as fired lb	6.84	NA
SU Fuel Wt. - As% of test fuel load	28.9%	NA
SU Fuel moisture-% DB	19	NA
Sufuel- Kg DB	2.61	NA
Test fuel loading density-lb/ft3	9.97	11.55
Residual SU fuel Wt.-as fired lb	3.4	NA
residual SU fuel Wt-as % of test fuel load	14.4%	NA
Test run duration min.	128	418
Test run duration -h	2.13	6.97
Test fuel Load Wt at end of test-as fired lb	2.16	0
Total fuel burned Kg DB	10.59	10.36
% test fuel load Wt at end of test	9.1%	0.0%
Burn rate Kg/hr DB	5.41	1.49

Burn rate-as% of low to high Midpoint	NA	27.5%
Heat output btu/h	58,657	19,619
average dilution tunnel flowrate Dscfm	321	339
Total PM Emissions	5.9	5.9
PM Emission train precision %	1.55%	2.29%
PM emission g/kg		
PM Emission rate-g/h	2.77	0.85
Total CO emission-g	168.2	487.6
CO emission rate-g/h	116.0	70.0
1st hour emission rate	4.3	4.8
Overall efficiency-CSAB415,1		
%HHV basis	68.54%	69.56%
%LHV basis	73.75%	74.85%

Section 1 - model Identification	
Model name number	F45 V2
Manufacturer	JOTUL
address	
appliance category	WOOD STOVE
Usable Firebox Volume - ft^3	2.37
Catalytic/Non-Cat	Non-Cat
Convection Air Fan (No, Standard, Optional)	OPTION
Section 1B Laboratory information	
Testing laboratory	Polytests Services
adress	695-B Gaudette, St-jean-sur-richelieu
ISO/ Accreditation info	17025
Dates tested	30-04-2019
Test Methods / Standard	ALT-125

Dilution Tunnel Inside Diameter - in.	8
Fliter Diameter - mm	47
Filter Material	PTFE Pall

Section 2 - Test condition Summary	High	Med / Low
Model Name(s)/Number(s)	F45 V2	
Usable Firebox Volume - ft^3	2.37	
Convection Air Fan (No, Standard, Optional)	OPTION	
Test Run #	1.1	1.1
Date Tested	30-04-2019	30-04-2019
Test Run Category (L, M, H)	H	M
Average Barometric Pressure - in Hg	30.08	30.08
Max. Observed Ambient Temp - °F	75.08	78.76
Min. Observed Ambient Temp - °F	66.27	72.58
Max. Observed Filter Temp - °F	89.17	89.28
Test Run Air Settings		
Primary (measured up from minimum)	full open	medium setting
Secondary (measured up from minimum)	fix	fix
Convection Air Fan Setting	auto high	auto low
Test fuel load		
Cordwood Fuel Species	Oak	Oak
Specific Gravity (from Table 1)	0.66	0.66
Higher Heating Value - Btu/lb (from Annex A1)	8690	8690
Nom. Test Fuel Load Piece Length - in.	16	16
Number of Test Fuel Pieces	5	5
Test fuel Weight		
Kindling - As Fired lb	3.82	NA
Kindling Wt. - As % of Test Fuel Load	16.2%	NA

Kindling Moisture - % DB	9.0	NA
Kindling - kg DB	1.59	NA
SU Fuel - As Fired lb	6.84	NA
SU Fuel Wt. - As % of Test Fuel Load	28.9%	NA
SU Fuel Moisture - % DB	19.0	NA
SU Fuel - kg DB	2.61	NA
Test Fuel Load - As Fired lb	23.63	27.38
Ave. Test Fuel Load MC % DB	20.16	19.86
Test Fuel Load - kg DB	8.92	10.36
Test fuel Loading density lb/ft3	9.97	11.55
Residual SU fuel wt - as fired lb	3.4	NA
Residual SU fuel wt.- as % of test fuel load	14.4%	NA
Test run duration - minutes	128	418
Test run duration - h	2.13	6.97
Test fuel load wt at the end of the test - as fired lb	2.16	0
total fuel burned kg Db	10.59	10.36
% test fuel load wt at end of the test	9.1%	0.0%

Section 3 Test run results summary	High	Med / Low
Model name / number		
Usuable Firebox volume		
Convection air Fan (no, Standard, option)		
Test run nu.	1.1	1.2
Date tested	30-04-2019	30-04-2019
Test Run Category	H	M
Burn Rate - kg/h DB	5.41	1.49
Burn Rate - As % of Low to High Midpoint	NA	27.5%
Burn Duration - h	2.13	6.97
Heat Output - Btu/h	58,657	19,619

Average Dilution Tunnel Flow Rate - dscfm	321.1	339.2
Average Sample Flow Rates - dscfm		
Train 1	0.1882	0.1981
Train 2	0.1826	0.1898
Total PM Emissions - g		
Train 1 g	5.83	5.79
train 2 g	6.01	6.06
Average	5.92	5.92
PM emission train precision %	1.55%	2.29%
PM emission g/kg	0.56	0.57
PM emission rate g/h	2.77	0.85
Total Co Emission g/h	168.2	487.6
Co emission Rate g	116.0	70.0
1st hour emission rate	4.3	4.8
Overall Efficiency - CSA B415,1		
% HHV Basis	68.5%	69.6%
% LHV Basis	73.8%	74.8%

Section 4 Weighted average Summary		
Model name / number	F45 V2	
Usable Firebox volume	2.37	
Convection air Fan (no, Standard, option)	OPTION	
average for each test run category	L	M
burn rate kg/h DB	1.28	1.49
PM Emission rate - g/h	2.13	0.85
Co emission rate - g/h	80.18	70.00
Overall Efficiency - CSA B 415,1		
% HHV Basis	74.0%	69.6%
% LHV Basis	79.7%	74.8%

Heat output - Btu/hr	16748	19619
Category weighting	0.4	0.4

ASTM E 3053 Weighted averages		
PM Emission Rate - g/h	1.75	
CO Emission Rate g/h	83.3	
Overall Efficiency - CSA B415,1		
% HHV Basis	71.15%	
% LHV Basis	76.55%	
Heat output range - Btu/h	16,748	to
Co Arithmetic average g/min	1.48	

Lorsque le summary sera finalisé, s'assurer que tout a des unités

r/hr)		2.8
		5.414
Average:		30.076
Start:		30.268
End:		29.884
DGM #1	Final:	32015.114
	Initial:	31990.123
DGM #2	Final:	30231.417
	Initial:	30206.611
NKIN)		
DGM #1:		536.373
DGM #2:		536.519
DGM #1:		1.0101
DGM #2:		0.9873
		321.055
)		
Total Sample Train 1:		3.30
Total Sample Train 2:		3.30

Deviation (%)
1.55%

(Btu/h)
(lb/h)
(Btu/h)

dry lb

Barometric pressure		Relative humidity		Air Velocity	
Before (in.Hg)	After (in.Hg)	Before (%)	After (%)	Before (ft/min)	After (ft/min)
30.27	29.88	26	23.1	0	0

	Sam pie Data			
Total Temperatures (°R)	Volume sampled (DSCF)		Particulate catch (mg)	
	1	2	1	2
595.06	24.089	23.369	3.50	3.50
560.54	82.824	79.338	3.60	3.60

Total Emission (g)		
Train 1	Train 2	% Deviation
5.83	6.01	1.55%
5.79	6.06	2.29%

F45 V2			
2.37			
OPTION			
2.1			
01-05-2019			
L			
1.28			
23.70%			
8.3			
16,748			

331.7			
0.1899			
0.1819			
17.65			
17.61			
17.63			
0.09%			
1.66			
2.13			
664.2			
80.2			
2.8			
74.0%			
79.7%			

H
5.41
2.77
115.98
68.5%
73.8%

58657
0.2

58657

*		*	*	*	*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	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom								
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF
0.00	258.00	27.1	0.8	4.2	353.8	73.9	125.6	413.3	436.2	282.9	299.4	594.0	0.20	77.61	78.17	82.60	0.19	78.47	79.05	82.15
1.0	259.0	26.5	0.3	1.9	384.7	73.7	111.4	403.7	429.8	280.9	298.3	593.8	0.20	77.96	78.36	83.09	0.19	78.64	79.22	86.24
2.0	260.0	26.3	0.6	3.7	452.0	73.7	113.1	412.1	417.1	279.2	297.7	594.0	0.20	78.26	78.48	83.01	0.19	78.78	79.30	86.63
3.0	261.0	26.1	0.7	6.3	520.1	73.7	115.6	448.3	404.8	276.8	296.1	593.1	0.20	78.54	78.59	82.87	0.19	78.92	79.39	86.61
4.0	262.0	25.9	0.5	9.1	498.6	73.2	112.8	472.8	393.5	275.7	294.8	591.4	0.20	78.69	78.66	82.75	0.19	79.02	79.50	86.28
5.0	263.0	25.7	0.6	7.7	525.8	73.8	114.1	493.7	383.3	274.1	293.1	589.6	0.20	78.78	78.72	82.63	0.19	79.07	79.52	86.10
6.0	264.0	25.4	0.3	9.6	542.9	73.9	113.6	523.3	374.4	271.7	291.5	590.2	0.20	78.81	78.76	83.29	0.19	79.13	79.56	85.94
7.0	265.0	25.2	0.3	11.2	532.5	74.1	112.0	546.2	366.0	271.1	289.8	589.2	0.20	78.85	78.79	83.62	0.19	79.12	79.58	85.74
8.0	266.0	25.1	0.2	10.0	511.5	73.8	109.1	555.2	358.8	270.0	287.8	587.4	0.20	78.85	78.81	83.67	0.19	79.17	79.61	85.55
9.0	267.0	24.9	0.3	8.5	491.9	73.6	107.6	548.7	352.7	269.0	286.4	585.9	0.20	78.74	78.82	83.63	0.19	79.15	79.63	85.34
10.0	268.0	24.8	0.4	7.4	490.3	73.9	107.9	539.8	347.3	268.7	284.8	584.2	0.20	78.68	78.80	83.59	0.19	79.09	79.64	85.23
11.0	269.0	24.6	0.5	7.5	485.5	73.3	107.0	532.8	342.0	268.4	283.0	582.2	0.20	78.62	78.77	83.54	0.19	79.04	79.63	85.10
12.0	270.0	24.5	0.4	7.8	467.3	73.6	105.2	524.3	337.4	267.9	281.4	582.3	0.20	78.58	78.76	83.48	0.19	79.00	79.61	84.96
13.0	271.0	24.4	0.5	6.7	450.7	73.4	104.4	515.2	333.1	267.2	279.6	579.0	0.20	78.53	78.75	83.47	0.19	78.98	79.61	84.81
14.0	272.0	24.3	0.6	6.0	440.4	73.6	103.3	505.2	329.3	266.4	278.2	578.9	0.20	78.44	78.73	83.34	0.19	78.92	79.58	84.63
15.0	273.0	24.2	0.6	5.8	436.0	73.5	103.3	497.2	325.6	265.7	276.8	576.3	0.20	78.37	78.72	83.27	0.19	78.88	79.56	84.56
16.0	274.0	24.0	0.6	6.0	430.8	73.5	103.1	490.1	322.1	265.1	275.0	573.3	0.20	78.29	78.67	83.24	0.19	78.77	79.54	84.47
17.0	275.0	23.9	0.6	5.9	429.9	73.4	102.6	487.0	318.9	264.3	273.8	570.9	0.20	78.23	78.64	83.19	0.19	78.73	79.52	84.35
18.0	276.0	23.8	0.6	6.1	426.5	73.5	101.5	482.3	316.1	263.2	272.0	567.2	0.20	78.23	78.63	83.14	0.19	78.73	79.50	84.23
19.0	277.0	23.7	0.5	6.1	425.0	73.8	101.0	477.2	313.5	261.6	270.3	565.8	0.20	78.18	78.61	83.09	0.19	78.71	79.49	84.13
20.0	278.0	23.6	0.5	6.1	425.2	72.8	99.4	472.0	310.8	260.0	268.5	564.0	0.20	78.10	78.57	82.90	0.19	78.61	79.45	83.98
21.0	279.0	23.4	0.5	6.2	424.5	72.8	100.3	469.4	308.4	259.2	266.8	561.2	0.20	77.92	78.52	82.72	0.19	78.51	79.41	83.83
22.0	280.0	23.3	0.5	6.3	425.4	72.9	100.8	466.1	306.0	257.8	264.9	557.2	0.20	77.82	78.47	82.58	0.19	78.39	79.35	83.67
23.0	281.0	23.2	0.5	6.4	427.8	72.7	100.3	464.8	303.3	256.7	262.9	554.1	0.20	77.74	78.43	82.53	0.19	78.33	79.31	83.59
24.0	282.0	23.1	0.5	6.5	430.1	73.0	99.9	463.5	300.6	255.8	261.5	551.4	0.20	77.76	78.39	82.43	0.19	78.30	79.27	83.48
25.0	283.0	23.0	0.4	6.7	433.4	72.9	100.5	464.9	298.2	253.8	259.8	548.8	0.20	77.76	78.36	82.30	0.19	78.26	79.24	83.37
26.0	284.0	22.8	0.4	6.9	443.9	73.0	101.6	472.6	295.6	252.9	258.3	546.6	0.20	77.73	78.34	82.23	0.19	78.23	79.19	83.34
27.0	285.0	22.6	0.4	7.7	457.7	72.9	101.8	484.4	293.1	251.8	256.9	542.9	0.20	77.77	78.29	82.11	0.19	78.23	79.18	83.28
28.0	286.0	22.5	0.3	8.4	473.7	72.9	103.0	500.1	291.0	250.6	255.6	540.4	0.20	77.74	78.27	82.07	0.19	78.20	79.16	83.30
29.0	287.0	22.3	0.2	9.3	487.5	73.0	103.6	517.8	289.2	249.4	254.0	538.0	0.20	77.68	78.24	82.00	0.19	78.15	79.13	83.31
30.0	288.0	22.2	0.2	9.8	496.0	72.8	104.2	533.6	288.0	248.1	252.7	536.4	0.20	77.68	78.21	81.97	0.19	78.11	79.12	83.29
31.0	289.0	22.0	0.1	10.0	505.6	73.0	104.4	547.4	287.0	247.3	251.5	533.7	0.20	77.62	78.21	81.87	0.19	78.07	79.10	83.31
32.0	290.0	21.8	0.1	10.4	518.3	72.9	105.2	565.3	286.1	246.5	250.5	530.9	0.20	77.66	78.18	81.82	0.19	78.05	79.08	83.35
33.0	291.0	21.6	0.1	10.9	537.7	73.2	106.9	590.6	285.3	245.5	249.3	529.6	0.20	77.64	78.15	81.78	0.19	78.01	79.08	83.39
34.0	292.0	21.4	0.1	12.2	546.1	73.2	107.4	612.2	285.1	244.9	248.5	526.7	0.20	77.66	78.10	81.70	0.19	77.97	79.04	83.47
35.0	293.0	21.2	0.1	12.2	552.6	73.3	106.7	629.2	285.0	244.2	248.0	524.1	0.20	77.71	78.09	81.64	0.19	77.97	79.02	83.46
36.0	294.0	21.1	0.1	12.1	554.3	73.1	108.9	642.2	285.3	243.8	247.4	522.9	0.20	77.78	78.05	85.24	0.19	78.01	78.96	88.33
37.0	295.0	20.8	0.1	12.0	555.8	73.4	108.2	648.9	285.5	243.2	246.9	520.8	0.20	77.99	78.09	85.79	0.19	78.09	78.98	89.28
38.0	296.0	20.7	0.1	11.7	555.8	73.6	110.0	654.4	285.9	243.1	247.4	519.4	0.20	78.23	78.14	85.49	0.19	78.25	79.02	89.03
39.0	297.0	20.4	0.1	11.6	552.6	73.9	112.3	658.0	286.5	243.0	247.4	517.2	0.20	78.57	78.21	85.22	0.19	78.46	79.07	88.74
40.0	298.0	20.3	0.1	11.4	551.2	74.4	112.7	658.0	287.4	243.1	247.5	515.4	0.20	78.88	78.31	84.98	0.19	78.70	79.13	88.47
41.0	299.0	20.1	0.1	11.2	550.1	74.6	112.3	657.2	288.3	242.9	247.8	513.3	0.20	79.22	78.43	84.77	0.19	78.97	79.24	88.17
42.0	300.0	19.9	0.1	11.0	548.7	73.9	113.0	658.6	289.1	243.6	248.5	511.2	0.20	79.54	78.54	84.64	0.19	79.21	79.37	87.93
43.0	301.0	19.7	0.1	10.9	547.7	73.9	112.7	658.1	289.9	244.0	249.0	508.5	0.20	79.79	78.63	84.58	0.19	79.43	79.43	87.79
44.0	302.0	19.6	0.1	10.8	546.4	74.4	113.0	657.3	290.8	244.7	249.7	507.2	0.20	79.89	78.70	84.49	0.19	79.54	79.49	87.60
45.0	303.0	19.4	0.1	10.7	544.8	74.2	112.8	656.7	291.6	245.3	250.1	503.7	0.20	79.88	78.74	84.35	0.19	79.60	79.53	87.45
46.0	304.0	19.2	0.1	10.6	544.7	74.0	112.2	655.1	292.6	245.8	250.6	502.6	0.20	79.82	78.74	84.28	0.19	79.62	79.57	87.30
47.0	305.0	19.1	0.1	10.6	546.2	74.1	110.6	652.5	293.6	246.6	251.3	501.1	0.20	79.81	78.75	84.13	0.19	79.63	79.57	87.11
48.0	306.0	18.9	0.1	10.6	545.6	74.4	109.8	653.6	294.6	247.0	252.0	498.6	0.20	79.82	78.76	84.03	0.19	79.66	79.58	86.89
49.0	307.0	18.7	0.1	10.6	547.0	74.3	109.9	654.6	295.5	247.7	252.7	495.9	0.20	79.82	78.79	83.99	0.19	79.71	79.62	86.75
50.0	308.0	18.6	0.1	10.7	546.6	74.1	110.7	656.0	296.5	248.3	253.6	493.2	0.20	79.90	78.80	83.95	0.19	79.77	79.63	86.70
51.0	309.0	18.4	0.1	10.7	548.1	74.1	109.7	656.7	297.5	248.5	253.8	491.9	0.20	79.90	78.82	83.85	0.19	79.78	79.64	86.55
52.0	310.0	18.2	0.1	10.7	548.2	74.4	109.9	659.1	298.6	249.0	254.6	490.7	0.20	79.92	78.82	83.77	0.19	79.81	79.64	86.49
53.0	311.0	18.1	0.1	10.7	548.2	74.4	110.5	659.8	299.7	249.5	255.3	487.5	0.20	79.93	78.83	83.75	0.19	79.83	79.66	86.45
54.0	312.0	17.8	0.1	10.7	548.3	73.8	110.8	660.2	300.8	250.2	256.0	485.3	0.20	79.96	78.86	83.71	0.19	79.85	79.66	86.40
55.0	313.0	17.7	0.1	10.6	548.4	74.0	110.6	659.7	302.0	250.7	256.6	483.6	0.20	79.96	78.86	83.68	0.19	79.88	79.66	86.36
56.0	314.0	17.5	0.1	10.7	549.5	74.1	111.0	662.0	303.4	251.3	257.0	482.2	0.20	79.96	78.84	83.63	0.19	79.82	79.65	86.31
57.0	315.0	17.3	0.1	10.7	549.3	73.9	111.1	663.0	304.5	252.1	257.6	481.3	0.20	79.99	78.82	83.62	0.19	79.80	79.64	86.29
58.0	316.0	17.3	0.1	10.7	549.1	74.0	110.4	661.8	305.7	252.2	257.8	480.4	0.20	80.03	78.82	83.84	0.19	79.81	79.63	86.23
59.0	317.0	17.0	0.1	10.7	549.2	74.1	110.0	663.1	307.1	253.0	258.6	479.1	0.20	79.97	78.80	83.76	0.19	79.77	79.62	86.15
60.0	318.0	16.8	0.1	10.7	550.6	74.0	110.4	664.3	308.5	253.6	259.0	478.8	0.20	79.98	78.77	83.63	0.19	79.77	79.61	86.12
61.0	319.0	16.7	0.1	10.8	551.2	73.9	111.2	665.0	310.0	254.1	259.4	477.4	0.20	80.01	78.76	83.53	0.19	79.78	79.63	86.15
62.0	320.0	16.5	0.1	10.8	551.0	73.7	110.8	666.8	311.9	255.0	259.7	475.0	0.20	80.08	78.77	83.44	0.19	79.80	79.63	86.10
63.0	321.0	16.5	0.1	10.8	551.3	73.8	110.8	667.2	313.8	255.5	260.1	473.2	0.20	80.13	78.76	83.31	0.19	79.85	79.61	86.06
64.0	322.0	16.2	0.1	10.7	550.7	73.9	110.5	667.4	315.9	256.3	260.1	472.1	0.20	80.15	78.77	83.21	0.19	79.88	79.62	86.02
65.0	323.0	16.1	0.1	10.8	551.6	73.9	110.6	668.0	318.1	257.1	260.7	470.3	0.20	80.18	78.75	83.11	0.19	79.87	79.60	85.97
66.0	324.0	15.9	0.1	10.8	552.2	73.7	111.4	669.4	320.1	257.7	261.2	469.0	0.20	80.25	78.75	83.03	0.19	79.88	79.58	85.95
67.0	325.0	15.8	0.1	10.9	552.8	73.9	111.6	670.5	322.1	258.4	261.4	468.3	0.20	80.21	78.74	82.98	0.19	79.86	79.58	85.98
68.0	326.0	15.6	0.1	10.9	553.5	73.8	110.5	671.9	324.1	259.2	261.9	467.6	0.20	80.19	78.70	82.90	0.19	79.81	79.57	85.93
69.0	327.0	15.4	0.1	10.9	553.3	73.9	110.7	673.0	326.1	260.0	262.2	466.2	0.20	80.22	78.68	82.88	0.19	79.82	79.56	85.92
70.0	328.0	15.3	0.1	11.0	553.7	73.8	111.5	673.7	328.0	260.9	262.6	464.7	0.20	80.27	78.68	82.84	0.19	79.81	79.56	85.94
71.0	329.0	15.2	0.1	11.0	554.6	73.8	110.4	672.9	329.6	261.4	263.0	463.6	0.20	80.29	78.65	82.83	0.19	79.82	79.54	85.89
72.0	330.0	15.0	0.1	11.1	554.9	73.8	110.9	674.2	331.0	262.1	263.3	462.4	0.20	80.35	78.64	82.79	0.19	79.82	79.52	85.91
73.0	331.0	14.7	0.1	11.1	554.7	73.9	110.8	675.1	332.4	262.8	263.9	462.3	0.20	80.40	78.62	82.79	0.19	79.80	79.51	85.92
74.0	332.0	14.6	0.1	11.1	555.5	73.8	110.5	675.4	333.7	263.6	264.3	461.3	0.20	80.45	78.61	82.80	0.19	79.85	79.51	85.91
75.0	333.0	14.5	0.1	11.2	555.6	73.9	111.3	676.5	335.0	264.3	264.6	460.2	0.20	80.50	78.58	82.79	0.19	79.86	79.51	85.90
76.0	334.0	14.4	0.1	11.2	554.0	73.9	110.7	675.2	336.4	264.9	265.0	458.5	0.20	80.52	78.58	82.81	0.19	79.86	79.51	85.89
77.0	335.0	14.2	0.1	11.2	554.2	73.9	110.7	675.9	337.4	265.6	265.7	457.8	0.20	80.54	78.59	82.81	0.19	79.88	79.48	85.89
78.0	336.0	14.0	0.1	11.2	553.9	73.8	110.5	676.4	338.4	266.1	266.2	456.9	0.20	80.58	78.58	82.82	0.19	79.89	79.49	85.82
79.0	337.0	13.8	0.1	11.1	552.9	73.8	110.6	675.4	339.6	266.7	266.7	456.1	0.20	80.64	78.55	82.81	0.19	79.90	79.49	85.82
80.0	338.0	13.7	0.1	11.1	552.8	74.0	110.4	673.6	341.0	267.4	267.3	455.1	0.20	80.67	78.56	82.86	0.19	79.93	79.49	85.83
81.0	339.0	13.6	0.1	11.0	552.3	73.9	110.1	672.8	342.6	268.0	268.0	454.2	0.20	80.72	78.56	82.85	0.19	79.95	79.46	85.81
82.0	340.0	13.4	0.1	11.1	551.5	73.8	110.2	672.8	344.0	268.6	268.6	453.6	0.20	80.72	78.57	82.84	0.19	79.97	79.47	85.78
83.0	341.0	13.3	0.1	11.1	552.1	74.0	110.0	673.7	345.6	268.9	269.2	453.5	0.20	80.75	78.57	82.89	0.19	80.01	79.48	85.76
84.0	342.0	13.0	0.1	11.2	552.3	73.9	110.2	675.4	346.9	269.5	269.9	452.4	0.20	80.76	78.57	82.89	0.19	80.01	79.46	85.75
85.0	343.0	13.0	0.1	11.3	553.5	74.1	110.2	675.8	348.2	269.9	270.6	452.0	0.20	80.78	78.57	82.91	0.19	80.01	79.45	85.77

86.0	344.0	12.8	0.1	11.3	553.6	74.0	110.3	678.4	349.6	270.5	271.3	452.1	0.20	80.79	78.59	82.95	0.19	80.05	79.47	85.77
87.0	345.0	12.6	0.1	11.3	554.9	74.1	110.4	680.0	350.7	271.1	271.9	451.5	0.20	80.80	78.57	82.97	0.19	80.04	79.48	85.78
88.0	346.0	12.4	0.1	11.4	555.3	74.1	110.0	681.3	352.0	271.6	272.9	452.2	0.20	80.82	78.56	82.99	0.19	80.05	79.45	85.76
89.0	347.0	12.3	0.1	11.4	555.2	74.1	109.4	682.0	353.5	271.7	273.5	451.5	0.20	80.80	78.57	83.00	0.19	80.06	79.46	85.71
90.0	348.0	12.2	0.1	11.4	555.0	73.9	109.8	682.4	355.0	272.4	274.2	450.9	0.20	80.82	78.56	83.03	0.19	80.08	79.48	85.69
91.0	349.0	12.0	0.1	11.4	555.5	74.2	109.9	682.9	356.4	272.8	274.9	450.3	0.20	80.83	78.58	83.02	0.19	80.08	79.46	85.69
92.0	350.0	11.9	0.1	11.4	554.9	74.2	109.5	683.5	357.8	273.3	276.0	451.2	0.20	80.83	78.59	83.02	0.19	80.10	79.46	85.66
93.0	351.0	11.7	0.1	11.3	555.4	73.5	111.3	684.4	359.2	273.6	276.8	451.8	0.20	80.79	78.57	83.05	0.19	80.06	79.46	85.70
94.0	352.0	11.6	0.1	11.4	555.8	73.4	111.6	684.4	360.1	274.1	277.6	452.4	0.20	80.73	78.58	83.04	0.19	80.02	79.43	85.69
95.0	353.0	11.4	0.1	11.4	556.5	73.3	110.9	684.5	360.9	274.6	278.0	452.7	0.20	80.60	78.57	83.03	0.19	79.94	79.42	85.60
96.0	354.0	11.3	0.1	11.4	557.6	73.3	108.8	684.0	361.8	275.2	278.9	452.1	0.20	80.48	78.54	82.96	0.19	79.86	79.40	85.41
97.0	355.0	11.1	0.1	11.5	559.9	72.8	109.4	683.3	362.5	275.9	279.3	452.0	0.20	80.38	78.50	82.92	0.19	79.79	79.39	85.33
98.0	356.0	10.8	0.1	11.5	561.4	72.7	110.3	684.9	363.2	276.2	280.3	451.8	0.20	80.35	78.50	82.90	0.19	79.77	79.38	85.33
99.0	357.0	10.7	0.1	11.7	562.8	72.6	110.4	686.2	363.6	276.9	281.3	452.0	0.20	80.29	78.49	82.91	0.19	79.73	79.36	85.30
100.0	358.0	10.6	0.1	11.8	566.3	72.9	110.1	689.3	364.0	277.7	281.9	451.2	0.20	80.33	78.48	82.88	0.19	79.75	79.37	85.30
101.0	359.0	10.5	0.1	11.9	568.1	73.2	110.1	692.3	364.6	277.9	282.5	450.9	0.20	80.38	78.47	82.88	0.19	79.76	79.36	85.31
102.0	360.0	10.3	0.1	12.0	570.6	73.2	110.2	695.4	365.2	278.4	283.5	450.9	0.20	80.45	78.47	82.89	0.19	79.76	79.36	85.30
103.0	361.0	10.2	0.2	12.1	575.8	73.6	111.1	699.9	366.0	279.6	284.6	450.4	0.20	80.46	78.45	82.90	0.19	79.75	79.36	85.34
104.0	362.0	10.0	0.2	12.3	579.2	73.1	111.0	703.9	366.7	280.6	285.6	451.2	0.20	80.39	78.42	82.91	0.19	79.71	79.34	85.37
105.0	363.0	9.8	0.2	12.5	586.1	73.8	110.0	708.4	367.1	281.5	286.6	451.6	0.20	80.39	78.44	82.94	0.19	79.70	79.35	85.33
106.0	364.0	9.7	0.2	12.8	590.3	74.1	112.2	716.6	367.5	282.6	287.9	452.1	0.20	80.47	78.47	82.92	0.19	79.79	79.36	85.38
107.0	365.0	9.5	0.2	13.2	594.4	74.4	113.9	723.6	368.2	283.9	288.8	451.5	0.20	80.82	78.55	83.04	0.19	79.98	79.42	85.53
108.0	366.0	9.3	0.2	13.2	594.4	74.8	115.0	729.3	368.4	285.1	289.9	451.4	0.20	81.21	78.64	83.15	0.19	80.23	79.49	85.66
109.0	367.0	9.2	0.2	13.0	595.1	74.7	116.4	733.1	368.5	286.4	291.1	451.2	0.20	81.64	78.75	83.28	0.19	80.51	79.61	85.83
110.0	368.0	9.0	0.2	13.1	595.0	74.8	117.6	735.3	368.7	287.9	291.9	451.4	0.20	81.98	78.89	83.39	0.19	80.79	79.71	86.00
111.0	369.0	8.8	0.2	13.0	593.4	74.4	116.1	735.7	369.2	289.0	293.1	451.6	0.20	82.23	78.99	83.48	0.19	81.00	79.82	86.04
112.0	370.0	8.7	0.1	12.5	589.8	74.9	115.6	734.4	369.6	290.6	294.0	451.1	0.20	82.35	79.06	83.56	0.19	81.17	79.91	86.13
113.0	371.0	8.5	0.1	12.1	583.6	74.8	115.2	732.7	370.4	291.6	295.4	451.9	0.20	82.37	79.15	83.58	0.19	81.24	79.95	86.15
114.0	372.0	8.3	0.1	11.8	580.6	74.6	114.0	728.4	371.4	292.9	296.4	452.1	0.20	82.25	79.17	83.63	0.19	81.25	80.01	86.16
115.0	373.0	8.2	0.2	11.6	580.6	74.1	114.7	724.6	372.1	294.0	297.4	452.6	0.20	82.19	79.21	83.69	0.19	81.27	80.05	86.24
116.0	374.0	8.1	0.1	11.7	579.2	74.5	113.3	721.5	373.1	295.1	298.3	452.8	0.20	82.17	79.25	83.72	0.19	81.31	80.08	86.23
117.0	375.0	8.0	0.1	11.5	572.2	74.6	112.2	718.7	374.3	296.4	299.2	453.2	0.20	82.20	79.28	83.74	0.19	81.29	80.09	86.21
118.0	376.0	7.8	0.1	10.9	565.9	74.7	112.0	713.6	375.9	297.4	300.0	453.4	0.20	82.15	79.30	83.76	0.19	81.28	80.14	86.21
119.0	377.0	7.7	0.2	10.7	561.5	74.6	112.0	708.2	378.0	298.0	300.8	453.8	0.20	82.14	79.32	83.78	0.19	81.28	80.13	86.18
120.0	378.0	7.6	0.1	10.6	559.5	74.8	111.2	703.2	380.2	298.3	301.2	453.6	0.20	82.11	79.34	83.82	0.19	81.27	80.15	86.14
121.0	379.0	7.5	0.2	10.7	557.9	74.9	109.8	700.2	383.2	297.9	301.9	453.4	0.20	82.09	79.35	83.78	0.19	81.27	80.17	86.04
122.0	380.0	7.3	0.2	10.7	555.5	75.0	111.5	697.6	386.2	298.7	302.9	453.8	0.20	82.05	79.37	83.84	0.19	81.27	80.19	86.05
123.0	381.0	7.2	0.2	10.8	555.2	74.8	111.1	696.1	389.0	299.1	303.3	454.0	0.20	82.01	79.39	83.85	0.19	81.28	80.20	86.05
124.0	382.0	7.1	0.2	10.9	554.2	74.1	111.1	695.8	391.3	299.4	303.6	453.3	0.20	81.96	79.39	83.88	0.19	81.28	80.22	86.05
125.0	383.0	7.0	0.2	11.0	553.6	74.4	110.7	695.1	393.9	299.1	303.9	453.0	0.20	81.99	79.40	83.89	0.19	81.30	80.24	86.04
126.0	384.0	6.9	0.2	10.9	549.9	74.2	110.0	692.8	396.3	299.1	304.4	453.5	0.20	82.02	79.37	83.91	0.19	81.27	80.26	86.04
127.0	385.0	6.7	0.2	10.6	543.5	74.8	109.7	686.9	399.0	299.0	304.9	454.1	0.20	82.00	79.35	83.90	0.19	81.20	80.24	86.00
128.0	386.0	6.6	0.1	9.9	542.1	74.6	109.8	681.5	402.0	298.9	305.2	454.6	0.20	81.95	79.35	83.93	0.19	81.16	80.24	85.99
129.0	387.0	6.5	0.1	9.7	537.2	74.6	109.0	676.7	405.5	299.1	305.7	455.1	0.20	81.90	79.36	83.92	0.19	81.13	80.23	85.93
130.0	388.0	6.5	0.1	9.4	531.4	74.8	108.5	670.7	409.1	298.8	306.0	455.6	0.20	81.90	79.36	83.90	0.19	81.14	80.24	85.91
131.0	389.0	6.4	0.1	9.1	525.0	74.2	107.8	664.2	412.9	298.4	306.2	455.9	0.20	81.91	79.37	83.91	0.19	81.13	80.23	85.82
132.0	390.0	6.3	0.1	8.9	518.6	74.4	107.2	656.0	416.5	298.0	306.4	456.3	0.20	81.90	79.36	83.86	0.19	81.12	80.23	85.75
133.0	391.0	6.2	0.1	8.4	510.2	73.8	108.3	647.2	419.9	297.8	307.0	456.2	0.20	81.82	79.36	83.84	0.19	81.06	80.23	85.69
134.0	392.0	6.2	0.1	8.0	503.6	73.9	106.8	636.6	423.2	297.7	307.0	456.4	0.20	81.77	79.31	83.83	0.19	81.00	80.22	85.64
135.0	393.0	6.1	0.1	7.8	499.8	74.2	105.9	627.5	425.9	297.1	306.9	456.7	0.20	81.78	79.29	83.80	0.19	80.97	80.21	85.55
136.0	394.0	6.1	0.1	7.8	497.3	74.3	105.2	620.1	428.1	296.9	306.8	456.8	0.20	81.79	79.26	83.76	0.19	80.95	80.19	85.45
137.0	395.0	6.0	0.1	7.8	495.6	74.2	105.6	613.4	430.2	296.6	306.7	456.9	0.20	81.81	79.28	83.72	0.19	80.94	80.21	85.40
138.0	396.0	5.9	0.1	7.9	494.3	74.2	105.1	608.7	432.2	295.4	306.2	457.3	0.20	81.79	79.26	83.69	0.19	80.95	80.21	85.31
139.0	397.0	5.8	0.1	7.9	491.9	74.3	105.6	605.9	434.3	295.4	306.0	457.9	0.20	81.53	79.25	83.65	0.19	80.83	80.18	85.23
140.0	398.0	5.8	0.1	8.0	489.2	74.6	104.8	602.7	436.2	295.1	305.5	459.1	0.20	81.49	79.20	83.59	0.19	80.78	80.17	85.16
141.0	399.0	5.7	0.1	7.7	483.2	74.2	103.8	596.6	437.7	294.9	304.6	459.3	0.20	81.47	79.23	83.57	0.19	80.77	80.19	85.08
142.0	400.0	5.7	0.1	7.3	473.8	74.8	102.4	586.5	439.0	294.8	303.7	460.7	0.20	81.51	79.24	83.48	0.19	80.77	80.17	84.99
143.0	401.0	5.7	0.2	6.8	467.1	74.3	101.9	577.3	440.4	294.4	303.1	460.8	0.20	81.49	79.25	83.42	0.19	80.74	80.18	84.83
144.0	402.0	5.6	0.2	6.6	460.3	74.6	103.1	568.0	441.7	294.0	302.0	461.3	0.20	81.45	79.24	83.36	0.19	80.68	80.18	84.82
145.0	403.0	5.6	0.2	6.5	455.1	74.5	101.1	560.4	443.0	292.9	301.0	462.7	0.20	81.49	79.26	83.30	0.19	80.69	80.17	84.67
146.0	404.0	5.6	0.2	6.4	450.7	74.3	101.5	552.9	444.5	292.7	300.5	463.0	0.20	81.52	79.27	83.23	0.19	80.70	80.17	84.56
147.0	405.0	5.5	0.2	6.4	445.8	74.4	100.9	545.1	445.7	292.0	299.5	463.7	0.20	81.49	79.27	83.18	0.19	80.68	80.15	84.44
148.0	406.0	5.5	0.2	6.2	440.3	74.2	100.9	538.0	447.1	291.4	298.5	464.1	0.20	81.46	79.30	83.09	0.19	80.66	80.16	84.35
149.0	407.0	5.5	0.2	6.1	435.8	74.2	100.7	531.6	448.2	290.5	297.3	465.2	0.20	81.37	79.27	83.00	0.19	80.63	80.12	84.29
150.0	408.0	5.4	0.3	6.1	431.9	74.1	99.8	525.0	449.6	290.0	296.2	466.2	0.20	81.32	79.25	84.00	0.19	77.88	78.38	83.64
151.0	409.0	5.4	0.3	6.0	427.1	74.0	99.8	519.0	450.7	289.1	295.1	467.3	0.20	81.26	79.25	84.03	0.19	77.95	78.39	83.36
152.0	410.0	5.4	0.3	6.0	424.3	73.6	99.7	513.0	451.9	288.2	294.0	467.9	0.20	81.24	79.20	83.83	0.19	78.08	78.42	83.08
153.0	411.0	5.3	0.3	5.9	420.3	73.5	99.4	507.1	453.3	287.5	292.4	468.7	0.20	81.21	79.17	83.70	0.19	78.25	78.46	82.87
154.0	412.0	5.3	0.3	5.9	416.6	73.4	98.9	502.6	454.4	286.6	291.1	469.0	0.20	81.18	79.14	83.50	0.19	78.46	78.53	82.69
155.0	413.0	5.3	0.3	5.9	413.2	73.5	99.0	496.7	455.4	285.8	289.6	470.0	0.20	81.05	79.07	83.33	0.19	78.66	78.62	82.53
156.0	414.0	5.2	0.3	5.9	409.9	73.3	98.5	492.1	456.0	284.9	288.5	470.8	0.20	80.94	79.01	83.16	0.19	78.91	78.74	82.44
157.0	415.0	5.2	0.4	5.8	406.6	73.9	97.0	486.6	456.5	283.9	287.0	471.8	0.20	80.90	79.01	83.00	0.19	79.19	78.85	82.35
158.0	416.0	5.2	0.4	5.8	403.7	73.7	96.9	481.9	457.1	282.9	285.5	472.5	0.20	80.68	78.96	82.89	0.19	79.44	78.98	82.33
159.0	417.0	5.1	0.4	5.8	400.2	74.0	97.8	476.4	457.3	281.7	283.9	473.5	0.20	80.52	78.91	82.79	0.19	79.71	79.13	82.34
160.0	418.0	5.1	0.4	5.8	396.8	74.1	97.5	472.9	457.5	280.8	282.6	474.3	0.20	80.45	78.92	82.69	0.19	80.02	79.27	82.36
161.0	419.0	5.1	0.4	5.8	394.4	74.0	97.2	468.8	457.6	280.4	281.3	475.4	0.20	80.44	78.91	82.59	0.19	80.27	79.43	82.37
162.0	420.0	5.1	0.5	5.7	391.5	73.5	97.1	464.7	457.5	279.3	280.1	476.2	0.20	80.38	78.88	82.54	0.19	80.55	79.60	82.42
163.0	421.0	5.0	0.5	5.7	388.0	73.7	97.7	461.4	456.8	278.5	278.8	477.3	0.20	80.34	78.89	82.46	0.19	80.80	79.74	82.47
164.0	422.0	5.0	0.5	5.7	386.2	73.5	96.9	456.0	456.7	277.8	277.5	477.8	0.20	80.30	78.85	82.47	0.19	81.07	79.90	82.57
165.0	423.0	5.0	0.5	5.7	383.3	73.2	96.9	453.1	456.7	276.6	276.3	479.2	0.20	80.28	78.83	82.44	0.19	81.35	80.06	82.66
166.0	424.0	5.0	0.5	5.7	380.9	73.2	96.4	449.6	456.7	276.0	274.9	480.3	0.20	80.25	78.82	82.44	0.19	81.58	80.20	82.76
167.0	425.0	5.0	0.5	5.6	379.7	73.2	96.2	446.0	456.5	275.2	273.7	480.8	0.20	80.21	78.79	82.42	0.19	81.82	80.37	82.86
168.0	426.0	4.9	0.5	5.6	377.5	73.6	95.9	442.6	456.0	274.4	272.6	481.9	0.20	80.19	78.77	82.43	0.19	82.09	80.51	83.00
169.0	427.0	4.9	0.5	5.7	374.7	73.5	95.8	439.2	455.2	273.6	271.3	482.8	0.20	80.14	78.71	82.47	0.19	82.32	80.68	83.13
170.0	428.0	4.8	0.6	5.6	372.5	73.2	96.1	436.3	454.0	272.7	270.1	483.5	0.20	80.12	78.69	82.47	0.19	82.55	80.83	83.23
171.0	429.0	4.8	0.6	5.7	371.4	73.2	96.0	433.8	453.4	272.0	268.9	484.5	0.20	80.09	78.68	82.52	0.19	82.75	80.96	83.36
172.0	430.0	4.8	0.6	5.7	370.0	73.1	95.3	430.8	453.1	271.1	267.6	484.0	0.20	80.03	78.66	82.55	0.19	82.97	81.12	83.49
173.0	431.0	4.8	0.6	5.7	368.6	73.3	95.3	428.4	453.1	270.2	266.5	485.0	0.20	80.01	78.63	82.59	0.19	83.14	81.26	83.57
174.0	432.0	4.7	0.6	5.7	366.5	73.1	95.3	426.4	452.8	269.4	265.4	486.5	0.20	80.00	78.59	82.65	0.19	83.35	81.42	83.71
175.0	433.0	4.7	0.6	5.6	364.9	73.3	94.9	423.8	452.3	268.8	264.3	487.4	0.20	80.02	78.58	82.71	0.19	83.55	81.56	83.82

176.0	434.0	4.7	0.6	5.6	363.2	73.4	94.7	421.8	451.6	267.9	263.3	488.1	0.20	80.01	78.54	82.77	0.19	83.75	81.72	83.94
177.0	435.0	4.7	0.6	5.6	362.0	73.4	94.0	419.4	451.2	267.0	262.3	489.2	0.20	79.94	78.54	82.85	0.19	83.95	81.87	84.09
178.0	436.0	4.7	0.6	5.6	360.0	73.5	92.9	417.2	450.6	266.5	261.2	490.5	0.20	79.79	78.50	82.92	0.19	84.13	82.00	84.23
179.0	437.0	4.6	0.7	5.6	358.8	73.8	93.4	414.6	449.9	265.4	260.3	491.6	0.20	79.69	78.48	82.97	0.19	84.31	82.16	84.39
180.0	438.0	4.6	0.7	5.5	356.9	73.7	93.6	412.8	449.5	264.6	259.3	492.6	0.20	79.66	78.48	83.07	0.19	84.48	82.32	84.45
181.0	439.0	4.5	0.7	5.5	356.1	73.4	92.4	410.7	448.9	264.1	258.4	492.5	0.20	79.58	78.47	83.10	0.19	84.58	82.44	84.44
182.0	440.0	4.5	0.6	5.5	354.4	73.7	93.1	409.1	448.5	263.5	257.2	493.4	0.20	79.50	78.45	83.10	0.19	84.57	82.50	84.44
183.0	441.0	4.5	0.7	5.5	352.5	73.3	93.4	407.8	447.9	262.6	256.8	493.8	0.20	79.46	78.45	83.13	0.19	84.50	82.54	84.41
184.0	442.0	4.5	0.6	5.5	351.0	73.6	93.7	405.3	447.0	261.5	255.9	494.9	0.20	79.38	78.41	83.14	0.19	84.37	82.56	84.36
185.0	443.0	4.4	0.6	5.5	350.1	73.7	93.2	403.9	446.1	261.1	255.0	496.4	0.20	79.37	78.38	83.18	0.19	84.21	82.56	84.34
186.0	444.0	4.4	0.6	5.5	349.1	73.8	92.0	401.9	445.6	260.6	254.0	497.0	0.20	79.37	78.36	83.17	0.19	84.05	82.55	84.31
187.0	445.0	4.4	0.6	5.5	347.9	73.7	92.9	400.5	445.8	259.8	253.7	498.0	0.20	79.41	78.38	83.17	0.19	83.89	82.52	84.25
188.0	446.0	4.4	0.6	5.5	347.3	73.4	91.6	398.7	445.1	259.5	252.9	498.6	0.20	79.41	78.39	83.16	0.19	83.80	82.52	84.24
189.0	447.0	4.3	0.6	5.5	345.6	73.5	93.0	397.3	444.9	258.8	252.4	499.8	0.20	79.36	78.35	84.00	0.19	77.88	78.38	83.64
190.0	448.0	4.3	0.6	5.5	345.3	73.5	92.9	395.7	444.3	258.1	251.4	499.9	0.20	79.35	78.34	84.03	0.19	77.95	78.39	83.36
191.0	449.0	4.3	0.6	5.5	344.7	73.5	92.7	394.9	443.7	257.6	251.0	500.4	0.20	79.34	78.29	83.83	0.19	78.08	78.42	83.08
192.0	450.0	4.2	0.6	5.5	343.7	73.5	92.7	393.2	443.0	256.8	250.2	500.1	0.20	79.34	78.28	83.70	0.19	78.25	78.46	82.87
193.0	451.0	4.2	0.6	5.5	343.5	73.6	92.3	392.1	442.8	256.4	249.6	500.9	0.20	79.33	78.28	83.50	0.19	78.46	78.53	82.69
194.0	452.0	4.2	0.6	5.5	342.7	73.6	92.7	390.9	442.2	255.8	249.2	502.4	0.20	79.32	78.26	83.33	0.19	78.66	78.62	82.53
195.0	453.0	4.2	0.6	5.5	341.3	73.4	91.9	389.5	441.6	255.2	248.3	503.2	0.20	79.29	78.26	83.16	0.19	78.91	78.74	82.44
196.0	454.0	4.2	0.7	5.5	341.1	73.9	91.4	388.4	441.4	254.7	247.8	503.9	0.20	79.24	78.24	83.00	0.19	79.19	78.85	82.35
197.0	455.0	4.1	0.6	5.5	340.1	73.6	91.8	387.4	441.1	254.4	247.2	504.3	0.20	79.16	78.19	82.89	0.19	79.44	78.98	82.33
198.0	456.0	4.1	0.6	5.5	338.7	73.7	92.6	386.3	440.4	253.8	246.7	504.5	0.20	79.17	78.22	82.79	0.19	79.71	79.13	82.34
199.0	457.0	4.1	0.7	5.5	338.1	73.3	92.8	385.7	439.8	253.3	246.3	505.2	0.20	79.12	78.18	82.69	0.19	80.02	79.27	82.36
200.0	458.0	4.0	0.7	5.5	337.5	73.4	92.4	384.4	439.5	252.8	245.7	506.1	0.20	79.14	78.18	82.59	0.19	80.27	79.43	82.37
201.0	459.0	4.0	0.7	5.5	336.3	73.4	92.3	383.2	439.3	252.6	245.1	506.8	0.20	79.15	78.16	82.54	0.19	80.55	79.60	82.42
202.0	460.0	4.0	0.6	5.4	335.3	73.6	92.3	381.8	439.1	252.2	244.5	506.9	0.20	79.13	78.15	82.46	0.19	80.80	79.74	82.47
203.0	461.0	3.9	0.7	5.4	334.6	73.5	92.3	381.2	439.0	251.7	244.0	507.4	0.20	79.11	78.13	82.47	0.19	81.07	79.90	82.57
204.0	462.0	3.9	0.7	5.4	333.8	73.5	92.2	379.6	438.9	251.1	243.7	508.3	0.20	79.09	78.10	82.44	0.19	81.35	80.06	82.66
205.0	463.0	3.9	0.7	5.4	333.3	73.4	92.3	378.7	438.8	250.9	243.1	508.9	0.20	79.07	78.09	82.44	0.19	81.58	80.20	82.76
206.0	464.0	3.9	0.7	5.5	332.6	73.5	92.1	377.5	438.9	250.4	242.5	509.8	0.20	79.08	78.08	82.42	0.19	81.82	80.37	82.86
207.0	465.0	3.9	0.7	5.4	332.1	73.5	92.1	376.7	438.8	250.0	242.1	510.3	0.20	79.05	78.06	82.43	0.19	82.09	80.51	83.00
208.0	466.0	3.9	0.7	5.4	331.7	73.5	92.1	375.6	438.8	249.5	241.6	510.5	0.20	79.06	78.07	82.47	0.19	82.32	80.68	83.13
209.0	467.0	3.8	0.7	5.4	331.7	73.4	91.3	375.0	438.4	248.9	241.2	512.3	0.20	78.93	78.04	82.47	0.19	82.55	80.83	83.23
210.0	468.0	3.8	0.7	5.4	330.1	73.6	92.4	374.5	438.0	248.3	240.9	513.9	0.20	78.89	78.02	82.52	0.19	82.75	80.96	83.36
211.0	469.0	3.8	0.7	5.4	329.9	73.7	91.7	372.7	437.8	247.8	240.5	514.8	0.20	78.89	78.02	82.55	0.19	82.97	81.12	83.49
212.0	470.0	3.8	0.7	5.4	330.2	73.4	91.6	372.0	437.3	247.4	240.2	514.2	0.20	78.87	78.00	82.59	0.19	83.14	81.26	83.57
213.0	471.0	3.7	0.7	5.4	329.5	73.3	91.0	371.2	437.1	246.9	240.0	515.0	0.20	78.82	78.00	82.65	0.19	83.35	81.42	83.71
214.0	472.0	3.7	0.7	5.4	328.2	73.2	91.7	370.6	437.1	246.6	239.4	515.7	0.20	78.78	77.97	82.71	0.19	83.55	81.56	83.82
215.0	473.0	3.7	0.7	5.4	328.5	73.0	91.6	369.7	436.7	246.2	239.0	516.4	0.20	78.79	77.95	82.77	0.19	83.75	81.72	83.94
216.0	474.0	3.6	0.7	5.4	328.1	73.2	91.6	368.9	436.6	245.8	238.7	516.9	0.20	78.75	77.91	82.85	0.19	83.95	81.87	84.09
217.0	475.0	3.7	0.7	5.4	327.2	73.2	91.8	368.8	436.5	245.5	238.5	518.5	0.20	78.75	77.90	82.92	0.19	84.13	82.00	84.23
218.0	476.0	3.6	0.7	5.4	326.7	73.2	91.7	367.5	436.2	245.2	238.0	518.7	0.20	78.74	77.86	82.97	0.19	84.31	82.16	84.39
219.0	477.0	3.6	0.7	5.4	325.2	73.2	91.4	366.6	436.1	245.0	237.5	519.7	0.20	78.72	77.87	83.07	0.19	84.48	82.32	84.45
220.0	478.0	3.5	0.6	4.9	323.3	73.3	91.0	365.6	435.5	244.5	237.0	520.3	0.20	78.70	77.84	84.00	0.19	77.88	78.38	83.64
221.0	479.0	3.6	0.6	4.8	321.2	73.4	90.7	364.4	435.3	244.4	236.5	521.4	0.20	78.70	77.82	84.03	0.19	77.95	78.39	83.36
222.0	480.0	3.5	0.7	4.7	319.6	73.6	90.1	363.1	435.0	243.9	236.1	521.5	0.20	78.72	77.81	83.83	0.19	78.08	78.42	83.08
223.0	481.0	3.5	0.7	4.7	317.6	73.4	90.7	361.0	434.3	243.6	235.9	522.3	0.20	78.74	77.80	83.70	0.19	78.25	78.46	82.87
224.0	482.0	3.5	0.7	4.7	316.4	73.6	90.5	360.0	433.5	243.1	235.4	522.4	0.20	78.71	77.80	83.50	0.19	78.46	78.53	82.69
225.0	483.0	3.5	0.7	4.7	314.8	73.3	90.6	358.8	432.8	242.8	235.2	523.3	0.20	78.66	77.81	83.33	0.19	78.66	78.62	82.53
226.0	484.0	3.5	0.6	4.7	313.7	73.4	89.4	356.2	431.8	242.4	234.9	524.8	0.20	78.63	77.78	83.16	0.19	78.91	78.74	82.44
227.0	485.0	3.4	0.6	4.7	312.5	73.1	90.6	355.2	430.9	242.1	234.7	525.5	0.20	78.61	77.76	83.00	0.19	79.19	78.85	82.35
228.0	486.0	3.4	0.6	4.7	311.6	73.4	90.7	353.4	429.9	241.6	234.5	526.2	0.20	78.61	77.80	82.89	0.19	79.44	78.98	82.33
229.0	487.0	3.4	0.6	4.7	310.2	73.7	89.9	352.3	428.9	241.1	234.1	527.1	0.20	78.61	77.80	82.79	0.19	79.71	79.13	82.34
230.0	488.0	3.3	0.6	4.7	310.1	73.7	90.2	350.7	427.9	240.4	234.0	526.2	0.20	78.60	77.80	82.69	0.19	80.02	79.27	82.36
231.0	489.0	3.4	0.6	4.7	308.3	73.5	90.6	350.1	426.7	239.8	233.9	527.6	0.20	78.61	77.79	82.59	0.19	80.27	79.43	82.37
232.0	490.0	3.3	0.6	4.7	307.7	73.3	90.7	348.9	425.6	239.2	233.7	528.2	0.20	78.56	77.79	82.54	0.19	80.55	79.60	82.42
233.0	491.0	3.3	0.6	4.7	307.1	73.3	90.9	347.6	424.6	238.8	233.2	527.8	0.20	78.55	77.77	82.46	0.19	80.80	79.74	82.47
234.0	492.0	3.3	0.6	4.7	305.9	73.3	90.8	345.9	423.7	238.2	232.9	529.4	0.20	78.51	77.75	82.47	0.19	81.07	79.90	82.57
235.0	493.0	3.3	0.6	4.7	305.5	73.4	88.9	344.1	422.7	237.7	232.3	530.3	0.20	78.50	77.74	82.44	0.19	81.35	80.06	82.66
236.0	494.0	3.2	0.6	4.7	304.8	73.4	89.4	342.9	421.9	237.2	231.8	530.5	0.20	78.52	77.75	82.44	0.19	81.58	80.20	82.76
237.0	495.0	3.2	0.6	4.7	304.5	73.5	89.5	342.1	421.0	236.5	231.7	529.4	0.20	78.55	77.77	82.42	0.19	81.82	80.37	82.86
238.0	496.0	3.2	0.6	4.7	303.8	73.6	89.2	340.9	420.1	236.2	231.2	529.6	0.20	78.55	77.77	82.43	0.19	82.09	80.51	83.00
239.0	497.0	3.2	0.6	4.7	303.2	73.8	89.2	340.2	419.1	235.5	231.0	529.4	0.20	78.56	77.77	82.47	0.19	82.32	80.68	83.13
240.0	498.0	3.2	0.6	4.7	303.3	73.6	89.4	339.3	418.2	234.9	230.7	528.9	0.20	78.57	77.76	82.47	0.19	82.55	80.83	83.23
241.0	499.0	3.1	0.6	4.8	302.1	73.6	88.8	338.1	417.2	234.0	230.2	530.9	0.20	78.52	77.76	82.52	0.19	82.75	80.96	83.36
242.0	500.0	3.1	0.6	4.7	301.9	73.4	88.3	337.2	416.4	233.2	229.9	531.3	0.20	78.40	77.72	82.55	0.19	82.97	81.12	83.49
243.0	501.0	3.1	0.6	4.7	301.1	73.4	88.9	336.8	415.6	232.8	229.3	531.7	0.20	78.36	77.72	82.59	0.19	83.14	81.26	83.57
244.0	502.0	3.0	0.6	4.8	300.3	73.4	89.4	336.4	414.8	232.2	229.0	532.5	0.20	78.37	77.71	82.65	0.19	83.35	81.42	83.71
245.0	503.0	3.1	0.6	4.8	300.0	73.4	89.9	335.9	414.1	231.7	228.7	532.4	0.20	78.38	77.67	82.71	0.19	83.55	81.56	83.82
246.0	504.0	3.0	0.6	4.8	299.0	73.6	89.2	334.7	413.5	231.2	228.3	531.9	0.20	78.37	77.68	82.77	0.19	83.75	81.72	83.94
247.0	505.0	3.0	0.6	4.6	297.9	73.3	89.7	334.3	412.5	230.6	228.3	533.0	0.20	78.37	77.65	82.85	0.19	83.95	81.87	84.09
248.0	506.0	3.0	0.6	4.6	297.3	73.4	89.7	333.1	411.6	230.1	227.9	532.9	0.20	78.35	77.64	82.92	0.19	84.13	82.00	84.23
249.0	507.0	3.0	0.6	4.5	296.9	73.3	89.9	332.5	410.6	229.7	227.7	532.9	0.20	78.33	77.64	82.97	0.19	84.31	82.16	84.39
250.0	508.0	3.0	0.6	4.5	296.2	73.2	90.0	331.6	409.7	229.1	227.4	533.8	0.20	78.37	77.61	83.07	0.19	84.48	82.32	84.45
251.0	509.0	2.9	0.6	4.7	296.2	73.4	89.5	331.2	408.7	228.6	227.0	534.3	0.20	78.30	77.61	83.10	0.19	84.58	82.44	84.44
252.0	510.0	2.9	0.6	4.7	295.5	73.6	89.7	330.5	407.7	227.6	226.8	535.3	0.20	78.30	77.59	83.10	0.19	84.57	82.50	84.44
253.0	511.0	3.0	0.6	4.7	294.9	73.7	89.3	329.5	407.1	227.2	226.6	535.5	0.20	78.29	77.58	83.13	0.19	84.50	82.54	84.41
254.0	512.0	2.9	0.6	4.7	294.6	73.2	89.4	329.1	406.2	226.6	226.4	535.7	0.20	78.28	77.56	83.14	0.19	84.37	82.56	84.36
255.0	513.0	2.9	0.6	4.7	293.7	73.2	89.4	328.8	405.4	226.3	225.9	535.8	0.20	78.32	77.57	83.18	0.19	84.21	82.56	84.34
256.0	514.0	2.8	0.6	4.7	293.7	73.3	89.0	328.7	404.6	225.8	225.4	535.0	0.20	78.31	77.57	83.17	0.19	84.05	82.55	84.31
257.0	515.0	2.9	0.6	4.6	293.6	73.4	88.7	327.2	404.0	224.6	225.2	536.4	0.20	78.23	77.56	83.17	0.19	83.89	82.52	84.25
258.0	516.0	2.8	0.6	4.6	293.0	73.3	88.4	326.3	403.2	224.1	224.8	536.4	0.20	78.23	77.57	83.16	0.19	83.80	82.52	84.24
259.0	517.0	2.8	0.6	4.7	292.4	73.3	88.8	326.4	402.6	223.7	224.9	536.5	0.20	78.17	77.55	83.17	0.19	83.78	82.55	84.27
260.0	518.0	2.8	0.6	4.7	292.2	73.6	88.1	325.1	402.0	222.8	224.3	537.1	0.20	78.23	77.55	83.21	0.19	83.84	82.61	84.33
261.0	519.0	2.8	0.6	4.7	291.5	73.7	89.2	325.8	401.3	222.6	224.8	537.1	0.20	78.34	77.61	83.31	0.19	83.98	82.70	84.45
262.0	520.0	2.7	0.6	4.6	290.8	74.0	91.1	325.3	400.8	222.5	224.2	537.0	0.20	78.55	77.64	83.36	0.19	84.13	82.81	84.57
263.0	521.0	2.7	0.6	4.6	290.0	74.1	92.4	324.8	400.3	222.1	224.2	535.2	0.20	78.85	77.72	83.46	0.19	84.29	82.92	84.70
264.0	522.0	2.6	0.6	4.6	289.2	74.4	93.4	324.3	399.8	221.9	223.9	534.4	0.20	79.11	77.81	83.53	0.19	84.48	83.03	84.82
265.0	523.0	2.7	0.6	4.6	288.4	74.6	94.7	323.8	399.5	221.4	224.0	534.3	0.20	79.39	77.92	83.60	0.19	84.68	83.16	84.96

266.0	524.0	2.7	0.6	4.6	287.9	74.6	95.3	323.7	398.6	221.1	224.0	534.7	0.20	79.69	78.06	83.66	0.19	84.86	83.31	85.11
267.0	525.0	2.6	0.6	4.6	287.2	74.8	95.9	323.2	397.8	220.8	223.8	533.6	0.20	80.00	78.21	83.76	0.19	85.07	83.45	85.23
268.0	526.0	2.6	0.6	4.6	286.7	74.9	97.0	322.4	397.2	220.4	223.8	533.8	0.20	80.28	78.39	83.80	0.19	85.22	83.56	85.26
269.0	527.0	2.6	0.5	4.6	286.2	74.8	97.2	322.7	396.7	220.1	223.8	534.3	0.20	80.56	78.57	83.81	0.19	85.33	83.66	85.25
270.0	528.0	2.6	0.5	4.6	285.9	75.1	97.8	321.8	396.3	219.7	223.7	534.9	0.20	80.85	78.77	83.81	0.19	85.29	83.73	85.23
271.0	529.0	2.6	0.5	4.6	284.9	75.2	97.6	321.2	395.9	219.4	223.3	534.3	0.20	81.07	78.96	83.81	0.19	85.24	83.75	85.18
272.0	530.0	2.6	0.5	4.6	284.6	74.9	98.4	320.9	395.5	218.9	223.2	533.9	0.20	81.33	79.15	83.83	0.19	85.09	83.77	85.10
273.0	531.0	2.5	0.5	4.6	284.5	75.2	98.8	320.7	395.1	218.7	223.1	532.8	0.20	81.56	79.33	83.79	0.19	84.94	83.77	85.04
274.0	532.0	2.6	0.5	4.6	284.1	75.4	99.2	320.2	394.7	218.3	223.0	531.6	0.20	81.80	79.52	83.77	0.19	84.75	83.75	84.95
275.0	533.0	2.5	0.5	4.6	283.6	75.6	99.8	319.9	394.2	218.2	222.6	530.9	0.20	82.05	79.69	83.75	0.19	84.62	83.75	84.88
276.0	534.0	2.5	0.5	4.6	283.5	75.9	100.1	319.5	393.8	217.8	222.6	530.9	0.20	82.26	79.88	83.73	0.19	84.47	83.73	84.80
277.0	535.0	2.4	0.5	4.6	283.1	75.7	100.5	318.9	393.6	217.3	222.8	530.9	0.20	82.50	80.07	83.71	0.19	84.33	83.69	84.73
278.0	536.0	2.4	0.5	4.6	282.0	75.9	100.9	318.8	393.2	216.9	222.5	530.2	0.20	82.70	80.23	83.69	0.19	84.22	83.68	84.70
279.0	537.0	2.4	0.5	4.6	282.2	75.8	101.1	317.9	392.8	216.8	222.1	529.9	0.20	82.91	80.42	83.71	0.19	84.18	83.67	84.72
280.0	538.0	2.4	0.5	4.6	282.2	75.9	101.3	317.9	392.6	216.4	221.9	528.7	0.20	83.11	80.59	83.72	0.19	84.22	83.70	84.71
281.0	539.0	2.4	0.5	4.6	281.8	75.7	101.8	317.6	392.3	216.1	221.8	528.4	0.20	83.26	80.74	83.75	0.19	84.33	83.78	84.82
282.0	540.0	2.4	0.5	4.6	281.2	76.0	102.0	316.8	392.0	215.8	221.6	528.7	0.20	83.44	80.91	83.80	0.19	84.50	83.85	84.93
283.0	541.0	2.3	0.5	4.6	280.9	76.1	102.0	316.5	391.9	215.5	221.6	529.0	0.20	83.55	81.05	82.59	0.19	83.14	81.26	83.57
284.0	542.0	2.4	0.5	4.5	280.8	76.4	102.8	316.1	391.4	215.0	221.2	529.3	0.20	83.72	81.24	82.65	0.19	83.35	81.42	83.71
285.0	543.0	2.3	0.5	4.5	280.5	76.4	102.5	315.9	390.9	214.7	220.9	528.8	0.20	83.88	81.41	82.71	0.19	83.55	81.56	83.82
286.0	544.0	2.3	0.5	4.6	279.9	76.5	103.2	315.2	390.3	214.5	220.8	527.8	0.20	84.07	81.56	82.77	0.19	83.75	81.72	83.94
287.0	545.0	2.3	0.5	4.6	279.8	76.5	103.7	314.6	389.9	214.2	220.4	526.9	0.20	84.23	81.74	82.85	0.19	83.95	81.87	84.09
288.0	546.0	2.2	0.5	4.6	279.8	76.6	103.8	314.0	389.6	214.0	220.1	526.7	0.20	84.42	81.89	82.92	0.19	84.13	82.00	84.23
289.0	547.0	2.2	0.5	4.6	279.6	76.7	104.1	313.7	389.2	213.6	220.1	527.8	0.20	84.56	82.04	82.97	0.19	84.31	82.16	84.39
290.0	548.0	2.2	0.5	4.5	278.4	76.6	102.3	313.4	388.6	213.3	219.8	527.6	0.20	84.70	82.19	83.07	0.19	84.48	82.32	84.45
291.0	549.0	2.2	0.5	4.5	278.8	76.8	100.0	313.1	388.1	213.0	219.4	527.3	0.20	84.76	82.31	83.10	0.19	84.58	82.44	84.44
292.0	550.0	2.2	0.5	4.5	278.8	76.6	98.8	312.9	387.5	212.8	219.1	526.8	0.20	84.69	82.37	83.10	0.19	84.57	82.50	84.44
293.0	551.0	2.2	0.5	4.5	279.2	76.6	97.8	312.4	387.1	212.6	218.6	526.2	0.20	84.48	82.38	83.13	0.19	84.50	82.54	84.41
294.0	552.0	2.1	0.5	4.5	279.4	76.6	97.1	311.7	386.8	212.3	218.5	525.9	0.20	84.23	82.39	83.14	0.19	84.37	82.56	84.36
295.0	553.0	2.1	0.5	4.5	279.3	76.5	96.3	311.6	386.2	212.1	217.9	525.8	0.20	84.03	82.38	83.18	0.19	84.21	82.56	84.34
296.0	554.0	2.1	0.5	4.4	279.5	76.4	95.8	311.3	385.5	211.8	217.7	525.2	0.20	83.80	82.32	83.17	0.19	84.05	82.55	84.31
297.0	555.0	2.0	0.5	4.4	278.9	76.4	95.4	310.9	385.4	211.5	217.7	525.8	0.20	83.60	82.29	83.17	0.19	83.89	82.52	84.25
298.0	556.0	2.0	0.5	4.4	278.6	77.0	96.0	310.6	385.0	211.0	217.5	526.7	0.20	83.52	82.29	83.16	0.19	83.80	82.52	84.24
299.0	557.0	2.0	0.5	4.4	278.0	76.9	97.1	310.9	384.7	210.9	217.2	527.3	0.20	83.50	82.30	83.17	0.19	83.78	82.55	84.27
300.0	558.0	2.0	0.5	4.4	277.3	77.3	98.2	310.4	384.2	210.6	216.8	526.8	0.20	83.64	82.36	83.21	0.19	83.84	82.61	84.33
301.0	559.0	2.0	0.5	4.4	276.9	77.2	99.4	310.2	384.0	210.3	216.7	525.9	0.20	83.84	82.46	83.31	0.19	83.98	82.70	84.45
302.0	560.0	2.0	0.5	4.4	276.4	77.2	100.7	309.6	383.5	210.1	216.3	525.2	0.20	84.09	82.54	83.36	0.19	84.13	82.81	84.57
303.0	561.0	2.0	0.5	4.4	275.5	77.4	101.5	309.3	383.0	209.9	216.2	524.5	0.20	84.37	82.67	83.46	0.19	84.29	82.92	84.70
304.0	562.0	2.0	0.5	4.3	275.0	77.4	102.1	308.6	382.5	209.6	215.9	524.7	0.20	84.63	82.80	83.53	0.19	84.48	83.03	84.82
305.0	563.0	1.9	0.5	4.3	274.7	77.4	103.4	308.0	382.1	209.6	215.6	524.6	0.20	84.85	82.95	83.60	0.19	84.68	83.16	84.96
306.0	564.0	1.9	0.5	4.3	274.2	77.2	104.0	307.5	381.5	209.2	215.6	524.1	0.20	85.07	83.11	83.66	0.19	84.86	83.31	85.11
307.0	565.0	1.9	0.5	4.3	273.7	77.3	103.7	307.3	380.9	208.8	215.6	523.9	0.20	85.26	83.26	83.76	0.19	85.07	83.45	85.23
308.0	566.0	1.8	0.5	4.3	273.3	77.5	101.7	306.7	380.3	208.5	215.2	524.8	0.20	85.42	83.38	83.80	0.19	85.22	83.56	85.26
309.0	567.0	1.9	0.5	4.3	273.3	77.1	100.1	306.2	379.7	208.3	215.1	524.0	0.20	85.47	83.48	83.81	0.19	85.33	83.66	85.25
310.0	568.0	1.8	0.5	4.3	273.3	77.3	98.9	305.8	379.1	208.0	214.9	524.1	0.20	85.35	83.52	83.81	0.19	85.29	83.73	85.23
311.0	569.0	1.8	0.5	4.3	273.4	77.2	98.0	305.1	378.7	207.7	214.5	523.2	0.20	85.17	83.53	83.81	0.19	85.24	83.75	85.18
312.0	570.0	1.8	0.5	4.3	273.9	77.1	97.2	304.8	378.3	207.4	214.4	522.9	0.20	84.93	83.54	83.83	0.19	85.09	83.77	85.10
313.0	571.0	1.8	0.5	4.4	274.0	77.2	96.6	305.1	377.9	206.9	214.4	523.1	0.20	84.65	83.51	83.79	0.19	84.94	83.77	85.04
314.0	572.0	1.8	0.5	4.4	274.2	77.6	96.0	303.9	377.4	206.6	214.0	523.8	0.20	84.45	83.48	83.77	0.19	84.75	83.75	84.95
315.0	573.0	1.8	0.5	4.4	273.9	76.9	95.3	304.1	377.2	206.6	213.6	524.0	0.20	84.21	83.48	83.75	0.19	84.62	83.75	84.88
316.0	574.0	1.8	0.5	4.4	274.3	76.6	95.1	304.1	377.0	206.3	213.3	523.2	0.20	84.03	83.43	83.73	0.19	84.47	83.73	84.80
317.0	575.0	1.7	0.5	4.4	274.5	76.7	94.8	303.7	376.8	206.0	213.0	522.0	0.20	83.90	83.38	83.71	0.19	84.33	83.69	84.73
318.0	576.0	1.7	0.5	4.4	274.3	77.2	95.4	303.5	376.7	205.4	212.9	522.4	0.20	83.82	83.35	83.69	0.19	84.22	83.68	84.70
319.0	577.0	1.7	0.6	4.4	274.2	77.2	96.6	303.3	376.8	205.0	213.0	522.4	0.20	83.78	83.36	83.71	0.19	84.18	83.67	84.72
320.0	578.0	1.7	0.5	4.4	273.4	77.5	97.5	303.2	376.7	204.6	212.7	522.3	0.20	83.94	83.38	83.72	0.19	84.22	83.70	84.71
321.0	579.0	1.6	0.5	4.5	272.8	77.6	98.9	303.2	376.8	204.4	212.5	521.3	0.20	84.20	83.46	83.75	0.19	84.33	83.78	84.82
322.0	580.0	1.7	0.5	4.5	272.5	77.6	100.7	303.4	377.0	204.1	212.5	521.0	0.20	84.49	83.56	83.80	0.19	84.50	83.85	84.93
323.0	581.0	1.6	0.5	4.5	272.0	77.7	101.7	302.9	377.1	203.9	212.2	520.1	0.20	84.78	83.66	83.87	0.19	84.69	83.95	85.06
324.0	582.0	1.6	0.5	4.4	271.8	77.6	102.7	302.4	377.1	203.6	212.1	519.9	0.20	85.06	83.79	83.93	0.19	84.90	84.08	85.19
325.0	583.0	1.5	0.5	4.4	271.2	77.6	103.7	302.5	377.5	203.4	211.9	519.1	0.20	85.31	83.96	84.00	0.19	85.14	84.19	85.32
326.0	584.0	1.6	0.5	4.4	270.9	77.8	104.6	302.4	377.4	203.1	212.0	519.4	0.20	85.56	84.09	84.09	0.19	85.31	84.32	85.46
327.0	585.0	1.5	0.5	4.5	270.9	77.7	103.9	301.9	377.3	202.9	211.9	519.8	0.20	85.77	84.22	84.15	0.19	85.55	84.47	85.59
328.0	586.0	1.5	0.5	4.5	271.0	78.0	102.4	301.1	377.4	202.5	211.6	520.3	0.20	85.86	84.33	84.18	0.19	85.68	84.58	85.61
329.0	587.0	1.5	0.5	4.5	271.3	77.6	100.4	301.1	377.5	202.3	211.5	520.2	0.20	85.86	84.44	84.17	0.19	85.75	84.67	85.57
330.0	588.0	1.5	0.5	4.6	271.8	78.0	99.4	301.3	377.9	202.0	211.4	521.1	0.20	85.67	84.48	84.18	0.19	85.71	84.71	85.52
331.0	589.0	1.5	0.6	4.6	272.1	77.9	98.1	301.0	378.0	201.7	211.1	520.7	0.20	85.45	84.50	84.15	0.19	85.61	84.74	85.46
332.0	590.0	1.5	0.6	4.6	272.2	77.8	97.5	301.3	378.3	201.5	211.2	519.2	0.20	85.21	84.49	84.13	0.19	85.49	84.75	85.40
333.0	591.0	1.5	0.6	4.6	272.2	77.7	96.9	301.6	378.5	201.2	211.2	518.8	0.20	85.02	84.48	84.12	0.19	85.36	84.73	85.35
334.0	592.0	1.5	0.6	4.5	272.8	77.3	96.3	301.5	378.8	201.0	211.1	517.9	0.20	84.85	84.45	84.11	0.19	85.20	84.74	85.29
335.0	593.0	1.4	0.6	4.5	272.9	77.1	96.0	301.7	379.1	200.9	211.1	517.4	0.20	84.70	84.45	84.12	0.19	85.10	84.73	85.24
336.0	594.0	1.4	0.6	4.5	272.9	76.9	95.7	301.3	379.1	200.5	210.8	517.5	0.20	84.54	84.40	84.10	0.19	84.96	84.72	85.19
337.0	595.0	1.4	0.6	4.5	273.3	77.5	95.0	300.9	379.3	200.3	210.6	518.3	0.20	84.31	84.36	84.08	0.19	84.82	84.70	85.10
338.0	596.0	1.4	0.6	4.5	273.2	77.9	94.8	301.0	379.4	200.3	210.5	518.4	0.20	84.20	84.31	84.03	0.19	84.66	84.68	85.04
339.0	597.0	1.3	0.6	4.4	272.9	77.5	95.0	301.2	379.9	200.1	210.4	518.3	0.20	84.09	84.27	84.03	0.19	84.56	84.63	84.98
340.0	598.0	1.3	0.6	4.5	272.7	78.0	96.5	301.4	380.2	199.9	210.6	518.7	0.20	84.13	84.29	84.00	0.19	84.53	84.64	84.95
341.0	599.0	1.3	0.6	4.5	271.9	78.1	98.1	301.8	381.0	199.7	210.7	518.6	0.20	84.26	84.30	84.03	0.19	84.58	84.67	85.03
342.0	600.0	1.3	0.6	4.6	271.9	78.3	99.0	301.2	381.5	199.5	210.6	517.9	0.20	84.52	84.37	84.06	0.19	84.70	84.72	85.12
343.0	601.0	1.3	0.6	4.6	272.0	78.3	101.0	301.0	381.8	199.3	210.7	516.8	0.20	84.77	84.45	84.15	0.19	84.87	84.78	85.27
344.0	602.0	1.3	0.6	4.6	271.6	77.7	101.9	301.6	382.4	199.1	210.7	518.0	0.20	85.07	84.58	84.20	0.19	85.08	84.87	85.37
345.0	603.0	1.2	0.6	4.6	271.8	77.8	103.3	300.9	382.7	199.2	210.3	516.3	0.20	85.25	84.67	84.27	0.19	85.24	84.96	85.49
346.0	604.0	1.2	0.6	4.6	272.1	77.7	104.5	300.8	383.5	199.1	210.4	516.0	0.20	85.45	84.78	84.32	0.19	85.43	85.07	85.64
347.0	605.0	1.2	0.6	4.6	271.6	77.8	103.7	300.6	383.9	198.8	210.4	516.2	0.20	85.62	84.91	84.37	0.19	85.60	85.17	85.72
348.0	606.0	1.2	0.6	4.6	272.3	78.0	101.5	300.8	384.3	198.6	210.1	515.4	0.20	85.78	85.02	84.40	0.19	85.77	85.28	85.72
349.0	607.0	1.1	0.6	4.6	272.5	77.9	100.2	300.8	384.8	198.5	210.3	514.3	0.20	85.79	85.09	84.37	0.19	85.84	85.36	85.70
350.0	608.0	1.1	0.6	4.6	272.1	77.9	99.3	300.7	385.3	198.3	210.4	514.9	0.20	85.60	85.11	84.35	0.19	85.79	85.38	85.66
351.0	609.0	1.1	0.8	4.2	272.0	77.3	97.9	300.3	385.5	197.9	210.2	515.8	0.20	85.43	85.13	84.36	0.19	85.71	85.40	85.60
352.0	610.0	1.1	0.7	4.2	272.3	76.6	96.8	300.2	386.1	197.2	209.9	516.2	0.20	84.97	85.04	84.28	0.19	85.46	85.36	85.45
353.0	611.0	1.1	0.7	4.2	272.1	77.0	96.1	299.8	386.9	197.2	209.8	516.1	0.20	84.56	84.96	84.22	0.19	85.19	85.30	85.32
354.0	612.0	1.0	0.6	4.2	271.8	76.7	95.9	299.8	387.5	197.1	209.7	515.8	0.20	84.27	84.89	84.16	0.19	84.97	85.22	85.18
355.0	613.0	1.1	0.6	4.2	271.6	76.6	95.6	299.4	388.1	197.0	209.9	514.5	0.20	84.11	84.83	84.12	0.19	84.87	85.18	85.13

356.0	614.0	1.0	0.6	4.2	271.6	76.6	95.3	299.6	388.4	197.0	210.0	514.5	0.20	83.97	84.80	84.08	0.19	84.70	85.16	85.04
357.0	615.0	1.0	0.6	4.2	271.4	76.8	95.0	299.2	388.9	196.9	210.0	512.9	0.20	83.87	84.73	84.03	0.19	84.58	85.12	85.00
358.0	616.0	1.0	0.6	4.2	271.3	76.8	95.0	299.1	389.5	196.8	210.2	513.3	0.20	83.82	84.67	84.01	0.19	84.49	85.07	84.94
359.0	617.0	1.0	0.6	4.2	270.8	77.3	95.8	298.1	389.7	195.8	210.0	514.0	0.20	83.74	84.65	83.98	0.19	84.42	85.06	84.92
360.0	618.0	0.9	0.6	4.2	269.7	77.4	97.2	298.6	390.1	196.0	209.7	513.8	0.20	83.82	84.65	83.97	0.19	84.42	85.05	84.93
361.0	619.0	0.9	0.6	4.2	269.5	77.7	98.6	298.1	390.5	196.0	209.6	512.6	0.20	84.08	84.71	84.02	0.19	84.54	85.09	85.00
362.0	620.0	0.9	0.6	4.2	268.8	77.8	100.6	298.2	390.7	195.9	209.7	511.3	0.20	84.43	84.79	84.08	0.19	84.73	85.16	85.15
363.0	621.0	0.9	0.6	4.2	267.9	78.1	102.1	298.1	390.6	195.8	209.8	510.6	0.20	84.74	84.89	84.12	0.19	84.93	85.24	85.29
364.0	622.0	0.9	0.6	4.2	267.2	78.3	103.4	297.5	390.5	195.8	209.7	509.7	0.20	85.08	85.03	84.23	0.19	85.18	85.33	85.44
365.0	623.0	0.9	0.6	4.2	266.9	78.2	104.6	297.0	390.5	195.6	209.7	509.8	0.20	85.42	85.18	84.29	0.19	85.45	85.46	85.63
366.0	624.0	0.8	0.6	4.2	266.3	78.3	105.0	297.1	390.7	195.6	209.7	508.9	0.20	85.75	85.33	84.41	0.19	85.71	85.59	85.81
367.0	625.0	0.8	0.6	4.2	266.4	78.5	103.2	296.6	390.5	195.5	209.7	509.1	0.20	86.06	85.50	84.46	0.19	85.96	85.74	85.91
368.0	626.0	0.8	0.6	4.2	266.4	78.6	101.4	296.4	390.3	195.3	209.4	509.2	0.20	86.29	85.62	84.50	0.19	86.19	85.87	85.92
369.0	627.0	0.8	0.6	4.2	266.5	78.6	100.1	296.3	390.3	195.0	209.5	508.0	0.20	86.30	85.73	84.54	0.19	86.30	85.97	85.92
370.0	628.0	0.7	0.6	4.2	266.7	78.4	99.0	295.8	390.4	195.0	209.2	507.2	0.20	86.21	85.74	84.54	0.19	86.31	85.99	85.91
371.0	629.0	0.8	0.6	4.1	266.2	78.3	98.3	295.4	390.5	195.0	209.2	506.6	0.20	86.07	85.76	84.57	0.19	86.26	86.03	85.90
372.0	630.0	0.7	0.6	4.1	265.9	78.4	97.7	294.7	390.7	194.9	209.1	506.0	0.20	85.90	85.79	84.57	0.19	86.20	86.03	85.88
373.0	631.0	0.7	0.6	4.1	265.8	78.1	97.0	294.6	391.0	194.7	208.9	505.3	0.20	85.73	85.76	84.58	0.19	86.08	86.04	85.85
374.0	632.0	0.7	0.6	4.1	265.3	78.4	96.5	293.6	391.1	194.3	208.8	505.1	0.20	85.56	85.74	84.61	0.19	85.98	86.05	85.80
375.0	633.0	0.7	0.6	4.1	265.2	78.6	96.2	293.4	391.2	194.2	208.9	504.8	0.20	85.34	85.72	84.58	0.19	85.85	86.03	85.77
376.0	634.0	0.6	0.6	4.0	264.7	78.7	95.9	292.9	390.6	194.0	208.8	504.4	0.20	85.17	85.67	84.58	0.19	85.73	86.00	85.73
377.0	635.0	0.7	0.6	3.9	264.3	78.7	95.8	292.6	390.2	193.8	208.5	504.0	0.20	85.01	85.64	84.57	0.19	85.60	86.00	85.68
378.0	636.0	0.6	0.6	3.9	263.6	78.3	95.7	292.3	389.7	193.7	208.4	502.7	0.20	84.91	85.59	84.55	0.19	85.49	85.97	85.63
379.0	637.0	0.6	0.6	3.9	263.3	78.1	95.3	291.7	389.3	193.5	208.2	502.2	0.20	84.78	85.56	84.53	0.19	85.42	85.93	85.59
380.0	638.0	0.6	0.6	3.9	263.1	78.0	95.2	291.2	388.8	193.3	208.2	501.4	0.20	84.68	85.51	84.52	0.19	85.31	85.91	85.53
381.0	639.0	0.6	0.6	3.9	262.4	78.0	95.1	291.0	388.5	193.2	207.9	500.9	0.20	84.58	85.46	84.49	0.19	85.20	85.89	85.48
382.0	640.0	0.6	0.6	3.9	262.5	77.4	94.1	289.9	388.0	192.6	207.7	501.6	0.20	84.48	85.40	84.47	0.19	85.11	85.85	85.42
383.0	641.0	0.5	0.6	3.9	262.1	77.6	93.3	289.3	387.6	191.7	207.3	502.2	0.20	84.00	85.29	84.39	0.19	84.83	85.77	85.23
384.0	642.0	0.6	0.6	3.8	261.6	77.1	93.2	288.7	387.3	191.9	207.2	501.9	0.20	83.69	85.17	84.27	0.19	84.55	85.65	85.09
385.0	643.0	0.5	0.6	3.8	261.2	77.0	93.4	288.1	386.9	191.4	207.0	501.9	0.20	83.48	85.08	84.21	0.19	84.36	85.57	84.98
386.0	644.0	0.5	0.6	3.8	260.5	77.5	94.5	286.9	386.2	190.8	206.6	502.0	0.20	83.45	85.02	84.13	0.19	84.26	85.48	84.90
387.0	645.0	0.5	0.6	3.9	260.1	77.6	96.0	287.2	385.8	190.7	206.6	501.7	0.20	83.57	85.01	84.14	0.19	84.28	85.47	84.92
388.0	646.0	0.5	0.6	3.9	259.3	77.7	97.2	286.6	385.1	190.5	206.0	500.9	0.20	83.78	85.04	84.11	0.19	84.36	85.48	84.96
389.0	647.0	0.5	0.6	3.9	258.1	77.9	99.3	286.8	384.5	190.2	205.8	498.9	0.20	84.11	85.08	84.15	0.19	84.53	85.52	85.09
390.0	648.0	0.5	0.6	3.9	257.5	78.0	100.8	286.8	384.2	190.1	205.6	497.7	0.20	84.44	85.17	84.19	0.19	84.73	85.59	85.20
391.0	649.0	0.4	0.6	3.9	257.0	78.3	101.9	286.3	383.8	190.0	205.4	496.7	0.20	84.76	85.28	84.26	0.19	84.97	85.70	85.34
392.0	650.0	0.5	0.6	3.9	256.6	78.4	103.1	285.8	383.5	189.8	205.1	495.8	0.20	85.11	85.42	84.34	0.19	85.23	85.80	85.51
393.0	651.0	0.4	0.6	3.9	255.7	78.5	102.7	285.2	383.2	189.8	204.9	494.4	0.20	85.41	85.55	84.41	0.19	85.47	85.90	85.64
394.0	652.0	0.4	0.6	3.9	255.8	78.7	100.8	284.6	382.4	189.4	204.5	494.8	0.20	85.67	85.66	84.44	0.19	85.71	86.01	85.66
395.0	653.0	0.4	0.6	3.9	256.1	78.6	99.4	284.6	382.1	189.2	204.5	494.3	0.20	85.80	85.75	84.48	0.19	85.82	86.09	85.66
396.0	654.0	0.4	0.6	3.9	255.9	78.6	98.3	284.5	381.6	189.1	204.2	492.8	0.20	85.79	85.81	84.45	0.19	85.87	86.13	85.64
397.0	655.0	0.4	0.6	3.9	255.9	78.6	97.5	283.6	380.9	188.9	203.8	491.8	0.20	85.70	85.81	84.46	0.19	85.87	86.15	85.61
398.0	656.0	0.4	0.6	3.8	255.7	78.5	96.9	283.8	380.3	188.7	203.7	490.7	0.20	85.59	85.81	84.47	0.19	85.81	86.14	85.62
399.0	657.0	0.3	0.6	3.8	255.6	78.2	96.3	283.5	379.7	188.5	203.4	489.8	0.20	85.44	85.79	84.44	0.19	85.72	86.16	85.58
400.0	658.0	0.3	0.6	3.8	255.2	78.3	96.0	283.0	379.1	188.4	203.1	489.0	0.20	85.26	85.77	84.46	0.19	85.62	86.16	85.55
401.0	659.0	0.3	0.6	3.8	255.0	78.2	95.6	282.6	378.6	188.2	202.8	487.8	0.20	85.13	85.74	84.44	0.19	85.56	86.14	85.49
402.0	660.0	0.3	0.6	3.8	255.0	78.2	95.2	282.3	378.4	188.0	202.6	487.0	0.20	84.96	85.71	84.44	0.19	85.42	86.11	85.46
403.0	661.0	0.3	0.6	3.8	254.7	78.1	94.9	281.8	378.3	187.7	202.2	486.4	0.20	84.85	85.66	84.39	0.19	85.33	86.08	85.42
404.0	662.0	0.2	0.6	3.8	254.1	78.0	94.7	281.5	378.2	187.4	202.1	485.9	0.20	84.70	85.63	84.38	0.19	85.24	86.06	85.37
405.0	663.0	0.2	0.6	3.8	254.1	78.1	94.5	280.9	378.1	187.2	201.8	485.1	0.20	84.58	85.57	84.35	0.19	85.14	86.02	85.32
406.0	664.0	0.2	0.6	3.8	253.6	77.9	94.3	280.6	378.6	187.0	201.5	484.5	0.20	84.47	85.52	84.32	0.19	85.03	85.98	85.30
407.0	665.0	0.2	0.6	3.8	253.6	77.9	94.0	280.4	378.9	186.8	201.3	483.9	0.20	84.36	85.46	84.30	0.19	84.95	85.97	85.22
408.0	666.0	0.2	0.6	3.8	253.1	78.0	94.0	279.9	379.0	186.5	201.0	483.3	0.20	84.27	85.44	84.25	0.19	84.86	85.92	85.19
409.0	667.0	0.2	0.5	3.8	252.8	77.8	93.9	279.5	379.1	186.3	200.7	483.3	0.20	84.17	85.36	84.26	0.19	84.76	85.86	85.13
410.0	668.0	0.2	0.5	3.7	252.7	77.8	93.6	278.8	379.2	185.9	200.5	482.5	0.20	84.12	85.31	84.22	0.19	84.67	85.84	85.06
411.0	669.0	0.2	0.5	3.7	252.2	77.8	93.6	278.6	379.2	185.7	200.2	482.0	0.20	84.03	85.25	84.17	0.19	84.59	85.80	85.03
412.0	670.0	0.1	0.5	3.7	252.2	77.8	93.4	278.1	379.1	185.5	199.8	482.1	0.20	83.98	85.22	84.16	0.19	84.55	85.77	84.96
413.0	671.0	0.1	0.5	3.7	251.7	77.8	93.4	277.4	379.1	185.1	199.6	481.4	0.20	83.90	85.14	84.13	0.19	84.45	85.74	84.89
414.0	672.0	0.1	0.5	3.7	251.6	77.7	93.2	277.2	379.0	184.9	199.3	481.2	0.20	83.85	85.10	84.09	0.19	84.41	85.70	84.88
415.0	673.0	0.1	0.5	3.7	251.4	77.7	93.1	276.6	378.9	184.6	199.2	481.4	0.20	83.79	85.05	84.05	0.19	84.33	85.64	84.82
416.0	674.0	0.1	0.5	3.7	251.0	78.2	93.6	275.6	378.8	184.1	198.8	482.1	0.20	83.78	85.02	84.02	0.19	84.29	85.60	84.77
417.0	675.0	0.1	0.5	3.7	250.5	78.4	95.4	275.7	378.8	183.9	198.9	483.0	0.20	83.86	85.03	84.02	0.19	84.30	85.59	84.80
418.0	676.0	0.0	0.5	3.7	250.0	78.8	96.4	274.9	378.7	183.5	198.4	482.6	0.20	84.03	85.05	84.00	0.19	84.40	85.59	84.83

Pre-burn data

		Average	65.93	#######	#######	#######			
			*1	*9	*	*			
Elapsed		Weight	Flue	Catalyst	Catalyst	Catalyst	Unit	Unit	Load
Time	Raw data row	Remaining	Gas	Down	Center	up	in	out	in
min		lbs	°F	°F	°F	°F	°F	°F	°F
0.00	6.00	0.1	62.5	#######	#######	#######	63.06	63.05	63.19
1.0	7.0	0.1	62.6	#######	#######	#######	63.07	63.06	63.19
2.0	8.0	0.1	62.6	#######	#######	#######	63.06	63.05	63.18
3.0	9.0	0.1	62.7	#######	#######	#######	63.09	63.04	63.17
4.0	10.0	0.1	62.8	#######	#######	#######	63.12	63.02	63.17
5.0	11.0	0.1	62.8	#######	#######	#######	63.13	63.04	63.20
6.0	12.0	0.1	62.8	#######	#######	#######	63.15	63.03	63.17
7.0	13.0	0.1	62.9	#######	#######	#######	63.19	63.04	63.18
8.0	14.0	0.1	62.9	#######	#######	#######	63.20	63.05	63.19
9.0	15.0	0.1	63.1	#######	#######	#######	63.24	63.05	63.17
10.0	16.0	0.1	63.2	#######	#######	#######	63.26	63.05	63.16
11.0	17.0	0.1	63.3	#######	#######	#######	63.33	63.07	63.20
12.0	18.0	0.1	63.4	#######	#######	#######	63.33	63.06	63.18
13.0	19.0	0.1	63.5	#######	#######	#######	63.36	63.04	63.19
	20.0	0.0	63.6	#######	#######	#######	63.41	63.07	63.21
	21.0	0.0	63.7	#######	#######	#######	63.45	63.08	63.22
	22.0	0.0	63.9	#######	#######	#######	63.49	63.09	63.23
	23.0	0.0	64.1	#######	#######	#######	63.52	63.10	63.21
	24.0	0.0	64.3	#######	#######	#######	63.57	63.09	63.21
	25.0	0.0	64.5	#######	#######	#######	63.59	63.10	63.22
	26.0	0.0	64.6	#######	#######	#######	63.65	63.14	63.23
	27.0	0.0	64.8	#######	#######	#######	63.68	63.14	63.26
	28.0	0.0	64.9	#######	#######	#######	63.74	63.15	63.27
	29.0	0.0	65.1	#######	#######	#######	63.80	63.18	63.27
	30.0	0.0	65.2	#######	#######	#######	63.82	63.17	63.27
	31.0	0.0	65.4	#######	#######	#######	63.85	63.18	63.30
	32.0	0.0	65.6	#######	#######	#######	63.93	63.19	63.30
	33.0	0.0	65.8	#######	#######	#######	63.97	63.23	63.30

	34.0	0.0	66.0	#######	#######	#######	64.01	63.24	63.31
	35.0	0.0	66.2	#######	#######	#######	64.04	63.24	63.31
	36.0	0.0	66.5	#######	#######	#######	64.11	63.25	63.34
	37.0	0.0	66.8	#######	#######	#######	64.17	63.29	63.37
	38.0	0.0	67.1	#######	#######	#######	64.19	63.31	63.37
	39.0	0.0	67.5	#######	#######	#######	64.22	63.30	63.39
	40.0	0.0	67.6	#######	#######	#######	64.28	63.36	63.40
	41.0	0.0	67.6	#######	#######	#######	64.30	63.36	63.40
	42.0	0.0	67.5	#######	#######	#######	64.32	63.38	63.41
	43.0	0.0	67.2	#######	#######	#######	64.35	63.39	63.46
	44.0	0.0	67.0	#######	#######	#######	64.39	63.42	63.46
	45.0	0.0	66.8	#######	#######	#######	64.42	63.43	63.45
	46.0	0.0	66.4	#######	#######	#######	64.48	63.47	63.45
	47.0	0.0	66.7	#######	#######	#######	64.48	63.46	63.49
	48.0	0.0	67.1	#######	#######	#######	64.51	63.48	63.51
	49.0	0.0	67.4	#######	#######	#######	64.53	63.49	63.49
	50.0	0.0	67.8	#######	#######	#######	64.57	63.51	63.52
	51.0	0.0	68.0	#######	#######	#######	64.62	63.50	63.52
	52.0	0.0	68.2	#######	#######	#######	64.66	63.55	63.53
	53.0	0.0	68.4	#######	#######	#######	64.69	63.54	63.56
#VALUE!	54.0	0.9	68.6	#######	#######	#######	64.74	63.59	63.55
#VALUE!	55.0	0.8	68.7	#######	#######	#######	64.78	63.59	63.56
#VALUE!	56.0	4.8	68.9	#######	#######	#######	64.80	63.62	63.60
#VALUE!	57.0	9.5	69.1	#######	#######	#######	64.82	63.63	63.59
#VALUE!	58.0	10.6	69.0	#######	#######	#######	64.87	63.68	63.62
#VALUE!	59.0	10.5	68.8	#######	#######	#######	64.90	63.72	63.62
#VALUE!	60.0	10.6	68.5	#######	#######	#######	64.94	63.76	63.63
#VALUE!	61.0	10.6	68.1	#######	#######	#######	64.97	63.76	63.64
#VALUE!	62.0	10.5	67.8	#######	#######	#######	64.99	63.78	63.65
#VALUE!	63.0	10.6	67.8	#######	#######	#######	65.02	63.79	63.67
#VALUE!	64.0	10.6	67.5	#######	#######	#######	65.05	63.80	63.65
#VALUE!	65.0	10.6	67.3	#######	#######	#######	65.08	63.84	63.71
#VALUE!	66.0	10.6	67.2	#######	#######	#######	65.10	63.87	63.71
#VALUE!	67.0	10.6	67.2	#######	#######	#######	65.11	63.83	63.72
#VALUE!	68.0	10.5	67.1	#######	#######	#######	65.14	63.87	63.73
#VALUE!	69.0	12.4	67.0	#######	#######	#######	65.14	63.88	63.75
#VALUE!	70.0	10.6	66.7	#######	#######	#######	65.18	63.90	63.77
#VALUE!	71.0								

#VALUE!	72.0
#VALUE!	73.0
#VALUE!	74.0
#VALUE!	75.0
#VALUE!	76.0
#VALUE!	77.0
#VALUE!	78.0
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#VALUE!	137.0
#VALUE!	138.0
#VALUE!	139.0
#VALUE!	140.0
#VALUE!	141.0
#VALUE!	142.0
#VALUE!	143.0
#VALUE!	144.0
#VALUE!	145.0

Load	(load)	(load)		delta					
out	Total	Qload	Total corr	Tavg(load)	Tavg(unit)	σ:	M	Cp	Heat stored
°F	L	L/min	(L)	(oF)	(oF)	(lb/gal)	(lb/min)	(Btu/lb oF)	(Btu)
62.92	62.88	23.35	62.8807259	-0.28	63.0529785	8.32815445	0	1.00140096	0
62.94	62.91	14.19	62.9081802	-0.25	63.0652905	8.32815708	0.06050928	1.00140088	#VALUE!
62.98	62.91	-14.54	62.9147987	-0.20	63.0575295	8.32816704	0.01458717	1.00140069	#VALUE!
63.02	62.91	-14.77	62.9090691	-0.14	63.0665531	8.32818165	-0.012628	1.00140049	#VALUE!
63.07	62.94	16.05	62.9419441	-0.10	63.0708714	8.32817619	0.0724565	1.00140036	#VALUE!
63.12	62.98	-13.93	62.982254	-0.07	63.0842724	8.32814908	0.08884302	1.00140026	#VALUE!
63.20	63.00	11.90	63.0008507	0.02	63.090704	8.3281739	0.04098713	1.00139992	#VALUE!
63.25	63.04	8.14	63.0381165	0.07	63.1184273	8.32816699	0.08213382	1.00139974	#VALUE!
63.33	63.07	-23.43	63.0662842	0.14	63.1290017	8.32815372	0.06208161	1.00139953	#VALUE!
63.38	63.08	9.08	63.0840874	0.21	63.1425267	8.32817402	0.03923825	1.00139927	#VALUE!
63.45	63.12	-13.85	63.1197319	0.29	63.1517105	8.32818966	0.07856048	1.00139898	#VALUE!
63.52	63.16	16.57	63.1571312	0.33	63.1976757	8.32814996	0.08242806	1.00139886	#VALUE!
63.61	63.20	-9.88	63.2003136	0.43	63.1942348	8.32816639	0.09517401	1.0013985	#VALUE!
63.69	63.24	-7.23	63.2355843	0.50	63.1997471	8.32815425	0.07773662	1.00139825	#VALUE!
63.79	63.28	17.91	63.2846527	0.58	63.2403584	8.32813004	0.10814675	1.00139798	#VALUE!
63.86	63.32	22.24	63.3234024	0.64	63.2628613	8.32811832	0.08540434	1.00139778	#VALUE!
63.96	63.35	16.73	63.3503761	0.73	63.288805	8.32811424	0.05945003	1.00139745	#VALUE!
64.05	63.41	13.41	63.4138641	0.84	63.3086968	8.32813505	0.13992755	1.00139707	#VALUE!
64.13	63.44	8.09	63.4418564	0.92	63.3326359	8.32813417	0.06169503	1.00139681	#VALUE!
64.22	63.50	18.38	63.495079	1.00	63.3485737	8.32811992	0.11730261	1.00139651	#VALUE!
64.32	63.55	21.47	63.5540009	1.09	63.3927689	8.32810809	0.12986387	1.0013962	#VALUE!
64.41	63.59	-16.95	63.5898323	1.14	63.4118157	8.32807723	0.07897241	1.00139601	#VALUE!
64.50	63.65	21.62	63.6468277	1.23	63.4472046	8.32806728	0.12561786	1.00139571	#VALUE!
64.61	63.69	-10.61	63.6919937	1.34	63.4884377	8.3280669	0.09954586	1.00139532	#VALUE!
64.69	63.74	-18.73	63.7408829	1.42	63.4913884	8.328064	0.1077518	1.00139505	#VALUE!
64.78	63.78	-18.45	63.7773895	1.48	63.5148869	8.32803896	0.08046055	1.00139483	#VALUE!
64.87	63.81	21.32	63.8118095	1.57	63.5610275	8.32803498	0.07586168	1.00139454	#VALUE!
64.96	63.88	16.60	63.8829727	1.66	63.600462	8.32802998	0.15684369	1.00139422	#VALUE!

65.07	63.93	22.64	63.9281616	1.76	63.6244144	8.32802134	0.09959634	1.00139388	#VALUE!
65.16	63.98	-4.82	63.97509	1.85	63.6405945	8.32802011	0.10343019	1.00139356	#VALUE!
65.25	64.03	-20.28	64.0336685	1.91	63.6782246	8.32799322	0.12910701	1.00139335	#VALUE!
65.37	64.12	18.42	64.1161652	2.00	63.7291317	8.32795649	0.18182273	1.00139304	#VALUE!
65.40	64.16	-8.86	64.1573257	2.03	63.7490979	8.32795683	0.09071774	1.00139293	#VALUE!
65.49	64.20	-22.09	64.1957855	2.10	63.760416	8.32793333	0.0847654	1.00139268	#VALUE!
65.55	64.22	-16.43	64.2174988	2.15	63.8184948	8.3279258	0.04785611	1.00139252	#VALUE!
65.61	64.28	10.34	64.2810822	2.21	63.8284588	8.32792616	0.14013781	1.0013923	#VALUE!
65.66	64.30	-15.70	64.3042984	2.24	63.8494778	8.3279092	0.0511685	1.00139218	#VALUE!
65.70	64.33	-8.31	64.3348465	2.24	63.8687592	8.32786392	0.06732801	1.00139218	#VALUE!
65.73	64.36	-8.93	64.3620682	2.28	63.9046917	8.32786211	0.05999663	1.00139207	#VALUE!
65.80	64.37	27.76	64.3745956	2.34	63.9259339	8.32786737	0.02761039	1.00139183	#VALUE!
65.84	64.43	26.02	64.4287491	2.38	63.9740162	8.32786435	0.11935431	1.00139169	#VALUE!
65.87	64.45	20.31	64.4463425	2.38	63.9692898	8.32782721	0.03877585	1.00139171	#VALUE!
65.91	64.46	25.75	64.462822	2.40	63.9950466	8.32780424	0.03632082	1.00139163	#VALUE!
65.98	64.48	13.12	64.4846191	2.49	64.0118637	8.32782729	0.04804081	1.00139131	#VALUE!
66.06	64.53	23.73	64.5275116	2.54	64.0410862	8.32779661	0.09453507	1.00139115	#VALUE!
66.10	64.55	1.01	64.553894	2.57	64.0594101	8.32778977	0.05814681	1.00139103	#VALUE!
66.18	64.59	-20.23	64.5911255	2.65	64.1032525	8.32778306	0.08205823	1.00139076	#VALUE!
66.25	64.65	-22.35	64.6528091	2.69	64.1142674	8.32774915	0.13595065	1.00139064	#VALUE!
66.29	64.67	9.67	64.6702957	2.74	64.1636315	8.32775508	0.03854047	1.00139045	#VALUE!
66.37	64.71	13.91	64.7106857	2.80	64.1847077	8.32774481	0.08901956	1.00139024	#VALUE!
66.46	64.74	12.90	64.7388687	2.85	64.2073746	8.32769956	0.06211533	1.00139006	#VALUE!
66.51	64.81	-16.41	64.8124466	2.91	64.2221222	8.32771296	0.16216569	1.00138984	#VALUE!
66.56	64.84	26.26	64.836731	2.93	64.2739506	8.3276799	0.05352282	1.00138977	#VALUE!
66.63	64.87	26.00	64.8667831	3.00	64.3061886	8.32767806	0.06623483	1.00138953	#VALUE!
66.65	64.89	-8.45	64.8888779	3.02	64.3520565	8.32766743	0.04869694	1.00138947	#VALUE!
66.71	64.89	10.97	64.8913116	3.07	64.3638096	8.32766538	0.00536387	1.00138929	#VALUE!
66.73	64.94	-15.48	64.9353333	3.08	64.3842316	8.32764498	0.09702383	1.00138927	#VALUE!
66.74	64.96	-3.92	64.9636383	3.07	64.4056893	8.32762802	0.06238422	1.0013893	#VALUE!
66.79	64.97	-3.45	64.9700851	3.14	64.4216194	8.32764408	0.01420875	1.00138907	#VALUE!
66.82	65.00	29.03	65.0008087	3.11	64.4600907	8.32757897	0.06771481	1.00138916	#VALUE!
66.84	65.02	-11.73	65.0163269	3.13	64.4809533	8.32758236	0.03420211	1.00138908	#VALUE!
66.85	65.04	22.64	65.0357208	3.13	64.4738598	8.32757569	0.04274416	1.00138908	#VALUE!
66.90	65.04	-14.27	65.0400085	3.17	64.5037384	8.32756075	0.00945009	1.00138895	#VALUE!
66.92	65.07	24.67	65.0694046	3.17	64.5085373	8.32754295	0.064789	1.00138895	#VALUE!
66.94	65.08	15.14	65.0845413	3.17	64.5402318	8.32751185	0.03336129	1.00138895	#VALUE!
							#VALUE!		#VALUE!

							Box Car
Qexchanger	Qout(i)	Qout(i) avg	Qout/h (avg)	Qout/h (i)	Target		1 hr
(Btu)	(Btu)	(Btu)	(Btu/h)(avg)	(Btu/h)(i)	(Btu/h)avg	Heat draw	
0	0					0	
-0.0152232	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
-0.0028771	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.00179273	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
-0.0074123	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
-0.0065114	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.00098171	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.00603444	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.00845265	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.00824628	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.02299545	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.02695324	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	
0.04095627	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.03910707	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.06265809	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.05453415	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.04349094	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.11793482	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.05658478	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.11765418	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.14179591	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.09048149	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.1549391	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.13385786	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.15311173	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.11959622	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.11900607	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.26037779	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!

0.17522516	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.19138714	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.24679445	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.36353038	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!
0.18431153	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.1783011	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.10285246	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.30996595	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!
0.1149538	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.15120537	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.13678441	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.06480814	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.28484946	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!
0.09235857	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.08737014	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.11992815	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.24041167	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.14991792	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.21796342	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.36568488	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!
0.10578238	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.24975152	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.17747495	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.47326669	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	3	#VALUE!
0.15725818	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.19929964	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.14730316	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.01650554	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.29920499	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	2	#VALUE!
0.19185925	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.04463493	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.2109273	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.1073401	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.13414034	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.02999795	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	0	#VALUE!
0.20579078	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
0.10588248	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	1	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	n.a	#VALUE!	

Description du test

Test standard	EPA
Run #	1
Date	30-04-2019
Technicien	M.M
Project #	PI 20194

Description de l'unité

Manufacturier	JOTUL	
Modèle	F45 V2	
Combustion system	Non-Cat	
Appliance type	WOOD STOVE	
Firebox volume	2.37	cu ft.
Appliance weight empty	n.a	lbs
Appliance weight full	OPTION	lbs

VERSION:	2.4		
Manufacturer:	JOTUL	Appliance Type:	Non-Cat
Model:	F45 V2		
		Temp. Units	F
Run:	1	Weight Units	lb
Project #:	PI 20194		
Test Duration (min):	418.00		

		Fuel Data		
			#REF!	
Wood Moisture (% wet):	16.57	HHV	20,207	kJ/kg
Load Weight (lb wet):	27.08	%C	50	
Burn Rate (dry kg/h):	1.47	%H	7	
Total Particulate Emissions:	5.92 g	%O	44	
		%Ash	0	

	Averages	0.38	7.58	0.00	430.85	73.89
					Temp. (F)	
Elapsed	Fuel Weight	Flue Gas Composition (%)			Flue	Room
Time (min)	Remaining (lb)	CO	CO_2	O_2	Gas	Temp
0.00	27.08	0.85	4.23	0.00	353.84	73.9
1.00	26.53	0.34	1.88	0.00	384.66	73.7
2.00	26.31	0.62	3.68	0.00	452.05	73.7
3.00	26.12	0.72	6.29	0.00	520.14	73.7
4.00	25.93	0.47	9.09	0.00	498.59	73.2
5.00	25.73	0.60	7.72	0.00	525.81	73.8
6.00	25.42	0.32	9.62	0.00	542.91	73.9
7.00	25.24	0.26	11.17	0.00	532.46	74.1
8.00	25.13	0.22	10.02	0.00	511.50	73.8
9.00	24.93	0.30	8.50	0.00	491.92	73.6
10.00	24.82	0.44	7.36	0.00	490.27	73.9
11.00	24.62	0.45	7.49	0.00	485.50	73.3
12.00	24.52	0.38	7.79	0.00	467.26	73.6
13.00	24.43	0.50	6.67	0.00	450.72	73.4
14.00	24.33	0.57	6.03	0.00	440.44	73.6
15.00	24.24	0.61	5.81	0.00	436.05	73.5
16.00	24.02	0.58	5.98	0.00	430.75	73.5
17.00	23.92	0.59	5.89	0.00	429.88	73.4
18.00	23.82	0.56	6.08	0.00	426.55	73.5

19.00	23.72	0.53	6.09	0.00	424.96	73.8
20.00	23.63	0.54	6.09	0.00	425.17	72.8
21.00	23.44	0.53	6.17	0.00	424.52	72.8
22.00	23.34	0.50	6.27	0.00	425.44	72.9
23.00	23.22	0.48	6.39	0.00	427.76	72.7
24.00	23.12	0.47	6.50	0.00	430.15	73.0
25.00	23.03	0.44	6.67	0.00	433.39	72.9
26.00	22.83	0.43	6.90	0.00	443.91	73.0
27.00	22.64	0.36	7.71	0.00	457.72	72.9
28.00	22.54	0.32	8.43	0.00	473.75	72.9
29.00	22.32	0.22	9.31	0.00	487.49	73.0
30.00	22.23	0.17	9.77	0.00	495.97	72.8
31.00	22.03	0.13	10.03	0.00	505.57	73.0
32.00	21.84	0.10	10.36	0.00	518.33	72.9
33.00	21.63	0.09	10.92	0.00	537.69	73.2
34.00	21.43	0.10	12.18	0.00	546.07	73.2
35.00	21.24	0.09	12.19	0.00	552.62	73.3
36.00	21.14	0.08	12.06	0.00	554.28	73.1
37.00	20.83	0.07	12.01	0.00	555.75	73.4
38.00	20.73	0.08	11.71	0.00	555.81	73.6
39.00	20.44	0.08	11.57	0.00	552.60	73.9
40.00	20.35	0.08	11.38	0.00	551.18	74.4
41.00	20.13	0.09	11.19	0.00	550.06	74.6
42.00	19.93	0.09	11.02	0.00	548.66	73.9
43.00	19.74	0.10	10.94	0.00	547.69	73.9
44.00	19.65	0.10	10.83	0.00	546.44	74.4
45.00	19.45	0.11	10.73	0.00	544.82	74.2
46.00	19.24	0.11	10.61	0.00	544.69	74.0
47.00	19.08	0.11	10.58	0.00	546.16	74.1
48.00	18.94	0.10	10.63	0.00	545.64	74.4
49.00	18.75	0.10	10.61	0.00	546.97	74.3
50.00	18.63	0.09	10.67	0.00	546.58	74.1
51.00	18.40	0.09	10.67	0.00	548.09	74.1
52.00	18.24	0.09	10.71	0.00	548.23	74.4
53.00	18.05	0.09	10.69	0.00	548.25	74.4
54.00	17.84	0.09	10.68	0.00	548.33	73.8
55.00	17.74	0.09	10.64	0.00	548.39	74.0
56.00	17.54	0.08	10.69	0.00	549.49	74.1

57.00	17.35	0.08	10.71	0.00	549.33	73.9
58.00	17.25	0.08	10.66	0.00	549.13	74.0
59.00	17.04	0.08	10.66	0.00	549.21	74.1
60.00	16.84	0.07	10.69	0.00	550.65	74.0
61.00	16.74	0.07	10.78	0.00	551.19	73.9
62.00	16.55	0.06	10.79	0.00	551.05	73.7
63.00	16.45	0.06	10.78	0.00	551.25	73.8
64.00	16.24	0.06	10.74	0.00	550.69	73.9
65.00	16.14	0.06	10.76	0.00	551.63	73.9
66.00	15.95	0.06	10.78	0.00	552.17	73.7
67.00	15.76	0.06	10.86	0.00	552.81	73.9
68.00	15.56	0.06	10.91	0.00	553.51	73.8
69.00	15.44	0.06	10.94	0.00	553.34	73.9
70.00	15.25	0.06	10.99	0.00	553.71	73.8
71.00	15.15	0.06	11.04	0.00	554.61	73.8
72.00	14.95	0.06	11.09	0.00	554.91	73.8
73.00	14.74	0.06	11.11	0.00	554.68	73.9
74.00	14.64	0.06	11.14	0.00	555.54	73.8
75.00	14.45	0.06	11.16	0.00	555.55	73.9
76.00	14.35	0.06	11.16	0.00	553.97	73.9
77.00	14.16	0.06	11.16	0.00	554.22	73.9
78.00	13.96	0.07	11.17	0.00	553.86	73.8
79.00	13.85	0.07	11.12	0.00	552.88	73.8
80.00	13.65	0.09	11.07	0.00	552.78	74.0
81.00	13.55	0.09	11.04	0.00	552.26	73.9
82.00	13.36	0.09	11.07	0.00	551.48	73.8
83.00	13.26	0.10	11.12	0.00	552.14	74.0
84.00	13.05	0.10	11.20	0.00	552.32	73.9
85.00	12.95	0.10	11.27	0.00	553.48	74.1
86.00	12.76	0.11	11.30	0.00	553.56	74.0
87.00	12.56	0.11	11.32	0.00	554.89	74.1
88.00	12.42	0.12	11.37	0.00	555.32	74.1
89.00	12.25	0.12	11.35	0.00	555.20	74.1
90.00	12.16	0.12	11.37	0.00	554.99	73.9
91.00	11.96	0.12	11.37	0.00	555.48	74.2
92.00	11.86	0.12	11.37	0.00	554.85	74.2
93.00	11.67	0.12	11.34	0.00	555.38	73.5
94.00	11.55	0.12	11.39	0.00	555.80	73.4

95.00	11.36	0.13	11.40	0.00	556.50	73.3
96.00	11.26	0.13	11.42	0.00	557.63	73.3
97.00	11.06	0.12	11.47	0.00	559.86	72.8
98.00	10.85	0.14	11.52	0.00	561.38	72.7
99.00	10.66	0.13	11.67	0.00	562.84	72.6
100.00	10.56	0.13	11.78	0.00	566.26	72.9
101.00	10.46	0.14	11.88	0.00	568.11	73.2
102.00	10.27	0.14	11.98	0.00	570.63	73.2
103.00	10.17	0.15	12.13	0.00	575.77	73.6
104.00	9.96	0.17	12.33	0.00	579.24	73.1
105.00	9.76	0.18	12.52	0.00	586.05	73.8
106.00	9.66	0.20	12.75	0.00	590.33	74.1
107.00	9.47	0.20	13.15	0.00	594.41	74.4
108.00	9.26	0.21	13.18	0.00	594.36	74.8
109.00	9.16	0.21	12.99	0.00	595.14	74.7
110.00	8.96	0.20	13.05	0.00	594.97	74.8
111.00	8.77	0.18	13.03	0.00	593.37	74.4
112.00	8.67	0.13	12.52	0.00	589.79	74.9
113.00	8.55	0.08	12.06	0.00	583.62	74.8
114.00	8.26	0.14	11.76	0.00	580.56	74.6
115.00	8.17	0.16	11.58	0.00	580.62	74.1
116.00	8.07	0.08	11.66	0.00	579.23	74.5
117.00	7.97	0.09	11.47	0.00	572.20	74.6
118.00	7.78	0.13	10.94	0.00	565.86	74.7
119.00	7.66	0.15	10.69	0.00	561.47	74.6
120.00	7.56	0.15	10.64	0.00	559.53	74.8
121.00	7.47	0.17	10.69	0.00	557.88	74.9
122.00	7.29	0.18	10.74	0.00	555.51	75.0
123.00	7.18	0.19	10.81	0.00	555.20	74.8
124.00	7.08	0.21	10.89	0.00	554.19	74.1
125.00	6.96	0.20	10.96	0.00	553.62	74.4
126.00	6.86	0.21	10.87	0.00	549.92	74.2
127.00	6.67	0.20	10.56	0.00	543.48	74.8
128.00	6.57	0.14	9.93	0.00	542.08	74.6
129.00	6.53	0.07	9.69	0.00	537.16	74.6
130.00	6.47	0.06	9.39	0.00	531.38	74.8
131.00	6.38	0.07	9.14	0.00	525.03	74.2
132.00	6.28	0.07	8.90	0.00	518.57	74.4

133.00	6.16	0.08	8.37	0.00	510.20	73.8
134.00	6.16	0.09	7.96	0.00	503.65	73.9
135.00	6.07	0.09	7.82	0.00	499.77	74.2
136.00	6.07	0.09	7.81	0.00	497.34	74.3
137.00	5.97	0.09	7.82	0.00	495.58	74.2
138.00	5.87	0.09	7.88	0.00	494.32	74.2
139.00	5.78	0.09	7.94	0.00	491.94	74.3
140.00	5.77	0.09	7.97	0.00	489.19	74.6
141.00	5.68	0.10	7.73	0.00	483.16	74.2
142.00	5.68	0.13	7.26	0.00	473.82	74.8
143.00	5.68	0.16	6.84	0.00	467.10	74.3
144.00	5.58	0.19	6.61	0.00	460.28	74.6
145.00	5.58	0.21	6.53	0.00	455.14	74.5
146.00	5.58	0.22	6.43	0.00	450.73	74.3
147.00	5.48	0.23	6.38	0.00	445.84	74.4
148.00	5.48	0.23	6.20	0.00	440.33	74.2
149.00	5.48	0.25	6.14	0.00	435.77	74.2
150.00	5.36	0.25	6.10	0.00	431.89	74.1
151.00	5.37	0.28	6.01	0.00	427.12	74.0
152.00	5.36	0.29	5.97	0.00	424.34	73.6
153.00	5.27	0.30	5.94	0.00	420.30	73.5
154.00	5.27	0.31	5.94	0.00	416.59	73.4
155.00	5.27	0.33	5.91	0.00	413.24	73.5
156.00	5.17	0.33	5.88	0.00	409.87	73.3
157.00	5.17	0.36	5.85	0.00	406.58	73.9
158.00	5.17	0.38	5.83	0.00	403.73	73.7
159.00	5.07	0.40	5.79	0.00	400.17	74.0
160.00	5.07	0.42	5.78	0.00	396.78	74.1
161.00	5.07	0.44	5.78	0.00	394.35	74.0
162.00	5.07	0.46	5.75	0.00	391.52	73.5
163.00	4.97	0.47	5.73	0.00	388.01	73.7
164.00	4.97	0.49	5.72	0.00	386.17	73.5
165.00	4.97	0.50	5.68	0.00	383.31	73.2
166.00	4.97	0.50	5.65	0.00	380.94	73.2
167.00	4.97	0.50	5.63	0.00	379.71	73.2
168.00	4.88	0.51	5.63	0.00	377.53	73.6
169.00	4.88	0.53	5.65	0.00	374.74	73.5
170.00	4.81	0.57	5.63	0.00	372.50	73.2

171.00	4.78	0.57	5.65	0.00	371.36	73.2
172.00	4.78	0.56	5.65	0.00	370.03	73.1
173.00	4.78	0.56	5.65	0.00	368.62	73.3
174.00	4.68	0.56	5.65	0.00	366.51	73.1
175.00	4.68	0.56	5.63	0.00	364.86	73.3
176.00	4.68	0.58	5.62	0.00	363.16	73.4
177.00	4.68	0.60	5.59	0.00	362.02	73.4
178.00	4.68	0.65	5.57	0.00	360.01	73.5
179.00	4.56	0.66	5.55	0.00	358.79	73.8
180.00	4.56	0.66	5.50	0.00	356.87	73.7
181.00	4.47	0.66	5.49	0.00	356.15	73.4
182.00	4.47	0.64	5.50	0.00	354.38	73.7
183.00	4.47	0.66	5.49	0.00	352.46	73.3
184.00	4.47	0.64	5.47	0.00	350.98	73.6
185.00	4.37	0.62	5.49	0.00	350.11	73.7
186.00	4.37	0.61	5.50	0.00	349.11	73.8
187.00	4.37	0.60	5.49	0.00	347.92	73.7
188.00	4.37	0.60	5.50	0.00	347.27	73.4
189.00	4.27	0.60	5.50	0.00	345.63	73.5
190.00	4.27	0.63	5.50	0.00	345.32	73.5
191.00	4.27	0.64	5.50	0.00	344.71	73.5
192.00	4.18	0.64	5.50	0.00	343.73	73.5
193.00	4.18	0.64	5.49	0.00	343.46	73.6
194.00	4.17	0.64	5.48	0.00	342.75	73.6
195.00	4.18	0.65	5.48	0.00	341.30	73.4
196.00	4.18	0.65	5.47	0.00	341.13	73.9
197.00	4.08	0.65	5.45	0.00	340.10	73.6
198.00	4.08	0.65	5.47	0.00	338.73	73.7
199.00	4.08	0.65	5.45	0.00	338.12	73.3
200.00	3.98	0.66	5.45	0.00	337.53	73.4
201.00	3.98	0.67	5.45	0.00	336.29	73.4
202.00	3.98	0.65	5.40	0.00	335.26	73.6
203.00	3.93	0.65	5.40	0.00	334.61	73.5
204.00	3.88	0.66	5.40	0.00	333.83	73.5
205.00	3.88	0.67	5.42	0.00	333.30	73.4
206.00	3.88	0.67	5.45	0.00	332.63	73.5
207.00	3.88	0.68	5.42	0.00	332.09	73.5
208.00	3.88	0.69	5.42	0.00	331.71	73.5

209.00	3.77	0.69	5.40	0.00	331.67	73.4
210.00	3.77	0.69	5.40	0.00	330.06	73.6
211.00	3.77	0.70	5.39	0.00	329.94	73.7
212.00	3.77	0.71	5.38	0.00	330.21	73.4
213.00	3.67	0.71	5.37	0.00	329.46	73.3
214.00	3.67	0.72	5.35	0.00	328.24	73.2
215.00	3.67	0.72	5.37	0.00	328.54	73.0
216.00	3.57	0.70	5.37	0.00	328.08	73.2
217.00	3.67	0.69	5.38	0.00	327.16	73.2
218.00	3.57	0.69	5.39	0.00	326.74	73.2
219.00	3.57	0.69	5.37	0.00	325.20	73.2
220.00	3.48	0.57	4.88	0.00	323.29	73.3
221.00	3.57	0.60	4.80	0.00	321.25	73.4
222.00	3.47	0.67	4.71	0.00	319.59	73.6
223.00	3.48	0.67	4.70	0.00	317.65	73.4
224.00	3.48	0.66	4.71	0.00	316.42	73.6
225.00	3.47	0.65	4.70	0.00	314.85	73.3
226.00	3.47	0.65	4.68	0.00	313.68	73.4
227.00	3.38	0.64	4.67	0.00	312.51	73.1
228.00	3.38	0.65	4.70	0.00	311.64	73.4
229.00	3.38	0.65	4.68	0.00	310.24	73.7
230.00	3.28	0.64	4.68	0.00	310.06	73.7
231.00	3.38	0.64	4.68	0.00	308.30	73.5
232.00	3.28	0.64	4.69	0.00	307.75	73.3
233.00	3.28	0.65	4.72	0.00	307.08	73.3
234.00	3.28	0.65	4.70	0.00	305.89	73.3
235.00	3.28	0.64	4.69	0.00	305.54	73.4
236.00	3.18	0.63	4.67	0.00	304.78	73.4
237.00	3.18	0.64	4.70	0.00	304.46	73.5
238.00	3.18	0.65	4.70	0.00	303.83	73.6
239.00	3.18	0.65	4.73	0.00	303.17	73.8
240.00	3.18	0.65	4.73	0.00	303.27	73.6
241.00	3.07	0.65	4.76	0.00	302.14	73.6
242.00	3.07	0.64	4.73	0.00	301.94	73.4
243.00	3.07	0.64	4.72	0.00	301.08	73.4
244.00	2.97	0.65	4.75	0.00	300.32	73.4
245.00	3.07	0.65	4.77	0.00	299.95	73.4
246.00	2.97	0.65	4.78	0.00	298.96	73.6

247.00	2.97	0.61	4.57	0.00	297.89	73.3
248.00	2.97	0.61	4.55	0.00	297.34	73.4
249.00	2.97	0.61	4.54	0.00	296.92	73.3
250.00	2.97	0.60	4.54	0.00	296.23	73.2
251.00	2.90	0.61	4.70	0.00	296.21	73.4
252.00	2.95	0.60	4.68	0.00	295.48	73.6
253.00	2.97	0.60	4.69	0.00	294.92	73.7
254.00	2.87	0.59	4.67	0.00	294.59	73.2
255.00	2.87	0.58	4.67	0.00	293.68	73.2
256.00	2.77	0.58	4.65	0.00	293.74	73.3
257.00	2.87	0.57	4.64	0.00	293.58	73.4
258.00	2.78	0.57	4.63	0.00	293.01	73.3
259.00	2.77	0.56	4.65	0.00	292.44	73.3
260.00	2.77	0.57	4.67	0.00	292.23	73.6
261.00	2.77	0.57	4.67	0.00	291.52	73.7
262.00	2.68	0.59	4.63	0.00	290.79	74.0
263.00	2.68	0.61	4.60	0.00	290.00	74.1
264.00	2.61	0.59	4.62	0.00	289.17	74.4
265.00	2.68	0.59	4.62	0.00	288.44	74.6
266.00	2.68	0.57	4.60	0.00	287.90	74.6
267.00	2.58	0.56	4.57	0.00	287.19	74.8
268.00	2.58	0.56	4.59	0.00	286.73	74.9
269.00	2.58	0.55	4.57	0.00	286.17	74.8
270.00	2.58	0.55	4.57	0.00	285.91	75.1
271.00	2.58	0.54	4.57	0.00	284.93	75.2
272.00	2.58	0.54	4.57	0.00	284.63	74.9
273.00	2.48	0.54	4.56	0.00	284.49	75.2
274.00	2.58	0.54	4.55	0.00	284.11	75.4
275.00	2.48	0.54	4.55	0.00	283.59	75.6
276.00	2.48	0.54	4.55	0.00	283.50	75.9
277.00	2.39	0.53	4.55	0.00	283.10	75.7
278.00	2.39	0.53	4.55	0.00	282.04	75.9
279.00	2.39	0.53	4.57	0.00	282.19	75.8
280.00	2.39	0.53	4.55	0.00	282.17	75.9
281.00	2.39	0.53	4.56	0.00	281.77	75.7
282.00	2.39	0.54	4.57	0.00	281.23	76.0
283.00	2.27	0.53	4.56	0.00	280.88	76.1
284.00	2.39	0.53	4.54	0.00	280.81	76.4

285.00	2.27	0.53	4.54	0.00	280.51	76.4
286.00	2.27	0.53	4.55	0.00	279.89	76.5
287.00	2.27	0.54	4.55	0.00	279.79	76.5
288.00	2.17	0.54	4.56	0.00	279.83	76.6
289.00	2.17	0.54	4.56	0.00	279.55	76.7
290.00	2.17	0.53	4.52	0.00	278.39	76.6
291.00	2.17	0.54	4.49	0.00	278.82	76.8
292.00	2.17	0.54	4.48	0.00	278.85	76.6
293.00	2.17	0.54	4.46	0.00	279.22	76.6
294.00	2.08	0.54	4.45	0.00	279.43	76.6
295.00	2.08	0.54	4.45	0.00	279.27	76.5
296.00	2.08	0.55	4.44	0.00	279.54	76.4
297.00	1.98	0.54	4.42	0.00	278.87	76.4
298.00	1.98	0.54	4.39	0.00	278.60	77.0
299.00	1.99	0.53	4.38	0.00	278.00	76.9
300.00	1.98	0.54	4.39	0.00	277.32	77.3
301.00	1.98	0.54	4.39	0.00	276.86	77.2
302.00	1.98	0.53	4.38	0.00	276.38	77.2
303.00	1.98	0.53	4.38	0.00	275.52	77.4
304.00	1.98	0.53	4.35	0.00	274.96	77.4
305.00	1.88	0.52	4.31	0.00	274.71	77.4
306.00	1.88	0.52	4.29	0.00	274.21	77.2
307.00	1.88	0.51	4.29	0.00	273.69	77.3
308.00	1.78	0.52	4.32	0.00	273.25	77.5
309.00	1.88	0.51	4.30	0.00	273.27	77.1
310.00	1.78	0.51	4.29	0.00	273.32	77.3
311.00	1.78	0.52	4.27	0.00	273.40	77.2
312.00	1.78	0.52	4.29	0.00	273.92	77.1
313.00	1.78	0.52	4.39	0.00	273.98	77.2
314.00	1.78	0.52	4.38	0.00	274.21	77.6
315.00	1.78	0.53	4.38	0.00	273.89	76.9
316.00	1.78	0.53	4.39	0.00	274.28	76.6
317.00	1.69	0.54	4.41	0.00	274.47	76.7
318.00	1.69	0.54	4.42	0.00	274.32	77.2
319.00	1.69	0.55	4.42	0.00	274.20	77.2
320.00	1.69	0.55	4.40	0.00	273.35	77.5
321.00	1.59	0.55	4.48	0.00	272.83	77.6
322.00	1.69	0.55	4.50	0.00	272.45	77.6

323.00	1.59	0.54	4.46	0.00	271.97	77.7
324.00	1.59	0.54	4.44	0.00	271.81	77.6
325.00	1.49	0.54	4.44	0.00	271.20	77.6
326.00	1.59	0.53	4.43	0.00	270.92	77.8
327.00	1.47	0.54	4.46	0.00	270.86	77.7
328.00	1.47	0.54	4.46	0.00	271.05	78.0
329.00	1.47	0.53	4.48	0.00	271.25	77.6
330.00	1.47	0.55	4.56	0.00	271.76	78.0
331.00	1.47	0.56	4.59	0.00	272.06	77.9
332.00	1.47	0.55	4.55	0.00	272.20	77.8
333.00	1.47	0.56	4.57	0.00	272.21	77.7
334.00	1.47	0.56	4.54	0.00	272.84	77.3
335.00	1.38	0.56	4.50	0.00	272.86	77.1
336.00	1.38	0.56	4.47	0.00	272.91	76.9
337.00	1.38	0.56	4.47	0.00	273.28	77.5
338.00	1.38	0.55	4.49	0.00	273.15	77.9
339.00	1.28	0.55	4.44	0.00	272.88	77.5
340.00	1.28	0.56	4.49	0.00	272.69	78.0
341.00	1.28	0.57	4.54	0.00	271.92	78.1
342.00	1.28	0.58	4.59	0.00	271.90	78.3
343.00	1.26	0.59	4.60	0.00	271.97	78.3
344.00	1.28	0.59	4.59	0.00	271.55	77.7
345.00	1.18	0.60	4.60	0.00	271.81	77.8
346.00	1.18	0.60	4.60	0.00	272.05	77.7
347.00	1.17	0.60	4.59	0.00	271.56	77.8
348.00	1.18	0.60	4.59	0.00	272.27	78.0
349.00	1.08	0.61	4.59	0.00	272.47	77.9
350.00	1.08	0.61	4.58	0.00	272.06	77.9
351.00	1.08	0.77	4.17	0.00	271.99	77.3
352.00	1.08	0.71	4.15	0.00	272.29	76.6
353.00	1.08	0.66	4.19	0.00	272.06	77.0
354.00	0.99	0.63	4.20	0.00	271.77	76.7
355.00	1.08	0.61	4.19	0.00	271.57	76.6
356.00	0.99	0.60	4.19	0.00	271.65	76.6
357.00	0.99	0.59	4.19	0.00	271.41	76.8
358.00	0.99	0.58	4.19	0.00	271.34	76.8
359.00	0.99	0.59	4.20	0.00	270.76	77.3
360.00	0.89	0.58	4.21	0.00	269.72	77.4

361.00	0.89	0.59	4.23	0.00	269.47	77.7
362.00	0.89	0.58	4.24	0.00	268.78	77.8
363.00	0.89	0.58	4.24	0.00	267.90	78.1
364.00	0.89	0.58	4.18	0.00	267.18	78.3
365.00	0.89	0.58	4.17	0.00	266.92	78.2
366.00	0.79	0.58	4.17	0.00	266.29	78.3
367.00	0.79	0.58	4.17	0.00	266.36	78.5
368.00	0.79	0.58	4.18	0.00	266.44	78.6
369.00	0.79	0.57	4.18	0.00	266.52	78.6
370.00	0.70	0.57	4.15	0.00	266.68	78.4
371.00	0.77	0.58	4.11	0.00	266.21	78.3
372.00	0.67	0.59	4.07	0.00	265.86	78.4
373.00	0.68	0.59	4.07	0.00	265.79	78.1
374.00	0.68	0.58	4.06	0.00	265.33	78.4
375.00	0.68	0.58	4.05	0.00	265.21	78.6
376.00	0.58	0.57	3.97	0.00	264.69	78.7
377.00	0.68	0.56	3.93	0.00	264.25	78.7
378.00	0.58	0.56	3.91	0.00	263.60	78.3
379.00	0.58	0.56	3.92	0.00	263.28	78.1
380.00	0.58	0.56	3.91	0.00	263.08	78.0
381.00	0.58	0.56	3.90	0.00	262.44	78.0
382.00	0.58	0.55	3.88	0.00	262.47	77.4
383.00	0.48	0.56	3.86	0.00	262.10	77.6
384.00	0.58	0.56	3.83	0.00	261.60	77.1
385.00	0.48	0.56	3.83	0.00	261.17	77.0
386.00	0.48	0.56	3.82	0.00	260.53	77.5
387.00	0.48	0.58	3.86	0.00	260.10	77.6
388.00	0.48	0.61	3.88	0.00	259.25	77.7
389.00	0.48	0.60	3.89	0.00	258.10	77.9
390.00	0.48	0.60	3.88	0.00	257.46	78.0
391.00	0.38	0.59	3.87	0.00	256.99	78.3
392.00	0.48	0.59	3.90	0.00	256.58	78.4
393.00	0.38	0.58	3.89	0.00	255.71	78.5
394.00	0.38	0.60	3.89	0.00	255.77	78.7
395.00	0.38	0.60	3.88	0.00	256.08	78.6
396.00	0.38	0.59	3.87	0.00	255.90	78.6
397.00	0.38	0.58	3.86	0.00	255.94	78.6
398.00	0.38	0.57	3.84	0.00	255.72	78.5

399.00	0.29	0.56	3.81	0.00	255.59	78.2
400.00	0.29	0.57	3.81	0.00	255.23	78.3
401.00	0.29	0.57	3.79	0.00	254.99	78.2
402.00	0.29	0.56	3.78	0.00	255.00	78.2
403.00	0.29	0.56	3.78	0.00	254.68	78.1
404.00	0.25	0.56	3.78	0.00	254.14	78.0
405.00	0.19	0.56	3.77	0.00	254.14	78.1
406.00	0.19	0.56	3.78	0.00	253.61	77.9
407.00	0.19	0.55	3.77	0.00	253.55	77.9
408.00	0.19	0.55	3.77	0.00	253.13	78.0
409.00	0.19	0.55	3.76	0.00	252.78	77.8
410.00	0.19	0.55	3.74	0.00	252.66	77.8
411.00	0.19	0.55	3.75	0.00	252.18	77.8
412.00	0.09	0.54	3.73	0.00	252.19	77.8
413.00	0.09	0.54	3.73	0.00	251.74	77.8
414.00	0.09	0.53	3.71	0.00	251.64	77.7
415.00	0.09	0.53	3.72	0.00	251.43	77.7
416.00	0.09	0.53	3.71	0.00	250.99	78.2
417.00	0.09	0.53	3.70	0.00	250.52	78.4
418.00	0.00	0.53	3.70	0.00	249.96	78.8
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
0.00	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
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VERSION:	2.4		
Manufacturer:	JOTUL	Appliance Type:	Non-Cat
Model:	F45 V2		
		Temp. Units	F
Run:	1	Weight Units	lb
Project #:	PI 20194		
Test Duration (min):	350.00		

		Fuel Data		
			Oak	
Wood Moisture (% wet):	16.78	HHV	20,207	kJ/kg
Load Weight (lb wet):	21.47	%C	50	
Burn Rate (dry kg/h):	1.39	%H	7	
Total Particulate Emissions:	5.92 g	%O	44	
		%Ash	0	

	Averages	0.16	4.64	#DIV/0!	340.43	69.25
					Temp. (F)	
Elapsed	Fuel Weight	Flue Gas Composition (%)			Flue	Room
Time (min)	Remaining (lb)	CO	CO_2	O_2	Gas	Temp
0.00	17.14	0.23	8.57		597.85	70.07
1.00	20.97	0.18	6.63		609.47	69.98
2.00	20.66	0.29	8.48		668.49	69.87
3.00	20.37	0.18	11.17		718.60	70.03
4.00	19.99	0.22	13.60		764.33	69.79
5.00	19.66	0.43	15.18		784.26	70.07
6.00	19.26	0.51	15.76		791.08	70.39
7.00	18.97	0.48	15.49		792.68	70.72
8.00	18.58	0.48	15.36		792.64	70.83
9.00	18.17	0.45	15.07		790.95	71.07
10.00	17.88	0.42	14.91		792.40	71.27
11.00	17.57	0.39	14.88		795.43	71.31
12.00	17.18	0.39	14.85		795.41	71.64
13.00	16.87	0.44	14.72		795.09	71.58
14.00	16.58	0.45	14.67		788.93	71.62
15.00	16.28	0.40	14.22		788.89	71.67
16.00	15.87	0.38	14.19		792.65	71.97
17.00	15.59	0.39	14.37		798.69	72.28
18.00	15.17	0.41	14.59		801.29	72.23

19.00	14.98	0.41	14.57	810.58	71.77
20.00	14.58	0.40	14.73	822.65	72.43
21.00	14.19	0.42	15.06	824.22	72.82
22.00	13.90	0.41	15.01	828.33	72.65
23.00	13.59	0.39	14.88	830.74	72.68
24.00	13.29	0.40	15.03	836.71	72.43
25.00	12.98	0.41	15.09	840.01	72.73
26.00	12.59	0.41	15.16	844.16	72.43
27.00	12.28	0.40	15.27	848.68	72.66
28.00	11.89	0.39	15.35	852.66	73.05
29.00	11.49	0.39	15.38	857.95	73.02
30.00	11.19	0.41	15.49	861.74	73.03
31.00	10.90	0.42	15.49	856.18	73.48
32.00	10.59	0.41	15.25	850.95	73.33
33.00	10.24	0.39	15.01	848.90	73.42
34.00	10.01	0.38	14.78	841.76	73.87
35.00	9.69	0.38	14.67	837.70	74.04
36.00	9.31	0.37	14.55	834.28	74.44
37.00	8.99	0.36	14.49	833.38	74.38
38.00	8.70	0.35	14.48	832.90	73.98
39.00	8.51	0.36	14.45	835.30	73.79
40.00	8.19	0.38	14.52	835.99	74.22
41.00	7.91	0.37	14.62	836.50	73.83
42.00	7.50	0.38	14.57	837.30	74.14
43.00	7.30	0.37	14.55	838.94	74.53
44.00	7.01	0.39	14.53	839.98	73.19
45.00	6.70	0.38	14.58	839.27	74.00
46.00	6.51	0.37	14.50	840.07	73.87
47.00	6.12	0.37	14.45	839.06	73.85
48.00	5.90	0.37	14.44	836.61	74.34
49.00	5.61	0.36	14.34	828.75	74.63
50.00	5.42	0.35	14.09	819.05	74.55
51.00	5.10	0.34	13.88	816.67	74.08
52.00	4.91	0.34	13.74	810.34	74.61
53.00	4.62	0.32	13.71	807.12	73.99
54.00	4.40	0.32	13.61	803.42	73.97
55.00	4.11	0.31	13.49	795.81	74.66
56.00	3.92	0.29	13.35	789.79	74.56

57.00	3.70	0.27	13.18	777.40	74.78
58.00	3.51	0.18	12.95	766.22	74.40
59.00	3.31	0.16	12.55	752.02	74.93
60.00	3.12	0.15	12.09	734.60	74.55
61.00	2.91	0.12	11.30	720.42	75.05
62.00	2.90	0.07	10.47	706.28	74.74
63.00	2.71	0.07	10.08	694.48	74.43
64.00	2.52	0.08	9.79	687.36	74.19
65.00	2.42	0.10	9.67	681.95	74.67
66.00	2.32	0.10	9.61	678.76	75.05
67.00	2.11	0.09	9.72	676.06	74.76
68.00	2.01	0.10	9.69	674.21	74.89
69.00	1.82	0.10	9.75	673.16	75.08
70.00	1.72	0.09	9.84	671.27	75.01
71.00	1.62	0.07	9.93	671.49	74.73
72.00	1.40	0.08	10.12	667.57	74.56
73.00	1.31	0.07	9.94	665.72	74.43
74.00	1.11	0.06	9.96	666.03	74.99
75.00	1.02	0.05	9.99	664.05	74.60
76.00	0.92	0.05	9.86	658.65	74.83
77.00	0.82	0.05	9.58	653.21	74.76
78.00	0.72	0.05	9.31	646.37	74.68
79.00	0.61	0.05	8.99	637.60	74.67
80.00	0.51	0.09	8.65	629.65	74.56
81.00	0.41	0.12	8.33	621.74	74.26
82.00	0.41	0.15	8.11	613.90	74.66
83.00	0.31	0.21	8.02	607.80	74.79
84.00	0.22	0.23	7.91	600.74	74.34
85.00	0.12	0.28	7.74	597.42	74.56
86.00	0.02	0.28	7.62	594.13	74.20
87.00	0.02	0.33	7.51	589.87	73.95
88.00	-0.07	0.37	7.41	580.98	73.68
89.00	-0.19	0.39	7.00	572.95	73.68
90.00	-0.29	0.44	6.75	567.81	73.95
91.00	-0.29	0.45	6.68	563.31	74.03
92.00	-0.39	0.45	6.65	560.60	74.13
93.00	-0.48	0.45	6.70	558.21	74.07
94.00	-0.58	0.43	6.77	557.48	73.91

95.00	-0.58	0.39	6.90	555.91	73.63
96.00	-0.68	0.41	6.87	554.57	73.94
97.00	-0.68	0.39	6.95	554.38	74.03
98.00	-0.78	0.39	7.01	554.34	73.54
99.00	-0.87	0.39	7.03	552.90	73.87
100.00	-0.87	0.29	6.90	550.70	73.69
101.00	-0.99	0.31	6.80	546.52	73.72
102.00	-0.99	0.35	6.63	539.69	73.15
103.00	-1.09	0.37	6.34	534.74	73.59
104.00	-1.09	0.41	6.17	529.95	73.42
105.00	-1.19	0.45	6.11	526.82	72.77
106.00	-1.28	0.45	6.09	524.30	73.32
107.00	-1.28	0.46	6.07	521.67	73.26
108.00	-1.28	0.48	6.04	518.09	73.22
109.00	-1.38	0.49	6.04	514.68	73.71
110.00	-1.38	0.52	5.91	509.75	73.60
111.00	-1.48	0.54	5.73	505.22	73.76
112.00	-1.48	0.60	5.53	500.16	72.99
113.00	-1.48	0.66	5.43	494.46	73.96
114.00	-1.58	0.71	5.33	490.85	72.70
115.00	-1.58	0.74	5.28	487.19	73.40
116.00	-1.67	0.75	5.27	482.87	73.77
117.00	-1.67	0.76	5.21	480.44	73.88
118.00	-1.79	0.74	5.09	476.88	73.77
119.00	-1.79	0.76	5.04	474.69	73.03
120.00	-1.79	0.78	5.04	471.91	73.09
121.00	-1.89	0.78	5.01	468.83	73.05
122.00	-1.89	0.80	5.00	465.26	73.30
123.00	-1.89	0.68	4.57	460.99	73.67
124.00	-1.89	0.70	4.48	457.48	73.81
125.00	-1.99	0.72	4.34	453.31	73.89
126.00	-1.99	0.74	4.31	450.09	73.69
127.00	-1.99	0.74	4.29	435.23	73.64
128.00	-2.08	0.53	4.20	446.99	73.22
129.00	-5.57	0.00	-0.07	67.63	65.87
130.00	-5.57	0.00	-0.07	67.63	65.87
131.00	-5.57	0.00	-0.07	67.63	65.87
132.00	-5.57	0.00	-0.07	67.63	65.87

133.00	-5.57	0.00	-0.07	67.63	65.87
134.00	-5.57	0.00	-0.07	67.63	65.87
135.00	-5.57	0.00	-0.07	67.63	65.87
136.00	-5.57	0.00	-0.07	67.63	65.87
137.00	-5.57	0.00	-0.07	67.63	65.87
138.00	-5.57	0.00	-0.07	67.63	65.87
139.00	-5.57	0.00	-0.07	67.63	65.87
140.00	-5.57	0.00	-0.07	67.63	65.87
141.00	-5.57	0.00	-0.07	67.63	65.87
142.00	-5.57	0.00	-0.07	67.63	65.87
143.00	-5.57	0.00	-0.07	67.63	65.87
144.00	-5.57	0.00	-0.07	67.63	65.87
145.00	-5.57	0.00	-0.07	67.63	65.87
146.00	-5.57	0.00	-0.07	67.63	65.87
147.00	-5.57	0.00	-0.07	67.63	65.87
148.00	-5.57	0.00	-0.07	67.63	65.87
149.00	-5.57	0.00	-0.07	67.63	65.87
150.00	-5.57	0.00	-0.07	67.63	65.87
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152.00	-5.57	0.00	-0.07	67.63	65.87
153.00	-5.57	0.00	-0.07	67.63	65.87
154.00	-5.57	0.00	-0.07	67.63	65.87
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158.00	-5.57	0.00	-0.07	67.63	65.87
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161.00	-5.57	0.00	-0.07	67.63	65.87
162.00	-5.57	0.00	-0.07	67.63	65.87
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164.00	-5.57	0.00	-0.07	67.63	65.87
165.00	-5.57	0.00	-0.07	67.63	65.87
166.00	-5.57	0.00	-0.07	67.63	65.87
167.00	-5.57	0.00	-0.07	67.63	65.87
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169.00	-5.57	0.00	-0.07	67.63	65.87
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174.00	-5.57	0.00	-0.07	67.63	65.87
175.00	-5.57	0.00	-0.07	67.63	65.87
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321.00	-5.57	0.00	-0.07	67.63	65.87
322.00	-5.57	0.00	-0.07	67.63	65.87

323.00	-5.57	0.00	-0.07	67.63	65.87
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325.00	-5.57	0.00	-0.07	67.63	65.87
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327.00	-5.57	0.00	-0.07	67.63	65.87
328.00	-5.57	0.00	-0.07	67.63	65.87
329.00	-5.57	0.00	-0.07	67.63	65.87
330.00	-5.57	0.00	-0.07	67.63	65.87
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332.00	-5.57	0.00	-0.07	67.63	65.87
333.00	-5.57	0.00	-0.07	67.63	65.87
334.00	-5.57	0.00	-0.07	67.63	65.87
335.00	-5.57	0.00	-0.07	67.63	65.87
336.00	-5.57	0.00	-0.07	67.63	65.87
337.00	-5.57	0.00	-0.07	67.63	65.87
338.00	-5.57	0.00	-0.07	67.63	65.87
339.00	-5.57	0.00	-0.07	67.63	65.87
340.00	-5.57	0.00	-0.07	67.63	65.87
341.00	-5.57	0.00	-0.07	67.63	65.87
342.00	-5.57	0.00	-0.07	67.63	65.87
343.00	-5.57	0.00	-0.07	67.63	65.87
344.00	-5.57	0.00	-0.07	67.63	65.87
345.00	-5.57	0.00	-0.07	67.63	65.87
346.00	-5.57	0.00	-0.07	67.63	65.87
347.00	-5.57	0.00	-0.07	67.63	65.87
348.00	-5.57	0.00	-0.07	67.63	65.87
349.00	-5.57	0.00	-0.07	67.63	65.87
350.00	-5.57	0.00	-0.07	67.63	65.87

Manufacturer: JOTUL
Model: F45 V2

Run: 1
Project #: PI 20194
Test Duration: 418 min

	HHV	LHV
Eff	68.54%	73.75%
Comb Eff	98.16%	98.16%
HT Eff	69.83%	75.13%
Output	61,835	kJ/h
Burn Rate	4.46	kg/h
Grams CO	168	g
Input	90,214	kJ/h
MC wet	16.78	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19.86
F_0
1.051

		Air Fuel Ratio (A/F)
Overall Heating Efficiency:	68.54%	Dry Molecular Weight (M_d)
Combustion Efficiency:	98.16%	Dry Moles Exhaust Gas (N_T):
Heat Transfer Efficiency:	69.83%	Air Fuel Ratio (A/F)

Heat Output:	58,657	Btu/h	61,835	kJ/h
Heat Input:	85,577	Btu/h	90,214	kJ/h
Burn Duration:	1.45	h		
Burn Rate:	9.84	lb/h	4.464	kg/h
Stack Temp:	760.8	Deg. F	404.9	Deg. C

30.32
297.85
8.52

Manufacturer: JOTUL
Model: F45 V2

Run: 1
Project #: PI 20194
Test Duration: 418 min

	HHV	LHV
Eff	69.56%	74.85%
Comb Eff	97.01%	97.01%
HT Eff	71.71%	77.16%
Output	20,682	kJ/h
Burn Rate	1.47	kg/h
Grams CO	488	g
Input	29,732	kJ/h
MC wet	16.57	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19.86
F_0
1.048

		Air Fuel Ratio (A/F)
Overall Heating Efficiency:	69.56%	Dry Molecular Weight (M_d)
Combustion Efficiency:	97.01%	Dry Moles Exhaust Gas (N_r):
Heat Transfer Efficiency:	71.71%	Air Fuel Ratio (A/F)

Heat Output:	19,619	Btu/h	20,682	kJ/h
Heat Input:	28,204	Btu/h	29,732	kJ/h
Burn Duration:	6.97	h		
Burn Rate:	3.24	lb/h	1.471	kg/h
Stack Temp:	380.5	Deg. F	193.6	Deg. C

29.60
512.79
14.67

Vérifications à faire sur les données du test

je veux le fault (

Les critères sont en rouge

Autres exigences

Homogénéité du tunnel	0.0220		<	0.014	fault
Tunnel flow rate	321.055297			Entre 90 et 110% du target	ok
Ratio débit tunnel/burn rate	59.30		>	50	ok
Diamètre tunnel minimum	15.4	in			

Exigences de la B415

8.3.1(B415) Test fuel density	#REF!	lbs/ft3		Between 23,7 and 40,6	NA
12.2 Collection hood	Feuille data			Voir exigences	Voir feuille
12.3 Draft dillution tunnel	Feuille data			à droite	Voir feuille
12.4 Particulate filter temperature	89.17	°F	<	Entre 65 et 90°F	ok
12.4 Particulate filter temperature	80.34	°F	>	80°F	ok
12.4 Particulate filter temperature	89.28	°F	<	90°F	ok
12.4 Particulate filter temperature	81.64	°F	>	80°F	ok
12.5 Particulate sample flow velocity	17.4839671	ft/sec	>	15.77	ok
			<	19.28	ok
12.5 Particulate sample flow velocity	18.2943709	ft/sec	>	15.70	ok
			<	19.19	ok
12.7 Proportional rate variation PR	89.4	%	>	90	fault
PR	106.6	%	<	110	ok
12.7 Proportional rate variation PR	95.5	%	>	90	ok
PR	104.5	%	<	110	ok
Nombre PR entre 90 et 110	254				
90% des PR	230.4	lectures		90% Between 90 and 110	ok
Nombre PR entre 90 et 110	836				
90% des PR	752.4	lectures		90% Between 90 and 110	ok
12.8 a) Difference between emissions	1.55%		<	7.50%	ok
12.8 a) Difference between emissions	2.29%		<	7.50%	ok
b) Difference between emissions factors	#REF!		<	0.5	#REF!
Émissions					#REF!
Tunnel temperature		°F		Between 59 and 125°F	fault

Exigences EPA

Vitesse d'échantillonage		Between 0,15 and 0,25		ok
Difference train 1 - train 2	1.55%		7.50%	ok

Project nu.	PI 20194
Date	30-04-2019
Technicien	dp

qui tourne au rouge

12.2
The collection hood shall entrain 100% of the flue gases during the entire test.
12.3

The dilution tunnel shall not impose a draft on the appliance greater than 1.25 Pa (0.005 in wc) when tested in accordance with Clause 10.3.2.

The particulate filter temperature shall not exceed 32 °C (90°F) during the run.
12.5

The particulate sample flow velocity during the test run shall be within 10% of the dilution tunnel flow velocity.

Note: An initial sample flow of 0.015 m3/min (0.53 ft3/min) is normally used.

12.6
The average of the five appliance surface temperature measurements at the locations specified in Clause 5.2.7 at the start of the test run and at the completion of the test run shall be within 70 °C (126°F).
12.7
The proportional rate variation, PR, determined in accordance with Clause 13.1, shall be between 80 and

120 for all values and between 90 and 110 for at least 90% of values.
12.8
Test results shall be considered unacceptable if the
average emission rate for the acceptable test run shall be reported and used to calculate the average emission rate specified in Clause 13.5.

EPA (method 5G-3)

If mean is larger than 7.5
If mean is less than applicable limit (4.1 for cat. 7.5 for non-cat)

Temps acquisition de données	Flue temp °F	Room temp °F	Tunnel dry bulb °F	Catalyst down °F	Catalyst center °F	Catalyst up °F	Mass flow 1 Reading L/min	DGM 1 in Inlet T °F	DGM 1 out Outlet T °F	Filter 1 Temp °F	massflow2 Reading L/min	DGM 2 in Inlet T °F	DGM 2 out Outlet T °F
	62.51	63.11	67.60	##############	##############	##############	0.00	63.21	63.24	62.60	0.00	63.29	63.27

Filter 2	scale	Tunnel Velocity	Flue draft	CO	CO2		Right	Back	bottom	Top	Left
Temp		Pressure	Pressure								
°F	lbs	in. Wc	in. Wc	%	%		°F	°F	°F	°F	°F
62.59	0.08	0.0733	0.00	0.00	0.00		63.06	63.05	63.19	62.92	62.88

Temps acquisition de données	Flue temp °F	Room temp °F	Tunnel dry bulb °F	Catalyst down °F	Catalyst center °F	Catalyst up °F	Mass flow 1 Reading dcV
	Flue	Room	Tunnel	catlist down	catalyst center	catalyst up	MFC 1
	62.51	63.11	67.60	##############	##############	##############	0.00
	62.59	63.20	69.48	##############	##############	##############	0.00
	62.63	63.32	71.65	##############	##############	##############	0.00
	62.67	63.37	73.41	##############	##############	##############	0.00
	62.77	63.50	74.73	##############	##############	##############	0.00
	62.81	63.60	75.60	##############	##############	##############	0.00
	62.81	63.69	76.64	##############	##############	##############	0.00
	62.88	63.82	77.47	##############	##############	##############	0.00
	62.94	64.12	78.24	##############	##############	##############	0.00
	63.06	64.24	78.58	##############	##############	##############	0.00
	63.16	64.26	73.06	##############	##############	##############	0.00
	63.26	64.33	79.58	##############	##############	##############	0.00
	63.36	64.47	80.01	##############	##############	##############	0.00
	63.47	64.56	78.39	##############	##############	##############	0.00
	63.58	64.62	81.43	##############	##############	##############	0.00
	63.71	64.69	82.17	##############	##############	##############	0.00
	63.87	64.96	82.46	##############	##############	##############	0.00
	64.05	65.02	82.91	##############	##############	##############	0.00
	64.27	64.94	83.07	##############	##############	##############	0.00
	64.47	65.19	83.64	##############	##############	##############	0.00
	64.58	65.28	83.96	##############	##############	##############	0.00
	64.75	65.28	84.29	##############	##############	##############	0.00
	64.88	65.18	84.61	##############	##############	##############	0.00
	65.06	65.49	84.95	##############	##############	##############	0.00
	65.21	65.46	85.38	##############	##############	##############	0.00
	65.41	65.57	85.57	##############	##############	##############	0.00
	65.58	65.68	86.10	##############	##############	##############	0.00
	65.82	65.76	86.06	##############	##############	##############	0.00
	66.01	65.60	86.49	##############	##############	##############	0.00
	66.19	65.76	84.43	##############	##############	##############	0.00
	66.50	65.99	82.38	##############	##############	##############	0.00
	66.82	65.92	80.66	##############	##############	##############	0.00

67.13	66.01	79.15	##############	##############	##############	0.00
67.46	65.84	77.97	##############	##############	##############	0.00
67.63	65.87	76.99	##############	##############	##############	0.00
67.61	65.82	76.08	##############	##############	##############	0.00
67.50	65.87	75.42	##############	##############	##############	0.00
67.24	65.83	74.79	##############	##############	##############	0.00
67.04	65.92	74.26	##############	##############	##############	0.00
66.76	65.84	73.72	##############	##############	##############	0.00
66.44	66.20	75.72	##############	##############	##############	0.00
66.74	66.03	78.09	##############	##############	##############	0.00
67.11	66.07	80.16	##############	##############	##############	0.00
67.43	65.69	81.46	##############	##############	##############	0.00
67.75	65.97	82.77	##############	##############	##############	0.00
67.98	66.03	83.72	##############	##############	##############	0.00
68.22	66.19	84.81	##############	##############	##############	0.00
68.43	66.39	85.36	##############	##############	##############	0.00
68.55	66.58	84.94	##############	##############	##############	0.00
68.71	66.53	82.80	##############	##############	##############	0.00
68.89	66.45	81.20	##############	##############	##############	0.00
69.08	66.59	79.65	##############	##############	##############	0.00
69.03	66.48	78.46	##############	##############	##############	0.00
68.82	66.45	77.45	##############	##############	##############	0.00
68.49	66.34	76.85	##############	##############	##############	0.00
68.09	66.41	76.07	##############	##############	##############	0.00
67.77	66.34	75.41	##############	##############	##############	0.00
67.76	66.39	74.94	##############	##############	##############	0.00
67.54	66.33	74.54	##############	##############	##############	0.00
67.33	66.39	74.25	##############	##############	##############	0.00
67.25	66.27	73.87	##############	##############	##############	0.00
67.20	66.36	73.63	##############	##############	##############	0.00
67.14	66.27	73.61	##############	##############	##############	0.00
67.04	66.33	73.22	##############	##############	##############	0.00
66.68	66.37	73.07	##############	##############	##############	0.00
69.19	66.27	72.78	##############	##############	##############	4.60
96.63	66.41	74.87	##############	##############	##############	3.51
103.28	66.54	74.13	##############	##############	##############	3.50
102.21	66.48	73.08	##############	##############	##############	3.50
95.74	66.38	73.09	##############	##############	##############	3.50

95.47	66.47	73.28	##############	##############	##############	3.51
101.62	66.47	72.95	##############	##############	##############	3.51
109.98	66.46	75.20	##############	##############	##############	3.50
121.61	66.69	77.64	##############	##############	##############	3.50
126.48	66.94	79.95	##############	##############	##############	3.51
124.67	66.99	81.85	##############	##############	##############	3.51
123.05	67.20	83.52	##############	##############	##############	3.51
121.64	67.27	84.47	##############	##############	##############	3.51
130.94	67.18	83.93	##############	##############	##############	3.50
182.31	67.33	82.96	##############	##############	##############	3.50
343.42	67.40	89.00	##############	##############	##############	3.50
478.84	67.19	96.68	##############	##############	##############	3.50
568.48	67.11	104.29	##############	##############	##############	3.51
680.42	66.91	116.07	##############	##############	##############	3.50
717.87	67.28	123.50	##############	##############	##############	3.50
688.32	67.30	124.62	##############	##############	##############	3.50
674.89	67.13	124.57	##############	##############	##############	3.50
739.56	67.32	130.83	##############	##############	##############	3.50
726.29	67.43	131.77	##############	##############	##############	3.50
706.51	67.56	130.53	##############	##############	##############	3.50
711.86	67.81	131.47	##############	##############	##############	3.50
710.81	67.85	131.22	##############	##############	##############	3.51
707.45	67.81	131.19	##############	##############	##############	3.50
707.53	67.65	130.94	##############	##############	##############	3.50
702.61	67.80	130.28	##############	##############	##############	3.51
697.50	67.85	129.92	##############	##############	##############	3.51
692.53	68.25	129.26	##############	##############	##############	3.50
692.80	68.33	130.88	##############	##############	##############	3.50
684.79	68.57	130.19	##############	##############	##############	3.50
662.12	68.87	129.16	##############	##############	##############	3.51
647.12	69.17	127.52	##############	##############	##############	3.50
632.26	69.06	126.90	##############	##############	##############	3.50
615.82	69.12	125.81	##############	##############	##############	3.50
609.56	69.49	125.49	##############	##############	##############	3.50
610.25	69.52	125.93	##############	##############	##############	3.50
597.85	70.07	169.60	##############	##############	##############	3.50
609.47	69.98	141.52	##############	##############	##############	3.51
668.49	69.87	138.65	##############	##############	##############	3.50

718.60	70.03	141.48	##############	##############	##############	3.50
764.33	69.79	146.48	##############	##############	##############	3.50
784.26	70.07	148.84	##############	##############	##############	3.51
791.08	70.39	151.41	##############	##############	##############	3.51
792.68	70.72	152.23	##############	##############	##############	3.50
792.64	70.83	152.83	##############	##############	##############	3.50
790.95	71.07	153.49	##############	##############	##############	3.50
792.40	71.27	153.58	##############	##############	##############	3.51
795.43	71.31	154.46	##############	##############	##############	3.51
795.41	71.64	154.52	##############	##############	##############	3.51
795.09	71.58	154.62	##############	##############	##############	3.51
788.93	71.62	155.54	##############	##############	##############	3.50
788.89	71.67	154.66	##############	##############	##############	3.51
792.65	71.97	155.79	##############	##############	##############	3.52
798.69	72.28	156.63	##############	##############	##############	3.51
801.29	72.23	156.89	##############	##############	##############	3.51
810.58	71.77	157.83	##############	##############	##############	3.51
822.65	72.43	159.78	##############	##############	##############	3.52
824.22	72.82	158.82	##############	##############	##############	3.52
828.33	72.65	158.54	##############	##############	##############	3.52
830.74	72.68	158.54	##############	##############	##############	3.52
836.71	72.43	158.94	##############	##############	##############	3.52
840.01	72.73	158.78	##############	##############	##############	3.52
844.16	72.43	158.57	##############	##############	##############	3.52
848.68	72.66	159.65	##############	##############	##############	3.52
852.66	73.05	159.20	##############	##############	##############	3.52
857.95	73.02	159.98	##############	##############	##############	3.52
861.74	73.03	161.26	##############	##############	##############	3.52
856.18	73.48	161.70	##############	##############	##############	3.52
850.95	73.33	161.52	##############	##############	##############	3.52
848.90	73.42	161.69	##############	##############	##############	3.52
841.76	73.87	161.50	##############	##############	##############	3.52
837.70	74.04	161.80	##############	##############	##############	3.53
834.28	74.44	161.20	##############	##############	##############	3.53
833.38	74.38	162.05	##############	##############	##############	3.52
832.90	73.98	161.38	##############	##############	##############	3.53
835.30	73.79	159.85	##############	##############	##############	3.53
835.99	74.22	160.23	##############	##############	##############	3.53

836.50	73.83	158.34	##############	##############	##############	3.53
837.30	74.14	157.45	##############	##############	##############	3.53
838.94	74.53	156.73	##############	##############	##############	3.53
839.98	73.19	158.12	##############	##############	##############	3.53
839.27	74.00	156.90	##############	##############	##############	3.53
840.07	73.87	156.84	##############	##############	##############	3.53
839.06	73.85	157.00	##############	##############	##############	3.53
836.61	74.34	156.14	##############	##############	##############	3.53
828.75	74.63	155.86	##############	##############	##############	3.53
819.05	74.55	154.74	##############	##############	##############	3.53
816.67	74.08	152.83	##############	##############	##############	3.53
810.34	74.61	152.63	##############	##############	##############	3.53
807.12	73.99	151.27	##############	##############	##############	3.53
803.42	73.97	150.64	##############	##############	##############	3.54
795.81	74.66	150.73	##############	##############	##############	3.53
789.79	74.56	149.77	##############	##############	##############	3.54
777.40	74.78	146.83	##############	##############	##############	3.54
766.22	74.40	146.71	##############	##############	##############	3.53
752.02	74.93	146.81	##############	##############	##############	3.53
734.60	74.55	145.06	##############	##############	##############	3.53
720.42	75.05	144.16	##############	##############	##############	3.53
706.28	74.74	143.57	##############	##############	##############	3.53
694.48	74.43	141.76	##############	##############	##############	3.54
687.36	74.19	139.51	##############	##############	##############	3.54
681.95	74.67	137.93	##############	##############	##############	3.54
678.76	75.05	136.77	##############	##############	##############	3.54
676.06	74.76	135.55	##############	##############	##############	3.54
674.21	74.89	135.25	##############	##############	##############	3.54
673.16	75.08	134.33	##############	##############	##############	3.54
671.27	75.01	132.50	##############	##############	##############	3.54
671.49	74.73	133.11	##############	##############	##############	3.54
667.57	74.56	132.28	##############	##############	##############	3.54
665.72	74.43	132.26	##############	##############	##############	3.54
666.03	74.99	131.10	##############	##############	##############	3.54
664.05	74.60	131.90	##############	##############	##############	3.54
658.65	74.83	131.27	##############	##############	##############	3.54
653.21	74.76	130.59	##############	##############	##############	3.54
646.37	74.68	129.32	##############	##############	##############	3.54

637.60	74.67	127.17	##############	##############	##############	3.54
629.65	74.56	126.26	##############	##############	##############	3.54
621.74	74.26	125.95	##############	##############	##############	3.54
613.90	74.66	125.70	##############	##############	##############	3.54
607.80	74.79	124.96	##############	##############	##############	3.54
600.74	74.34	123.58	##############	##############	##############	3.55
597.42	74.56	122.66	##############	##############	##############	3.54
594.13	74.20	122.10	##############	##############	##############	3.54
589.87	73.95	121.44	##############	##############	##############	3.54
580.98	73.68	120.72	##############	##############	##############	3.54
572.95	73.68	120.32	##############	##############	##############	0.00
567.81	73.95	120.16	##############	##############	##############	1.88
563.31	74.03	119.86	##############	##############	##############	0.00
560.60	74.13	119.72	##############	##############	##############	0.00
558.21	74.07	119.09	##############	##############	##############	0.00
557.48	73.91	118.45	##############	##############	##############	0.00
555.91	73.63	116.56	##############	##############	##############	0.00
554.57	73.94	117.87	##############	##############	##############	0.24
554.38	74.03	117.85	##############	##############	##############	0.00
554.34	73.54	116.94	##############	##############	##############	0.00
552.90	73.87	116.85	##############	##############	##############	0.00
550.70	73.69	115.69	##############	##############	##############	0.00
546.52	73.72	116.54	##############	##############	##############	0.00
539.69	73.15	115.49	##############	##############	##############	0.00
534.74	73.59	114.51	##############	##############	##############	0.00
529.95	73.42	114.42	##############	##############	##############	0.00
526.82	72.77	114.18	##############	##############	##############	0.00
524.30	73.32	112.91	##############	##############	##############	0.00
521.67	73.26	111.93	##############	##############	##############	0.00
518.09	73.22	112.45	##############	##############	##############	0.00
514.68	73.71	114.01	##############	##############	##############	0.00
509.75	73.60	115.04	##############	##############	##############	0.00
505.22	73.76	115.64	##############	##############	##############	0.00
500.16	72.99	115.64	##############	##############	##############	0.00
494.46	73.96	114.76	##############	##############	##############	0.00
490.85	72.70	114.34	##############	##############	##############	0.00
487.19	73.40	113.62	##############	##############	##############	0.00
482.87	73.77	112.53	##############	##############	##############	0.00

480.44	73.88	111.09	##############	##############	##############	0.00
476.88	73.77	110.41	##############	##############	##############	0.00
474.69	73.03	109.89	##############	##############	##############	0.00
471.91	73.09	109.28	##############	##############	##############	0.00
468.83	73.05	109.51	##############	##############	##############	0.00
465.26	73.30	109.01	##############	##############	##############	0.00
460.99	73.67	108.85	##############	##############	##############	0.00
457.48	73.81	108.05	##############	##############	##############	0.00
453.31	73.89	107.32	##############	##############	##############	0.00
450.09	73.69	106.99	##############	##############	##############	0.00
435.23	73.64	111.70	##############	##############	##############	0.00
446.99	73.22	108.17	##############	##############	##############	0.00
448.70	73.38	107.61	##############	##############	##############	0.00
448.11	73.21	106.64	##############	##############	##############	0.00
447.71	73.44	106.41	##############	##############	##############	0.00
446.61	72.79	106.09	##############	##############	##############	0.00
445.30	72.04	105.16	##############	##############	##############	0.00
443.99	72.28	105.14	##############	##############	##############	0.00
443.14	71.88	105.18	##############	##############	##############	0.00
442.03	72.47	104.60	##############	##############	##############	0.00
440.80	72.73	104.81	##############	##############	##############	0.00
439.17	72.96	104.87	##############	##############	##############	0.00
437.70	72.64	104.49	##############	##############	##############	0.00
433.53	72.93	104.52	##############	##############	##############	0.00
430.59	72.72	105.61	##############	##############	##############	0.00
429.76	72.54	105.18	##############	##############	##############	0.00
428.53	72.47	104.99	##############	##############	##############	0.00
426.75	73.06	103.68	##############	##############	##############	0.00
425.20	72.82	104.88	##############	##############	##############	0.00
423.82	73.30	105.03	##############	##############	##############	0.00
353.84	73.86	125.60	##############	##############	##############	3.72
384.66	73.68	111.44	##############	##############	##############	3.72
452.05	73.71	113.08	##############	##############	##############	3.71
520.14	73.67	115.61	##############	##############	##############	3.72
498.59	73.25	112.84	##############	##############	##############	3.71
525.81	73.84	114.07	##############	##############	##############	3.72
542.91	73.85	113.57	##############	##############	##############	3.72
532.46	74.11	111.98	##############	##############	##############	3.72

511.50	73.81	109.08	##############	##############	##############	3.72
491.92	73.58	107.61	##############	##############	##############	3.72
490.27	73.87	107.86	##############	##############	##############	3.72
485.50	73.35	106.97	##############	##############	##############	3.72
467.26	73.61	105.24	##############	##############	##############	3.72
450.72	73.45	104.37	##############	##############	##############	3.72
440.44	73.55	103.26	##############	##############	##############	3.72
436.05	73.49	103.29	##############	##############	##############	3.72
430.75	73.49	103.06	##############	##############	##############	3.72
429.88	73.38	102.56	##############	##############	##############	3.72
426.55	73.52	101.47	##############	##############	##############	3.72
424.96	73.78	101.00	##############	##############	##############	3.72
425.17	72.83	99.40	##############	##############	##############	3.72
424.52	72.76	100.34	##############	##############	##############	3.72
425.44	72.90	100.79	##############	##############	##############	3.72
427.76	72.73	100.35	##############	##############	##############	3.72
430.15	72.96	99.92	##############	##############	##############	3.72
433.39	72.92	100.49	##############	##############	##############	3.72
443.91	72.98	101.65	##############	##############	##############	3.72
457.72	72.93	101.83	##############	##############	##############	3.72
473.75	72.87	102.97	##############	##############	##############	3.72
487.49	73.03	103.57	##############	##############	##############	3.72
495.97	72.81	104.21	##############	##############	##############	3.72
505.57	72.97	104.38	##############	##############	##############	3.72
518.33	72.90	105.20	##############	##############	##############	3.72
537.69	73.20	106.87	##############	##############	##############	3.71
546.07	73.16	107.36	##############	##############	##############	3.72
552.62	73.30	106.65	##############	##############	##############	3.72
554.28	73.08	108.86	##############	##############	##############	3.71
555.75	73.44	108.21	##############	##############	##############	3.72
555.81	73.63	110.03	##############	##############	##############	3.72
552.60	73.87	112.33	##############	##############	##############	3.72
551.18	74.43	112.68	##############	##############	##############	3.72
550.06	74.56	112.31	##############	##############	##############	3.72
548.66	73.91	113.02	##############	##############	##############	3.72
547.69	73.90	112.70	##############	##############	##############	3.72
546.44	74.37	112.96	##############	##############	##############	3.72
544.82	74.15	112.77	##############	##############	##############	3.71

544.69	73.96	112.16	##############	##############	##############	3.72
546.16	74.11	110.55	##############	##############	##############	3.71
545.64	74.41	109.79	##############	##############	##############	3.71
546.97	74.30	109.90	##############	##############	##############	3.71
546.58	74.12	110.71	##############	##############	##############	3.72
548.09	74.11	109.68	##############	##############	##############	3.71
548.23	74.45	109.88	##############	##############	##############	3.72
548.25	74.39	110.54	##############	##############	##############	3.72
548.33	73.79	110.81	##############	##############	##############	3.72
548.39	73.98	110.63	##############	##############	##############	3.72
549.49	74.11	110.97	##############	##############	##############	3.71
549.33	73.88	111.09	##############	##############	##############	3.72
549.13	73.96	110.38	##############	##############	##############	3.72
549.21	74.08	109.99	##############	##############	##############	3.72
550.65	73.98	110.36	##############	##############	##############	3.72
551.19	73.88	111.20	##############	##############	##############	3.72
551.05	73.70	110.84	##############	##############	##############	3.72
551.25	73.85	110.76	##############	##############	##############	3.72
550.69	73.92	110.50	##############	##############	##############	3.71
551.63	73.88	110.64	##############	##############	##############	3.71
552.17	73.72	111.44	##############	##############	##############	3.72
552.81	73.90	111.61	##############	##############	##############	3.72
553.51	73.77	110.51	##############	##############	##############	3.72
553.34	73.88	110.69	##############	##############	##############	3.72
553.71	73.77	111.55	##############	##############	##############	3.72
554.61	73.81	110.39	##############	##############	##############	3.72
554.91	73.80	110.85	##############	##############	##############	3.72
554.68	73.91	110.83	##############	##############	##############	3.72
555.54	73.85	110.52	##############	##############	##############	3.72
555.55	73.95	111.28	##############	##############	##############	3.72
553.97	73.91	110.67	##############	##############	##############	3.72
554.22	73.87	110.74	##############	##############	##############	3.72
553.86	73.82	110.47	##############	##############	##############	3.72
552.88	73.85	110.56	##############	##############	##############	3.72
552.78	73.97	110.41	##############	##############	##############	3.72
552.26	73.90	110.13	##############	##############	##############	3.72
551.48	73.77	110.20	##############	##############	##############	3.71
552.14	74.01	109.96	##############	##############	##############	3.72

552.32	73.90	110.18	##############	##############	##############	3.72
553.48	74.06	110.16	##############	##############	##############	3.72
553.56	73.96	110.29	##############	##############	##############	3.72
554.89	74.08	110.37	##############	##############	##############	3.71
555.32	74.09	109.99	##############	##############	##############	3.72
555.20	74.11	109.38	##############	##############	##############	3.72
554.99	73.94	109.80	##############	##############	##############	3.72
555.48	74.21	109.90	##############	##############	##############	3.72
554.85	74.17	109.46	##############	##############	##############	3.72
555.38	73.48	111.31	##############	##############	##############	3.72
555.80	73.39	111.59	##############	##############	##############	3.72
556.50	73.32	110.91	##############	##############	##############	3.72
557.63	73.26	108.81	##############	##############	##############	3.72
559.86	72.76	109.39	##############	##############	##############	3.72
561.38	72.72	110.27	##############	##############	##############	3.72
562.84	72.58	110.42	##############	##############	##############	3.72
566.26	72.92	110.07	##############	##############	##############	3.72
568.11	73.21	110.10	##############	##############	##############	3.72
570.63	73.18	110.20	##############	##############	##############	3.72
575.77	73.56	111.10	##############	##############	##############	3.72
579.24	73.09	110.98	##############	##############	##############	3.72
586.05	73.81	110.01	##############	##############	##############	3.72
590.33	74.11	112.19	##############	##############	##############	3.72
594.41	74.42	113.93	##############	##############	##############	3.72
594.36	74.77	115.02	##############	##############	##############	3.71
595.14	74.68	116.42	##############	##############	##############	3.72
594.97	74.78	117.56	##############	##############	##############	3.72
593.37	74.44	116.08	##############	##############	##############	3.72
589.79	74.91	115.58	##############	##############	##############	3.72
583.62	74.75	115.24	##############	##############	##############	3.72
580.56	74.59	113.97	##############	##############	##############	3.72
580.62	74.06	114.71	##############	##############	##############	3.72
579.23	74.54	113.25	##############	##############	##############	3.72
572.20	74.58	112.20	##############	##############	##############	3.72
565.86	74.71	112.02	##############	##############	##############	3.72
561.47	74.62	112.03	##############	##############	##############	3.72
559.53	74.82	111.18	##############	##############	##############	3.73
557.88	74.88	109.82	##############	##############	##############	3.72

555.51	75.04	111.50	##############	##############	##############	3.72
555.20	74.77	111.10	##############	##############	##############	3.72
554.19	74.11	111.15	##############	##############	##############	3.72
553.62	74.37	110.66	##############	##############	##############	3.72
549.92	74.17	110.01	##############	##############	##############	3.72
543.48	74.78	109.66	##############	##############	##############	3.72
542.08	74.60	109.80	##############	##############	##############	3.72
537.16	74.61	108.96	##############	##############	##############	3.71
531.38	74.82	108.47	##############	##############	##############	3.72
525.03	74.21	107.81	##############	##############	##############	3.72
518.57	74.43	107.22	##############	##############	##############	3.72
510.20	73.76	108.26	##############	##############	##############	3.72
503.65	73.88	106.83	##############	##############	##############	3.72
499.77	74.23	105.88	##############	##############	##############	3.72
497.34	74.28	105.23	##############	##############	##############	3.72
495.58	74.22	105.62	##############	##############	##############	3.73
494.32	74.17	105.09	##############	##############	##############	3.72
491.94	74.26	105.63	##############	##############	##############	3.72
489.19	74.59	104.79	##############	##############	##############	3.72
483.16	74.19	103.83	##############	##############	##############	3.72
473.82	74.77	102.37	##############	##############	##############	3.72
467.10	74.35	101.86	##############	##############	##############	3.72
460.28	74.56	103.06	##############	##############	##############	3.72
455.14	74.53	101.14	##############	##############	##############	3.73
450.73	74.33	101.53	##############	##############	##############	3.72
445.84	74.39	100.91	##############	##############	##############	3.73
440.33	74.19	100.86	##############	##############	##############	3.72
435.77	74.22	100.66	##############	##############	##############	3.72
431.89	74.08	99.84	##############	##############	##############	3.72
427.12	74.01	99.78	##############	##############	##############	3.72
424.34	73.57	99.68	##############	##############	##############	3.72
420.30	73.50	99.42	##############	##############	##############	3.72
416.59	73.41	98.94	##############	##############	##############	3.72
413.24	73.54	98.96	##############	##############	##############	3.72
409.87	73.35	98.47	##############	##############	##############	3.72
406.58	73.95	97.03	##############	##############	##############	3.72
403.73	73.66	96.92	##############	##############	##############	3.72
400.17	74.02	97.79	##############	##############	##############	3.72

396.78	74.12	97.49	##############	##############	##############	3.72
394.35	74.04	97.23	##############	##############	##############	3.72
391.52	73.54	97.10	##############	##############	##############	3.72
388.01	73.71	97.70	##############	##############	##############	3.72
386.17	73.46	96.89	##############	##############	##############	3.73
383.31	73.18	96.89	##############	##############	##############	3.72
380.94	73.24	96.42	##############	##############	##############	3.72
379.71	73.18	96.23	##############	##############	##############	3.72
377.53	73.60	95.92	##############	##############	##############	3.72
374.74	73.49	95.77	##############	##############	##############	3.72
372.50	73.19	96.07	##############	##############	##############	3.72
371.36	73.16	95.95	##############	##############	##############	3.72
370.03	73.08	95.32	##############	##############	##############	3.72
368.62	73.31	95.33	##############	##############	##############	3.72
366.51	73.14	95.32	##############	##############	##############	3.72
364.86	73.30	94.94	##############	##############	##############	3.72
363.16	73.40	94.65	##############	##############	##############	3.73
362.02	73.36	94.04	##############	##############	##############	3.72
360.01	73.46	92.91	##############	##############	##############	3.72
358.79	73.77	93.40	##############	##############	##############	3.72
356.87	73.68	93.61	##############	##############	##############	3.72
356.15	73.44	92.42	##############	##############	##############	3.72
354.38	73.67	93.10	##############	##############	##############	3.73
352.46	73.31	93.40	##############	##############	##############	3.72
350.98	73.63	93.68	##############	##############	##############	3.72
350.11	73.67	93.19	##############	##############	##############	3.73
349.11	73.84	92.01	##############	##############	##############	3.71
347.92	73.66	92.86	##############	##############	##############	3.72
347.27	73.42	91.59	##############	##############	##############	3.72
345.63	73.46	93.03	##############	##############	##############	3.72
345.32	73.52	92.90	##############	##############	##############	3.72
344.71	73.53	92.67	##############	##############	##############	3.72
343.73	73.51	92.71	##############	##############	##############	3.72
343.46	73.63	92.32	##############	##############	##############	3.72
342.75	73.58	92.69	##############	##############	##############	3.72
341.30	73.45	91.94	##############	##############	##############	3.72
341.13	73.90	91.35	##############	##############	##############	3.72
340.10	73.60	91.79	##############	##############	##############	3.71

338.73	73.67	92.62	##############	##############	##############	3.73
338.12	73.34	92.84	##############	##############	##############	3.72
337.53	73.40	92.41	##############	##############	##############	3.72
336.29	73.35	92.28	##############	##############	##############	3.72
335.26	73.55	92.34	##############	##############	##############	3.72
334.61	73.52	92.29	##############	##############	##############	3.72
333.83	73.49	92.17	##############	##############	##############	3.72
333.30	73.38	92.33	##############	##############	##############	3.72
332.63	73.54	92.13	##############	##############	##############	3.72
332.09	73.49	92.12	##############	##############	##############	3.72
331.71	73.53	92.14	##############	##############	##############	3.71
331.67	73.39	91.32	##############	##############	##############	3.71
330.06	73.57	92.45	##############	##############	##############	3.72
329.94	73.73	91.68	##############	##############	##############	3.72
330.21	73.40	91.58	##############	##############	##############	3.72
329.46	73.33	91.02	##############	##############	##############	3.72
328.24	73.18	91.71	##############	##############	##############	3.72
328.54	73.00	91.64	##############	##############	##############	3.72
328.08	73.15	91.63	##############	##############	##############	3.72
327.16	73.21	91.83	##############	##############	##############	3.72
326.74	73.21	91.66	##############	##############	##############	3.72
325.20	73.16	91.42	##############	##############	##############	3.73
323.29	73.29	90.99	##############	##############	##############	3.72
321.25	73.42	90.69	##############	##############	##############	3.72
319.59	73.65	90.08	##############	##############	##############	3.72
317.65	73.38	90.70	##############	##############	##############	3.72
316.42	73.58	90.52	##############	##############	##############	3.73
314.85	73.34	90.63	##############	##############	##############	3.72
313.68	73.43	89.45	##############	##############	##############	3.72
312.51	73.14	90.64	##############	##############	##############	3.72
311.64	73.39	90.73	##############	##############	##############	3.72
310.24	73.68	89.88	##############	##############	##############	3.73
310.06	73.70	90.18	##############	##############	##############	3.72
308.30	73.45	90.60	##############	##############	##############	3.72
307.75	73.26	90.66	##############	##############	##############	3.72
307.08	73.31	90.89	##############	##############	##############	3.72
305.89	73.30	90.75	##############	##############	##############	3.72
305.54	73.40	88.91	##############	##############	##############	3.72

304.78	73.45	89.38	##############	##############	##############	3.72
304.46	73.47	89.54	##############	##############	##############	3.71
303.83	73.65	89.24	##############	##############	##############	3.72
303.17	73.77	89.18	##############	##############	##############	3.72
303.27	73.61	89.36	##############	##############	##############	3.72
302.14	73.57	88.75	##############	##############	##############	3.72
301.94	73.41	88.31	##############	##############	##############	3.72
301.08	73.44	88.92	##############	##############	##############	3.72
300.32	73.38	89.40	##############	##############	##############	3.72
299.95	73.38	89.93	##############	##############	##############	3.72
298.96	73.60	89.18	##############	##############	##############	3.72
297.89	73.34	89.73	##############	##############	##############	3.72
297.34	73.43	89.66	##############	##############	##############	3.72
296.92	73.27	89.91	##############	##############	##############	3.72
296.23	73.21	89.97	##############	##############	##############	3.71
296.21	73.36	89.46	##############	##############	##############	3.72
295.48	73.56	89.65	##############	##############	##############	3.72
294.92	73.65	89.28	##############	##############	##############	3.72
294.59	73.25	89.44	##############	##############	##############	3.71
293.68	73.20	89.37	##############	##############	##############	3.72
293.74	73.33	88.97	##############	##############	##############	3.72
293.58	73.41	88.74	##############	##############	##############	3.71
293.01	73.31	88.37	##############	##############	##############	3.73
292.44	73.27	88.82	##############	##############	##############	3.72
292.23	73.58	88.15	##############	##############	##############	3.72
291.52	73.67	89.23	##############	##############	##############	3.72
290.79	74.01	91.08	##############	##############	##############	3.72
290.00	74.06	92.37	##############	##############	##############	3.72
289.17	74.37	93.44	##############	##############	##############	3.72
288.44	74.60	94.71	##############	##############	##############	3.73
287.90	74.57	95.32	##############	##############	##############	3.72
287.19	74.79	95.87	##############	##############	##############	3.73
286.73	74.86	96.98	##############	##############	##############	3.72
286.17	74.82	97.20	##############	##############	##############	3.72
285.91	75.11	97.81	##############	##############	##############	3.72
284.93	75.21	97.63	##############	##############	##############	3.72
284.63	74.95	98.43	##############	##############	##############	3.72
284.49	75.23	98.84	##############	##############	##############	3.72

284.11	75.37	99.23	##############	##############	##############	3.72
283.59	75.57	99.77	##############	##############	##############	3.72
283.50	75.86	100.08	##############	##############	##############	3.73
283.10	75.74	100.54	##############	##############	##############	3.72
282.04	75.92	100.86	##############	##############	##############	3.72
282.19	75.83	101.12	##############	##############	##############	3.72
282.17	75.95	101.31	##############	##############	##############	3.72
281.77	75.74	101.77	##############	##############	##############	3.72
281.23	76.01	101.98	##############	##############	##############	3.73
280.88	76.12	102.01	##############	##############	##############	3.73
280.81	76.35	102.85	##############	##############	##############	3.73
280.51	76.40	102.48	##############	##############	##############	3.72
279.89	76.54	103.21	##############	##############	##############	3.73
279.79	76.51	103.69	##############	##############	##############	3.72
279.83	76.61	103.82	##############	##############	##############	3.73
279.55	76.69	104.08	##############	##############	##############	3.72
278.39	76.60	102.29	##############	##############	##############	3.73
278.82	76.83	100.05	##############	##############	##############	3.73
278.85	76.58	98.81	##############	##############	##############	3.73
279.22	76.60	97.81	##############	##############	##############	3.73
279.43	76.65	97.07	##############	##############	##############	3.73
279.27	76.46	96.26	##############	##############	##############	3.73
279.54	76.36	95.80	##############	##############	##############	3.73
278.87	76.41	95.37	##############	##############	##############	3.74
278.60	77.03	96.03	##############	##############	##############	3.73
278.00	76.94	97.14	##############	##############	##############	3.73
277.32	77.31	98.17	##############	##############	##############	3.74
276.86	77.17	99.43	##############	##############	##############	3.73
276.38	77.23	100.66	##############	##############	##############	3.74
275.52	77.42	101.53	##############	##############	##############	3.73
274.96	77.42	102.11	##############	##############	##############	3.73
274.71	77.43	103.43	##############	##############	##############	3.74
274.21	77.17	104.04	##############	##############	##############	3.73
273.69	77.33	103.66	##############	##############	##############	3.73
273.25	77.48	101.72	##############	##############	##############	3.73
273.27	77.15	100.06	##############	##############	##############	3.73
273.32	77.25	98.92	##############	##############	##############	3.73
273.40	77.23	97.96	##############	##############	##############	3.74

273.92	77.12	97.21	##############	##############	##############	3.73
273.98	77.23	96.59	##############	##############	##############	3.74
274.21	77.64	95.97	##############	##############	##############	3.73
273.89	76.89	95.30	##############	##############	##############	3.73
274.28	76.61	95.06	##############	##############	##############	3.74
274.47	76.69	94.83	##############	##############	##############	3.73
274.32	77.21	95.40	##############	##############	##############	3.73
274.20	77.22	96.60	##############	##############	##############	3.73
273.35	77.45	97.47	##############	##############	##############	3.73
272.83	77.59	98.87	##############	##############	##############	3.73
272.45	77.55	100.75	##############	##############	##############	3.73
271.97	77.74	101.74	##############	##############	##############	3.73
271.81	77.63	102.70	##############	##############	##############	3.73
271.20	77.59	103.73	##############	##############	##############	3.74
270.92	77.77	104.56	##############	##############	##############	3.73
270.86	77.68	103.94	##############	##############	##############	3.74
271.05	78.03	102.38	##############	##############	##############	3.73
271.25	77.65	100.40	##############	##############	##############	3.74
271.76	77.96	99.39	##############	##############	##############	3.73
272.06	77.86	98.11	##############	##############	##############	3.74
272.20	77.75	97.46	##############	##############	##############	3.73
272.21	77.68	96.86	##############	##############	##############	3.74
272.84	77.27	96.30	##############	##############	##############	3.74
272.86	77.13	96.03	##############	##############	##############	3.73
272.91	76.90	95.68	##############	##############	##############	3.73
273.28	77.51	95.01	##############	##############	##############	3.74
273.15	77.88	94.82	##############	##############	##############	3.74
272.88	77.52	95.01	##############	##############	##############	3.74
272.69	77.97	96.53	##############	##############	##############	3.74
271.92	78.11	98.06	##############	##############	##############	3.74
271.90	78.32	98.95	##############	##############	##############	3.73
271.97	78.35	100.97	##############	##############	##############	3.74
271.55	77.68	101.92	##############	##############	##############	3.73
271.81	77.82	103.29	##############	##############	##############	3.74
272.05	77.69	104.50	##############	##############	##############	3.74
271.56	77.82	103.74	##############	##############	##############	3.74
272.27	77.98	101.53	##############	##############	##############	3.74
272.47	77.86	100.17	##############	##############	##############	3.74

272.06	77.90	99.27	##############	##############	##############	3.74
271.99	77.30	97.92	##############	##############	##############	3.73
272.29	76.57	96.83	##############	##############	##############	3.73
272.06	76.96	96.13	##############	##############	##############	3.72
271.77	76.71	95.91	##############	##############	##############	3.72
271.57	76.62	95.60	##############	##############	##############	3.73
271.65	76.58	95.27	##############	##############	##############	3.73
271.41	76.83	95.04	##############	##############	##############	3.73
271.34	76.82	95.02	##############	##############	##############	3.73
270.76	77.31	95.81	##############	##############	##############	3.73
269.72	77.36	97.21	##############	##############	##############	3.73
269.47	77.70	98.60	##############	##############	##############	3.73
268.78	77.78	100.58	##############	##############	##############	3.73
267.90	78.11	102.10	##############	##############	##############	3.73
267.18	78.27	103.36	##############	##############	##############	3.73
266.92	78.20	104.58	##############	##############	##############	3.73
266.29	78.29	104.96	##############	##############	##############	3.72
266.36	78.45	103.25	##############	##############	##############	3.73
266.44	78.55	101.44	##############	##############	##############	3.72
266.52	78.62	100.14	##############	##############	##############	3.73
266.68	78.43	99.00	##############	##############	##############	3.74
266.21	78.31	98.29	##############	##############	##############	3.73
265.86	78.35	97.66	##############	##############	##############	3.73
265.79	78.13	96.97	##############	##############	##############	3.74
265.33	78.44	96.48	##############	##############	##############	3.74
265.21	78.61	96.17	##############	##############	##############	3.73
264.69	78.75	95.93	##############	##############	##############	3.73
264.25	78.68	95.81	##############	##############	##############	3.73
263.60	78.34	95.67	##############	##############	##############	3.73
263.28	78.12	95.35	##############	##############	##############	3.73
263.08	78.01	95.16	##############	##############	##############	3.73
262.44	78.03	95.08	##############	##############	##############	3.73
262.47	77.42	94.13	##############	##############	##############	3.73
262.10	77.55	93.34	##############	##############	##############	3.73
261.60	77.08	93.23	##############	##############	##############	3.72
261.17	77.03	93.36	##############	##############	##############	3.73
260.53	77.54	94.51	##############	##############	##############	3.73
260.10	77.56	96.02	##############	##############	##############	3.73

259.25	77.71	97.16	##############	##############	##############	3.73
258.10	77.91	99.32	##############	##############	##############	3.73
257.46	78.02	100.83	##############	##############	##############	3.73
256.99	78.26	101.91	##############	##############	##############	3.73
256.58	78.45	103.10	##############	##############	##############	3.73
255.71	78.53	102.66	##############	##############	##############	3.73
255.77	78.67	100.83	##############	##############	##############	3.73
256.08	78.64	99.41	##############	##############	##############	3.73
255.90	78.56	98.35	##############	##############	##############	3.73
255.94	78.57	97.51	##############	##############	##############	3.73
255.72	78.52	96.92	##############	##############	##############	3.73
255.59	78.24	96.30	##############	##############	##############	3.74
255.23	78.26	95.98	##############	##############	##############	3.73
254.99	78.16	95.58	##############	##############	##############	3.73
255.00	78.20	95.16	##############	##############	##############	3.73
254.68	78.11	94.86	##############	##############	##############	3.73
254.14	78.05	94.70	##############	##############	##############	3.73
254.14	78.06	94.49	##############	##############	##############	3.73
253.61	77.93	94.32	##############	##############	##############	3.73
253.55	77.91	94.04	##############	##############	##############	3.73
253.13	77.99	93.99	##############	##############	##############	3.73
252.78	77.82	93.88	##############	##############	##############	3.73
252.66	77.80	93.62	##############	##############	##############	3.73
252.18	77.83	93.64	##############	##############	##############	3.74
252.19	77.76	93.43	##############	##############	##############	3.73
251.74	77.75	93.39	##############	##############	##############	3.73
251.64	77.72	93.18	##############	##############	##############	3.73
251.43	77.70	93.09	##############	##############	##############	3.73
250.99	78.23	93.62	##############	##############	##############	3.73
250.52	78.44	95.37	##############	##############	##############	3.73
249.96	78.76	96.44	##############	##############	##############	3.74

DGM 1 in	DGM 1 out	Filter 1	massflow2	DGM 2 in	DGM 2 out	Filter 2
Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
°F	°F	°F	ma	°F	°F	°F

DGM 1 in	DGM 1 out	Filter 1	MFC 2	DGM 2 in	DGM 2 out	Filter 2
63.21	63.24	62.60	0.00	63.29	63.266	62.6
63.25	63.27	62.57	0.00	63.34	63.283	62.6
63.27	63.33	62.61	0.00	63.41	63.356	62.6
63.39	63.46	62.63	0.00	63.51	63.457	62.6
63.53	63.61	62.65	0.00	63.66	63.592	62.7
63.67	63.73	62.69	0.00	63.84	63.759	62.7
63.82	63.89	62.73	0.00	63.98	63.916	62.7
63.98	64.08	62.78	0.00	64.15	64.098	62.7
64.18	64.28	62.82	0.00	64.37	64.301	62.8
64.39	64.49	62.89	0.00	64.56	64.510	62.9
64.59	64.68	62.95	0.00	64.78	64.750	62.9
64.77	64.90	63.01	0.00	64.99	64.951	63.0
64.98	65.08	63.08	0.00	65.18	65.180	63.1
65.19	65.28	63.12	0.00	65.39	65.379	63.1
65.43	65.52	63.23	0.00	65.63	65.634	63.2
65.63	65.74	63.30	0.00	65.83	65.857	63.3
65.85	65.97	63.37	0.00	66.06	66.088	63.3
66.09	66.19	63.44	0.00	66.28	66.316	63.4
66.32	66.39	63.51	0.00	66.50	66.536	63.5
66.54	66.64	63.61	0.00	66.72	66.767	63.5
66.77	66.85	63.68	0.00	66.92	66.986	63.6
67.00	67.04	63.90	0.00	67.14	67.197	63.7
67.22	67.26	64.11	0.00	67.35	67.445	63.9
67.41	67.48	64.25	0.00	67.58	67.658	64.3
67.63	67.69	68.13	0.00	67.79	67.877	67.5
67.84	67.92	74.77	0.00	68.02	68.095	75.9
68.07	68.18	84.74	0.00	68.28	68.360	84.8
68.32	68.41	85.59	0.00	68.50	68.595	87.3
68.52	68.65	85.01	0.00	68.72	68.826	87.1
68.75	68.85	84.31	0.00	68.94	69.093	86.3
68.97	69.08	83.66	0.00	69.15	69.320	85.3
69.16	69.24	82.93	0.00	69.31	69.499	84.3

69.33	69.34	82.23	0.00	69.41	69.630	83.5
69.40	69.41	81.57	0.00	69.47	69.701	82.6
69.47	69.47	80.96	0.00	69.52	69.762	81.9
69.52	69.48	80.36	0.00	69.52	69.798	81.1
69.56	69.50	79.76	0.00	69.53	69.777	80.4
69.59	69.50	79.21	0.00	69.53	69.801	79.8
69.59	69.48	78.69	0.00	69.51	69.782	79.2
69.59	69.48	81.91	0.00	69.51	69.754	79.2
69.60	69.50	84.17	0.00	69.52	69.743	81.3
69.58	69.48	83.61	0.00	69.51	69.737	81.4
69.60	69.52	82.87	0.00	69.57	69.756	81.0
69.66	69.59	82.21	0.00	69.64	69.792	80.4
69.72	69.68	81.53	0.00	69.73	69.874	79.8
69.80	69.78	80.93	0.00	69.83	69.955	79.2
69.92	69.91	80.32	0.00	69.95	70.073	78.7
70.07	70.05	79.77	0.00	70.12	70.210	78.2
70.20	70.21	79.23	0.00	70.28	70.374	77.7
70.35	70.36	78.73	0.00	70.42	70.534	77.2
70.48	70.47	78.27	0.00	70.53	70.677	76.8
70.56	70.54	77.85	0.00	70.60	70.756	76.4
70.63	70.59	77.36	0.00	70.62	70.809	76.0
70.65	70.60	76.95	0.00	70.63	70.824	75.7
70.66	70.60	76.61	0.00	70.63	70.824	75.3
70.67	70.58	76.27	0.00	70.62	70.831	75.0
70.65	70.55	75.95	0.00	70.58	70.787	74.7
70.63	70.51	75.59	0.00	70.58	70.752	74.4
70.61	70.49	75.30	0.00	70.53	70.713	74.1
70.56	70.44	74.97	0.00	70.50	70.670	73.8
70.51	70.39	82.79	0.00	70.44	70.622	78.7
70.45	70.34	85.86	0.00	70.41	70.557	83.9
70.42	70.32	88.64	0.00	70.40	70.535	88.9
70.38	70.27	88.24	0.00	70.34	70.508	89.6
70.34	70.23	87.40	0.00	70.32	70.450	88.9
69.31	69.80	86.50	4.50	69.94	69.802	87.9
69.02	69.66	85.58	3.50	69.78	69.504	86.6
69.01	69.56	84.74	3.50	69.67	69.389	85.6
68.99	69.46	83.95	3.51	69.59	69.283	84.6
68.96	69.36	83.12	3.50	69.49	69.214	83.7

68.91	69.27	82.39	3.50	69.43	69.127	82.9
68.85	69.16	81.70	3.50	69.34	69.085	82.1
68.91	69.12	81.00	3.50	69.31	69.030	81.3
68.97	69.09	80.35	3.50	69.31	69.009	80.6
69.09	69.08	80.35	3.50	69.31	69.009	80.6
69.27	69.12	82.39	3.50	69.49	69.049	80.7
69.49	69.19	84.24	3.50	69.62	69.104	81.2
69.72	69.25	83.69	3.50	69.79	69.176	80.9
69.95	69.35	83.00	3.50	69.97	69.264	80.3
70.08	69.40	82.36	3.50	70.08	69.352	80.3
70.14	69.45	81.78	3.49	70.15	69.405	80.3
70.12	69.47	85.96	3.50	70.17	69.435	82.3
70.12	69.47	86.54	3.50	70.18	69.427	84.3
70.13	69.48	86.04	3.49	70.20	69.464	84.3
70.18	69.53	85.40	3.50	70.24	69.488	83.8
70.25	69.55	84.82	3.50	70.32	69.566	83.2
70.38	69.60	84.26	3.49	70.41	69.624	82.6
70.43	69.64	83.75	3.51	70.48	69.692	82.1
70.52	69.68	83.34	3.49	70.52	69.734	81.7
70.64	69.73	82.90	3.50	70.63	69.825	81.3
70.78	69.79	82.55	3.50	70.74	69.868	81.0
70.93	69.84	82.24	3.50	70.86	69.956	80.7
71.03	69.89	81.99	3.51	70.96	70.042	80.5
71.15	69.93	82.58	3.50	71.06	70.108	82.4
71.22	69.99	83.01	3.50	71.14	70.184	84.2
71.34	70.04	82.87	3.50	71.24	70.249	84.3
71.60	70.11	82.69	3.49	71.39	70.326	84.1
71.80	70.20	83.54	3.50	71.55	70.426	83.8
72.11	70.32	85.21	3.50	71.78	70.532	83.4
72.47	70.45	85.08	3.50	72.07	70.690	83.2
72.76	70.60	84.87	3.50	72.35	70.816	83.1
73.06	70.76	84.70	3.49	72.62	70.974	83.0
73.35	70.96	84.52	3.50	72.89	71.141	82.8
73.64	71.12	84.35	3.51	73.20	71.325	82.7
73.91	71.32	84.24	3.50	73.49	71.489	82.6
74.20	71.52	84.17	3.50	73.76	71.666	85.3
74.51	71.73	84.13	3.50	74.07	71.873	86.3
74.79	71.95	84.05	3.51	74.36	72.063	86.5

75.08	72.17	84.01	3.50	74.66	72.270	86.4
75.41	72.40	84.07	3.50	74.99	72.494	86.3
75.65	72.63	84.10	3.50	75.30	72.699	86.2
75.91	72.86	84.13	3.50	75.60	72.905	86.1
76.24	73.12	84.18	3.50	75.94	73.136	86.0
76.53	73.35	84.17	3.50	76.23	73.356	85.9
76.88	73.60	84.22	3.50	76.57	73.606	85.8
77.23	73.85	84.30	3.50	76.90	73.846	85.8
77.54	74.09	84.47	3.51	77.22	74.070	85.8
77.83	74.31	84.68	3.50	77.53	74.281	85.93
78.10	74.53	84.87	3.50	77.83	74.478	85.97
78.38	74.77	85.08	3.51	78.128	74.726	86.01
78.57	74.99	85.24	3.50	78.409	74.942	86.07
78.87	75.21	85.43	3.51	78.695	75.180	86.13
79.15	75.45	85.63	3.51	78.970	75.391	86.24
79.45	75.66	85.86	3.51	79.270	75.597	86.35
79.73	75.91	86.09	3.51	79.566	75.847	86.47
80.00	76.10	86.34	3.51	79.861	76.072	86.56
80.13	76.30	86.14	3.52	80.053	76.250	86.67
80.16	76.39	85.79	3.52	80.154	76.400	86.71
80.15	76.49	85.67	3.51	80.202	76.518	86.68
80.14	76.57	80.52	3.52	80.255	76.656	86.75
80.09	76.62	80.87	3.52	80.232	76.729	86.85
80.03	76.66	81.08	3.52	80.210	76.823	86.97
79.99	76.71	81.30	3.52	80.202	76.900	87.07
79.99	76.75	81.51	3.52	80.214	76.976	87.20
79.98	76.79	81.74	3.52	80.230	77.055	87.31
80.00	76.86	82.04	3.52	80.277	77.153	87.40
80.26	76.95	82.35	3.52	80.412	77.261	87.55
80.52	77.08	82.67	3.52	80.606	77.398	87.70
80.87	77.21	83.01	3.52	80.836	77.555	87.84
81.14	77.37	83.40	3.52	81.060	77.705	88.02
81.47	77.56	83.74	3.52	81.318	77.891	88.13
81.83	77.73	84.10	3.52	81.582	78.059	88.27
82.13	77.92	84.47	3.51	81.869	78.255	88.39
82.37	78.10	84.84	3.52	82.111	78.461	88.53
82.46	78.25	85.19	3.52	82.264	78.624	88.65
82.46	78.37	85.53	3.52	82.318	78.758	88.74

82.44	78.44	85.90	3.53	82.332	78.848	88.85
82.27	78.50	86.17	3.53	82.237	78.920	88.97
82.16	78.53	86.42	3.52	82.171	79.010	89.08
82.09	78.60	86.73	3.53	82.203	79.087	89.17
82.02	78.62	87.02	3.52	82.172	79.144	89.10
81.91	78.67	87.24	3.52	82.115	79.230	88.02
81.83	78.70	87.52	3.52	82.067	79.276	87.00
81.84	78.71	87.77	3.53	82.035	79.321	86.21
81.95	78.79	87.99	3.52	82.042	79.395	85.58
82.00	78.84	88.19	3.53	82.079	79.452	85.12
82.00	78.85	87.06	3.53	82.006	79.502	84.89
82.08	78.90	85.97	3.53	82.057	79.572	85.04
82.05	78.93	85.33	3.53	82.057	79.603	85.22
81.87	78.93	85.06	3.54	81.979	79.628	85.44
81.81	78.93	85.36	3.53	81.858	79.635	85.64
81.83	78.89	85.74	3.53	81.765	79.657	85.83
81.87	78.95	86.08	3.53	81.836	79.695	86.00
81.91	79.01	86.37	3.53	81.913	79.772	86.14
82.18	79.11	86.69	3.53	82.062	79.825	86.30
82.42	79.24	86.99	3.53	82.281	79.968	86.46
82.71	79.39	87.30	3.53	82.520	80.125	86.66
83.06	79.52	87.58	3.54	82.753	80.254	86.83
83.34	79.69	87.83	3.53	82.989	80.403	86.92
83.49	79.79	88.01	3.53	83.147	80.548	87.05
83.49	79.86	88.14	3.54	83.197	80.599	87.13
83.42	79.93	88.31	3.54	83.166	80.675	87.18
83.25	79.95	88.39	3.53	83.084	80.724	87.25
83.03	79.97	88.49	3.54	82.964	80.751	87.28
82.91	79.97	88.54	3.54	82.873	80.778	87.29
82.71	79.96	88.59	3.54	82.781	80.791	87.33
82.74	80.00	88.62	3.54	82.757	80.817	87.33
82.84	80.03	88.65	3.53	82.758	80.847	87.33
82.78	80.03	88.66	3.53	82.719	80.857	87.33
82.70	80.05	88.64	3.54	82.597	80.847	87.31
82.63	80.04	88.62	3.54	82.561	80.877	87.27
82.51	80.05	88.58	3.54	82.496	80.872	87.26
82.47	80.05	88.56	3.54	82.439	80.877	87.24
82.33	80.06	88.51	3.53	82.340	80.878	87.18

82.08	80.00	88.44	3.54	82.152	80.845	87.09
81.86	79.99	88.37	3.53	82.096	80.843	87.01
81.63	79.94	88.30	3.54	81.927	80.798	86.95
81.60	79.90	88.21	3.54	81.819	80.790	86.88
81.60	79.86	88.14	3.53	81.657	80.785	86.81
81.63	79.83	88.05	3.54	81.618	80.763	86.73
81.54	79.78	87.86	3.54	81.520	80.734	86.60
81.45	79.76	87.75	3.54	81.405	80.712	86.53
81.29	79.69	87.68	3.54	81.330	80.689	86.43
81.26	79.68	87.55	3.54	81.250	80.664	86.37
80.88	79.66	86.70	0.00	81.086	80.652	86.04
80.36	79.50	86.15	0.89	80.878	80.349	85.70
80.19	79.81	85.85	0.00	80.797	80.473	85.44
80.12	79.92	85.53	0.00	80.764	80.489	85.26
80.11	79.74	##############	0.00	80.667	80.500	#############
79.97	79.58	##############	0.00	80.630	80.538	#############
79.83	79.50	##############	0.00	80.530	80.447	#############
79.41	79.51	##############	0.06	80.351	80.208	#############
79.44	79.68	##############	0.00	80.333	80.259	#############
79.41	79.72	##############	0.00	80.242	80.224	#############
79.36	79.66	##############	0.00	80.155	80.149	#############
79.45	79.53	##############	0.00	80.116	80.147	#############
79.31	79.32	74.03	0.00	80.086	80.194	74.00
79.19	79.22	74.21	0.00	79.979	80.104	74.22
78.96	79.09	74.23	0.00	79.851	80.018	74.42
78.91	79.02	74.26	0.00	79.769	79.936	74.35
78.83	78.96	74.31	0.00	79.676	79.855	74.31
78.77	78.90	74.34	0.00	79.622	79.811	74.35
78.73	78.87	74.36	0.00	79.566	79.752	74.32
78.68	78.85	74.40	0.00	79.540	79.693	74.33
78.69	78.88	74.43	0.00	79.575	79.679	74.36
78.72	78.94	74.50	0.00	79.624	79.721	74.39
78.79	79.02	74.55	0.00	79.681	79.798	74.43
78.86	79.11	74.61	0.00	79.755	79.877	74.47
78.94	79.19	74.65	0.00	79.825	79.936	74.49
78.99	79.25	74.70	0.00	79.860	80.013	74.54
79.06	79.29	74.73	0.00	79.915	80.076	74.57
79.09	79.33	74.78	0.00	79.945	80.108	74.59

Temps acquisition de données	Flue temp °F	Room temp °F	Tunnel dry bulb °F	Catalyst down °F	Catalyst center °F	Catalyst up °F	Mass flow 1 Reading dcV
	Flue	Room	Tunnel	catlist down	catalyst center	catalyst up	MFC 1
	67.80	66.90	68.55	##############	##############	##############	0.00
	67.79	66.97	68.50	##############	##############	##############	0.00
	67.79	66.82	68.42	##############	##############	##############	0.00
	67.78	67.00	68.36	##############	##############	##############	0.00
	67.76	67.03	68.43	##############	##############	##############	0.00
	67.72	66.98	68.28	##############	##############	##############	0.00
	67.73	67.08	68.24	##############	##############	##############	0.00
	67.68	67.07	68.29	##############	##############	##############	0.00
	67.65	66.98	68.31	##############	##############	##############	0.00
	67.29	65.91	68.12	##############	##############	##############	0.00
	67.09	65.56	68.18	##############	##############	##############	0.00
	67.13	65.94	68.28	##############	##############	##############	0.00
	67.14	66.10	68.24	##############	##############	##############	0.00
	67.27	66.21	68.16	##############	##############	##############	0.00
	67.47	66.33	68.17	##############	##############	##############	0.00
	67.54	66.33	68.14	##############	##############	##############	0.00
	67.36	66.34	68.12	##############	##############	##############	0.00
	67.24	66.43	68.09	##############	##############	##############	0.00
	67.14	66.34	68.07	##############	##############	##############	0.00
	67.16	66.50	68.02	##############	##############	##############	0.00
	67.17	66.69	67.98	##############	##############	##############	0.00
	67.17	66.55	67.99	##############	##############	##############	0.00
	72.29	66.78	68.26	##############	##############	##############	0.00
	94.21	66.66	70.56	##############	##############	##############	0.00
	101.23	66.64	69.50	##############	##############	##############	0.00
	143.88	66.74	70.17	##############	##############	##############	0.00
	233.79	66.69	74.04	##############	##############	##############	0.00
	307.68	66.73	78.10	##############	##############	##############	0.00
	345.28	66.68	81.06	##############	##############	##############	0.00
	431.49	66.72	87.74	##############	##############	##############	0.00
	452.78	66.72	90.79	##############	##############	##############	0.00
	463.65	66.79	93.08	##############	##############	##############	0.00

499.36	66.82	97.15	##############	##############	##############	0.00
586.08	66.88	105.87	##############	##############	##############	0.00
645.38	67.08	113.68	##############	##############	##############	0.00
680.99	66.94	119.19	##############	##############	##############	0.00
688.10	67.08	122.07	##############	##############	##############	0.00
685.47	67.20	123.28	##############	##############	##############	0.00
689.78	67.37	124.26	##############	##############	##############	0.00
695.42	67.30	125.05	##############	##############	##############	0.00
706.23	67.48	126.05	##############	##############	##############	0.00
679.49	67.26	124.57	##############	##############	##############	0.00
669.04	67.55	123.81	##############	##############	##############	0.00
655.44	67.67	122.55	##############	##############	##############	0.00
639.32	67.43	120.57	##############	##############	##############	0.00
623.07	67.34	120.02	##############	##############	##############	0.00
616.11	67.68	119.13	##############	##############	##############	0.00
606.66	67.53	117.90	##############	##############	##############	0.00
594.54	67.60	116.39	##############	##############	##############	0.00
584.19	67.56	115.59	##############	##############	##############	0.00
576.36	67.71	114.70	##############	##############	##############	0.00
574.54	67.61	114.26	##############	##############	##############	0.00
574.90	67.61	114.84	##############	##############	##############	0.00
578.91	67.43	115.28	##############	##############	##############	0.00
573.67	67.44	114.98	##############	##############	##############	0.00
564.69	68.00	151.36	##############	##############	##############	0.00
530.73	67.95	128.70	##############	##############	##############	0.00
561.14	67.77	120.08	##############	##############	##############	0.00
615.99	67.49	123.44	##############	##############	##############	0.00
664.87	67.82	126.70	##############	##############	##############	0.00
706.02	68.01	131.04	##############	##############	##############	0.00
733.56	67.92	134.57	##############	##############	##############	0.00
748.32	67.90	136.78	##############	##############	##############	0.00
757.26	68.16	138.43	##############	##############	##############	0.00
764.75	67.96	140.21	##############	##############	##############	0.00
772.89	68.24	141.63	##############	##############	##############	0.00
776.79	68.34	141.75	##############	##############	##############	0.00
775.79	68.66	143.03	##############	##############	##############	0.00
772.65	68.37	142.87	##############	##############	##############	0.00
768.39	68.15	142.51	##############	##############	##############	0.00

766.47	68.47	142.37	##############	##############	##############	0.00
766.96	68.40	143.51	##############	##############	##############	0.00
769.54	68.70	142.95	##############	##############	##############	0.00
770.82	68.82	143.62	##############	##############	##############	0.00
770.03	68.88	143.41	##############	##############	##############	0.00
769.80	68.76	142.58	##############	##############	##############	0.00
767.40	68.76	143.12	##############	##############	##############	0.00
764.37	68.96	142.37	##############	##############	##############	0.00
761.08	68.98	141.88	##############	##############	##############	0.00
757.04	69.12	141.72	##############	##############	##############	0.00
754.27	69.29	140.46	##############	##############	##############	0.00
754.39	69.31	140.15	##############	##############	##############	0.00
753.77	69.17	140.06	##############	##############	##############	0.00
752.02	69.25	138.37	##############	##############	##############	0.00
748.34	69.26	139.21	##############	##############	##############	0.00
744.17	69.18	138.56	##############	##############	##############	0.00
742.24	69.37	138.39	##############	##############	##############	0.00
741.29	69.31	138.37	##############	##############	##############	0.00
739.85	69.46	138.58	##############	##############	##############	0.00
736.49	69.36	137.15	##############	##############	##############	0.00
734.11	69.50	137.06	##############	##############	##############	0.00
731.40	69.33	136.45	##############	##############	##############	0.00
726.83	69.48	135.89	##############	##############	##############	0.00
725.25	69.16	135.54	##############	##############	##############	0.00
723.20	69.54	136.11	##############	##############	##############	0.00
719.99	69.57	135.50	##############	##############	##############	0.00
718.00	69.61	135.24	##############	##############	##############	0.00
715.05	69.77	134.98	##############	##############	##############	0.00
712.34	69.84	133.48	##############	##############	##############	0.00
710.85	69.87	133.82	##############	##############	##############	0.00
708.27	69.73	133.23	##############	##############	##############	0.00
705.21	69.40	132.79	##############	##############	##############	0.00
701.28	69.30	132.91	##############	##############	##############	0.00
698.12	69.63	131.42	##############	##############	##############	0.00
694.26	69.60	131.51	##############	##############	##############	0.00
692.35	69.63	130.67	##############	##############	##############	0.00
689.82	69.72	130.42	##############	##############	##############	0.00
688.08	69.87	129.59	##############	##############	##############	0.00

684.84	70.01	130.34	##############	##############	##############	0.00
683.70	69.83	129.44	##############	##############	##############	0.00
679.95	69.79	128.54	##############	##############	##############	0.00
676.13	69.83	128.21	##############	##############	##############	0.00
672.42	69.53	127.13	##############	##############	##############	0.00
667.56	69.55	126.82	##############	##############	##############	0.00
665.73	69.66	126.86	##############	##############	##############	0.00
663.77	69.69	126.11	##############	##############	##############	0.00
662.11	69.64	125.95	##############	##############	##############	0.00
659.33	69.84	125.57	##############	##############	##############	0.00
657.11	69.61	125.53	##############	##############	##############	0.00
655.60	69.70	124.76	##############	##############	##############	0.00
651.76	69.75	124.40	##############	##############	##############	0.00
651.18	70.01	124.46	##############	##############	##############	0.00
649.90	69.95	124.15	##############	##############	##############	0.00
650.62	69.76	123.78	##############	##############	##############	0.00
651.28	69.81	123.99	##############	##############	##############	0.00
653.96	70.03	123.84	##############	##############	##############	0.00
654.86	70.08	123.65	##############	##############	##############	0.00
655.61	70.24	123.88	##############	##############	##############	0.00
654.97	70.24	123.74	##############	##############	##############	0.00
651.10	69.98	122.90	##############	##############	##############	0.00
644.53	69.99	122.42	##############	##############	##############	0.00
636.48	70.27	121.35	##############	##############	##############	0.00
631.19	70.12	120.49	##############	##############	##############	0.00
625.59	70.21	120.30	##############	##############	##############	0.00
619.80	70.13	119.81	##############	##############	##############	0.00
614.20	69.93	118.87	##############	##############	##############	0.00
606.64	69.99	118.46	##############	##############	##############	0.00
606.61	69.92	117.38	##############	##############	##############	0.00
603.67	70.01	117.33	##############	##############	##############	0.00
598.01	69.99	116.73	##############	##############	##############	0.00
592.93	69.55	116.23	##############	##############	##############	0.00
587.21	69.62	114.66	##############	##############	##############	0.00
581.84	69.65	115.28	##############	##############	##############	0.00
576.49	70.00	114.39	##############	##############	##############	0.00
572.58	69.49	114.49	##############	##############	##############	0.00
567.08	69.66	114.05	##############	##############	##############	0.00

564.65	69.86	113.19	##############	##############	##############	0.00
562.92	69.88	112.60	##############	##############	##############	0.00
559.99	69.99	112.26	##############	##############	##############	0.00
559.72	70.12	112.39	##############	##############	##############	0.00
556.69	70.12	112.61	##############	##############	##############	0.00
554.67	69.96	112.08	##############	##############	##############	0.00
551.78	70.08	111.74	##############	##############	##############	0.00
547.59	70.21	111.37	##############	##############	##############	0.00
543.12	70.12	110.98	##############	##############	##############	0.00
540.35	69.90	110.83	##############	##############	##############	0.00
542.10	69.79	110.84	##############	##############	##############	0.00
539.99	70.13	110.14	##############	##############	##############	0.00
536.63	70.03	110.19	##############	##############	##############	0.00
533.28	70.08	109.69	##############	##############	##############	0.00
531.42	69.76	109.45	##############	##############	##############	0.00
528.08	69.84	109.03	##############	##############	##############	0.00
523.13	70.21	108.81	##############	##############	##############	0.00
520.35	70.02	108.30	##############	##############	##############	0.00
516.44	70.07	107.76	##############	##############	##############	0.00
512.80	69.85	107.52	##############	##############	##############	0.00
508.12	69.72	107.04	##############	##############	##############	0.00
503.53	69.78	106.49	##############	##############	##############	0.00
498.37	69.74	106.17	##############	##############	##############	0.00
492.82	69.67	105.66	##############	##############	##############	0.00
488.03	69.79	105.22	##############	##############	##############	0.00
483.30	69.70	104.49	##############	##############	##############	0.00
479.90	69.24	104.37	##############	##############	##############	0.00
477.08	69.42	103.34	##############	##############	##############	0.00
471.57	69.67	109.74	##############	##############	##############	0.00
492.00	69.72	107.94	##############	##############	##############	0.00
498.33	69.60	107.92	##############	##############	##############	0.00
501.04	69.50	107.41	##############	##############	##############	0.00
502.64	69.42	106.59	##############	##############	##############	0.00
500.77	69.80	107.21	##############	##############	##############	0.00
500.42	69.61	107.58	##############	##############	##############	0.00
505.54	69.53	107.43	##############	##############	##############	0.00
510.57	69.65	107.76	##############	##############	##############	0.00
515.17	69.83	108.14	##############	##############	##############	0.00

512.68	69.89	107.83	##############	##############	##############	0.00
507.14	70.06	107.70	##############	##############	##############	0.00
506.48	70.02	107.16	##############	##############	##############	0.00
506.00	69.88	106.55	##############	##############	##############	0.00
503.21	69.87	105.64	##############	##############	##############	0.00
502.61	69.59	105.58	##############	##############	##############	0.00
501.07	69.68	105.91	##############	##############	##############	0.00
500.83	69.58	105.94	##############	##############	##############	0.00
501.50	69.83	104.47	##############	##############	##############	0.00
496.83	69.68	105.07	##############	##############	##############	0.00
489.67	69.88	104.81	##############	##############	##############	0.00
481.01	69.40	104.99	##############	##############	##############	0.00
474.96	69.67	104.93	##############	##############	##############	0.00
471.57	69.86	104.64	##############	##############	##############	0.00
444.02	69.98	114.85	##############	##############	##############	0.00
493.10	70.08	108.10	##############	##############	##############	0.00
509.89	69.79	106.49	##############	##############	##############	0.00
508.96	70.00	107.10	##############	##############	##############	0.00
506.99	70.08	106.58	##############	##############	##############	0.00
503.85	70.00	105.87	##############	##############	##############	0.00
500.75	69.88	104.91	##############	##############	##############	0.00
500.48	69.93	104.92	##############	##############	##############	0.00
501.26	69.65	105.28	##############	##############	##############	0.00
502.34	69.46	104.70	##############	##############	##############	0.00
476.27	69.46	100.03	##############	##############	##############	0.00
483.37	69.80	103.19	##############	##############	##############	0.00
481.00	69.54	104.50	##############	##############	##############	0.00
477.14	69.74	104.57	##############	##############	##############	0.00
477.90	69.72	104.04	##############	##############	##############	0.00
477.24	69.66	103.79	##############	##############	##############	0.00
476.35	69.75	103.61	##############	##############	##############	0.00
473.43	69.71	103.64	##############	##############	##############	0.00
469.98	69.79	102.56	##############	##############	##############	0.00
466.67	69.65	102.19	##############	##############	##############	0.00
464.42	69.90	102.61	##############	##############	##############	0.00
460.58	69.95	101.61	##############	##############	##############	0.00
458.15	70.02	100.08	##############	##############	##############	0.00
454.04	70.20	101.25	##############	##############	##############	0.00

450.34	70.18	102.98	##############	##############	##############	0.00
448.01	70.29	103.22	##############	##############	##############	0.00
444.03	70.59	104.47	##############	##############	##############	0.00
437.46	70.72	104.97	##############	##############	##############	0.00
432.50	70.98	105.05	##############	##############	##############	0.00
326.32	71.50	129.15	##############	##############	##############	3.51
415.35	71.66	111.10	##############	##############	##############	3.51
468.68	71.59	111.92	##############	##############	##############	3.51
494.47	71.52	111.53	##############	##############	##############	3.51
485.85	71.79	109.67	##############	##############	##############	3.52
482.89	72.03	108.48	##############	##############	##############	3.52
459.30	72.01	107.07	##############	##############	##############	3.52
453.39	72.39	106.56	##############	##############	##############	3.52
450.48	72.31	105.91	##############	##############	##############	3.51
450.75	72.42	106.13	##############	##############	##############	3.52
452.25	72.40	105.53	##############	##############	##############	3.52
457.71	72.63	104.40	##############	##############	##############	3.52
455.97	72.49	104.38	##############	##############	##############	3.52
454.96	72.40	103.57	##############	##############	##############	3.51
463.41	72.58	103.25	##############	##############	##############	3.52
474.21	72.04	104.62	##############	##############	##############	3.52
485.44	72.41	106.49	##############	##############	##############	3.52
502.35	72.23	108.36	##############	##############	##############	3.52
523.40	72.51	110.09	##############	##############	##############	3.52
533.04	72.72	111.38	##############	##############	##############	3.51
538.77	72.30	111.74	##############	##############	##############	3.52
541.88	72.28	112.37	##############	##############	##############	3.52
542.33	72.26	113.65	##############	##############	##############	3.51
543.30	72.33	114.35	##############	##############	##############	3.52
543.51	72.59	114.82	##############	##############	##############	3.51
544.00	72.60	115.25	##############	##############	##############	3.51
543.27	72.78	115.60	##############	##############	##############	3.52
543.09	72.99	115.70	##############	##############	##############	3.51
542.75	73.18	116.19	##############	##############	##############	3.51
541.32	73.14	116.31	##############	##############	##############	3.51
540.76	73.27	116.51	##############	##############	##############	3.51
539.74	73.69	114.69	##############	##############	##############	3.51
539.09	73.69	113.60	##############	##############	##############	3.51

539.08	73.27	113.67	##############	##############	##############	3.51
538.25	73.12	112.70	##############	##############	##############	3.51
537.96	73.02	112.91	##############	##############	##############	3.51
536.98	73.11	112.56	##############	##############	##############	3.51
537.10	73.28	112.12	##############	##############	##############	3.51
537.13	73.53	111.61	##############	##############	##############	3.51
536.15	73.13	111.79	##############	##############	##############	3.51
535.80	73.25	111.67	##############	##############	##############	3.51
536.50	73.57	109.75	##############	##############	##############	3.51
536.20	73.79	110.58	##############	##############	##############	3.51
535.22	73.75	112.66	##############	##############	##############	3.51
534.10	74.03	113.51	##############	##############	##############	3.50
531.95	73.68	113.33	##############	##############	##############	3.51
531.31	73.59	114.34	##############	##############	##############	3.51
530.80	73.91	113.75	##############	##############	##############	3.51
528.78	73.73	114.72	##############	##############	##############	3.51
527.67	73.56	115.46	##############	##############	##############	3.51
526.72	73.34	115.04	##############	##############	##############	3.51
525.23	73.16	114.16	##############	##############	##############	3.51
523.58	73.06	113.38	##############	##############	##############	3.51
522.57	73.06	112.56	##############	##############	##############	3.51
521.53	73.51	111.47	##############	##############	##############	3.51
520.27	73.89	110.06	##############	##############	##############	3.51
518.66	73.56	110.12	##############	##############	##############	3.51
518.00	73.68	107.85	##############	##############	##############	3.51
516.73	73.85	109.07	##############	##############	##############	3.50
514.90	73.49	108.87	##############	##############	##############	3.51
513.22	73.75	107.51	##############	##############	##############	3.51
511.29	73.78	108.09	##############	##############	##############	3.51
510.39	74.00	109.21	##############	##############	##############	3.51
510.18	73.98	107.98	##############	##############	##############	3.51
510.09	74.35	107.26	##############	##############	##############	3.52
509.77	74.42	109.28	##############	##############	##############	3.51
509.32	74.86	110.95	##############	##############	##############	3.51
509.70	74.91	110.70	##############	##############	##############	3.51
508.92	74.99	111.87	##############	##############	##############	3.51
509.04	75.43	111.61	##############	##############	##############	3.52
506.69	75.33	112.84	##############	##############	##############	3.51

505.49	75.39	112.66	##############	##############	##############	3.51
504.45	75.14	111.64	##############	##############	##############	3.51
503.92	74.45	111.38	##############	##############	##############	3.51
503.64	74.67	110.24	##############	##############	##############	3.51
502.98	74.38	108.57	##############	##############	##############	3.51
502.03	74.15	108.95	##############	##############	##############	3.51
500.82	74.17	107.94	##############	##############	##############	3.51
500.01	74.01	107.12	##############	##############	##############	3.50
499.15	74.35	107.66	##############	##############	##############	3.51
497.67	74.45	107.31	##############	##############	##############	3.51
497.76	74.13	107.40	##############	##############	##############	3.51
497.48	74.35	106.08	##############	##############	##############	3.51
496.56	74.17	105.95	##############	##############	##############	3.50
495.11	74.20	106.71	##############	##############	##############	3.51
494.63	74.19	107.29	##############	##############	##############	3.50
493.56	74.20	107.42	##############	##############	##############	3.50
492.57	73.95	106.92	##############	##############	##############	3.51
492.60	73.85	105.06	##############	##############	##############	3.50
491.01	74.07	105.33	##############	##############	##############	3.51
490.45	73.99	105.16	##############	##############	##############	3.52
489.57	73.66	104.83	##############	##############	##############	3.50
489.38	74.23	104.74	##############	##############	##############	3.51
485.72	74.22	106.35	##############	##############	##############	3.51
482.14	74.70	107.04	##############	##############	##############	3.50
477.90	74.92	107.33	##############	##############	##############	3.50
474.21	74.93	108.17	##############	##############	##############	3.51
471.34	75.19	108.23	##############	##############	##############	3.51
468.30	75.42	108.47	##############	##############	##############	3.51
465.75	75.31	107.88	##############	##############	##############	3.50
462.87	75.29	107.69	##############	##############	##############	3.50
460.18	75.53	106.95	##############	##############	##############	3.51
459.94	75.47	106.64	##############	##############	##############	3.51
458.45	75.49	105.09	##############	##############	##############	3.51
456.29	75.24	105.49	##############	##############	##############	3.51
453.75	75.22	106.02	##############	##############	##############	3.51
452.19	75.19	106.06	##############	##############	##############	3.51
452.03	75.26	105.82	##############	##############	##############	3.51
451.18	75.62	104.94	##############	##############	##############	3.50

449.86	75.46	103.86	##############	##############	##############	3.51
448.97	75.56	103.96	##############	##############	##############	3.51
448.56	75.29	103.29	##############	##############	##############	3.51
449.10	75.07	102.09	##############	##############	##############	3.51
448.26	75.31	102.94	##############	##############	##############	3.51
447.82	75.34	103.08	##############	##############	##############	3.51
448.33	75.27	102.35	##############	##############	##############	3.50
448.14	74.97	102.93	##############	##############	##############	3.51
448.42	75.19	103.13	##############	##############	##############	3.51
448.61	75.39	103.58	##############	##############	##############	3.50
449.03	75.44	103.44	##############	##############	##############	3.51
449.27	75.33	103.94	##############	##############	##############	3.50
448.86	75.31	103.78	##############	##############	##############	3.51
451.79	75.43	103.70	##############	##############	##############	3.51
454.51	74.88	103.47	##############	##############	##############	3.51
452.06	74.74	103.66	##############	##############	##############	3.52
445.83	74.87	103.36	##############	##############	##############	3.51
439.37	74.77	101.81	##############	##############	##############	3.51
434.91	74.89	101.25	##############	##############	##############	3.51
432.27	74.87	100.49	##############	##############	##############	3.51
429.98	74.80	100.25	##############	##############	##############	3.51
426.25	74.86	100.75	##############	##############	##############	3.51
419.75	74.66	100.62	##############	##############	##############	3.50
416.45	74.50	100.49	##############	##############	##############	3.51
413.16	74.32	100.69	##############	##############	##############	3.51
411.54	74.52	99.97	##############	##############	##############	3.51
411.28	73.78	99.43	##############	##############	##############	3.51
410.64	74.29	99.95	##############	##############	##############	3.50
407.68	74.28	100.28	##############	##############	##############	3.51
407.12	74.14	99.17	##############	##############	##############	3.51
403.24	73.96	99.10	##############	##############	##############	3.51
399.25	74.06	97.94	##############	##############	##############	3.51
395.21	74.31	97.82	##############	##############	##############	3.51
392.88	74.12	97.40	##############	##############	##############	3.51
389.59	73.97	97.19	##############	##############	##############	3.51
388.54	74.09	96.36	##############	##############	##############	3.51
387.00	73.88	96.04	##############	##############	##############	3.51
385.52	74.04	97.37	##############	##############	##############	3.51

382.24	74.27	99.38	##############	##############	##############	3.51
377.30	74.61	99.06	##############	##############	##############	3.51
373.03	74.78	100.60	##############	##############	##############	3.51
369.50	74.96	100.57	##############	##############	##############	3.50
365.63	75.07	99.98	##############	##############	##############	3.51
362.36	75.03	98.87	##############	##############	##############	3.51
353.37	75.07	98.18	##############	##############	##############	3.51
346.72	75.30	97.77	##############	##############	##############	3.50
342.48	74.97	97.50	##############	##############	##############	3.51
339.67	74.88	96.09	##############	##############	##############	3.51
336.26	75.11	96.41	##############	##############	##############	3.52
332.96	75.11	96.62	##############	##############	##############	3.51
330.42	75.08	96.04	##############	##############	##############	3.51
328.96	75.10	95.82	##############	##############	##############	3.51
328.09	75.07	95.81	##############	##############	##############	3.51
326.87	74.78	96.03	##############	##############	##############	3.51
325.88	74.68	94.57	##############	##############	##############	3.52
325.51	74.77	94.97	##############	##############	##############	3.51
322.61	74.78	94.93	##############	##############	##############	3.50
320.72	74.59	94.84	##############	##############	##############	3.51
319.46	74.64	94.69	##############	##############	##############	3.50
319.09	74.14	94.08	##############	##############	##############	3.50
316.63	74.11	93.93	##############	##############	##############	3.51
315.49	74.38	93.58	##############	##############	##############	3.51
314.67	74.53	94.56	##############	##############	##############	3.50
313.58	74.69	93.84	##############	##############	##############	3.51
311.15	75.29	95.70	##############	##############	##############	3.51
310.58	75.10	96.57	##############	##############	##############	3.51
310.20	75.57	97.77	##############	##############	##############	3.51
310.00	75.92	98.50	##############	##############	##############	3.51
309.14	76.18	99.19	##############	##############	##############	3.51
309.24	76.34	100.26	##############	##############	##############	3.51
308.38	76.82	100.58	##############	##############	##############	3.51
308.13	77.08	100.87	##############	##############	##############	3.51
307.91	77.07	101.19	##############	##############	##############	3.51
307.53	77.08	101.78	##############	##############	##############	3.51
307.12	77.21	102.46	##############	##############	##############	3.51
307.10	77.51	102.86	##############	##############	##############	3.51

307.02	77.45	103.00	##############	##############	##############	3.52
307.96	77.36	103.94	##############	##############	##############	3.52
309.11	77.59	103.65	##############	##############	##############	3.52
309.29	77.56	104.68	##############	##############	##############	3.52
308.83	77.70	104.53	##############	##############	##############	3.52
309.13	77.76	102.55	##############	##############	##############	3.52
308.96	77.75	101.01	##############	##############	##############	3.52
308.55	77.61	100.24	##############	##############	##############	3.52
308.33	77.56	99.19	##############	##############	##############	3.52
307.67	77.65	98.27	##############	##############	##############	3.52
307.41	77.71	98.06	##############	##############	##############	3.53
305.59	77.78	97.58	##############	##############	##############	3.52
306.34	77.67	97.12	##############	##############	##############	3.52
303.62	77.52	96.59	##############	##############	##############	3.51
304.40	77.47	96.49	##############	##############	##############	3.52
303.08	77.63	96.13	##############	##############	##############	3.52
304.23	77.65	96.91	##############	##############	##############	3.53
307.26	77.78	98.25	##############	##############	##############	3.52
310.28	78.13	99.26	##############	##############	##############	3.53
311.78	78.20	100.50	##############	##############	##############	3.53
311.63	78.28	101.69	##############	##############	##############	3.53
312.76	78.23	102.48	##############	##############	##############	3.53
312.75	78.37	102.92	##############	##############	##############	3.53
312.69	78.48	103.43	##############	##############	##############	3.52
313.75	78.21	102.23	##############	##############	##############	3.53
313.71	78.23	101.12	##############	##############	##############	3.53
313.95	78.14	100.51	##############	##############	##############	3.53
315.12	78.63	99.49	##############	##############	##############	3.53
315.89	78.51	99.19	##############	##############	##############	3.53
316.39	77.88	98.96	##############	##############	##############	3.52
317.33	77.92	98.30	##############	##############	##############	3.53
318.60	77.93	98.58	##############	##############	##############	3.53
319.88	77.72	98.17	##############	##############	##############	3.53
322.11	77.90	97.91	##############	##############	##############	3.53
325.09	77.91	97.15	##############	##############	##############	3.53
327.50	77.97	97.24	##############	##############	##############	3.53
330.39	77.81	97.54	##############	##############	##############	3.53
332.16	77.83	98.07	##############	##############	##############	3.53

334.14	78.00	97.38	##############	##############	##############	3.53
334.66	78.08	96.67	##############	##############	##############	3.53
332.71	77.95	96.95	##############	##############	##############	3.52
331.55	78.17	98.16	##############	##############	##############	3.53
328.41	78.40	99.46	##############	##############	##############	3.53
324.89	78.59	100.14	##############	##############	##############	3.52
321.54	78.73	101.46	##############	##############	##############	3.52
318.69	78.87	102.05	##############	##############	##############	3.53
316.01	78.69	103.11	##############	##############	##############	3.52
313.63	78.71	102.81	##############	##############	##############	3.53
308.59	78.96	101.44	##############	##############	##############	3.53
305.87	78.92	100.50	##############	##############	##############	3.53
303.19	78.89	99.52	##############	##############	##############	3.53
301.08	78.97	99.23	##############	##############	##############	3.53
298.81	79.04	98.68	##############	##############	##############	3.52
296.74	78.96	98.15	##############	##############	##############	3.53
294.94	78.93	97.68	##############	##############	##############	3.53
293.10	79.10	97.24	##############	##############	##############	3.53
291.24	78.58	96.94	##############	##############	##############	3.53
289.30	78.96	97.02	##############	##############	##############	3.53
288.23	78.64	96.73	##############	##############	##############	3.53
286.73	78.48	96.27	##############	##############	##############	3.53
285.37	78.40	95.71	##############	##############	##############	3.53
284.29	78.22	96.03	##############	##############	##############	3.53
282.95	78.69	95.64	##############	##############	##############	3.53
281.82	78.60	95.19	##############	##############	##############	3.53
280.80	78.51	95.46	##############	##############	##############	3.54
279.49	78.70	95.20	##############	##############	##############	3.53
278.56	78.41	95.05	##############	##############	##############	3.53
277.62	78.08	94.93	##############	##############	##############	3.53
276.59	78.40	94.79	##############	##############	##############	3.53
276.05	78.30	94.46	##############	##############	##############	3.53
275.38	77.94	94.36	##############	##############	##############	3.53
274.89	78.22	93.96	##############	##############	##############	3.53
273.65	78.31	93.82	##############	##############	##############	3.53
272.81	78.25	94.09	##############	##############	##############	3.53
272.20	78.50	94.96	##############	##############	##############	3.54
270.87	78.82	96.64	##############	##############	##############	3.54

270.11	79.01	97.89	##############	##############	##############	3.53
269.42	78.67	99.03	##############	##############	##############	3.54
268.74	79.16	99.97	##############	##############	##############	3.53
268.06	79.31	98.61	##############	##############	##############	3.53
268.01	79.05	97.36	##############	##############	##############	3.53
267.56	78.81	97.15	##############	##############	##############	3.53
267.01	79.15	96.33	##############	##############	##############	3.53
266.72	79.04	95.71	##############	##############	##############	3.53
266.50	78.90	94.98	##############	##############	##############	3.53
266.00	78.99	94.85	##############	##############	##############	3.53
266.28	78.70	94.24	##############	##############	##############	3.53
266.26	78.70	94.33	##############	##############	##############	3.54
266.72	78.83	93.89	##############	##############	##############	3.53
266.91	78.47	93.71	##############	##############	##############	3.53
267.05	78.79	93.13	##############	##############	##############	3.53
267.01	78.82	93.51	##############	##############	##############	3.53
266.42	78.42	93.62	##############	##############	##############	3.53
266.07	78.57	93.82	##############	##############	##############	3.53
266.16	78.77	93.02	##############	##############	##############	3.53
266.14	78.55	92.97	##############	##############	##############	3.54
265.82	78.51	93.26	##############	##############	##############	3.53
265.45	78.44	93.13	##############	##############	##############	3.53
264.99	78.47	93.30	##############	##############	##############	3.53
265.15	78.09	93.25	##############	##############	##############	3.53
264.72	78.10	93.64	##############	##############	##############	3.54
264.38	78.17	92.98	##############	##############	##############	3.53
264.35	78.07	92.74	##############	##############	##############	3.53
264.23	77.91	92.92	##############	##############	##############	3.53
263.94	78.26	92.78	##############	##############	##############	3.54
263.91	78.47	93.99	##############	##############	##############	3.53
263.36	78.47	95.25	##############	##############	##############	3.53
262.62	78.69	96.63	##############	##############	##############	3.53
262.28	78.78	97.60	##############	##############	##############	3.53
261.50	78.79	98.47	##############	##############	##############	3.53
261.24	78.74	98.01	##############	##############	##############	3.53
261.77	78.94	96.79	##############	##############	##############	3.53
261.60	78.57	96.08	##############	##############	##############	3.54
261.76	78.58	95.60	##############	##############	##############	3.53

262.00	78.66	94.82	##############	##############	##############	3.53
262.17	78.37	94.15	##############	##############	##############	3.53
262.16	78.39	94.24	##############	##############	##############	3.53
262.51	78.31	93.71	##############	##############	##############	3.53
262.12	78.17	93.24	##############	##############	##############	3.53
261.87	77.92	93.09	##############	##############	##############	3.54
261.90	77.91	92.94	##############	##############	##############	3.53
262.14	77.84	92.90	##############	##############	##############	3.54
262.11	77.76	92.68	##############	##############	##############	3.54
261.90	77.51	92.85	##############	##############	##############	3.54
261.61	77.61	92.86	##############	##############	##############	3.53
261.96	77.66	92.73	##############	##############	##############	3.53
261.57	77.61	92.78	##############	##############	##############	3.54
261.22	77.61	92.86	##############	##############	##############	3.52
261.20	77.54	92.86	##############	##############	##############	3.53
261.48	77.49	92.51	##############	##############	##############	3.53
261.51	77.40	92.49	##############	##############	##############	3.53
261.91	77.34	92.51	##############	##############	##############	3.53
262.32	77.68	91.83	##############	##############	##############	3.53
262.16	77.86	92.28	##############	##############	##############	3.53
261.72	78.09	94.08	##############	##############	##############	3.53
261.76	78.32	95.57	##############	##############	##############	3.54
261.59	78.30	96.45	##############	##############	##############	3.53
261.56	78.31	97.59	##############	##############	##############	3.53
261.36	78.45	98.10	##############	##############	##############	3.53
261.92	78.25	97.32	##############	##############	##############	3.53
262.53	78.34	96.29	##############	##############	##############	3.53
263.04	78.34	95.69	##############	##############	##############	3.53
263.00	78.14	94.88	##############	##############	##############	3.53
263.22	77.87	94.52	##############	##############	##############	3.53
263.54	77.92	94.33	##############	##############	##############	3.53
263.68	77.88	93.88	##############	##############	##############	3.53
263.81	77.78	93.70	##############	##############	##############	3.54
264.12	77.68	93.27	##############	##############	##############	3.53
263.84	77.60	93.37	##############	##############	##############	3.53
263.53	77.51	93.17	##############	##############	##############	3.53
264.23	77.45	92.95	##############	##############	##############	3.54
263.73	77.38	92.78	##############	##############	##############	3.53

264.28	77.35	92.38	##############	##############	##############	3.54
263.59	77.20	92.60	##############	##############	##############	3.53
263.69	77.08	92.51	##############	##############	##############	3.53
263.57	77.07	92.43	##############	##############	##############	3.53
263.14	77.12	92.24	##############	##############	##############	3.53
262.75	77.00	92.09	##############	##############	##############	3.53
262.75	77.05	92.05	##############	##############	##############	3.53
262.57	76.98	92.12	##############	##############	##############	3.53
262.51	77.40	91.48	##############	##############	##############	3.53
262.39	77.47	92.97	##############	##############	##############	3.53
261.66	77.73	93.89	##############	##############	##############	3.53
261.41	77.95	95.43	##############	##############	##############	3.53
260.71	77.89	96.47	##############	##############	##############	3.54
260.64	78.03	97.88	##############	##############	##############	3.53
260.23	78.03	98.22	##############	##############	##############	3.53
260.50	77.87	96.98	##############	##############	##############	3.53
260.13	78.15	95.90	##############	##############	##############	3.53
259.99	77.73	95.23	##############	##############	##############	3.53
260.54	77.82	94.48	##############	##############	##############	3.53
260.12	77.77	94.09	##############	##############	##############	3.53
260.61	77.43	93.71	##############	##############	##############	3.53
260.46	77.39	93.16	##############	##############	##############	3.53
260.53	77.41	93.17	##############	##############	##############	3.53
260.52	77.17	93.06	##############	##############	##############	3.54
260.64	77.21	92.93	##############	##############	##############	3.53
260.42	77.13	92.62	##############	##############	##############	3.53
260.89	77.06	92.46	##############	##############	##############	3.53
260.64	77.10	92.36	##############	##############	##############	3.53
260.69	77.02	92.23	##############	##############	##############	3.53
260.82	76.94	92.06	##############	##############	##############	3.53
260.73	76.92	91.91	##############	##############	##############	3.53
260.73	76.82	92.06	##############	##############	##############	3.53
260.79	76.72	91.83	##############	##############	##############	3.53
261.24	76.95	91.52	##############	##############	##############	3.53
261.30	77.34	91.35	##############	##############	##############	3.53
260.93	77.31	92.89	##############	##############	##############	3.53
260.50	77.61	94.44	##############	##############	##############	3.53
260.06	77.59	95.32	##############	##############	##############	3.53

259.67	77.76	96.32	##############	##############	##############	3.53
259.87	77.71	97.66	##############	##############	##############	3.53
259.78	77.80	98.41	##############	##############	##############	3.53
259.98	77.71	96.94	##############	##############	##############	3.53
260.06	77.67	95.82	##############	##############	##############	3.53
260.63	77.62	95.01	##############	##############	##############	3.53
261.24	77.52	94.32	##############	##############	##############	3.53
261.06	77.54	94.10	##############	##############	##############	3.53
260.91	77.45	93.71	##############	##############	##############	3.53
261.18	77.19	93.37	##############	##############	##############	3.53
261.34	77.11	93.23	##############	##############	##############	3.54
261.50	77.11	93.03	##############	##############	##############	3.53
261.57	77.11	92.80	##############	##############	##############	3.53
261.52	76.97	92.58	##############	##############	##############	3.53
261.65	76.98	92.45	##############	##############	##############	3.53
261.81	76.80	92.30	##############	##############	##############	3.53
261.74	76.76	92.21	##############	##############	##############	3.53
261.72	76.65	91.93	##############	##############	##############	3.53
262.50	76.61	91.45	##############	##############	##############	3.53
262.22	76.68	91.37	##############	##############	##############	3.53
262.18	76.52	91.51	##############	##############	##############	3.53
262.41	77.02	90.94	##############	##############	##############	3.53
261.90	77.01	92.41	##############	##############	##############	3.53
261.25	77.32	93.76	##############	##############	##############	3.53
260.80	77.38	95.15	##############	##############	##############	3.54
260.64	77.58	95.97	##############	##############	##############	3.53
260.51	77.75	97.44	##############	##############	##############	3.53
260.38	77.85	97.72	##############	##############	##############	3.53
260.39	77.67	97.28	##############	##############	##############	3.53
260.75	77.84	95.81	##############	##############	##############	3.54
260.91	77.55	95.26	##############	##############	##############	3.53
261.09	77.72	94.61	##############	##############	##############	3.53
261.34	77.34	94.10	##############	##############	##############	3.53
261.37	77.25	93.63	##############	##############	##############	3.53
261.18	77.06	93.09	##############	##############	##############	3.53
261.06	77.03	93.02	##############	##############	##############	3.54
261.03	76.96	92.72	##############	##############	##############	3.54
260.99	76.87	92.62	##############	##############	##############	3.53

260.52	76.80	92.38	##############	##############	##############	3.53
260.51	76.75	92.06	##############	##############	##############	3.53
260.25	76.71	91.93	##############	##############	##############	3.53
259.91	76.58	91.69	##############	##############	##############	3.53
259.90	76.55	91.56	##############	##############	##############	3.53
259.79	76.52	91.25	##############	##############	##############	3.53
259.63	76.51	91.49	##############	##############	##############	3.53
259.50	76.45	90.86	##############	##############	##############	3.53
259.34	76.89	90.54	##############	##############	##############	3.53
258.89	77.15	91.40	##############	##############	##############	3.53
258.18	77.15	93.06	##############	##############	##############	3.53
257.38	77.49	94.62	##############	##############	##############	3.53
257.02	77.59	95.39	##############	##############	##############	3.53
256.75	77.73	96.36	##############	##############	##############	3.54
256.68	77.53	97.54	##############	##############	##############	3.53
256.14	77.61	97.68	##############	##############	##############	3.53
255.81	77.81	96.20	##############	##############	##############	3.53
256.07	77.47	95.22	##############	##############	##############	3.53
255.86	77.60	94.51	##############	##############	##############	3.53
255.75	77.41	93.85	##############	##############	##############	3.53
255.28	77.06	93.26	##############	##############	##############	3.53
255.62	77.14	92.83	##############	##############	##############	3.53
254.82	77.01	92.52	##############	##############	##############	3.53
254.17	76.87	92.30	##############	##############	##############	3.53
254.09	76.81	91.89	##############	##############	##############	3.53
253.60	76.64	91.68	##############	##############	##############	3.53
253.48	76.62	91.15	##############	##############	##############	3.53
253.57	76.70	91.25	##############	##############	##############	3.53
253.16	76.57	91.13	##############	##############	##############	3.53
253.24	76.46	90.98	##############	##############	##############	3.53
252.51	76.42	91.01	##############	##############	##############	3.53
252.88	76.37	90.86	##############	##############	##############	3.53
252.78	76.26	90.70	##############	##############	##############	3.52
252.83	76.56	90.47	##############	##############	##############	3.53
252.26	76.97	90.69	##############	##############	##############	3.53
251.66	77.05	92.30	##############	##############	##############	3.53
251.57	77.30	93.75	##############	##############	##############	3.53
251.39	77.28	94.65	##############	##############	##############	3.53

251.18	77.20	95.67	##############	##############	##############	3.53
250.29	77.58	96.73	##############	##############	##############	3.53
250.36	77.86	97.62	##############	##############	##############	3.53
250.09	77.63	96.92	##############	##############	##############	3.53
249.83	77.76	95.40	##############	##############	##############	3.53
250.27	77.42	94.52	##############	##############	##############	3.53
250.23	77.35	93.84	##############	##############	##############	3.53
249.89	77.26	93.14	##############	##############	##############	3.54
249.58	77.03	92.75	##############	##############	##############	3.53
248.97	77.08	92.09	##############	##############	##############	3.53
248.38	76.85	91.91	##############	##############	##############	3.53
248.17	76.91	91.58	##############	##############	##############	3.53
247.90	76.86	91.50	##############	##############	##############	3.53
247.47	76.82	91.34	##############	##############	##############	3.53
247.22	76.83	91.20	##############	##############	##############	3.53
247.08	76.74	90.94	##############	##############	##############	3.53
246.49	76.63	90.88	##############	##############	##############	3.53
245.95	76.71	90.44	##############	##############	##############	3.53
245.68	76.55	90.43	##############	##############	##############	3.53
245.29	76.48	90.42	##############	##############	##############	3.53
245.08	76.46	90.31	##############	##############	##############	3.53
245.12	76.68	90.14	##############	##############	##############	3.53
244.59	77.14	90.37	##############	##############	##############	3.54
243.57	77.03	91.90	##############	##############	##############	3.53
242.64	77.50	93.48	##############	##############	##############	3.53
241.94	77.51	94.42	##############	##############	##############	3.53
241.57	77.57	95.70	##############	##############	##############	3.53
240.92	77.75	96.73	##############	##############	##############	3.53
240.79	77.93	97.27	##############	##############	##############	3.53
240.64	77.66	96.25	##############	##############	##############	3.53
240.18	77.75	94.71	##############	##############	##############	3.53
240.08	77.48	93.79	##############	##############	##############	3.53
240.51	77.61	93.15	##############	##############	##############	3.53
240.21	77.33	92.55	##############	##############	##############	3.54
239.91	77.44	92.03	##############	##############	##############	3.53
239.47	77.33	91.69	##############	##############	##############	3.53
238.94	77.05	91.50	##############	##############	##############	3.53
238.62	77.01	91.12	##############	##############	##############	3.53

238.47	76.96	90.84	##############	##############	##############	3.53
237.62	76.79	90.63	##############	##############	##############	3.53
236.84	76.81	90.38	##############	##############	##############	3.53
236.48	76.81	90.20	##############	##############	##############	3.53
236.07	76.71	90.06	##############	##############	##############	3.53
235.37	76.55	89.93	##############	##############	##############	3.53
234.88	76.39	89.31	##############	##############	##############	3.53
234.90	75.46	89.15	##############	##############	##############	3.54
234.61	76.14	88.93	##############	##############	##############	3.54

DGM 1 in	DGM 1 out	Filter 1	massflow2	DGM 2 in	DGM 2 out	Filter 2
Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
°F	°F	°F	ma	°F	°F	°F
DGM 1 in	DGM 1 out	Filter 1	MFC 2	DGM 2 in	DGM 2 out	Filter 2
68.60	68.59	68.07	0.00	68.70	68.768	67.5
68.60	68.59	68.03	0.00	68.69	68.772	67.5
68.58	68.60	68.01	0.00	68.69	68.787	67.5
68.62	68.60	67.96	0.00	68.71	68.793	67.5
68.61	68.62	67.94	0.00	68.74	68.808	67.5
68.63	68.63	67.91	0.00	68.75	68.852	67.5
68.61	68.62	67.88	0.00	68.74	68.845	67.5
68.60	68.62	67.90	0.00	68.74	68.850	67.5
68.63	68.64	67.86	0.00	68.77	68.850	67.5
68.59	68.61	67.82	0.00	68.75	68.869	67.5
68.56	68.56	67.74	0.00	68.72	68.830	67.4
68.53	68.53	67.69	0.00	68.70	68.779	67.4
68.49	68.50	67.69	0.00	68.65	68.742	67.6
68.45	68.47	67.69	0.00	68.62	68.740	67.6
68.41	68.45	67.66	0.00	68.61	68.711	67.5
68.39	68.44	67.64	0.00	68.59	68.676	67.5
68.36	68.43	67.64	0.00	68.57	68.656	67.5
68.32	68.41	67.62	0.00	68.58	68.652	67.4
68.32	68.38	67.61	0.00	68.57	68.652	67.4
68.30	68.39	67.60	0.00	68.56	68.640	67.4
68.29	68.37	67.56	0.00	68.56	68.619	67.4
68.29	68.37	67.52	0.00	68.56	68.634	67.3
68.30	68.38	67.51	0.00	68.54	68.620	67.3
68.30	68.37	67.52	0.00	68.55	68.627	67.3
68.31	68.40	67.49	0.00	68.57	68.648	67.3
68.29	68.38	67.48	0.00	68.56	68.617	67.3
68.32	68.42	67.49	0.00	68.59	68.637	67.3
68.31	68.43	67.45	0.00	68.59	68.647	67.3
68.32	68.42	67.46	0.00	68.61	68.659	67.3
68.33	68.45	67.41	0.00	68.63	68.669	67.3
68.33	68.46	67.44	0.00	68.63	68.667	67.3
68.35	68.47	67.43	0.00	68.67	68.705	67.2

68.36	68.50	67.43	0.00	68.68	68.757	67.3
68.39	68.54	67.45	0.00	68.73	68.788	67.3
68.39	68.56	67.46	0.00	68.76	68.818	67.3
68.44	68.63	67.50	0.00	68.81	68.864	67.3
68.48	68.68	67.52	0.00	68.85	68.903	67.3
68.53	68.72	67.57	0.00	68.92	68.955	67.4
68.60	68.81	67.60	0.00	68.99	69.027	67.4
68.69	68.89	67.68	0.00	69.05	69.104	67.4
68.74	68.95	67.75	0.00	69.13	69.178	67.5
68.82	69.04	67.80	0.00	69.20	69.253	67.6
68.89	69.11	67.87	0.00	69.30	69.350	67.7
68.94	69.14	67.93	0.00	69.32	69.415	67.7
69.01	69.21	68.02	0.00	69.40	69.495	67.8
69.07	69.29	68.05	0.00	69.46	69.572	67.8
69.10	69.34	68.11	0.00	69.51	69.629	67.9
69.13	69.37	68.16	0.00	69.57	69.684	67.9
69.21	69.44	68.24	0.00	69.62	69.748	68.0
69.28	69.50	68.30	0.00	69.70	69.828	68.0
69.32	69.53	68.37	0.00	69.73	69.883	68.1
69.36	69.59	68.39	0.00	69.78	69.954	68.2
69.41	69.64	68.46	0.00	69.81	69.991	68.2
69.44	69.68	68.50	0.00	69.87	70.025	68.3
69.47	69.68	68.56	0.00	69.87	70.058	68.3
69.49	69.70	68.59	0.00	69.90	70.112	68.3
69.50	69.76	68.62	0.00	69.96	70.143	68.4
69.55	69.78	68.68	0.00	69.99	70.192	68.4
69.57	69.79	68.72	0.00	70.01	70.216	68.5
69.61	69.84	68.77	0.00	70.05	70.259	68.6
69.64	69.89	68.80	0.00	70.09	70.314	68.6
69.67	69.91	68.88	0.00	70.15	70.337	68.7
69.72	69.98	68.92	0.00	70.17	70.392	68.7
69.78	70.05	69.01	0.00	70.25	70.466	68.8
69.85	70.12	69.08	0.00	70.35	70.532	68.8
69.89	70.18	69.15	0.00	70.38	70.581	68.9
69.93	70.21	69.23	0.00	70.47	70.656	69.0
69.98	70.27	69.31	0.00	70.53	70.703	69.0
70.02	70.33	69.40	0.00	70.62	70.790	69.1
70.09	70.41	69.46	0.00	70.70	70.873	69.2

70.13	70.46	69.54	0.00	70.75	70.925	69.2
70.18	70.51	69.64	0.00	70.81	70.989	69.3
70.23	70.58	69.76	0.00	70.87	71.066	69.4
70.23	70.60	69.82	0.00	70.91	71.091	69.4
70.27	70.64	69.89	0.00	70.94	71.169	69.5
70.31	70.68	69.98	0.00	70.97	71.173	69.5
70.31	70.72	70.05	0.00	71.04	71.219	69.6
70.35	70.76	70.14	0.00	71.11	71.268	69.7
70.42	70.81	70.26	0.00	71.15	71.328	69.8
70.42	70.83	70.31	0.00	71.17	71.353	69.8
70.42	70.84	70.40	0.00	71.19	71.382	69.9
70.45	70.88	70.48	0.00	71.23	71.404	69.9
70.48	70.90	70.55	0.00	71.24	71.450	70.0
70.53	70.94	70.62	0.00	71.30	71.479	70.0
70.57	70.99	70.64	0.00	71.35	71.519	70.1
70.62	71.05	70.73	0.00	71.40	71.595	70.2
70.64	71.07	70.77	0.00	71.45	71.642	70.2
70.64	71.09	70.83	0.00	71.49	71.683	70.3
70.66	71.12	70.92	0.00	71.51	71.737	70.3
70.70	71.12	70.93	0.00	71.53	71.760	70.4
70.72	71.17	71.01	0.00	71.57	71.813	70.4
70.71	71.20	71.08	0.00	71.59	71.855	70.5
70.73	71.22	71.14	0.00	71.64	71.884	70.6
70.78	71.28	71.17	0.00	71.67	71.940	70.6
70.80	71.29	71.24	0.00	71.70	71.966	70.7
70.81	71.31	71.29	0.00	71.74	71.994	70.7
70.83	71.35	71.35	0.00	71.77	72.052	70.8
70.86	71.35	71.39	0.00	71.79	72.067	70.8
70.87	71.40	71.45	0.00	71.84	72.120	70.9
70.88	71.41	71.46	0.00	71.85	72.129	70.9
70.90	71.39	71.52	0.00	71.86	72.182	71.0
70.92	71.43	71.53	0.00	71.89	72.185	71.0
70.93	71.45	71.58	0.00	71.91	72.205	71.1
70.95	71.47	71.60	0.00	71.95	72.238	71.1
70.99	71.50	71.59	0.00	71.97	72.271	71.2
71.01	71.51	71.61	0.00	72.00	72.312	71.2
71.02	71.53	71.64	0.00	72.04	72.344	71.2
71.06	71.55	71.65	0.00	72.04	72.344	71.2

71.06	71.59	71.67	0.00	72.05	72.370	71.2
71.10	71.62	71.69	0.00	72.12	72.386	71.3
71.13	71.67	71.70	0.00	72.16	72.432	71.3
71.20	71.72	71.76	0.00	72.18	72.466	71.3
71.23	71.73	71.77	0.00	72.20	72.472	71.3
71.23	71.76	71.75	0.00	72.21	72.498	71.3
71.27	71.78	71.73	0.00	72.23	72.514	71.3
71.26	71.76	71.73	0.00	72.22	72.518	71.3
71.28	71.76	71.74	0.00	72.21	72.499	71.3
71.32	71.79	71.77	0.00	72.25	72.481	71.35
71.31	71.80	71.77	0.00	72.24	72.498	71.32
71.32	71.79	71.80	0.00	72.237	72.498	71.35
71.33	71.80	71.81	0.00	72.234	72.499	71.36
71.30	71.78	71.80	0.00	72.230	72.482	71.35
71.30	71.79	71.78	0.00	72.222	72.510	71.41
71.30	71.78	71.77	0.00	72.228	72.519	71.41
71.31	71.78	71.72	0.00	72.217	72.519	71.41
71.33	71.79	71.73	0.00	72.254	72.515	71.38
71.31	71.77	71.74	0.00	72.240	72.500	71.37
71.34	71.80	71.73	0.00	72.256	72.504	71.33
71.35	71.81	71.71	0.00	72.239	72.492	71.34
71.36	71.82	71.69	0.00	72.262	72.516	71.33
71.36	71.85	71.68	0.00	72.279	72.535	71.36
71.36	71.86	71.67	0.00	72.307	72.550	71.38
71.39	71.86	71.67	0.00	72.323	72.583	71.38
71.39	71.86	71.69	0.00	72.293	72.589	71.38
71.39	71.85	71.72	0.00	72.299	72.587	71.37
71.38	71.86	71.71	0.00	72.285	72.589	71.38
71.36	71.83	71.70	0.00	72.268	72.599	71.36
71.36	71.83	71.70	0.00	72.261	72.569	71.34
71.35	71.82	71.67	0.00	72.267	72.572	71.34
71.35	71.79	71.64	0.00	72.261	72.580	71.35
71.33	71.79	71.62	0.00	72.255	72.575	71.35
71.34	71.79	71.59	0.00	72.251	72.599	71.37
71.33	71.79	71.59	0.00	72.252	72.598	71.34
71.35	71.79	71.59	0.00	72.250	72.595	71.32
71.32	71.77	71.57	0.00	72.232	72.583	71.31
71.33	71.77	71.57	0.00	72.230	72.589	71.32

71.33	71.79	71.55	0.00	72.214	72.578	71.28
71.33	71.76	71.54	0.00	72.211	72.557	71.27
71.31	71.76	71.51	0.00	72.214	72.574	71.27
71.33	71.79	71.50	0.00	72.251	72.604	71.31
71.32	71.77	71.46	0.00	72.221	72.578	71.29
71.32	71.76	71.46	0.00	72.229	72.599	71.30
71.34	71.80	71.46	0.00	72.256	72.614	71.33
71.35	71.79	71.45	0.00	72.237	72.599	71.30
71.33	71.78	71.47	0.00	72.244	72.601	71.29
71.36	71.77	71.49	0.00	72.214	72.593	71.31
71.34	71.76	71.48	0.00	72.214	72.564	71.30
71.34	71.75	71.48	0.00	72.192	72.532	71.29
71.33	71.74	71.48	0.00	72.178	72.525	71.27
71.34	71.74	71.47	0.00	72.168	72.494	71.26
71.35	71.71	71.45	0.00	72.157	72.479	71.27
71.35	71.73	71.43	0.00	72.150	72.457	71.26
71.37	71.72	71.41	0.00	72.167	72.475	71.28
71.34	71.72	71.36	0.00	72.129	72.439	71.26
71.36	71.71	71.36	0.00	72.134	72.429	71.24
71.35	71.70	71.33	0.00	72.139	72.436	71.22
71.33	71.71	71.33	0.00	72.115	72.431	71.21
71.32	71.68	71.30	0.00	72.129	72.428	71.18
71.33	71.67	71.31	0.00	72.112	72.447	71.21
71.32	71.69	71.25	0.00	72.121	72.429	71.20
71.36	71.71	71.24	0.00	72.159	72.450	71.21
71.36	71.73	71.17	0.00	72.178	72.497	71.17
71.39	71.80	71.15	0.00	72.217	72.510	71.16
71.42	71.81	71.10	0.00	72.262	72.550	71.11
71.42	71.82	71.08	0.00	72.254	72.578	71.10
71.44	71.83	71.05	0.00	72.264	72.574	71.10
71.43	71.83	71.06	0.00	72.260	72.565	71.09
71.45	71.85	71.00	0.00	72.276	72.578	71.07
71.45	71.89	71.02	0.00	72.305	72.596	71.08
71.45	71.86	70.97	0.00	72.304	72.588	71.05
71.46	71.85	70.95	0.00	72.282	72.624	71.04
71.44	71.83	70.92	0.00	72.291	72.625	71.00
71.42	71.82	70.88	0.00	72.262	72.620	70.97
71.40	71.81	70.87	0.00	72.257	72.597	70.95

71.40	71.78	70.87	0.00	72.229	72.590	70.95
71.38	71.77	70.86	0.00	72.219	72.582	70.98
71.34	71.75	70.85	0.00	72.220	72.580	70.91
71.35	71.75	70.86	0.00	72.210	72.565	70.91
71.35	71.76	70.84	0.00	72.211	72.586	70.90
71.35	71.75	70.83	0.00	72.205	72.567	70.88
71.37	71.75	70.83	0.00	72.225	72.586	70.87
71.38	71.75	70.96	0.00	72.221	72.587	70.91
71.41	71.74	73.91	0.00	72.198	72.597	75.46
71.38	71.74	80.27	0.00	72.179	72.566	82.44
71.41	71.74	82.95	0.00	72.185	72.537	84.25
71.43	71.80	83.09	0.00	72.243	72.571	83.86
71.50	71.85	82.56	0.00	72.290	72.579	83.25
71.53	71.88	81.92	0.00	72.282	72.608	82.61
71.56	71.93	81.29	0.00	72.330	72.614	82.08
71.60	71.98	80.74	0.00	72.374	72.644	81.51
71.62	72.00	80.24	0.00	72.387	72.678	80.98
71.65	72.01	79.79	0.00	72.397	72.696	80.51
71.66	72.02	79.36	0.00	72.423	72.707	80.07
71.68	72.06	78.96	0.00	72.431	72.714	79.63
71.68	72.05	78.59	0.00	72.440	72.740	79.22
71.69	72.07	78.25	0.00	72.459	72.756	78.86
71.70	72.07	77.92	0.00	72.432	72.756	78.49
71.71	72.05	77.56	0.00	72.424	72.745	78.16
71.71	72.06	77.26	0.00	72.436	72.757	77.84
71.73	72.09	76.98	0.00	72.458	72.758	77.53
71.72	72.11	76.69	0.00	72.454	72.750	77.23
71.73	72.09	76.51	0.00	72.452	72.733	76.98
71.75	72.08	76.26	0.00	72.451	72.748	76.73
71.72	72.08	76.03	0.00	72.468	72.781	76.47
71.72	72.09	75.80	0.00	72.474	72.799	76.22
71.70	72.08	75.57	0.00	72.467	72.795	76.02
71.71	72.07	75.38	0.00	72.453	72.778	75.79
71.70	72.05	75.24	0.00	72.438	72.763	75.65
71.68	72.04	76.79	0.00	72.426	72.742	77.84
71.67	72.00	83.60	0.00	72.410	72.752	82.49
71.68	72.01	85.57	0.00	72.423	72.729	82.77
71.72	72.08	85.34	0.00	72.467	72.738	82.30

71.78	72.15	85.58	0.00	72.540	72.769	81.79
71.89	72.25	86.68	0.00	72.645	72.829	81.37
71.99	72.35	80.88	0.00	72.730	72.921	90.31
72.09	72.47	84.81	0.00	72.832	73.002	91.75
72.24	72.62	86.41	0.00	72.957	73.169	91.40
73.49	72.72	86.16	3.51	73.690	73.407	90.58
74.27	72.93	85.78	3.51	74.077	73.584	89.74
74.72	73.10	85.43	3.51	74.390	73.760	88.98
75.04	73.27	85.06	3.51	74.664	73.872	88.29
75.39	73.44	84.74	3.50	74.943	74.034	87.66
75.70	73.62	84.46	3.50	75.236	74.177	87.09
75.95	73.78	84.18	3.51	75.508	74.320	86.57
76.22	73.95	83.90	3.51	75.770	74.460	86.08
76.46	74.12	83.70	3.51	76.027	74.616	85.65
76.70	74.30	83.50	3.51	76.268	74.785	85.29
76.93	74.48	83.34	3.51	76.514	74.938	84.92
77.11	74.60	83.16	3.51	76.716	75.073	84.54
77.13	74.71	83.01	3.51	76.800	75.181	84.21
77.06	74.78	82.82	3.52	76.834	75.245	83.91
76.98	74.84	82.69	3.51	76.835	75.305	83.61
77.01	74.90	82.54	3.51	76.896	75.381	83.36
77.18	75.00	82.43	3.52	77.001	75.445	83.14
77.39	75.09	82.38	3.51	77.167	75.555	82.98
77.63	75.21	82.31	3.52	77.353	75.650	82.78
77.82	75.35	82.22	3.51	77.530	75.757	82.62
77.99	75.47	82.20	3.51	77.712	75.885	82.45
78.24	75.60	82.19	3.51	77.905	76.015	82.31
78.53	75.76	82.18	3.51	78.135	76.146	82.22
78.82	75.93	82.19	3.51	78.375	76.300	82.15
79.12	76.10	82.22	3.51	78.633	76.463	82.06
79.41	76.27	82.26	3.51	78.894	76.616	82.05
79.69	76.47	82.33	3.51	79.148	76.770	82.00
79.95	76.62	82.40	3.51	79.392	76.929	82.01
80.22	76.81	82.48	3.51	79.651	77.106	82.03
80.47	76.98	82.60	3.51	79.899	77.271	82.0
80.73	77.16	82.66	3.52	80.141	77.425	82.0
80.88	77.30	82.73	3.50	80.311	77.581	82.1
80.82	77.38	82.80	3.51	80.368	77.681	82.1

80.66	77.46	82.87	3.50	80.342	77.777	82.1
80.49	77.50	82.92	3.51	80.312	77.840	82.1
80.31	77.53	82.98	3.51	80.252	77.882	82.1
80.20	77.56	83.01	3.51	80.180	77.954	82.1
80.07	77.58	83.07	3.51	80.110	77.991	82.1
79.90	77.57	83.07	3.50	79.994	78.010	82.1
79.82	77.58	83.08	3.51	79.923	78.043	82.0
79.74	77.60	83.09	3.50	79.871	78.067	82.0
79.70	77.61	83.11	3.50	79.805	78.095	82.0
79.69	77.63	83.11	3.51	79.798	78.112	82.0
79.84	77.69	83.15	3.51	79.843	78.168	82.0
80.06	77.76	83.22	3.50	79.971	78.245	82.0
80.29	77.83	83.25	3.50	80.120	78.342	82.0
80.52	77.94	83.27	3.51	80.254	78.434	82.1
80.67	78.05	83.29	3.51	80.409	78.545	82.1
80.85	78.19	83.35	3.51	80.559	78.650	82.1
81.05	78.33	83.39	3.50	80.733	78.769	82.1
81.20	78.46	83.44	3.51	80.896	78.873	82.1
81.23	78.51	83.48	3.50	80.948	78.974	82.1
81.12	78.57	83.49	3.51	80.893	79.050	82.1
80.95	78.57	83.52	3.51	80.807	79.095	82.2
80.79	78.58	83.51	3.51	80.711	79.131	82.1
80.60	78.59	83.46	3.50	80.582	79.129	82.1
80.41	78.58	83.45	3.50	80.532	79.142	82.1
80.32	78.59	83.37	3.50	80.429	79.151	82.0
80.25	78.58	83.34	3.50	80.352	79.156	82.0
80.18	78.61	82.97	3.51	80.306	79.202	81.9
80.05	78.60	82.58	3.50	80.223	79.198	81.9
79.99	78.59	82.58	3.51	80.160	79.181	81.8
79.94	78.62	82.19	3.51	80.145	79.202	81.8
79.97	78.66	84.01	3.50	80.137	79.208	81.7
80.11	78.67	84.07	3.50	80.191	79.238	81.8
80.33	78.78	83.89	3.51	80.289	79.310	81.8
80.64	78.85	83.77	3.50	80.466	79.383	81.8
80.88	78.93	83.63	3.51	80.615	79.463	81.9
81.13	79.05	83.47	3.50	80.801	79.579	81.9
81.35	79.18	83.34	3.51	81.003	79.696	82.0
81.58	79.29	83.23	3.51	81.211	79.821	82.0

81.79	79.44	83.12	3.50	81.386	79.956	82.1
81.91	79.56	83.00	3.51	81.513	80.057	82.1
81.79	79.60	82.87	3.50	81.517	80.129	82.1
81.55	79.62	82.78	3.51	81.432	80.164	82.1
81.26	79.60	82.67	3.50	81.298	80.185	82.1
80.95	79.58	82.59	3.50	81.168	80.174	82.1
80.66	79.58	82.54	3.50	81.036	80.202	82.1
80.44	79.53	82.43	3.50	80.845	80.184	82.0
80.24	79.50	82.38	3.50	80.672	80.170	82.0
80.10	79.47	82.33	3.50	80.586	80.160	82.0
80.02	79.47	82.30	3.50	80.493	80.161	82.0
79.95	79.44	82.26	3.50	80.398	80.142	82.0
79.86	79.42	82.20	3.51	80.360	80.124	81.9
79.79	79.40	82.15	3.49	80.272	80.121	81.9
79.76	79.37	82.12	3.50	80.182	80.118	81.9
79.72	79.35	82.09	3.50	80.155	80.121	81.9
79.68	79.32	82.04	3.50	80.103	80.101	81.9
79.68	79.32	82.01	3.50	80.076	80.078	81.8
79.63	79.30	81.97	3.50	80.026	80.063	81.8
79.59	79.29	81.97	3.50	79.996	80.055	81.8
79.56	79.28	81.94	3.51	79.913	80.060	81.7
79.60	79.31	81.94	3.50	79.917	80.037	81.7
79.70	79.32	81.90	3.50	79.985	80.042	81.7
79.97	79.40	81.89	3.50	80.136	80.071	81.7
80.21	79.46	81.89	3.50	80.270	80.127	81.7
80.53	79.58	81.93	3.51	80.519	80.243	81.8
80.83	79.70	81.93	3.50	80.735	80.334	81.8
81.09	79.81	82.00	3.50	80.968	80.440	81.8
81.29	79.91	82.03	3.51	81.138	80.553	81.8
81.30	79.97	82.08	3.50	81.192	80.622	81.9
81.19	79.99	82.13	3.51	81.194	80.657	81.9
81.04	80.01	82.14	3.51	81.128	80.685	81.9
80.89	80.06	82.19	3.50	81.132	80.704	81.9
80.75	80.05	82.18	3.51	81.028	80.729	81.9
80.66	80.02	82.22	3.51	80.928	80.724	82.0
80.58	80.01	82.21	3.50	80.880	80.742	81.9
80.49	79.99	82.21	3.51	80.810	80.748	82.0
80.47	79.99	82.22	3.50	80.760	80.756	82.0

80.44	79.98	82.22	3.50	80.737	80.766	82.0
80.36	79.98	82.24	3.51	80.704	80.773	82.0
80.32	79.96	82.25	3.51	80.691	80.797	82.0
80.30	79.99	82.25	3.50	80.674	80.822	82.0
80.26	79.99	82.25	3.51	80.666	80.816	82.0
80.23	79.98	82.26	3.51	80.681	80.820	82.0
80.20	80.00	82.27	3.50	80.677	80.852	82.0
80.21	80.01	82.27	3.50	80.677	80.861	82.0
80.24	80.01	82.31	3.50	80.669	80.879	82.0
80.21	80.01	82.30	3.50	80.642	80.868	82.0
80.14	79.98	82.31	3.50	80.570	80.872	82.0
80.11	79.94	82.33	3.51	80.525	80.870	82.0
80.04	79.94	82.32	3.51	80.444	80.860	82.0
79.98	79.93	82.32	3.51	80.384	80.876	81.9
79.93	79.91	82.33	3.51	80.374	80.846	81.9
79.92	79.94	82.32	3.50	80.388	80.876	81.9
79.84	79.92	82.33	3.51	80.347	80.832	81.9
79.78	79.89	82.31	3.50	80.270	80.841	81.9
79.61	79.91	82.26	3.50	80.214	80.830	81.9
79.52	79.88	82.23	3.50	80.155	80.809	81.8
79.46	79.87	82.21	3.51	80.142	80.793	81.8
79.42	79.88	82.18	3.50	80.099	80.799	81.7
79.32	79.84	82.18	3.50	80.009	80.797	81.7
79.24	79.83	82.15	3.50	79.993	80.781	81.7
79.17	79.79	82.09	3.50	79.953	80.739	81.6
79.08	79.77	82.02	3.50	79.919	80.727	81.5
79.03	79.74	81.98	3.51	79.839	80.687	81.5
78.98	79.70	81.93	3.51	79.758	80.686	81.5
78.94	79.65	81.86	3.50	79.625	80.637	81.4
78.88	79.64	81.87	3.50	79.547	80.619	81.4
78.82	79.60	81.82	3.51	79.465	80.593	81.3
78.78	79.59	81.76	3.50	79.449	80.568	81.2
78.67	79.57	81.72	3.50	79.386	80.551	81.2
78.60	79.51	81.60	3.51	79.338	80.530	81.1
78.61	79.51	81.56	3.51	79.311	80.504	81.1
78.59	79.49	81.47	3.50	79.305	80.492	81.0
78.58	79.51	81.38	3.50	79.326	80.451	80.9
78.65	79.51	81.32	3.51	79.406	80.462	80.9

78.88	79.58	81.28	3.50	79.523	80.491	80.9
79.14	79.64	81.25	3.51	79.681	80.552	80.9
79.43	79.74	81.31	3.51	79.886	80.638	80.9
79.72	79.84	81.29	3.50	80.113	80.715	80.9
79.94	79.95	81.29	3.51	80.286	80.791	80.9
80.09	80.05	81.27	3.50	80.468	80.867	80.9
80.17	80.12	81.31	3.51	80.572	80.955	81.0
80.18	80.15	81.34	3.50	80.613	80.978	80.9
80.15	80.21	81.34	3.50	80.657	81.027	80.9
80.09	80.23	81.34	3.50	80.653	81.049	81.0
80.01	80.25	81.37	3.51	80.657	81.075	81.0
79.92	80.25	81.36	3.51	80.630	81.101	80.9
79.84	80.27	81.35	3.50	80.605	81.096	80.9
79.74	80.23	81.34	3.51	80.546	81.094	80.9
79.64	80.24	81.31	3.50	80.481	81.097	80.9
79.61	80.22	81.34	3.52	80.466	81.095	80.9
79.54	80.23	81.32	3.50	80.428	81.116	80.8
79.49	80.21	81.30	3.51	80.386	81.102	80.8
79.44	80.20	81.30	3.50	80.320	81.079	80.8
79.38	80.20	81.27	3.50	80.280	81.105	80.7
79.31	80.18	81.26	3.50	80.224	81.104	80.7
79.24	80.14	81.21	3.51	80.134	81.068	80.6
79.17	80.16	81.19	3.51	80.095	81.047	80.6
79.14	80.15	82.10	3.50	80.068	81.060	80.5
79.10	80.13	85.23	3.51	80.041	81.035	83.2
79.26	80.19	85.21	3.51	80.136	81.076	88.0
79.50	80.23	85.02	3.51	80.262	81.084	88.7
79.81	80.32	84.82	3.51	80.465	81.136	88.5
80.12	80.43	84.68	3.51	80.704	81.237	88.2
80.40	80.55	84.57	3.50	80.914	81.330	87.8
80.70	80.66	84.43	3.51	81.170	81.440	87.4
80.99	80.81	84.32	3.51	81.430	81.559	87.1
81.32	80.98	84.23	3.50	81.696	81.693	86.8
81.60	81.11	84.16	3.50	81.953	81.817	86.6
81.86	81.28	84.08	3.51	82.195	81.953	86.3
82.12	81.44	84.05	3.51	82.458	82.081	86.1
82.35	81.61	83.99	3.52	82.717	82.214	85.9
82.59	81.78	83.94	3.51	82.933	82.366	85.7

82.76	81.93	83.97	3.51	83.170	82.483	85.6
82.93	82.09	83.96	3.52	83.362	82.623	85.5
83.11	82.26	83.94	3.51	83.601	82.782	85.4
83.28	82.42	83.96	3.52	83.793	82.908	85.3
83.46	82.60	83.96	3.52	84.013	83.068	85.2
83.62	82.70	84.00	3.52	84.164	83.184	85.1
83.69	82.81	84.02	3.52	84.290	83.298	85.0
83.61	82.90	84.05	3.52	84.309	83.383	85.0
83.46	82.93	84.04	3.52	84.256	83.425	84.9
83.26	82.93	84.06	3.52	84.150	83.455	84.8
83.06	82.93	84.07	3.51	84.061	83.479	84.8
82.88	82.91	84.06	3.52	83.933	83.459	84.7
82.72	82.91	84.05	3.52	83.822	83.464	84.6
82.53	82.87	84.06	3.53	83.691	83.456	84.5
82.39	82.84	84.07	3.52	83.589	83.455	84.5
82.32	82.82	84.03	3.52	83.496	83.413	84.4
82.36	82.82	84.02	3.52	83.489	83.432	84.3
82.43	82.85	84.06	3.52	83.498	83.447	84.3
82.62	82.93	84.04	3.52	83.642	83.504	84.2
82.85	83.01	84.04	3.52	83.767	83.574	84.2
83.07	83.13	84.08	3.51	83.950	83.662	84.2
83.31	83.24	84.09	3.52	84.120	83.764	84.2
83.53	83.35	84.14	3.52	84.285	83.862	84.2
83.78	83.50	84.20	3.53	84.504	84.002	84.2
83.96	83.60	84.23	3.52	84.658	84.087	84.2
84.09	83.69	84.28	3.52	84.796	84.178	84.2
84.06	83.76	84.31	3.52	84.828	84.257	84.2
83.95	83.78	84.32	3.52	84.783	84.287	84.2
83.78	83.78	84.36	3.53	84.685	84.302	84.2
83.60	83.77	84.38	3.53	84.565	84.306	84.2
83.51	83.78	84.39	3.53	84.501	84.323	84.2
83.36	83.75	84.41	3.52	84.406	84.323	84.1
83.19	83.72	84.40	3.52	84.292	84.310	84.1
83.08	83.70	84.43	3.52	84.191	84.298	84.1
83.00	83.67	84.41	3.52	84.114	84.296	84.1
82.92	83.65	84.41	3.53	84.048	84.309	84.0
82.83	83.64	84.41	3.53	83.968	84.303	84.0
82.76	83.62	84.41	3.52	83.905	84.287	84.0

82.67	83.59	84.38	3.52	83.832	84.265	84.0
82.61	83.60	84.37	3.52	83.775	84.269	83.9
82.55	83.58	84.36	3.52	83.730	84.280	83.9
82.67	83.61	84.35	3.53	83.789	84.279	83.9
82.87	83.64	84.39	3.53	83.894	84.331	83.9
83.12	83.75	84.38	3.52	84.073	84.378	84.0
83.42	83.85	84.43	3.52	84.268	84.466	84.0
83.69	83.94	84.48	3.52	84.469	84.576	84.0
83.94	84.08	84.54	3.52	84.674	84.667	84.1
84.20	84.20	84.57	3.53	84.883	84.798	84.1
84.37	84.33	84.63	3.52	85.048	84.891	84.2
84.41	84.37	84.65	3.52	85.132	84.981	84.1
84.36	84.46	84.69	3.53	85.156	85.028	84.2
84.29	84.47	84.76	3.52	85.133	85.062	84.2
84.13	84.47	84.78	3.52	85.065	85.095	84.2
83.95	84.48	84.80	3.52	84.978	85.080	84.2
83.82	84.44	84.81	3.52	84.891	85.076	84.2
83.73	84.44	84.82	3.52	84.828	85.077	84.3
83.65	84.43	84.82	3.53	84.758	85.086	84.2
83.60	84.43	84.84	3.53	84.702	85.077	84.2
83.47	84.41	84.84	3.52	84.633	85.064	84.2
83.41	84.39	84.83	3.53	84.546	85.060	84.2
83.36	84.37	84.84	3.53	84.502	85.054	84.2
83.28	84.36	84.80	3.53	84.434	85.043	84.2
83.18	84.33	84.76	3.53	84.359	85.018	84.1
83.11	84.30	84.75	3.53	84.284	85.017	84.1
83.06	84.29	84.74	3.54	84.243	85.006	84.1
83.00	84.26	84.74	3.53	84.160	84.978	84.1
82.96	84.24	84.69	3.53	84.113	84.977	84.1
82.92	84.25	84.68	3.53	84.061	84.971	84.0
82.85	84.21	84.67	3.53	84.026	84.968	84.0
82.77	84.16	84.64	3.52	83.959	84.932	83.9
82.71	84.13	84.61	3.53	83.875	84.924	83.9
82.69	84.10	84.54	3.53	83.840	84.895	83.9
82.64	84.07	84.47	3.54	83.771	84.860	83.8
82.63	84.05	84.45	3.53	83.733	84.841	83.8
82.78	84.08	84.43	3.53	83.810	84.849	83.7
82.97	84.13	84.46	3.53	83.930	84.868	83.8

83.22	84.20	84.44	3.52	84.106	84.913	83.7
83.45	84.27	84.41	3.53	84.293	84.985	83.8
83.68	84.38	84.44	3.53	84.478	85.052	83.8
83.89	84.49	84.45	3.53	84.650	85.158	83.8
84.04	84.54	84.47	3.53	84.783	85.223	83.8
84.01	84.57	84.47	3.53	84.781	85.256	83.9
83.95	84.59	84.48	3.53	84.776	85.281	83.9
83.83	84.58	84.45	3.52	84.720	85.262	83.9
83.71	84.57	84.45	3.53	84.651	85.262	83.8
83.55	84.54	84.44	3.53	84.560	85.258	83.8
83.42	84.51	84.44	3.53	84.454	85.219	83.8
83.30	84.49	84.46	3.53	84.369	85.204	83.8
83.14	84.44	84.41	3.53	84.281	85.164	83.8
83.04	84.40	84.39	3.52	84.188	85.130	83.8
82.94	84.39	84.34	3.53	84.132	85.110	83.7
82.89	84.34	84.31	3.53	84.062	85.082	83.7
82.82	84.32	84.29	3.52	83.987	85.057	83.7
82.77	84.31	84.28	3.53	83.931	85.055	83.7
82.72	84.26	84.22	3.52	83.843	85.028	83.6
82.67	84.24	84.16	3.52	83.805	85.002	83.6
82.61	84.20	84.12	3.53	83.744	84.969	83.6
82.51	84.17	84.11	3.53	83.687	84.941	83.5
82.48	84.14	84.08	3.52	83.650	84.906	83.5
82.41	84.11	84.03	3.53	83.607	84.874	83.5
82.36	84.10	84.00	3.53	83.568	84.844	83.4
82.30	84.06	83.94	3.53	83.459	84.821	83.4
82.20	84.02	83.88	3.53	83.363	84.768	83.3
82.12	83.95	83.87	3.53	83.283	84.729	83.3
82.16	83.94	83.82	3.52	83.238	84.706	83.2
82.25	83.92	83.77	3.53	83.278	84.657	83.2
82.41	83.95	83.78	3.52	83.366	84.671	83.2
82.61	83.98	83.77	3.53	83.492	84.697	83.2
82.84	84.05	83.75	3.53	83.656	84.723	83.2
83.06	84.13	83.76	3.54	83.838	84.803	83.2
83.23	84.19	83.78	3.53	83.956	84.858	83.2
83.35	84.22	83.79	3.52	84.053	84.912	83.2
83.36	84.27	83.78	3.52	84.095	84.917	83.2
83.32	84.27	83.80	3.53	84.049	84.923	83.2

83.20	84.23	83.77	3.53	83.987	84.913	83.2
83.06	84.19	83.78	3.53	83.897	84.867	83.2
82.91	84.15	83.76	3.53	83.830	84.848	83.2
82.78	84.07	83.74	3.52	83.716	84.832	83.1
82.62	84.01	83.68	3.52	83.590	84.775	83.1
82.49	83.94	83.67	3.54	83.464	84.748	83.1
82.34	83.88	83.63	3.53	83.318	84.690	83.1
82.23	83.83	83.62	3.53	83.194	84.610	83.0
82.11	83.77	83.58	3.53	83.079	84.575	83.0
82.02	83.71	83.50	3.53	82.959	84.516	83.0
81.96	83.65	83.49	3.52	82.855	84.493	82.9
81.90	83.61	83.46	3.53	82.792	84.459	82.9
81.84	83.57	83.43	3.53	82.747	84.411	82.9
81.82	83.50	83.38	3.53	82.713	84.383	82.8
81.79	83.47	83.33	3.53	82.681	84.329	82.8
81.74	83.42	83.30	3.53	82.650	84.295	82.8
81.66	83.34	83.28	3.53	82.596	84.252	82.7
81.56	83.29	83.23	3.53	82.506	84.215	82.7
81.50	83.27	83.16	3.53	82.409	84.169	82.7
81.56	83.25	83.14	3.53	82.427	84.137	82.6
81.69	83.25	83.09	3.52	82.470	84.125	82.6
81.89	83.31	83.08	3.53	82.620	84.146	82.5
82.12	83.35	83.06	3.53	82.745	84.165	82.5
82.40	83.41	83.07	3.52	82.922	84.209	82.6
82.62	83.50	83.12	3.53	83.096	84.262	82.6
82.84	83.56	83.11	3.52	83.256	84.320	82.6
82.98	83.62	83.11	3.53	83.397	84.359	82.6
82.97	83.65	83.12	3.52	83.436	84.388	82.6
82.91	83.65	83.11	3.53	83.423	84.382	82.6
82.84	83.65	83.13	3.53	83.381	84.376	82.6
82.74	83.62	83.14	3.52	83.346	84.357	82.6
82.59	83.57	83.13	3.52	83.283	84.324	82.6
82.45	83.53	83.09	3.53	83.189	84.304	82.6
82.30	83.50	83.08	3.52	83.079	84.263	82.6
82.18	83.42	83.05	3.53	82.954	84.219	82.5
82.06	83.39	83.01	3.52	82.856	84.181	82.5
81.96	83.36	83.00	3.52	82.743	84.156	82.5
81.84	83.31	82.97	3.53	82.647	84.096	82.5

81.76	83.26	82.95	3.53	82.550	84.055	82.5
81.66	83.22	82.90	3.53	82.452	84.016	82.4
81.56	83.16	82.86	3.53	82.348	83.986	82.4
81.48	83.11	82.82	3.52	82.266	83.915	82.4
81.40	83.07	82.77	3.53	82.158	83.897	82.4
81.32	83.02	82.76	3.53	82.096	83.839	82.3
81.24	82.96	82.70	3.53	81.990	83.777	82.3
81.16	82.89	82.65	3.53	81.928	83.761	82.3
81.15	82.87	82.62	3.53	81.882	83.688	82.2
81.24	82.85	82.58	3.53	81.946	83.670	82.2
81.41	82.84	82.57	3.52	82.034	83.663	82.2
81.60	82.88	82.54	3.53	82.172	83.686	82.1
81.85	82.95	82.55	3.53	82.344	83.699	82.1
82.10	83.02	82.58	3.52	82.518	83.770	82.2
82.34	83.07	82.59	3.54	82.697	83.820	82.2
82.55	83.16	82.62	3.52	82.872	83.870	82.2
82.67	83.21	82.62	3.53	82.978	83.909	82.2
82.66	83.24	82.65	3.52	83.033	83.936	82.3
82.59	83.23	82.65	3.53	83.032	83.938	82.3
82.48	83.22	82.63	3.53	82.985	83.929	82.3
82.36	83.18	82.65	3.53	82.947	83.922	82.3
82.24	83.15	82.64	3.53	82.882	83.895	82.3
82.09	83.07	82.62	3.53	82.786	83.867	82.3
81.94	83.01	82.58	3.53	82.690	83.822	82.2
81.83	82.96	82.59	3.53	82.580	83.792	82.2
81.72	82.93	82.55	3.53	82.467	83.726	82.2
81.60	82.88	82.53	3.53	82.359	83.692	82.2
81.48	82.82	82.51	3.52	82.242	83.648	82.2
81.38	82.78	82.48	3.52	82.119	83.604	82.1
81.29	82.73	82.45	3.52	82.032	83.553	82.1
81.19	82.67	82.42	3.52	81.911	83.495	82.1
81.12	82.63	82.40	3.52	81.841	83.449	82.0
81.05	82.57	82.36	3.53	81.751	83.406	82.0
80.98	82.54	82.31	3.52	81.652	83.354	82.0
81.02	82.51	82.28	3.53	81.670	83.337	82.0
81.12	82.50	82.23	3.53	81.728	83.291	81.9
81.28	82.50	82.24	3.52	81.823	83.257	81.9
81.46	82.54	82.23	3.53	81.951	83.271	81.9

81.71	82.60	82.23	3.53	82.125	83.330	81.9
81.91	82.67	82.24	3.53	82.279	83.380	81.9
82.14	82.73	82.28	3.53	82.438	83.428	82.0
82.32	82.81	82.28	3.53	82.622	83.499	82.0
82.47	82.87	82.29	3.52	82.762	83.554	82.0
82.47	82.90	82.29	3.53	82.801	83.570	82.0
82.36	82.89	82.31	3.52	82.788	83.586	82.0
82.27	82.88	82.34	3.53	82.768	83.572	82.0
82.18	82.84	82.32	3.53	82.719	83.564	82.0
82.05	82.81	82.33	3.53	82.680	83.559	82.0
81.91	82.77	82.32	3.53	82.573	83.517	82.0
81.75	82.74	82.32	3.53	82.436	83.472	82.0
81.62	82.66	82.32	3.52	82.320	83.453	82.0
81.51	82.61	82.30	3.52	82.217	83.410	82.0
81.42	82.56	82.27	3.53	82.109	83.356	82.0
81.31	82.50	82.27	3.52	81.990	83.322	81.9
81.22	82.46	82.27	3.53	81.879	83.280	81.9
81.13	82.39	82.24	3.53	81.785	83.221	81.9
81.07	82.36	82.20	3.53	81.715	83.192	81.9
80.96	82.31	82.17	3.53	81.650	83.130	81.8
80.90	82.26	82.17	3.53	81.572	83.088	81.8
80.88	82.22	82.12	3.53	81.519	83.059	81.8
80.96	82.24	82.08	3.52	81.583	83.047	81.7
81.08	82.24	82.06	3.52	81.672	83.027	81.7
81.30	82.31	82.07	3.53	81.816	83.066	81.7
81.53	82.34	82.05	3.53	81.956	83.103	81.7
81.78	82.41	82.09	3.53	82.134	83.132	81.7
82.00	82.49	82.11	3.52	82.294	83.188	81.8
82.23	82.58	82.12	3.53	82.491	83.253	81.8
82.41	82.66	82.14	3.53	82.645	83.335	81.8
82.45	82.70	82.16	3.52	82.714	83.372	81.9
82.38	82.71	82.17	3.53	82.715	83.362	81.9
82.24	82.68	82.18	3.52	82.679	83.363	81.9
82.14	82.67	82.20	3.53	82.648	83.360	81.9
82.05	82.65	82.17	3.52	82.605	83.351	81.9
81.91	82.62	82.20	3.53	82.537	83.337	81.9
81.77	82.55	82.19	3.53	82.427	83.303	81.9
81.64	82.51	82.15	3.52	82.276	83.277	81.9

81.52	82.47	82.16	3.53	82.198	83.243	81.9
81.39	82.42	82.12	3.52	82.083	83.171	81.9
81.29	82.37	82.13	3.53	81.969	83.139	81.8
81.18	82.31	82.09	3.53	81.873	83.099	81.8
81.06	82.26	82.08	3.53	81.774	83.050	81.8
80.99	82.22	82.02	3.53	81.656	83.019	81.8
80.91	82.16	81.99	3.52	81.578	82.964	81.7
80.84	82.11	81.94	3.53	81.484	82.905	81.7
80.78	82.07	81.93	3.53	81.417	82.861	81.7
80.87	82.09	81.91	3.53	81.454	82.835	81.6
81.00	82.06	81.90	3.53	81.523	82.840	81.6
81.19	82.12	81.87	3.53	81.665	82.852	81.6
81.41	82.18	81.87	3.53	81.816	82.868	81.6
81.62	82.22	81.87	3.53	81.945	82.933	81.6
81.83	82.29	81.91	3.54	82.133	82.971	81.6
82.07	82.40	81.92	3.53	82.312	83.033	81.7
82.25	82.46	81.95	3.52	82.481	83.103	81.7
82.34	82.51	81.97	3.52	82.566	83.139	81.7
82.29	82.52	81.99	3.52	82.586	83.166	81.7
82.23	82.54	82.00	3.53	82.589	83.177	81.7
82.08	82.52	81.99	3.52	82.540	83.183	81.7
81.96	82.47	82.01	3.53	82.486	83.168	81.7
81.80	82.45	82.01	3.53	82.412	83.170	81.7
81.66	82.41	81.98	3.53	82.308	83.124	81.8
81.55	82.36	81.99	3.52	82.203	83.104	81.7
81.42	82.30	81.97	3.53	82.101	83.065	81.7
81.31	82.25	81.94	3.53	82.002	83.030	81.7
81.19	82.19	81.92	3.53	81.929	82.973	81.7
81.09	82.16	81.88	3.53	81.822	82.948	81.6
81.00	82.10	81.82	3.53	81.705	82.899	81.6
80.92	82.05	81.82	3.52	81.618	82.846	81.6
80.86	82.01	81.77	3.54	81.546	82.832	81.5
80.79	81.95	81.75	3.52	81.481	82.787	81.5
80.74	81.90	81.69	3.53	81.442	82.729	81.5
80.74	81.89	81.66	3.53	81.411	82.705	81.4
80.84	81.88	81.64	3.53	81.452	82.694	81.4
81.00	81.92	81.65	3.53	81.544	82.696	81.4
81.17	81.94	81.65	3.53	81.641	82.715	81.4

81.33	82.02	81.64	3.53	81.744	82.748	81.4
81.55	82.09	81.67	3.52	81.899	82.801	81.4
81.76	82.18	81.67	3.53	82.063	82.862	81.4
81.96	82.28	81.72	3.52	82.251	82.951	81.4
82.12	82.36	81.72	3.53	82.366	83.010	81.5
82.16	82.40	81.75	3.53	82.437	83.043	81.5
82.11	82.42	81.74	3.54	82.449	83.063	81.5
82.04	82.42	81.77	3.53	82.420	83.068	81.5
81.93	82.41	81.77	3.52	82.383	83.048	81.5
81.81	82.40	81.76	3.52	82.367	83.051	81.5
81.68	82.37	81.74	3.53	82.291	83.039	81.5
81.56	82.31	81.74	3.53	82.226	83.022	81.5
81.43	82.29	81.73	3.52	82.143	83.019	81.5
81.34	82.25	81.72	3.53	82.064	82.980	81.5
81.23	82.19	81.73	3.52	81.985	82.958	81.4
81.16	82.18	81.69	3.52	81.885	82.934	81.4
81.08	82.12	81.69	3.52	81.812	82.899	81.4
81.01	82.09	81.67	3.53	81.711	82.854	81.4
80.94	82.03	81.66	3.53	81.634	82.828	81.4
80.86	81.99	81.62	3.52	81.566	82.798	81.3
80.80	81.96	81.58	3.52	81.489	82.747	81.3
80.73	81.93	81.55	3.53	81.435	82.734	81.3
80.80	81.92	81.52	3.53	81.443	82.691	81.2
80.92	81.91	81.52	3.52	81.492	82.700	81.2
81.08	81.95	81.52	3.52	81.616	82.696	81.2
81.27	82.01	81.53	3.53	81.729	82.741	81.3
81.48	82.09	81.57	3.53	81.882	82.804	81.3
81.73	82.17	81.59	3.52	82.062	82.849	81.3
81.97	82.27	81.63	3.53	82.228	82.917	81.3
82.21	82.37	81.67	3.53	82.438	82.987	81.4
82.36	82.44	81.70	3.54	82.554	83.061	81.4
82.38	82.50	81.73	3.54	82.637	83.098	81.5
82.32	82.52	81.73	3.52	82.640	83.125	81.5
82.19	82.52	81.77	3.53	82.591	83.136	81.5
82.08	82.49	81.80	3.53	82.580	83.122	81.5
81.95	82.47	81.78	3.52	82.523	83.106	81.5
81.84	82.43	81.78	3.53	82.459	83.094	81.5
81.75	82.44	81.76	3.53	82.395	83.073	81.5

81.65	82.40	81.76	3.53	82.347	83.083	81.5
81.52	82.36	81.74	3.52	82.251	83.044	81.5
81.37	82.32	81.72	3.53	82.142	83.025	81.5
81.27	82.26	81.68	3.53	82.025	82.978	81.5
81.17	82.22	81.69	3.53	81.942	82.950	81.5
81.10	82.19	81.67	3.53	81.875	82.925	81.4
81.00	82.13	81.64	3.52	81.744	82.864	81.4
80.85	82.07	81.56	3.53	81.637	82.812	81.3
80.68	82.01	81.50	3.52	81.525	82.747	81.3

scale	Tunnel Velocity	Flue draft	CO	CO2	O2		Right	Back
	Pressure	Pressure						
lbs	dcV	dcV	ma	ma	ma		°F	°F
weight	vel. Tunnel	draft	co	co2	na		right	back
-0.0122	7.206	0.413	0.00	0.0040		3.53743E-08	68.733	69.2705
-0.0119	7.214	0.413	0.00	0.0040		4.12412E-08	68.749	69.2681
-0.0123	7.091	0.413	0.00	0.0040		5.21776E-08	68.730	69.2298
-0.0123	7.953	0.434	0.00	0.0040		5.83119E-08	68.723	69.2297
-0.0120	5.726	0.362	0.00	0.0040		7.53834E-08	68.713	69.2189
-0.0120	5.675	0.413	0.00	0.0040		3.69726E-08	68.701	69.1940
-0.0123	0.001	0.414	0.00	0.0040		4.04405E-08	68.678	69.1691
-0.0121	6.454	0.413	0.00	0.0040		3.75071E-08	68.678	69.1516
-0.0120	6.876	0.434	0.00	0.0040		7.56499E-08	68.649	69.1248
-0.0121	6.044	0.362	0.00	0.0040		6.60484E-08	68.611	69.0886
-0.0122	6.824	0.413	0.00	0.0040		7.40509E-08	68.547	69.0585
-0.0121	6.771	0.362	0.00	0.0040		6.63148E-08	68.548	69.0408
-0.0122	6.841	0.362	0.004	0.0040		7.35166E-08	68.522	69.0308
-0.0123	6.966	0.362	0.004	0.0040		6.41815E-08	68.491	68.9885
6.9511	6.998	0.413	0.004	0.0040		5.45791E-08	68.472	68.9643
9.9465	6.925	0.362	0.004	0.0044		6.52484E-08	68.460	68.9703
9.9496	6.947	0.362	0.004	0.0041		5.51122E-08	68.441	68.9568
9.9491	6.823	0.362	0.004	0.0040		4.49761E-08	68.460	68.9127
9.9466	6.803	0.413	0.004	0.0040		6.79154E-08	68.428	68.8946
9.8491	6.926	0.362	0.004	0.0040		5.13783E-08	68.429	68.8763
9.9495	6.854	0.413	0.004	0.0040		5.83128E-08	68.412	68.8423
9.8518	6.875	0.413	0.004	0.0040		4.89782E-08	68.405	68.8210
9.9502	6.803	0.774	0.004	0.0040		6.15148E-08	68.378	68.7939
9.9499	6.844	1.292	0.004	0.0040		4.551E-08	68.370	68.9393
9.8494	6.967	1.666	0.004	0.0040		4.09746E-08	68.377	69.7300
9.7545	6.874	3.330	0.004	0.0040		5.48447E-08	68.369	70.2455
9.6572	6.772	5.353	0.004	0.0040		3.43065E-08	68.355	70.9346
9.5573	6.649	5.942	0.004	0.0040		4.65764E-08	68.414	72.1892
9.3648	6.844	6.799	0.004	0.0040		3.05725E-08	68.423	73.7335
9.2485	6.752	7.84	0.004	0.0040		5.13774E-08	68.550	75.9102
9.0529	6.649	7.75	0.004	0.0040		5.00432E-08	68.682	79.1602
8.8601	6.526	8.02	0.004	0.0040		5.64453E-08	68.933	83.8810

8.7535	6.642	8.56	0.004	0.0040	4.36423E-08	69.265	91.4166
8.3522	6.485	9.41	0.004	0.0040	4.44419E-08	69.732	104.0654
7.9626	6.526	9.85	0.004	0.0040	4.65763E-08	70.340	118.2417
7.6526	6.387	10.10	0.004	0.0040	4.25742E-08	71.180	133.4875
7.2654	6.538	10.02	0.004	0.0040	4.97769E-08	72.304	148.2720
6.8561	6.434	10.08	0.004	0.0040	4.49757E-08	73.754	162.6616
6.5630	6.557	9.99	0.004	0.0040	3.11056E-08	75.611	177.9651
6.1928	6.608	10.10	0.004	0.0040	5.69789E-08	77.833	196.0444
5.9626	6.796	10.05	0.010	0.0106	5.21778E-08	80.479	214.8655
5.6702	6.845	9.78	0.013	0.0154	3.51071E-08	83.553	232.5543
5.3578	6.680	9.76	0.014	0.0155	5.0312E-08	87.027	249.6145
5.1658	6.801	9.58	0.014	0.0155	3.6975E-08	90.864	266.8214
4.9697	6.334	9.51	0.014	0.0155	5.56457E-08	95.093	283.7568
4.7759	6.700	9.24	0.014	0.0155	3.43066E-08	99.540	300.2783
4.5618	6.526	9.24	0.007	0.0104	6.97825E-08	104.292	314.7205
4.3671	6.454	9.22	0.012	0.0160	4.12417E-08	109.073	330.9184
4.2714	6.558	8.97	0.004	0.0045	5.16442E-08	114.056	345.3157
4.0766	6.803	8.90	0.004	0.0041	4.36424E-08	118.990	358.5938
3.9783	6.557	8.91	0.004	0.0041	5.05775E-08	123.957	368.6797
3.8819	6.629	9.02	0.004	0.0041	5.67121E-08	128.739	377.0668
3.6672	6.504	8.97	0.004	0.0040	3.59059E-08	133.397	385.2428
3.4754	6.526	9.11	0.004	0.0040	5.72456E-08	137.966	396.7196
3.3761	6.557	8.90	0.004	0.0040	6.25806E-08	142.445	409.2682
15.3794	6.297	8.56	0.004	0.0040	5.27108E-08	146.902	418.9353
26.6203	6.207	8.80	0.004	0.0040	6.5248E-08	151.135	418.3575
26.4268	6.772	9.19	0.004	0.0040	4.31083E-08	155.033	405.1671
26.1161	6.506	9.81	0.004	0.0040	4.15083E-08	158.770	389.7136
25.8237	6.498	10.08	0.004	0.0040	5.32442E-08	162.260	375.9801
25.5129	6.487	10.17	0.004	0.0040	4.79097E-08	165.672	364.7383
25.1324	6.526	10.42	0.004	0.0040	4.20418E-08	168.894	355.8782
24.8122	6.167	10.53	0.004	0.0040	5.75128E-08	172.323	348.8822
24.4249	6.311	10.56	0.004	0.0040	5.16446E-08	175.747	343.3862
24.0154	6.331	10.56	0.004	0.0040	4.97774E-08	179.296	339.5763
23.7316	6.127	10.56	0.004	0.0040	4.31086E-08	183.046	337.0620
23.3407	6.331	10.56	0.004	0.0040	6.25814E-08	187.018	335.6236
23.0257	6.171	10.49	0.004	0.0040	3.0573E-08	191.308	335.2503
22.6392	6.331	10.56	0.004	0.0040	4.20426E-08	195.779	335.6486
22.3240	6.188	10.53	0.004	0.0040	4.28428E-08	200.509	336.5825

22.0338	6.044	10.53	0.004	0.0040	2.41718E-08	205.391	337.7761
21.6273	6.090	10.53	0.004	0.0040	3.53742E-08	210.425	339.3547
21.3398	5.993	10.56	0.004	0.0040	3.99091E-08	215.508	341.1574
21.0467	6.167	10.56	0.004	0.0040	3.19068E-08	220.568	343.5581
20.7330	6.439	10.56	0.004	0.0040	4.87115E-08	225.635	346.3758
20.4383	6.505	10.51	0.004	0.0040	4.17763E-08	230.716	349.4434
20.1346	6.290	10.51	0.004	0.0040	3.37739E-08	235.784	352.6708
19.8356	6.044	10.46	0.004	0.0040	1.67024E-08	240.718	356.1950
19.5435	6.533	10.56	0.004	0.0040	4.52435E-08	245.578	359.7334
19.2391	6.434	10.46	0.004	0.0040	2.7372E-08	250.375	363.3900
18.9469	6.383	10.38	0.004	0.0040	3.75077E-08	255.005	367.3635
18.6315	6.331	10.42	0.004	0.0040	4.87107E-08	259.491	371.3567
18.4412	6.649	10.56	0.004	0.0040	3.00391E-08	264.017	375.5369
18.1455	6.577	10.51	0.004	0.0040	3.03054E-08	268.208	379.4310
17.8344	6.6283	10.4396	0.004	0.0040	4.33753E-08	272.442	383.3908
17.5480	6.3106	10.3879	0.004	0.0040	4.15084E-08	276.356	386.9511
17.3507	6.3101	10.3465	0.004	0.0040	5.23261E-09	280.109	390.5724
17.0369	6.3118	10.3672	0.004	0.0040	3.43067E-08	283.620	394.1246
16.7438	6.3311	10.3155	0.004	0.0040	2.87052E-08	287.284	397.5541
16.5541	6.1157	10.4382	0.004	0.0040	3.13727E-08	290.538	400.7450
16.2459	6.4208	10.3673	0.004	0.0040	4.20417E-08	293.684	403.8373
16.0467	6.3313	10.3879	0.004	0.0040	3.48401E-08	296.727	406.9064
15.7556	6.3311	10.3156	0.004	0.0040	3.05722E-08	299.619	410.1590
15.5575	6.3233	10.3156	0.004	0.0040	1.91025E-08	302.208	413.4009
15.2472	6.3311	10.1190	0.004	0.0040	1.85687E-08	304.912	416.4448
15.0578	6.3829	10.1915	0.004	0.0040	2.55035E-08	307.362	419.7081
14.8623	6.3107	10.1915	0.004	0.0040	2.25695E-08	309.714	422.8941
14.6436	6.1924	10.0984	0.004	0.00	0.00	312.099	426.1696
14.3522	6.4343	10.1191	0.004	0.0040	3.45727E-08	313.994	429.3157
14.1596	6.2901	10.1521	0.004	0.0040	3.1638E-08	315.987	432.4771
13.8503	6.2901	10.1709	0.004	0.0040	2.55031E-08	317.713	435.2899
13.7533	6.4850	10.1709	0.004	0.0040	1.9102E-08	319.445	437.8995
13.5601	6.1682	10.0986	0.004	0.0040	3.53724E-08	321.127	440.7466
13.3609	6.3107	9.9950	0.004	0.0040	4.36408E-08	322.681	443.6189
13.0519	6.3107	10.0262	0.004	0.0040	2.28357E-08	324.239	446.5920
12.9569	6.4202	10.0261	0.004	0.0040	3.4572E-08	325.531	449.5213
12.7592	6.3312	10.0778	0.004	0.0040	1.67004E-08	326.817	452.6488
12.5632	6.3312	10.1503	0.004	0.0040	3.11045E-08	327.966	455.7014

12.3491	6.4890	9.8296	0.004	0.0040	2.39027E-08	329.093	458.8540
12.1576	6.5056	9.9951	0.004	0.0040	-3.70666E-10	330.029	450.5208
11.9762	6.5830	9.9951	0.004	0.0040	1.16326E-08	330.897	432.9599
11.7680	6.6289	9.8813	0.004	0.0041	3.03049E-08	331.875	423.5892
11.6687	6.6801	9.8504	0.004	0.0040	1.6701E-08	332.362	416.7998
11.3571	6.1049	9.9227	0.004	0.0040	2.63025E-08	333.183	412.0894
11.2631	6.3107	9.8296	0.004	0.0040	2.41685E-08	333.796	408.6761
11.0685	6.3865	9.7779	0.004	0.0040	4.79083E-08	334.060	406.4288
10.8513	6.4545	9.7572	0.004	0.0040	1.37665E-08	334.731	404.5198
10.7543	6.5246	9.7572	0.004	0.0040	2.15016E-08	335.307	403.1565
10.5589	6.4345	9.7452	0.0041	0.0040	1.40335E-08	335.9053	402.32
10.3648	6.4782	9.6124	0.004	0.0040	3.3238E-08	336.21	401.79
10.2695	6.4339	9.8090	0.004	0.0040	2.2302E-08	336.84	401.24
10.0558	6.3313	9.6538	0.004	0.0040	2.39022E-08	337.29	400.96
9.8592	6.2903	9.6124	0.004	0.0040	1.21656E-08	337.53	401.06
9.7627	6.4851	9.7572	0.004	0.0040	1.37655E-08	337.96	401.87
9.5674	6.4412	9.6124	0.004	0.0040	2.28348E-08	338.01	402.39
9.4701	6.5342	9.6538	0.004	0.0040	1.56331E-08	338.13	402.73
9.2558	6.5263	9.7262	0.004	0.0040	0.00	338.51	403.36
9.0632	6.4340	9.7572	0.004	0.0040	0.00	338.81	404.32
8.9649	6.3916	9.7055	0.004	0.0040	0.00	339.29	405.65
8.7689	6.2800	9.6538	0.004	0.0040	0.00	339.76	407.21
8.5766	6.4340	9.6331	0.004	0.0040	0.00	340.20	409.48
8.4577	6.5571	9.6124	0.004	0.0040	0.00	340.76	411.69
8.3625	6.5061	9.5607	0.004	0.0040	0.00	341.22	414.33
8.2633	6.5263	9.5089	0.004	0.0040	0.00	341.94	417.18
8.0706	6.3314	9.2917	0.004	0.0040	0.00	342.43	420.10
8.0337	6.5263	9.4158	0.004	0.0040	0.00	342.81	422.48
7.8744	6.4852	9.1673	0.004	0.0040	0.00	343.19	425.04
7.7788	6.8237	9.3847	0.004	0.0040	0.00	343.03	427.52
7.6601	6.4135	9.2400	0.004	0.0040	0.00	343.38	429.45
7.6620	6.3314	9.2193	0.004	0.0040	0.00	343.42	430.49
7.5641	6.7376	9.0434	0.004	0.0040	0.00	342.95	431.64
7.4654	6.6287	9.1675	0.004	0.0040	0.00	342.84	432.35
7.3692	6.3315	8.9504	0.004	0.0040	0.00	342.31	432.65
7.2728	6.4341	9.0020	0.004	0.0040	0.00	341.79	433.36
7.1742	6.6083	8.8986	0.004	0.0040	0.00	341.23	433.40
7.1725	6.6801	8.8262	0.004	0.0040	0.00	340.32	433.76

7.0752	6.4134	8.9193	0.004	0.0040	0.00	339.70	434.56
6.9584	6.3649	8.8779	0.004	0.0040	0.00	338.80	435.09
6.9605	6.4852	8.8986	0.004	0.0040	0.00	338.29	435.91
6.7633	6.5059	8.8986	0.004	0.0040	0.00	337.33	436.65
6.6677	6.4545	8.8468	0.004	0.0040	0.00	336.28	437.71
6.6674	6.6907	8.7331	0.004	0.0040	0.00	335.24	438.30
6.5692	6.4135	8.8262	0.004	0.0040	0.00	334.26	439.30
6.4742	6.6289	8.7021	0.004	0.0040	0.00	333.18	439.56
6.3753	6.6494	8.7159	0.004	0.0040	0.00	332.17	439.77
6.3743	6.4573	8.5572	0.004	0.0040	0.00	331.00	439.05
6.2775	6.4339	8.7021	0.004	0.0040	0.00	329.74	438.20
6.1627	6.4340	8.7021	0.004	0.0040	0.00	328.63	436.09
6.1605	6.5971	8.6504	0.004	0.0040	0.00	327.57	434.56
6.0639	6.58	8.6504	0.004	0.0040	0.00	326.61	433.67
5.9667	6.56	8.6504	0.004	0.0040	0.00	325.45	432.96
5.8704	6.65	8.4849	0.004	0.0040	0.00	324.23	432.34
5.8694	6.68	8.4125	0.004	0.0040	0.00	323.07	431.13
5.7729	6.61	8.4223	0.004	0.0040	0.00	321.81	429.67
5.7711	6.68	8.3609	0.004	0.0040	0.00	320.35	427.34
5.6739	6.45	8.3614	0.004	0.0040	0.00	319.06	424.78
5.6742	6.56	8.3401	0.004	0.0040	0.00	317.53	422.05
5.5763	6.45	8.2677	0.004	0.0040	0.00	316.34	418.94
5.4800	6.70	8.1954	0.004	0.0040	0.00	315.26	415.65
5.4790	6.64	8.2367	0.004	0.0040	0.00	313.74	412.15
5.3635	6.63	8.0920	0.004	0.0040	0.00	312.13	408.44
5.3631	6.61	8.0403	0.004	0.0040	0.00	310.81	405.07
5.3620	6.58	8.1126	0.004	0.0040	0.00	309.37	401.88
5.2659	6.65	8.0919	0.004	0.0040	0.00	307.91	412.63
5.1671	6.46	8.0919	0.004	0.0040	0.00	306.42	416.65
5.0715	6.51	8.1436	0.004	0.0040	0.00	304.93	423.78
5.0358	6.58	8.0919	0.004	0.0040	0.00	303.46	430.98
4.9725	6.77	8.2367	0.004	0.0040	0.00	301.75	436.83
4.8749	6.45	8.3400	0.004	0.0040	0.00	300.56	441.06
4.7877	6.63	8.1953	0.004	0.0040	0.00	299.10	444.40
4.7776	6.56	8.2676	0.004	0.0040	0.00	298.18	448.07
4.6817	6.51	8.3090	0.004	0.0040	0.00	296.92	450.91
4.6814	6.56	8.2676	0.004	0.0040	0.00	295.94	452.47
4.5655	6.65	8.2884	0.004	0.0040	0.00	295.16	453.40

4.5652	6.85	8.3608	0.004	0.0040	0.00	294.24	453.13
4.4685	6.63	8.2366	0.004	0.0040	0.00	293.32	453.24
4.4672	6.90	8.2884	0.004	0.0040	0.00	292.63	453.34
4.3708	6.75	8.2367	0.004	0.0040	0.00	291.75	452.72
4.3707	6.9396	8.2883	0.004	0.0040	0.00	291.06	451.89
4.3702	6.8958	8.2366	0.004	0.0040	0.00	290.31	451.50
4.2732	6.5776	8.1953	0.004	0.0040	0.00	289.44	451.18
4.1755	6.6290	8.2366	0.006	0.0101	0.00	288.92	449.62
4.1761	6.8441	8.1436	0.011	0.0073	0.00	288.19	448.04
4.1750	6.6291	8.1125	0.012	0.0075	0.00	287.44	447.03
4.0791	6.6084	8.0402	0.012	0.0074	0.00	286.89	445.72
4.0789	6.6290	8.0195	0.015	0.0072	0.00	286.36	444.86
3.9817	6.6110	7.8748	0.016	0.0071	0.00	285.86	443.36
3.9809	6.9264	7.8024	0.017	0.0070	0.00	285.35	441.82
6.1618	6.8580	6.6013	0.018	0.0070	0.00	284.81	440.25
3.8834	6.9121	8.4330	0.017	0.0177	0.00	284.22	438.84
3.7668	6.9266	8.3813	0.008	0.0076	0.00	283.68	437.20
3.7671	6.8967	8.2366	0.008	0.0076	0.00	282.84	435.72
3.6692	6.9260	8.1642	0.009	0.0076	0.00	282.36	434.45
3.6692	7.1997	8.1643	0.011	0.0076	0.00	282.01	433.11
3.6698	6.8753	8.1126	0.013	0.0076	0.00	281.23	432.48
3.5730	7.12	8.1953	0.013	0.0076	0.00	280.74	432.10
3.5729	7.00	8.1953	0.013	0.0076	0.00	280.07	431.83
3.4755	7.07	8.1435	0.013	0.0076	0.00	279.25	430.97
3.4755	6.90	7.7297	0.013	0.0076	0.00	278.76	430.60
3.4752	6.63	7.9988	0.012	0.0073	0.00	278.44	430.36
3.3781	6.70	7.9471	0.016	0.0072	0.00	278.02	429.66
3.3769	6.80	7.9471	0.017	0.0071	0.00	277.71	428.66
3.3782	6.63	7.9988	0.018	0.0071	0.00	277.16	427.99
3.2805	7.23	7.8748	0.018	0.0071	0.00	276.77	427.46
3.2798	6.76	7.8748	0.018	0.0071	0.00	276.23	426.72
3.1832	6.49	7.9678	0.019	0.0071	0.00	275.81	426.01
3.1833	6.77	7.9471	0.018	0.0070	0.00	275.12	425.25
3.1834	6.84	7.8437	0.020	0.0070	0.00	274.75	424.74
3.1828	6.67	7.8230	0.007	0.0070	0.00	274.34	424.18
3.0658	6.65	7.7714	0.007	0.0070	0.00	273.95	423.94
3.1838	6.80	7.8024	0.007	0.0069	0.00	273.24	423.60
3.0670	6.63	7.6784	0.007	0.0069	0.00	272.79	423.53

3.0669	6.58	7.6059	0.007	0.0181	0.00	272.25	423.16
2.9690	6.61	7.5336	0.007	0.0180	0.00	271.86	422.22
2.9694	6.58	7.3579	0.007	0.0181	0.00	271.53	421.79
2.9690	6.59	7.3412	0.007	0.0173	0.00	271.28	421.01
2.8722	6.65	7.2856	0.007	0.0166	0.00	270.33	419.28
25.8586	6.84	5.4052	0.007	0.0164	0.00	269.64	418.60
27.8109	6.84	7.7507	0.009	0.0080	0.00	269.15	408.60
27.6164	6.76	8.1437	0.012	0.0191	0.00	268.34	395.08
27.4292	6.80	8.4848	0.010	0.0079	0.00	267.12	381.64
27.2287	6.88	8.1954	0.010	0.0092	0.00	266.13	369.38
27.1080	6.86	8.1954	0.010	0.0094	0.00	265.38	357.91
26.9234	6.97	7.9679	0.010	0.0093	0.00	264.30	347.74
26.8209	6.8755	8.0403	0.011	0.0087	0.00	263.69	338.61
26.6284	6.9758	7.9473	0.011	0.0087	0.00	262.47	330.26
26.5297	7.0163	7.9474	0.011	0.0088	0.00	261.61	322.81
26.3146	6.9986	7.9680	0.011	0.0089	0.00	261.05	315.71
26.1945	6.6292	8.0715	0.010	0.0089	0.00	260.29	309.22
26.1261	6.6087	8.1438	0.010	0.0092	0.00	259.47	303.63
25.9313	6.8155	8.0405	0.011	0.0091	0.00	258.52	297.84
25.8332	6.6501	8.2370	0.011	0.0092	0.00	257.55	293.59
25.6180	6.7525	8.2575	0.010	0.0095	0.00	256.67	289.56
25.4269	6.7604	8.4128	0.009	0.0099	0.00	255.89	285.84
25.2245	6.7729	8.6506	0.007	0.0104	0.00	254.75	282.66
25.0395	6.5781	8.7336	0.006	0.0109	0.00	253.67	280.29
24.8158	6.7524	8.8265	0.006	0.0118	0.00	252.66	278.34
24.6256	6.5693	8.8265	0.006	0.0118	0.00	251.91	276.79
24.4359	6.5081	8.8059	0.006	0.0116	0.00	250.89	275.40
24.2383	6.6498	8.8773	0.006	0.0116	0.00	250.20	274.62
24.1417	6.5267	8.8783	0.006	0.0114	0.00	249.79	273.90
23.8230	7.07	8.8473	0.006	0.0114	0.00	249.47	273.57
23.7271	6.95	8.8991	0.006	0.0112	0.00	249.41	273.31
23.5397	6.90	8.8991	0.006	0.0112	0.00	249.22	273.32
23.3436	6.95	8.8474	0.006	0.0111	0.00	249.23	273.38
23.2279	6.93	8.8268	0.006	0.0111	0.00	249.28	273.59
23.0287	6.95	8.8785	0.006	0.0111	0.00	249.34	273.93
22.8378	6.75	8.8061	0.006	0.0110	0.00	249.44	274.16
22.6375	6.68	8.8993	0.006	0.0110	0.00	249.65	274.49
22.5447	7.00	8.8993	0.006	0.0110	0.00	250.16	274.80

22.2363	6.85	8.8270	0.006	0.0109	0.00	250.30	275.56
22.1363	6.93	8.9216	0.006	0.0109	0.00	250.77	276.14
21.9386	6.84	8.8994	0.006	0.0109	0.00	251.17	276.79
21.8477	6.95	8.8787	0.0061	0.0109	0.00	251.66	277.54
21.5629	6.63	8.9201	0.0062	0.0109	0.00	252.04	278.48
21.4398	6.88	8.8995	0.0062	0.0109	0.00	252.17	279.42
21.2449	6.77	9.0029	0.0061	0.0109	0.00	252.79	280.30
21.1404	6.93	8.9719	0.0062	0.0109	0.00	252.82	281.37
20.9278	7.09	9.1167	0.0062	0.0109	0.00	253.30	282.44
20.7324	6.70	8.8996	0.0060	0.0109	0.00	253.89	283.47
20.5390	6.53	8.8478	0.0059	0.0109	0.00	254.43	284.51
20.4480	6.68	8.8916	0.0057	0.0109	0.00	254.87	285.49
20.2464	6.70	8.8479	0.0058	0.0109	0.00	255.10	286.60
20.1344	6.82	8.8996	0.0061	0.0108	0.00	255.96	287.85
19.9352	6.70	8.8479	0.0060	0.0108	0.00	256.75	289.06
19.8047	6.68	8.7342	0.0059	0.0108	0.00	257.14	290.29
19.6438	6.70	8.7031	0.0060	0.0107	0.00	257.90	291.42
19.4466	6.53	8.7548	0.0061	0.0107	0.00	258.57	292.71
19.3306	6.61	8.8273	0.0061	0.0107	0.00	258.62	293.91
19.1397	6.65	8.7549	0.0062	0.0106	0.00	258.99	295.11
18.9496	6.85	8.8066	0.0063	0.0106	0.00	259.44	296.23
18.8489	6.6297	8.8791	0.0063	0.0105	0.00	260.30	297.56
18.6783	6.6929	8.8067	0.0064	0.0105	0.00	260.80	298.44
18.5376	7.0709	8.8998	0.0066	0.0105	0.00	261.29	299.59
18.3437	6.8971	8.7550	0.0067	0.0105	0.00	261.68	300.78
18.2466	6.8453	8.6826	0.0069	0.0104	0.00	262.42	301.89
18.1515	6.6503	8.7033	0.0069	0.0104	0.00	263.12	303.02
17.9557	6.6298	8.8274	0.0069	0.0104	0.00	263.94	303.94
17.8389	6.6503	8.6516	0.0069	0.0103	0.00	264.10	305.02
17.7409	6.7550	8.6516	0.0070	0.0103	0.00	264.15	306.07
17.5428	6.7735	8.6826	0.0069	0.0103	0.00	264.86	307.24
17.3523	6.9274	8.7550	0.0068	0.0104	0.00	265.37	308.40
17.2560	6.7607	8.5068	0.0067	0.0104	0.00	265.79	309.65
17.0369	6.8453	8.58	0.0068	0.0104	0.00	266.19	310.56
16.9427	6.6504	8.54	0.0067	0.0104	0.00	266.75	311.59
16.8416	6.7529	8.70	0.0066	0.0104	0.00	267.17	312.44
16.6472	6.4348	8.58	0.0065	0.0104	0.00	267.49	313.33
16.5503	6.7530	8.49	0.0065	0.0103	0.00	267.90	314.31

16.357	6.58	8.56	0.0066	0.0103	0.00	267.70	315.37
16.239	6.38	8.63	0.0066	0.0102	0.00	267.93	316.18
16.143	6.51	8.56	0.0066	0.0102	0.00	268.25	317.07
16.049	6.85	8.70	0.0066	0.0101	0.00	268.33	317.69
15.849	6.84	8.70	0.0066	0.0101	0.00	268.48	318.42
15.758	6.85	8.56	0.0067	0.0100	0.00	268.46	319.21
15.659	6.51	8.68	0.0066	0.0100	0.00	268.51	319.71
15.442	6.67	8.70	0.0067	0.0099	0.00	268.71	320.52
15.344	6.68	8.56	0.0065	0.0099	0.00	268.82	321.03
15.153	6.65	8.54	0.0066	0.0099	0.00	268.86	321.56
15.062	6.73	8.63	0.0065	0.0099	0.00	269.03	322.13
15.053	6.65	8.56	0.0065	0.0099	0.00	268.98	322.75
14.864	6.61	8.63	0.0065	0.0098	0.00	269.27	323.19
14.745	6.77	8.51	0.0064	0.0098	0.00	268.61	323.78
14.650	6.80	8.54	0.0064	0.0098	0.00	268.66	324.10
14.551	6.95	8.41	0.0064	0.0098	0.00	268.88	324.35
14.451	6.88	8.56	0.0063	0.0098	0.00	268.79	324.80
14.357	6.41	8.63	0.0064	0.0098	0.00	268.91	325.29
14.237	6.56	8.44	0.0064	0.0097	0.00	269.12	325.77
14.064	6.58	8.51	0.0063	0.0098	0.00	268.96	326.11
13.948	6.92	8.31	0.0064	0.0097	0.00	269.02	326.73
13.847	6.82	8.43	0.0064	0.0097	0.00	269.07	327.62
13.749	6.85	8.36	0.0094	0.0097	0.00	269.15	328.93
13.651	6.80	8.34	0.0104	0.0096	0.00	269.35	330.44
13.555	6.86	8.24	0.0102	0.0095	0.00	269.58	331.77
13.452	6.82	8.27	0.0102	0.0094	0.00	269.4693	333.0706
13.364	6.75	8.09	0.0101	0.0094	0.00	269.52	333.99
13.185	6.85	8.14	0.0117	0.0093	0.00	269.43	334.87
13.053	6.70	8.11	0.0119	0.0092	0.00	269.66	335.10
13.053	6.53	8.04	0.0117	0.0092	0.00	269.77	335.32
12.957	6.66	8.07	0.0114	0.0091	0.00	269.88	335.67
12.758	6.58	8.00	0.0105	0.0092	0.00	269.27	336.37
12.759	6.43	8.04	0.0096	0.0092	0.00	269.73	336.94
12.662	6.86	8.02	0.0094	0.0092	0.00	269.66	337.67
12.566	6.80	8.00	0.0094	0.0092	0.00	269.25	338.45
12.469	6.68	8.04	0.0094	0.0091	0.00	269.10	339.13
12.352	6.51	8.00	0.0093	0.0091	0.00	269.12	339.47
12.254	6.83	7.97	0.0095	0.0091	0.00	270.01	339.90

12.158	6.68	8.07	0.0097	0.0090	0.00	270.00	340.55
12.060	6.82	7.88	0.0098	0.0090	0.00	269.54	341.20
11.963	6.95	8.04	0.0096	0.0090	0.00	269.45	341.66
11.963	7.09	7.97	0.0096	0.0090	0.00	269.42	342.51
11.866	6.75	7.97	0.0094	0.0090	0.00	269.08	343.49
11.768	6.70	7.97	0.0092	0.0090	0.00	268.94	344.22
11.672	6.70	7.97	0.0092	0.0090	0.00	269.20	345.07
11.551	7.07	7.85	0.0090	0.0090	0.00	269.27	346.07
11.455	6.70	7.95	0.0088	0.0091	0.00	269.13	346.66
11.357	6.61	7.97	0.0089	0.0091	0.00	268.82	347.24
11.259	6.69	7.97	0.0087	0.0091	0.00	268.54	348.11
11.166	6.43	7.95	0.0087	0.0092	0.00	268.50	348.96
11.065	6.45	7.97	0.0088	0.0092	0.00	268.14	349.86
10.967	6.63	8.07	0.0088	0.0092	0.00	268.13	350.92
10.853	7.09	8.02	0.0098	0.0092	0.00	268.79	352.08
10.854	6.77	8.00	0.0108	0.0091	0.00	268.46	352.96
10.757	6.81	7.90	0.0099	0.0089	0.00	268.21	353.69
10.741	6.33	7.90	0.0112	0.0086	0.00	268.67	354.19
10.659	6.44	7.82	0.0119	0.0084	0.00	268.17	355.00
10.559	6.52	7.75	0.0118	0.0084	0.00	268.00	355.52
10.461	7.00	7.80	0.0118	0.0083	0.00	268.08	355.95
10.364	6.46	7.58	0.0117	0.0083	0.00	267.20	356.58
10.270	6.68	7.70	0.0118	0.0083	0.00	266.71	356.88
10.267	6.44	7.50	0.0132	0.0080	0.00	265.23	356.98
10.169	6.68	7.53	0.0135	0.0080	0.00	264.40	357.11
10.170	6.68	7.48	0.0138	0.0080	0.00	263.47	357.21
10.051	6.68	7.53	0.0136	0.0080	0.00	262.73	357.43
9.955	6.63	7.43	0.0133	0.0081	0.00	261.66	357.63
9.955	7.00	7.43	0.0133	0.0082	0.00	260.62	357.80
9.762	7.00	7.48	0.0134	0.0081	0.00	260.20	357.76
9.760	6.77	7.48	0.0132	0.0081	0.00	259.60	358.24
9.662	6.49	7.41	0.0127	0.0080	0.00	258.96	358.87
9.566	6.70	7.19	0.0127	0.0079	0.00	258.62	359.62
9.468	6.85	7.24	0.0131	0.0078	0.00	257.88	360.38
9.468	6.88	7.16	0.0134	0.0078	0.00	256.91	361.07
9.375	7.12	7.24	0.0136	0.0077	0.00	256.55	361.33
9.373	6.85	7.21	0.0132	0.0078	0.00	255.52	361.44
9.257	7.02	7.19	0.0130	0.0078	0.00	254.97	361.08

9.162	6.61	6.97	0.0128	0.0078	0.00	254.15	360.60
9.157	6.77	6.97	0.0137	0.0077	0.00	253.48	359.93
9.107	6.97	6.82	0.0150	0.0076	0.00	252.63	358.75
9.059	6.70	6.85	0.0152	0.0076	0.00	252.66	357.30
8.962	7.03	6.82	0.0154	0.0075	0.00	251.75	355.84
8.962	7.07	6.80	0.0149	0.0075	0.00	251.41	354.66
8.865	6.97	6.70	0.0158	0.0073	0.00	250.73	353.01
8.867	6.93	6.58	0.0072	0.0069	0.00	250.16	350.69
8.771	6.92	6.61	0.0074	0.0181	0.00	249.44	347.88
8.670	7.07	6.50	0.0074	0.0180	0.00	248.83	344.99
8.673	6.58	6.50	0.0073	0.0181	0.00	248.22	342.24
8.673	6.65	6.39	0.0072	0.0181	0.00	247.21	339.56
8.574	6.68	6.39	0.0071	0.0180	0.00	246.51	336.80
8.459	7.12	6.34	0.0072	0.0181	0.00	244.96	334.29
8.456	7.25	6.28	0.0071	0.0182	0.00	243.64	331.83
8.360	6.82	6.24	0.0069	0.0188	0.00	242.45	329.74
8.361	6.85	6.28	0.0184	0.0188	0.00	241.56	327.71
8.261	6.77	6.32	0.0182	0.0188	0.00	240.39	325.85
8.264	6.60	6.26	0.0177	0.0189	0.00	238.96	324.42
8.164	6.63	6.21	0.0180	0.0187	0.00	237.72	322.86
8.166	6.97	6.24	0.0179	0.0186	0.00	236.49	321.28
8.067	6.88	6.24	0.0181	0.0184	0.00	235.23	319.60
8.067	7.00	6.19	0.0175	0.0187	0.00	234.35	318.08
7.971	6.65	6.21	0.0183	0.0181	0.00	233.51	316.72
7.969	6.87	6.09	0.0178	0.0184	0.00	232.37	315.63
7.968	6.85	6.07	0.0171	0.0188	0.00	231.49	314.31
7.873	7.14	5.99	0.0173	0.0186	0.00	230.60	313.06
7.777	6.75	5.94	0.0175	0.0186	0.00	229.56	311.77
7.775	6.86	5.97	0.0172	0.0187	0.00	228.62	310.70
7.661	6.63	5.92	0.0167	0.0190	0.00	227.04	309.55
7.661	6.75	5.94	0.0164	0.0192	0.00	226.54	308.47
7.563	6.63	5.90	0.0164	0.0193	0.00	225.59	307.70
7.563	6.90	5.89	0.0161	0.0195	0.00	224.51	306.72
7.464	6.85	5.87	0.0162	0.0194	0.00	223.44	305.89
7.464	6.58	5.82	0.0159	0.0196	0.00	222.28	305.24
7.369	6.77	5.82	0.0156	0.0199	0.00	221.52	304.80
7.369	6.68	5.87	0.0158	0.0199	0.00	220.97	304.35
7.284	7.01	5.87	0.0157	0.0072	0.00	220.24	304.42

7.272	7.13	5.89	0.0156	0.0072	0.00	219.41	304.64
7.173	6.80	5.89	0.0158	0.0072	0.00	218.68	305.17
7.175	6.77	5.89	0.0156	0.0073	0.00	217.89	305.56
7.076	6.85	5.87	0.0153	0.0074	0.00	217.33	306.24
7.076	6.97	5.87	0.0155	0.0073	0.00	216.37	307.15
6.959	7.02	5.92	0.0158	0.0073	0.00	215.44	308.08
6.959	6.91	5.94	0.0159	0.0073	0.00	214.80	309.05
6.864	6.93	5.94	0.0159	0.0073	0.00	213.81	310.31
6.865	6.93	5.97	0.0158	0.0073	0.00	213.50	311.40
6.766	6.77	5.92	0.0162	0.0073	0.00	212.35	312.47
6.766	6.53	5.92	0.0164	0.0073	0.00	211.80	313.52
6.669	6.56	6.00	0.0162	0.0073	0.00	210.87	314.35
6.570	6.63	5.94	0.0169	0.0072	0.00	210.55	315.22
6.573	6.56	5.92	0.0167	0.0072	0.00	209.78	315.99
6.473	6.63	5.94	0.0186	0.0070	0.00	209.42	316.37
6.473	6.65	5.89	0.0174	0.0072	0.00	209.12	317.20
6.473	6.88	5.82	0.0174	0.0073	0.00	208.79	318.11
6.377	6.80	5.97	0.0170	0.0073	0.00	208.29	318.70
6.280	6.70	5.97	0.0155	0.0075	0.00	208.03	320.05
6.279	6.68	5.89	0.0150	0.0076	0.00	207.23	321.97
6.164	6.82	5.94	0.0148	0.0076	0.00	206.91	323.51
6.164	6.93	5.89	0.0150	0.0076	0.00	206.58	325.04
6.164	6.77	5.87	0.0149	0.0075	0.00	206.43	326.42
6.065	6.80	5.92	0.0149	0.0075	0.00	205.80	327.82
5.969	7.07	5.97	0.0150	0.0075	0.00	205.32	328.96
5.969	6.80	6.00	0.0144	0.0075	0.00	204.98	330.16
5.870	6.70	6.07	0.0146	0.0075	0.00	204.63	331.57
5.872	6.63	6.16	0.0146	0.0075	0.00	204.90	332.78
5.773	6.80	6.07	0.0144	0.0075	0.00	204.25	334.09
5.775	6.95	6.12	0.0142	0.0075	0.00	203.88	335.50
5.677	6.85	6.09	0.0141	0.0076	0.00	204.07	337.20
5.676	7.00	6.12	0.0139	0.0076	0.00	203.52	338.95
5.580	6.70	6.12	0.0134	0.0076	0.00	203.50	340.46
5.581	6.65	6.26	0.0132	0.0077	0.00	203.40	341.83
5.483	6.68	6.36	0.0129	0.0077	0.00	203.48	343.01
5.482	6.75	6.46	0.0124	0.0077	0.00	203.81	344.32
5.367	6.82	6.28	0.0116	0.0078	0.00	203.85	345.26
5.268	6.85	6.32	0.0113	0.0078	0.00	204.01	346.38

5.268	6.83	6.47	0.0110	0.0079	0.00	204.15	347.53
5.268	7.12	6.48	0.0110	0.0079	0.00	204.45	348.75
5.268	6.83	6.46	0.0109	0.0078	0.00	204.86	350.21
5.171	6.97	6.28	0.0117	0.0076	0.00	204.94	351.37
5.171	6.90	6.32	0.0125	0.0073	0.00	205.26	352.26
5.074	6.83	6.24	0.0135	0.0072	0.00	205.40	352.57
4.976	6.80	6.07	0.0142	0.0071	0.00	205.76	352.45
5.073	6.63	6.07	0.0144	0.0070	0.00	205.79	351.98
5.075	6.58	5.97	0.0148	0.0070	0.00	205.89	351.83
4.977	6.56	5.94	0.0151	0.0069	0.00	206.08	351.12
4.880	6.65	5.94	0.0155	0.0069	0.00	206.19	350.10
4.881	6.70	5.89	0.0073	0.0170	0.00	206.29	348.53
4.881	6.81	5.89	0.0074	0.0168	0.00	206.31	346.42
4.872	6.56	5.80	0.0074	0.0167	0.00	206.44	344.08
4.783	6.76	5.87	0.0073	0.0166	0.00	206.64	341.42
4.781	6.53	5.82	0.0073	0.0166	0.00	206.03	338.95
4.782	6.70	5.75	0.0072	0.0165	0.00	205.96	336.42
4.686	6.61	5.75	0.0071	0.0165	0.00	205.68	334.10
4.686	6.83	5.78	0.0071	0.0165	0.00	205.57	331.74
4.682	6.58	5.71	0.0070	0.0165	0.00	205.04	329.74
4.686	7.00	5.71	0.0070	0.0166	0.00	204.86	327.73
4.685	6.77	5.65	0.0069	0.0165	0.00	204.73	325.60
4.568	6.80	5.68	0.0069	0.0165	0.00	204.47	323.90
4.569	6.58	5.62	0.0069	0.0164	0.00	204.20	322.40
4.567	6.77	5.62	0.0069	0.0164	0.00	203.87	320.74
4.568	6.77	5.55	0.0069	0.0165	0.00	203.23	319.41
4.471	6.70	5.55	0.0069	0.0164	0.00	202.63	318.25
4.471	6.90	5.55	0.0070	0.0164	0.00	202.24	317.18
4.470	6.90	5.60	0.0070	0.0165	0.00	201.90	316.05
4.472	7.00	5.51	0.0069	0.0165	0.00	201.62	315.03
4.470	6.75	5.53	0.0069	0.0165	0.00	201.20	313.93
4.471	6.70	5.53	0.0070	0.0166	0.00	200.84	313.03
4.372	6.68	5.48	0.0070	0.0166	0.00	200.23	312.30
4.372	6.75	5.51	0.0069	0.0167	0.00	200.02	311.41
4.373	6.63	5.46	0.0069	0.0167	0.00	199.20	310.76
4.374	6.63	5.48	0.0069	0.0168	0.00	199.00	310.28
4.374	6.65	5.41	0.0070	0.0167	0.00	198.66	309.81
4.373	6.70	5.26	0.0070	0.0168	0.00	198.18	309.55

4.276	6.66	5.33	0.0070	0.0169	0.00	197.69	309.46
4.275	6.63	5.33	0.0070	0.0170	0.00	197.55	309.43
4.275	7.00	5.26	0.0070	0.0170	0.00	197.22	309.26
4.178	6.85	5.18	0.0069	0.0170	0.00	196.74	309.23
4.276	7.07	5.31	0.0069	0.0171	0.00	196.41	309.12
4.178	6.61	5.26	0.0069	0.0170	0.00	195.89	309.10
4.178	6.85	5.33	0.0177	0.0171	0.00	195.83	308.99
4.179	6.95	5.31	0.0174	0.0171	0.00	195.14	309.07
4.178	6.90	5.36	0.0173	0.0170	0.00	194.90	309.07
4.081	6.77	5.26	0.0173	0.0171	0.00	194.63	308.99
4.081	7.16	5.33	0.0173	0.0171	0.00	194.08	309.06
4.080	7.23	5.33	0.0174	0.0173	0.00	193.56	309.40
3.984	6.80	5.36	0.0174	0.0173	0.00	193.22	309.62
3.986	6.90	5.33	0.0185	0.0175	0.00	192.85	309.86
3.983	6.76	5.33	0.0188	0.0175	0.00	192.61	309.97
3.984	6.63	5.36	0.0189	0.0175	0.00	192.35	310.11
3.984	6.65	5.31	0.0188	0.0175	0.00	191.92	310.30
3.983	6.64	5.31	0.0187	0.0175	0.00	191.66	310.45
3.984	6.77	5.36	0.0186	0.0176	0.00	191.66	310.53
3.985	6.70	5.31	0.0184	0.0175	0.00	190.91	310.58
3.888	6.83	5.26	0.0182	0.0176	0.00	190.54	310.69
3.887	6.85	5.31	0.0181	0.0176	0.00	190.73	310.79
3.769	6.85	5.26	0.0180	0.0176	0.00	190.52	310.89
3.886	6.77	5.31	0.0187	0.0175	0.00	190.42	310.88
3.886	6.58	5.26	0.0187	0.0176	0.00	190.29	311.05
3.886	6.75	5.26	0.0185	0.0176	0.00	190.04	311.11
3.886	6.77	5.26	0.0185	0.0176	0.00	189.76	311.24
3.769	7.18	5.26	0.0185	0.0177	0.00	189.37	311.52
3.770	7.16	5.26	0.0184	0.0177	0.00	189.53	311.88
3.769	6.62	5.17	0.0185	0.0177	0.00	189.30	312.16
3.673	6.65	5.12	0.0186	0.0179	0.00	189.44	312.23
3.672	6.63	5.09	0.0186	0.0180	0.00	188.75	312.76
3.673	6.61	5.07	0.0184	0.0179	0.00	188.67	313.04
3.581	6.53	5.07	0.0182	0.0179	0.00	188.66	313.33
3.575	6.61	5.07	0.0181	0.0179	0.00	188.54	313.49
3.574	6.49	5.12	0.0180	0.0179	0.00	188.28	313.79
3.575	6.63	5.12	0.0178	0.0179	0.00	187.78	313.91
3.575	6.64	5.14	0.0177	0.0179	0.00	187.64	313.97

3.574	6.51	5.17	0.0176	0.0179	0.00	187.42	314.23
3.478	6.56	5.17	0.0175	0.0179	0.00	187.17	314.38
3.478	6.51	5.14	0.0176	0.0180	0.00	186.90	314.65
3.478	7.00	5.24	0.0176	0.0179	0.00	186.78	314.92
3.466	6.95	5.09	0.0178	0.0175	0.00	186.51	315.22
3.379	6.93	5.24	0.0178	0.0174	0.00	186.32	315.46
3.381	7.12	5.24	0.0177	0.0174	0.00	186.23	315.69
3.380	6.80	5.14	0.0176	0.0174	0.00	185.96	315.83
3.381	6.80	5.24	0.0176	0.0174	0.00	185.81	315.99
3.380	6.77	5.17	0.0176	0.0174	0.00	185.76	316.19
3.379	6.61	5.17	0.0175	0.0175	0.00	185.67	316.23
3.381	7.09	5.14	0.0174	0.0175	0.00	185.44	316.39
3.284	6.51	5.17	0.0174	0.0176	0.00	185.36	316.76
3.283	6.69	5.14	0.0175	0.0176	0.00	185.20	317.04
3.281	6.58	5.17	0.0175	0.0176	0.00	184.93	317.25
3.283	6.65	5.12	0.0176	0.0178	0.00	184.83	317.69
3.186	6.68	5.17	0.0176	0.0178	0.00	184.72	318.00
3.185	6.63	5.17	0.0175	0.0179	0.00	184.62	318.58
3.186	6.75	5.31	0.0174	0.0179	0.00	184.88	319.16
3.186	6.70	5.09	0.0173	0.0179	0.00	184.82	319.56
3.185	6.75	5.09	0.0173	0.0180	0.00	184.93	320.01
3.069	6.70	5.12	0.0173	0.0180	0.00	185.10	320.58
3.134	6.77	5.09	0.0173	0.0182	0.00	185.03	321.20
3.068	6.75	5.01	0.0172	0.0183	0.00	184.96	321.91
3.068	6.77	5.01	0.0171	0.0184	0.00	185.06	322.63
2.971	6.68	5.07	0.0171	0.0184	0.00	184.95	323.35
2.971	6.88	5.12	0.0171	0.0184	0.00	184.94	323.86
2.972	6.77	5.07	0.0172	0.0183	0.00	184.89	324.51
2.972	6.58	5.14	0.0176	0.0184	0.00	184.90	325.21
2.972	6.71	5.12	0.0176	0.0183	0.00	184.79	325.60
2.874	6.97	5.24	0.0177	0.0183	0.00	184.92	326.15
2.874	7.02	5.14	0.0177	0.0183	0.00	184.84	326.72
2.874	7.12	5.12	0.0177	0.0183	0.00	184.66	327.37
2.874	6.93	5.24	0.0176	0.0183	0.00	184.59	327.80
2.856	7.07	5.17	0.0177	0.0184	0.00	184.55	328.42
2.874	6.85	5.14	0.0175	0.0183	0.00	184.40	328.93
2.777	6.95	5.17	0.0171	0.0183	0.00	184.35	329.45
2.777	7.13	5.17	0.0168	0.0181	0.00	184.30	329.85

2.777	6.95	5.24	0.0167	0.0181	0.00	184.27	330.49
2.776	6.85	5.17	0.0167	0.0181	0.00	184.27	331.23
2.777	6.69	5.17	0.0168	0.0181	0.00	184.35	331.73
2.679	6.83	5.14	0.0168	0.0181	0.00	184.36	332.36
2.679	6.68	5.17	0.0169	0.0180	0.00	184.26	332.68
2.680	6.80	5.24	0.0170	0.0181	0.00	184.28	333.26
2.679	6.65	5.17	0.0167	0.0180	0.00	184.43	333.58
2.679	6.75	5.17	0.0166	0.0179	0.00	184.41	333.56
2.679	6.68	5.14	0.0166	0.0180	0.00	184.72	334.01
2.582	6.60	5.14	0.0164	0.0179	0.00	185.15	334.38
2.582	6.77	5.09	0.0164	0.0179	0.00	185.38	334.63
2.583	6.70	5.09	0.0164	0.0180	0.00	185.63	334.84
2.582	6.60	5.05	0.0168	0.0178	0.00	185.63	335.07
2.485	6.61	5.04	0.0171	0.0179	0.00	185.82	335.27
2.582	6.61	4.99	0.0172	0.0179	0.00	186.09	335.37
2.485	6.94	5.05	0.0172	0.0180	0.00	185.99	335.49
2.485	6.77	5.07	0.0172	0.0180	0.00	186.17	335.67
2.485	6.97	5.09	0.0171	0.0180	0.00	186.04	335.94
2.387	7.02	5.12	0.0171	0.0181	0.00	186.28	336.61
2.387	7.02	5.11	0.0171	0.0181	0.00	186.24	336.95
2.475	7.07	5.12	0.0171	0.0181	0.00	186.15	337.41
2.387	6.93	5.14	0.0170	0.0181	0.00	186.02	337.97
2.387	6.70	5.14	0.0171	0.0181	0.00	186.08	338.36
2.388	6.61	5.12	0.0171	0.0182	0.00	185.91	338.81
2.359	6.65	5.12	0.0171	0.0181	0.00	185.91	339.36
2.270	6.70	5.12	0.0169	0.0182	0.00	185.91	339.88
2.271	6.65	5.09	0.0170	0.0182	0.00	185.86	340.51
2.271	6.61	5.09	0.0170	0.0182	0.00	185.88	341.14
2.270	6.63	5.12	0.0169	0.0182	0.00	185.82	341.71
2.174	6.82	5.14	0.0168	0.0182	0.00	185.97	342.55
2.173	6.61	5.09	0.0168	0.0183	0.00	185.85	343.40
2.173	6.83	5.12	0.0168	0.0182	0.00	186.03	344.02
2.173	6.74	5.17	0.0168	0.0183	0.00	186.05	344.80
2.075	6.68	5.24	0.0168	0.0183	0.00	186.20	345.91
2.116	7.02	5.14	0.0168	0.0182	0.00	186.51	346.88
2.075	6.93	5.09	0.0167	0.0182	0.00	186.66	347.93
2.075	6.88	5.04	0.0167	0.0183	0.00	186.94	348.86
2.076	6.90	5.04	0.0168	0.0183	0.00	187.18	349.92

2.076	6.90	5.04	0.0169	0.0183	0.00	187.41	350.89
1.999	6.89	5.01	0.0169	0.0184	0.00	187.59	352.03
1.979	7.14	5.01	0.0169	0.0184	0.00	187.85	352.97
1.979	6.95	5.01	0.0168	0.0185	0.00	187.75	353.92
1.979	6.85	5.04	0.0167	0.0185	0.00	187.95	354.90
1.978	7.02	5.07	0.0166	0.0184	0.00	188.15	355.88
1.881	6.93	5.08	0.0166	0.0184	0.00	188.44	356.38
1.881	6.95	5.09	0.0165	0.0184	0.00	188.49	357.11
1.881	6.70	5.14	0.0166	0.0182	0.00	188.65	357.77
1.882	7.07	5.12	0.0167	0.0182	0.00	188.61	358.16
1.783	6.77	5.14	0.0166	0.0181	0.00	188.51	358.60
1.784	6.65	5.12	0.0166	0.0182	0.00	188.52	358.86
1.871	6.51	5.09	0.0166	0.0182	0.00	188.60	359.17
1.783	6.68	5.14	0.0165	0.0182	0.00	188.49	359.41
1.783	6.56	5.14	0.0165	0.0182	0.00	188.74	359.68
1.784	6.70	5.14	0.0165	0.0181	0.00	188.61	360.02
1.687	6.63	5.14	0.0165	0.0181	0.00	188.81	360.32
1.686	6.75	5.14	0.0165	0.0180	0.00	188.70	360.97
1.686	6.56	5.17	0.0166	0.0180	0.00	188.82	361.46
1.686	6.95	5.12	0.0166	0.0179	0.00	188.83	361.94
1.686	6.75	5.17	0.0166	0.0180	0.00	188.88	362.53
1.687	7.12	5.14	0.0165	0.0180	0.00	189.03	363.31
1.631	6.98	5.07	0.0167	0.0179	0.00	189.58	364.00
1.589	6.97	5.04	0.0167	0.0179	0.00	189.87	364.55
1.589	6.93	5.07	0.0165	0.0179	0.00	190.39	365.42
1.589	6.90	5.07	0.0163	0.0179	0.00	190.68	366.21
1.589	6.75	5.04	0.0161	0.0179	0.00	190.82	366.82
1.587	6.85	4.99	0.0161	0.0179	0.00	191.00	367.27
1.472	6.83	5.01	0.0163	0.0176	0.00	191.10	367.45
1.472	6.77	5.07	0.0165	0.0176	0.00	191.18	367.26
1.472	6.75	5.04	0.0165	0.0177	0.00	191.38	367.26
1.473	6.97	5.12	0.0164	0.0176	0.00	191.54	367.49
1.375	6.99	5.12	0.0164	0.0176	0.00	191.49	367.46
1.472	6.85	5.12	0.0163	0.0175	0.00	191.64	367.71
1.472	6.90	5.09	0.0163	0.0176	0.00	191.53	367.81
1.375	7.09	5.14	0.0164	0.0175	0.00	191.38	367.79
1.375	7.12	5.12	0.0163	0.0174	0.00	191.29	367.56
1.375	7.07	5.12	0.0160	0.0173	0.00	191.32	367.15

1.278	7.19	5.17	0.0157	0.0170	0.00	191.16	366.91
1.278	7.19	5.12	0.0157	0.0170	0.00	191.22	366.34
1.278	6.85	5.09	0.0154	0.0169	0.00	191.18	365.89
1.278	7.00	5.14	0.0153	0.0170	0.00	191.11	365.35
1.277	6.95	5.14	0.0152	0.0170	0.00	191.04	364.86
1.278	7.12	5.12	0.0151	0.0170	0.00	190.95	364.35
1.180	6.95	5.09	0.0155	0.0168	0.00	190.88	363.70
1.180	7.00	5.09	0.0154	0.0169	0.00	190.92	363.19
1.180	6.86	5.24	0.0152	0.0168	0.00	191.13	362.73
1.180	7.22	5.09	0.0151	0.0168	0.00	191.06	362.25
1.181	6.85	5.01	0.0150	0.0168	0.00	190.83	361.80
1.181	6.70	5.01	0.0149	0.0168	0.00	191.13	361.07
1.180	6.68	5.01	0.0151	0.0168	0.00	191.29	360.64
1.083	6.90	4.92	0.0151	0.0169	0.00	191.23	360.18
1.083	6.90	4.92	0.0152	0.0169	0.00	191.28	359.69
1.083	6.86	4.94	0.0150	0.0169	0.00	191.28	359.25
1.083	6.77	4.94	0.0151	0.0170	0.00	191.22	358.78
1.083	6.77	5.01	0.0150	0.0170	0.00	191.23	358.32
1.084	6.77	4.99	0.0149	0.0167	0.00	191.11	357.82
0.987	6.80	4.99	0.0147	0.0166	0.00	190.91	356.89
0.986	6.93	5.01	0.0146	0.0166	0.00	190.76	356.06
0.986	7.16	5.07	0.0145	0.0166	0.00	190.36	355.43
0.986	6.97	4.99	0.0144	0.0166	0.00	189.88	354.61
0.889	6.88	5.04	0.0143	0.0164	0.00	189.86	354.03
0.986	7.02	5.01	0.0143	0.0164	0.00	189.63	353.40
0.889	6.93	5.01	0.0142	0.0164	0.00	189.41	352.60
0.889	6.95	5.01	0.0142	0.0165	0.00	189.06	352.15
0.888	6.97	4.99	0.0144	0.0166	0.00	189.00	351.63
0.888	6.85	4.99	0.0143	0.0166	0.00	188.94	351.25
0.888	6.92	5.01	0.0142	0.0166	0.00	188.62	350.89
0.888	6.88	4.99	0.0141	0.0166	0.00	188.44	350.57
0.888	6.70	5.01	0.0141	0.0166	0.00	188.11	350.47
0.791	6.77	4.94	0.0141	0.0166	0.00	187.94	350.13
0.791	6.85	5.04	0.0143	0.0164	0.00	187.73	349.84
0.791	6.65	4.99	0.0143	0.0164	0.00	187.61	349.61
0.791	6.79	4.94	0.0143	0.0164	0.00	187.22	349.50
0.674	6.65	4.90	0.0144	0.0165	0.00	187.15	349.33
0.675	6.85	4.90	0.0143	0.0166	0.00	187.15	349.24

0.674	6.85	4.85	0.0143	0.0166	0.00	186.76	349.21
0.674	7.09	4.85	0.0143	0.0166	0.00	186.55	349.06
0.675	7.02	4.85	0.0142	0.0166	0.00	186.45	348.95
0.674	6.95	4.85	0.0142	0.0167	0.00	186.18	348.87
0.675	6.94	4.85	0.0142	0.0167	0.00	186.06	348.78
0.675	6.65	4.90	0.0142	0.0167	0.00	185.88	348.71
0.674	6.83	4.94	0.0142	0.0167	0.00	185.69	348.84
0.577	6.83	4.94	0.0142	0.0168	0.00	185.53	348.73
0.577	7.07	4.94	0.0149	0.0159	0.00	185.35	348.70
0.577	6.88	4.92	0.0153	0.0158	0.00	185.30	348.37
0.577	6.90	4.92	0.0151	0.0158	0.00	185.28	348.24
0.577	7.03	4.90	0.0150	0.0159	0.00	185.22	348.19
0.577	6.77	4.90	0.0150	0.0159	0.00	185.09	348.33
0.480	6.93	4.92	0.0150	0.0159	0.00	185.00	348.53
0.480	7.09	4.90	0.0149	0.0159	0.00	184.97	348.69
0.480	7.02	4.87	0.0151	0.0158	0.00	184.74	348.08
0.480	7.02	4.85	0.0153	0.0159	0.00	184.63	347.69
0.382	6.88	4.90	0.0154	0.0158	0.00	184.26	347.38
0.480	7.01	4.90	0.0155	0.0159	0.00	183.95	347.42
0.464	6.88	4.87	0.0156	0.0159	0.00	183.72	347.69
0.382	6.90	4.87	0.0155	0.0160	0.00	183.62	347.73
0.382	7.12	4.87	0.0154	0.0159	0.00	183.39	348.15
0.382	7.16	4.82	0.0153	0.0160	0.00	183.08	348.48
0.382	6.85	4.75	0.0151	0.0158	0.00	182.63	349.25
0.285	6.85	4.78	0.0156	0.0156	0.00	182.48	349.53
0.285	6.99	4.75	0.0153	0.0157	0.00	182.37	349.68
0.286	6.88	4.70	0.0150	0.0156	0.00	182.06	349.88
0.285	7.27	4.65	0.0148	0.0156	0.00	181.84	349.75
0.285	6.94	4.65	0.0147	0.0156	0.00	181.68	349.53
0.286	6.96	4.72	0.0148	0.0157	0.00	181.33	349.36
0.286	7.19	4.72	0.0148	0.0157	0.00	181.10	349.15
0.286	7.12	4.75	0.0147	0.0156	0.00	180.97	349.20
0.188	6.93	4.78	0.0146	0.0156	0.00	180.72	348.93
0.188	6.95	4.78	0.0146	0.0156	0.00	180.61	348.70
0.188	6.90	4.72	0.0146	0.0156	0.00	180.48	348.57
0.188	7.16	4.80	0.0146	0.0156	0.00	180.37	348.09
0.188	7.09	4.78	0.0145	0.0152	0.00	180.16	347.57
0.188	7.12	4.80	0.0145	0.0152	0.00	180.04	346.91

0.188	7.00	4.78	0.0144	0.0151	0.00	179.94	346.49
0.091	6.56	4.75	0.0145	0.0151	0.00	179.93	345.88
0.091	6.61	4.78	0.0144	0.0149	0.00	179.78	345.30
0.091	6.65	4.75	0.0151	0.0144	0.00	179.66	344.52
0.090	6.75	4.72	0.0151	0.0144	0.00	179.52	343.43
0.090	6.80	4.72	0.0152	0.0144	0.00	179.31	342.63
0.090	6.97	4.75	0.0152	0.0145	0.00	178.78	342.06
0.090	6.97	4.72	0.0153	0.0145	0.00	178.35	341.22
0.000	7.15	4.78	0.0152	0.0145	0.00	178.03	340.83

Bottom	Top	Left	(load)				
			Qload		80.70	9.91	
°F	°F	°F	dcV	press. Stat	po. Hg	po. Hg	

bottom	top	left	na	press. Stat	an gaz 1	Vacuum 1	Vacuum 2
71.0282	68.56	68.37	-3.71624684	2.31	67.83	10.0425034	10.02
70.9960	68.53	68.38	1.06674242	2.38	67.84	10.038868	10.02
70.9649	68.55	68.37	3.41419482	2.34	67.85	10.0415859	10.02
70.9639	68.51	68.36	-0.03271088	2.34	67.84	10.0403557	10.02
70.9017	68.50	68.35	1.76685524	2.36	67.87	10.0407333	10.02
70.8549	68.49	68.36	1.81332672	2.31	67.86	10.0397873	10.02
70.8158	68.50	68.35	-2.98872614	0.81	67.89	10.0388088	10.01
70.7959	68.47	68.32	3.00080371	2.38	67.89	10.0404539	10.02
70.7377	68.45	68.33	-3.92000651	2.36	67.90	10.0379	10.02
70.6767	68.40	68.29	3.43170762	2.38	67.93	10.0419655	10.02
70.6383	68.35	68.27	3.96420717	2.19	67.90	10.0421944	10.02
70.6016	68.31	68.23	4.06277418	2.34	67.91	10.0391045	10.02
70.5454	68.28	68.23	4.43167925	2.36	67.90	10.0406818	10.02
70.5047	68.27	68.19	-1.2953347	2.36	67.88	10.0386372	10.02
70.4656	68.27	68.20	3.36512947	2.36	67.89	10.039957	10.02
70.4444	68.28	68.18	3.62638807	2.38	67.89	10.0392704	10.02
70.4106	68.28	68.16	2.22690558	2.36	67.90	10.0406322	10.02
70.3976	68.23	68.15	3.60593891	2.32	67.90	10.0429249	10.02
70.3259	68.21	68.13	-3.265306	2.38	67.90	10.043067	10.02
70.3121	68.20	68.12	-4.42225075	2.38	67.91	10.0429678	10.02
70.2572	68.17	68.11	0.19483325	2.36	67.90	10.0406923	10.02
70.2277	68.16	68.09	-1.1864295	2.38	67.89	10.0412445	10.02
70.1815	68.43	68.07	3.04075885	2.34	67.89	10.0412884	10.02
70.1642	70.18	68.06	-1.50107098	2.34	67.88	10.0405045	10.02
70.1011	73.25	68.07	3.80893612	2.36	67.86	10.0408669	10.02
70.0491	87.52	68.06	-0.75642717	2.38	67.87	10.0407219	10.02
70.0159	119.00	68.06	-3.58709908	2.34	67.84	10.0408392	10.02
69.9736	169.83	68.07	-0.95094889	2.38	67.88	10.0414381	10.02
69.9297	218.17	68.12	4.05026579	2.35	67.88	10.041398	10.02
69.9374	269.795	68.23	4.90317154	2.34	67.91	10.0403652	10.02
69.9802	311.319	68.36	4.69254923	2.31	67.92	10.0382376	10.02
69.9848	342.294	68.57	-2.96493626	2.28	67.97	10.0388603	10.02

70.0523	374.641	68.89	-3.18396664	2.31	68.03	10.0400105	10.02
70.1684	442.661	69.36	3.72534966	2.31	68.09	10.040411	10.02
70.3370	521.840	69.99	3.54017043	2.23	68.21	10.0412722	10.02
70.5977	587.559	70.90	2.84929252	2.31	68.33	10.0438137	10.02
70.9775	644.704	72.08	0.22020547	2.23	68.45	10.0395041	10.02
71.5545	678.113	73.65	3.2355516	2.23	68.65	10.0384436	10.02
72.4399	696.778	75.61	4.21188688	2.28	68.88	10.0394096	10.02
73.6094	711.252	77.98	-0.73139679	2.28	69.09	10.0381584	10.02
75.1476	729.717	80.80	-3.09487772	2.38	69.32	10.0400887	10.02
77.0644	732.38	84.05	3.34512925	2.28	69.55	10.0386019	10.02
79.4262	725.09	87.70	1.73407352	2.38	69.83	10.0378571	10.02
82.2087	714.34	91.72	0.55029935	2.28	70.05	10.0384989	10.02
85.5342	698.90	96.21	4.92724562	2.26	70.29	10.0387745	10.02
89.3839	681.50	100.98	-0.99790269	2.28	70.52	10.0381021	10.02
93.6324	666.77	105.91	4.70384455	2.26	70.73	10.0372667	10.01
98.1234	652.28	111.11	-2.0729773	2.26	70.93	10.037322	10.02
102.8798	639.58	116.20	5.41339636	2.28	71.11	10.0371046	10.01
107.7316	627.11	121.39	1.79710567	2.28	71.31	10.0364742	10.02
112.7237	614.22	126.47	-1.20563686	2.23	71.46	10.0371399	10.01
117.7990	604.16	131.62	-2.18690825	2.28	71.61	10.0369568	10.01
122.8460	598.16	136.60	2.36069512	2.26	71.74	10.0376434	10.02
127.9679	594.42	141.38	4.98720074	2.26	71.86	10.0361328	10.02
133.1471	590.84	146.19	1.21998286	2.31	71.97	10.0392761	10.01
138.3546	585.78	150.77	3.23337126	2.26	72.07	10.0384512	10.01
143.7560	569.64	155.50	5.04545259	2.16	72.20	10.0368242	10.01
149.1410	568.67	159.88	3.67217612	2.36	72.31	10.0390615	10.02
154.7297	579.95	163.96	-0.14158915	2.23	72.41	10.0395565	10.01
160.4299	611.17	167.66	-2.4154613	2.28	72.48	10.0391769	10.01
165.9774	653.92	171.65	-0.30516326	2.23	72.62	10.0434866	10.01
171.3881	696.23	175.36	-2.95306063	2.26	72.76	10.0395441	10.01
176.4352	732.17	178.88	-1.4001677	2.23	72.94	10.03936	10.01
181.3880	761.82	182.52	1.42011654	2.26	73.10	10.0377588	10.01
185.9832	783.96	186.13	0.77463585	2.23	73.31	10.0388012	10.02
190.3469	801.12	190.05	5.09473562	2.19	73.52	10.0371323	10.01
194.4694	810.53	193.90	-1.83784807	2.26	73.78	10.0361042	10.01
198.3696	816.36	198.18	4.34915113	2.23	74.01	10.0360584	10.02
202.0916	819.70	202.57	-2.17354989	2.16	74.26	10.0353737	10.01
205.7648	825.70	207.05	2.36763024	2.21	74.49	10.0414152	10.01

209.3734	826.02	211.66	4.81626749	2.21	74.76	10.0343885	10.01
212.9131	826.96	216.10	4.93829775	2.21	75.00	10.0347977	10.01
216.4370	829.99	220.85	-2.38530898	2.21	75.24	10.034091	10.01
219.9435	834.15	225.31	-2.67808533	2.23	75.48	10.0348511	10.01
223.4641	836.04	229.77	2.05065918	2.23	75.74	10.0355711	10.01
227.0011	838.76	234.07	-2.21247578	2.21	76.00	10.0338116	10.01
230.5063	838.92	238.22	5.27384043	2.21	76.23	10.0356169	10.01
233.8898	838.61	242.41	3.54886436	2.23	76.46	10.0348454	10.01
237.2217	837.18	246.47	-1.15065324	2.28	76.69	10.035532	10.01
240.6478	835.46	250.43	5.07547045	2.23	76.90	10.0323915	10.01
243.7870	833.85	254.23	4.60806847	2.30	77.11	10.0344515	10.01
247.3699	832.40	258.02	0.48289406	2.31	77.31	10.0378609	10.01
250.7813	831.01	261.58	-1.77658272	2.28	77.52	10.0352592	10.01
254.0437	829.64	265.13	-1.5813936	2.31	77.70	10.0351639	10.01
257.1518	828.37	268.43	-1.43909347	2.31	77.88	10.0342121	10.01
260.4159	824.49	271.98	4.76268244	2.21	78.02	10.0341825	10.01
263.8759	821.97	275.29	-0.57490683	2.19	78.17	10.0332432	10.01
267.1747	819.93	278.41	2.25761867	2.21	78.35	10.0352201	10.01
270.3440	816.10	281.55	1.29308558	2.19	78.52	10.0342426	10.01
273.5019	811.87	284.31	3.67559481	2.21	78.64	10.0381718	10.01
276.5919	809.89	287.60	5.42584467	2.21	78.78	10.0375271	10.01
279.8113	805.60	290.51	-0.41591317	2.19	78.90	10.0360088	10.01
283.0697	801.30	293.14	4.96840668	2.21	79.00	10.036171	10.01
286.5056	797.08	296.19	3.83842325	2.22	79.14	10.038764	10.01
289.7202	794.05	298.96	0.64036697	2.21	79.22	10.0358973	10.01
292.6505	791.55	301.94	4.02708578	2.23	79.30	10.0365791	10.01
295.7113	787.45	304.47	-0.33084786	2.21	79.39	10.034934	10.01
299.2138	784.64	306.81	-1.80860806	2.21	79.47	10.035635	10.01
302.7316	781.10	309.44	4.94536877	2.21	79.55	10.0356617	10.01
306.5595	778.37	311.72	4.65464401	2.21	79.65	10.0364475	10.01
310.1700	775.06	314.31	-2.57990003	2.21	79.70	10.0402765	10.01
313.7297	771.46	316.33	1.95935094	2.19	79.77	10.0369148	10.01
316.9258	769.09	318.61	4.79219913	2.21	79.81	10.0367374	10.01
320.0040	765.88	320.68	2.52842927	2.16	79.86	10.0361242	10.01
323.5080	760.17	322.38	-1.84461844	2.16	79.86	10.0379715	10.02
327.0981	756.08	324.39	-2.65025687	2.16	79.90	10.0403175	10.02
330.3945	751.70	326.36	-2.57710385	2.19	79.92	10.0409575	10.02
333.7754	747.83	327.85	0.96479577	2.21	79.91	10.0397415	10.02

337.2931	744.76	329.60	1.14273965	2.21	79.93	10.0398426	10.01
340.5564	742.35	331.10	-1.57111907	2.16	79.93	10.0399866	10.01
344.0858	738.56	332.71	5.04844379	2.31	79.95	10.0412407	10.02
347.3676	735.69	334.53	2.82766509	2.28	79.94	10.0384455	10.02
350.6179	732.35	336.12	-1.02390361	2.28	79.96	10.0377083	10.01
353.6608	730.20	338.12	-1.45163	2.23	79.94	10.0406237	10.02
356.6539	727.45	339.75	4.44776869	2.19	79.92	10.0440798	10.02
360.1498	725.15	341.50	5.01368666	2.19	79.92	10.0384169	10.02
363.2064	724.42	343.05	-0.8742978	2.19	79.88	10.0390682	10.02
366.7680	722.14	344.50	4.06234741	2.19	79.89	10.0404348	10.02
369.85	720.423828	345.90	-2.42	2.23307514	79.8574677	10.04	10.02
373.115936	717.84	347.65	-2.90218568	2.16063428	79.86	10	10.02
376.066559	716.03	349.06	2.65066814	2.19169497	79.83	10	10.02
379.208496	713.30	350.36	4.60319376	2.19169283	79.80	10	10.02
382.679047	712.33	351.53	-1.64522183	2.2330749	79.78	10	10.02
385.699829	712.35	352.75	-0.28512338	2.19167376	79.75	10	10.02
389.258423	713.48	354.39	-2.08302021	2.23310685	79.71	10	10.02
392.283234	715.03	356.31	4.76348591	2.2124083	79.69	10	10.02
395.463867	716.89	357.72	5.13678837	2.1916821	79.64	10	10.02
398.000092	718.67	358.95	3.25976944	2.19167733	79.61	10	10.02
400.837006	719.44	360.47	-1.73808217	2.19166875	79.55	10	10.02
404.258148	717.82	362.06	4.79329729	2.1916616	79.54	10	10.02
407.789001	714.34	363.20	3.00400305	2.21242285	79.52	10	10.02
410.892792	708.03	364.02	4.2013936	2.16063023	79.50	10	10.02
413.800629	700.90	365.63	-2.25713229	2.19169164	79.50	10	10.02
416.973145	693.38	366.32	-2.6369493	2.21238732	79.48	10	10.02
420.659943	685.30	366.70	-3.27312946	2.16062284	79.46	10	10.02
423.509521	676.74	366.95	3.95518637	2.19247603	79.47	10	10.02
427.007813	669.31	367.38	-0.77582121	2.21239543	79.42	10	10.02
430.494049	661.59	367.78	4.24315405	2.28483844	79.37	10	10.02
433.447174	655.08	367.76	0.70694172	2.21239662	79.30	10	10.02
437.218628	649.32	367.31	-0.73743194	2.23306775	79.26	10	10.02
441.161102	643.47	367.09	-1.21838236	2.28481674	79.23	10	10.02
444.024933	637.91	366.36	3.93967462	2.30553985	79.19	10	10.02
447.903107	631.26	365.89	1.70635736	2.21239877	79.14	10	10.02
450.38382	625.03	364.69	4.54849911	2.23304772	79.07	10	10.02
453.871887	617.94	363.97	3.25874186	2.16063356	79.02	10	10.02
457.0914	610.86	362.91	-3.71425867	2.2124083	78.96	10	10.01

459.359039	604.81	361.61	-2.4392314	2.17573142	78.92	10	10.02
461.643921	598.85	360.44	-2.19872856	2.23306084	78.84	10	10.02
464.588043	594.34	359.57	-3.20759106	2.21241117	78.78	10	10.02
467.868713	589.79	357.97	4.22079706	2.2124033	78.75	10	10.02
470.878601	587.04	356.85	4.35406542	2.2123909	78.70	10	10.02
473.888092	582.94	355.76	3.10224319	2.21239448	78.64	10	10.02
476.647064	580.19	355.00	4.63905811	2.16068077	78.60	10	10.02
479.38855	575.73	354.02	3.42995763	2.19166732	78.54	10	10.02
482.07785	571.45	353.13	5.07524824	2.23306465	78.49	10	10.02
484.162781	566.99	352.51	3.45085835	2.21243668	78.46	10	10.02
486.185913	564.74	351.51	0.60292047	2.23307681	78.36	10	10.02
488.580597	564.29	351.06	3.61425996	2.21224785	78.29	10	10.02
490.452301	561.81	350.36	1.2679913	2.2124002	78.21	10	10.02
493.125031	558.13	349.24	4.12466478	2.21312642	78.18	10	10.02
495.158203	555.41	348.64	3.24641585	2.19167066	78.10	10	10.02
498.361938	552.37	347.90	2.19033504	2.21242356	78.01	10	10.02
502.145691	549.70	346.79	4.27782249	2.21239901	77.98	10	10.01
504.178589	545.69	345.65	4.42786503	2.21240377	77.91	10	10.01
506.770325	541.58	345.33	2.25280261	2.26414347	77.85	10	10.01
508.436279	536.21	344.27	-2.22565556	2.21239662	77.79	10	10.02
511.776123	532.29	343.49	-3.09786034	2.23307347	77.74	10	10.01
514.195679	526.91	342.35	-1.7612803	2.23310065	77.67	10	10.02
516.840393	521.06	340.82	-0.59187865	2.21241736	77.63	10	10.01
519.843628	515.21	339.53	-1.82507193	2.26414871	77.54	10	10.01
521.63678	508.87	337.96	-3.02953601	2.21258259	77.49	10	10.02
524.657898	503.46	336.64	4.60321379	2.21230507	77.40	10	10.01
526.764404	498.11	334.88	-0.69040626	2.19150043	77.34	10	10.02
528.765686	492.09	333.24	4.52108955	2.2330637	77.26	10	10.01
532.607117	485.39	331.57	-2.33761907	2.2124095	77.21	10	10.02
535.991516	487.31	329.92	-0.47734341	2.23306584	77.17	10	10.02
539.451233	490.51	328.37	3.8177793	2.20418167	77.11	10	10.02
542.54541	491.90	326.71	-0.92162752	2.21239281	77.03	10	10.02
544.522461	493.07	324.96	-1.749686	2.21239042	76.99	10	10.02
544.63385	495.12	322.86	-2.0335567	2.16062474	76.91	10	10.01
546.125854	494.85	321.06	-1.02957916	2.21239567	76.86	10	10.02
547.267334	495.39	319.20	4.53680944	2.23307085	76.80	10	10.02
547.370178	498.07	317.79	2.23939967	2.21237683	76.77	10	10.01
545.955139	501.39	316.06	-2.74849629	2.21238613	76.71	10	10.02

545.589111	504.62	314.47	0.23977971	2.33657384	76.69	10	10.01
546.065186	505.19	313.21	2.96089339	2.19151497	76.66	10	10.01
545.210388	503.97	312.05	-0.20211284	2.30556726	76.63	10	10.01
544.381897	503.49	311.37	3.32785225	2.33657551	76.64	10	10.02
542.551025	502.13	310.53	-2.04962802	2.26414895	76.60	10	10.02
542.73175	501.26	309.93	3.79782867	2.23308039	76.58	10	10.02
542.227966	500.47	309.18	-2.51458454	2.19157958	76.57	10	10.01
541.566956	500.61	308.68	0.9454115	2.23306036	76.59	10	10.01
541.251404	500.56	308.35	4.46603012	2.23275757	76.58	10	10.01
540.497742	500.22	307.63	3.66496134	2.26413107	76.58	10	10.01
539.12854	497.46	307.24	0.51658964	2.23307204	76.56	10	10.01
538.434753	492.55	307.32	-2.43311834	2.23306322	76.56	10	10.01
537.437012	486.99	306.86	4.26350737	2.21241283	76.56	10	10.01
536.534851	481.53	306.36	4.80662346	2.26413989	76.54	10	10.01
536.167969	475.91	305.85	3.95686483	2.33660293	76.51	10	10.01
535.160706	474.28	304.92	3.00227714	2.35729504	76.50	10	10.01
533.94281	482.01	304.35	1.84936464	2.35724807	76.52	10	10.01
533.286316	487.78	303.81	4.95944881	2.35702777	76.49	10	10.01
532.896362	490.89	303.16	-2.3110404	2.3572638	76.47	10	10.01
532.486877	491.41	301.79	0.70034111	2.33657789	76.49	10	10.01
532.169006	490.97	301.14	-2.7627995	2.33660293	76.48	10	10.01
531.91626	490.47	300.31	4.61106443	2.37799478	76.50	10	10.01
531.752808	490.37	299.82	0.96578926	2.35727406	76.48	10	10.01
531.777649	490.13	299.03	-1.60053515	2.35727	76.47	10	10.01
530.608643	488.09	298.06	-1.92289245	2.33661056	76.48	10	10.01
530.093262	485.11	297.83	4.44678736	2.23306227	76.44	10	10.01
529.253906	481.32	297.30	-0.3042469	2.19167829	76.44	10	10.01
529.147095	478.37	296.95	-2.02621341	2.23306751	76.44	10	10.01
529.243591	476.32	296.10	0.72198862	2.26414204	76.43	10	10.01
528.826599	476.24	295.75	0.65276086	2.28487539	76.40	10	10.01
528.771362	473.96	295.55	2.66961694	2.21232796	76.42	10	10.01
527.840332	472.17	294.60	-3.03336835	2.24963498	76.41	10	10.01
527.623108	469.10	294.40	4.61423874	2.28481269	76.38	10	10.01
526.910828	467.41	293.75	-2.6811738	2.26414657	76.38	10	10.01
526.309448	465.06	292.98	4.5783329	2.23306966	76.37	10	10.01
526.07312	461.56	292.18	1.79906416	2.22723556	76.35	10	10.01
525.706787	458.57	291.06	-1.91237032	2.21239471	76.32	10	10.01
525.971558	455.57	290.41	4.5996623	2.19171333	76.34	10	10.01

525.543701	452.57	289.41	4.126266	2.23305583	76.34	10	10.01
525.192017	449.79	288.52	2.99824643	2.19165587	76.35	10	10.00
523.485657	447.05	287.78	3.22233391	2.21239209	76.40	10	10.01
521.778809	442.96	287.07	0.8640427	2.2330575	76.44	10	10.01
520.930237	439.57	286.39	3.96414089	2.16062856	76.53	10	10.01
522.89386	421.58	285.76	4.27070856	2.30554271	76.55	10	9.82
524.206421	421.52	284.41	3.50118756	2.3572576	76.64	10	9.82
524.108887	437.39	283.41	0.04396894	2.27700233	76.74	10	9.82
524.170776	451.67	282.45	4.33280182	2.30554891	76.82	10	9.82
524.812378	462.57	281.24	-2.81668019	2.28482866	76.92	10	9.82
525.257629	470.33	279.74	-3.50688767	2.29696798	77.05	10	9.82
525.283508	479.78	278.28	0.48092482	2.30553222	77.15	10	9.82
525.781189	481.93	277.01	-2.81037426	2.30555439	77.26	10	9.81
526.63623	486.71	276.13	-2.50339508	2.33656263	77.37	10	9.82
525.583923	489.42	274.53	2.66999316	2.30553937	77.49	10	9.82
524.702515	493.98	272.93	-0.50714457	2.2848115	77.59	10	9.82
523.498291	498.52	271.53	-3.35479832	2.21239686	77.73	10	9.82
522.298584	498.86	270.05	-0.32029572	2.26410413	77.82	10	9.82
522.020447	499.26	268.58	4.41985559	2.23304796	77.91	10	9.82
520.527161	503.95	267.09	-2.44019556	2.21238995	77.97	10	9.82
518.782104	513.31	266.21	4.53140068	2.21232986	78.06	10	9.82
517.282593	528.81	264.52	3.70074248	2.28474331	78.12	10	9.82
515.491882	546.36	263.02	-1.70870566	2.21238184	78.23	10	9.82
513.585266	574.85	262.12	4.30550385	2.21229291	78.34	10	9.82
512.283569	598.76	261.10	4.58355188	2.21217585	78.45	10	9.82
510.694153	616.97	260.33	-1.80329227	2.21232295	78.55	10	9.82
507.959808	631.01	259.55	4.86804056	2.23302794	78.66	10	9.82
505.297668	641.87	258.79	1.21706343	2.212358	78.80	10	9.82
502.923615	649.63	258.15	-2.03558779	2.23302865	78.92	10	9.82
499.21283	655.02	257.93	-1.26443136	2.28479004	79.09	10	9.82
497.173706	658.92	257.70	2.05269146	2.30550766	79.25	10	9.82
494.858002	661.15	257.78	3.62135243	2.28475451	79.45	10	9.82
492.372437	663.57	257.72	0.01149306	2.30549812	79.65	10	9.82
489.11145	663.34	257.80	-0.65900701	2.26410007	79.86	10	9.82
487.175262	663.34	257.96	1.13960516	2.26409149	80.09	10	9.82
485.196045	662.81	258.23	-0.89642543	2.23287487	80.34	9.862	9.82
483.394196	662.03	258.18	-2.88401556	2.21236205	80.56	9.861	9.82
481.975342	660.75	258.21	-2.27283263	2.30549097	80.72	9.867	9.82

479.612183	658.87	258.85	2.33649826	2.28477931	80.90	9.866	9.82
477.318909	656.86	259.03	-1.22471392	2.26411557	81.03	9.866	9.83
473.938873	656.20	259.22	-2.65268373	2.21233726	81.14	9.869	9.83
471.201935	655.03	259.62	0.78608072	2.26408863	81.27	9.869	9.83
469.38736	653.93	260.40	-0.20379975	2.19164586	81.38	9.870	9.83
467.688904	653.21	260.74	3.39148426	2.21234417	81.46	9.871	9.83
464.358032	652.86	260.92	5.09153509	2.21232915	81.54	9.869	9.83
461.769775	651.51	261.25	0.80130333	2.26410294	81.62	9.871	9.83
460.572388	650.11	261.75	-0.74516952	2.2847383	81.71	9.871	9.83
459.044128	649.43	262.52	0.83841598	2.1915071	81.77	9.870	9.83
456.290771	648.94	262.72	4.84540033	2.1605742	81.85	9.869	9.83
453.356476	647.57	263.23	3.41667032	2.16057897	81.91	9.872	9.83
451.363831	646.41	263.80	-2.24406099	2.16058517	82.01	9.869	9.83
450.243439	644.76	264.73	-1.81195402	2.13989615	82.12	9.872	9.83
449.152893	641.56	264.82	2.60763192	2.19161534	82.17	9.872	9.83
445.854309	641.30	265.27	2.20913482	2.21232247	82.27	9.873	9.83
443.968628	639.42	265.75	4.34657669	2.08827662	82.34	9.875	9.83
442.412567	638.37	266.29	-1.08635211	2.21227932	82.42	9.876	9.83
440.156586	636.91	266.85	1.81477988	2.19159675	82.50	9.876	9.83
437.825165	635.37	266.97	4.23540306	2.14621305	82.59	9.876	9.83
435.790283	633.40	267.66	4.25698757	2.1605227	82.64	9.877	9.83
434.696167	630.62	268.20	3.30339026	2.19161296	82.67	9.875	9.83
433.003662	628.33	268.47	4.71533298	2.191607	82.66	9.876	9.83
431.600922	625.02	268.87	3.14361095	2.26407242	82.68	9.876	9.84
430.228302	623.80	269.06	0.85086328	2.26407743	82.65	9.872	9.83
427.61554	621.73	269.77	-2.39232612	2.1916163	82.68	9.876	9.83
426.741089	621.00	270.31	4.93955755	2.1605494	82.71	9.894	9.83
425.231049	618.73	270.40	-2.01232386	2.14000154	82.70	9.887	9.83
423.563538	615.84	271.11	-0.11160475	2.16057754	82.70	9.886	9.83
422.012299	614.77	271.92	-2.39176011	2.10882497	82.76	9.887	9.83
420.110931	612.17	271.83	-1.50170243	2.16056943	82.79	9.884	9.83
418.613617	612.31	272.28	3.91284752	2.26407886	82.85	9.888	9.83
416.56778	611.75	272.82	-2.528234	2.19158268	82.89	9.885	9.83
415.67511	609.87	273.24	-2.58094835	2.16059184	82.93	9.882	9.83
413.210602	609.46	273.71	-1.75745893	2.16057253	82.99	9.886	9.83
411.355621	608.83	274.09	-0.8803305	2.08814621	83.03	9.887	9.83
410.270569	607.75	273.97	-2.1301105	2.10881209	83.11	9.882	9.83
409.094604	606.93	274.62	0.93112457	2.06741595	83.19	9.885	9.83

407.927765	607.15	275.44	3.51531744	2.06795168	83.33	9.885	9.83
406.199951	605.27	275.59	1.59283769	2.1088047	83.41	9.887	9.83
404.917572	605.34	276.36	-2.56423211	2.06738591	83.49	9.889	9.83
403.657196	602.85	276.87	-3.72611237	2.16057968	83.50	9.887	9.83
402.549194	600.28	277.08	0.79812932	2.21233296	83.52	9.888	9.83
401.335541	599.42	277.79	3.81842756	2.19159031	83.51	9.887	9.83
400.257813	597.32	277.72	-1.31204081	2.10880208	83.47	9.891	9.83
399.083374	596.32	278.56	1.08074093	2.10881472	83.44	9.892	9.83
398.055664	594.60	278.69	2.5346334	2.10880208	83.39	9.889	9.83
396.39917	593.63	279.00	-2.39535213	2.16055465	83.37	9.890	9.83
394.712585	592.40	279.37	4.33100033	2.19158792	83.34	9.888	9.83
393.932648	590.42	279.90	3.83830595	2.13990664	83.30	9.889	9.84
392.19693	591.29	279.97	0.22734745	2.16055655	83.25	9.887	9.83
391.110474	590.32	280.15	2.5113759	2.21232724	83.24	9.886	9.83
389.79129	590.45	280.33	-3.25470161	2.16055107	83.20	9.885	9.83
388.475159	590.13	280.48	-2.6160233	2.20467782	83.18	9.888	9.83
387.628754	589.99	280.81	-3.0843606	2.21230745	83.15	9.889	9.83
386.997253	587.55	280.66	-3.12965226	2.10880375	83.14	9.887	9.83
386.149475	586.33	281.13	1.81850314	2.10881329	83.10	9.889	9.83
385.207214	585.27	281.41	2.24404788	2.06750369	83.09	9.890	9.83
384.224762	583.42	281.69	0.9366858	2.21231842	83.07	9.890	9.83
383.50946	582.44	281.69	4.72911358	2.13993001	83.06	9.887	9.83
383.167023	582.87	282.18	1.14130127	2.19161248	83.06	9.886	9.83
382.08606	578.12	282.04	-1.13586402	2.19160771	83.06	9.884	9.83
381.362366	576.02	281.93	3.84802675	2.22813368	83.09	9.881	9.82
380.8225	571.8010	282.0872	4.2907	2.0886	83.1584	9.881	9.83
380.351868	568.01	282.26	4.57273245	2.16056371	83.20	9.880	9.83
379.496887	564.75	282.21	-1.15032709	2.21232939	83.28	9.880	9.82
378.483002	561.17	282.12	-0.87938428	2.10871625	83.36	9.878	9.82
376.879547	558.51	282.16	3.51646185	2.08814931	83.44	9.879	9.82
376.703613	554.30	282.14	-2.04484534	2.08815837	83.50	9.881	9.82
376.470947	552.29	281.77	2.04852819	2.08814859	83.53	9.879	9.82
375.690033	548.99	281.45	4.02863503	2.03638625	83.57	9.879	9.82
375.105225	546.59	281.11	3.89534926	2.08812523	83.59	9.878	9.83
375.336426	544.13	280.74	2.68519545	2.10877609	83.61	9.877	9.82
375.038605	541.66	280.36	4.64913511	2.08815312	83.61	9.879	9.82
374.655243	539.53	280.28	4.55116796	2.06741333	83.63	9.878	9.82
374.70755	537.97	280.09	4.59593058	2.19159937	83.63	9.876	9.82

374.237518	536.52	279.50	-0.86740691	2.1915834	83.60	9.877	9.82
374.059052	535.11	279.22	-0.58059526	2.19159055	83.61	9.875	9.82
373.777527	533.97	278.93	-2.6918087	2.19158125	83.59	9.874	9.82
373.734467	533.41	278.39	0.27308387	2.2123487	83.60	9.873	9.82
373.575043	532.57	278.31	-0.08912036	2.16055489	83.59	9.872	9.82
373.267914	532.48	278.39	2.86969972	2.1875937	83.59	9.872	9.82
373.163422	531.88	277.65	3.50250483	2.10881376	83.61	9.871	9.82
373.426788	532.45	277.15	3.66469407	2.19159555	83.62	9.872	9.82
372.958282	531.69	276.41	4.4659853	2.16050553	83.65	9.871	9.82
372.628784	531.71	276.03	0.02037208	2.0674243	83.63	9.871	9.82
372.228241	532.52	275.88	4.89569759	2.10882258	83.66	9.870	9.82
372.051605	532.11	275.35	-0.37668306	2.03639221	83.63	9.869	9.82
371.630219	531.71	275.18	4.88210011	2.0956161	83.62	9.868	9.82
371.358826	532.35	274.68	4.67136097	1.99503803	83.62	9.868	9.82
371.371582	534.18	274.31	-1.20175326	2.19159698	83.59	9.865	9.82
371.316986	534.67	273.65	-1.26596498	2.19160342	83.59	9.864	9.82
371.183258	533.64	273.44	3.58825231	2.19160032	83.58	9.865	9.81
370.764343	529.81	272.94	-0.18075405	2.13988233	83.56	9.866	9.81
371.027374	525.58	272.88	5.02636671	2.03641272	83.54	9.864	9.81
370.887756	521.68	272.87	-1.56517482	2.08812952	83.52	9.867	9.81
370.459747	516.52	272.70	0.23230025	2.16056037	83.51	9.864	9.81
370.619659	512.52	272.50	3.57771182	2.03641224	83.51	9.865	9.81
370.641357	506.77	272.07	0.11649802	2.10881066	83.46	9.868	9.81
370.379883	502.85	271.79	3.09706569	2.10880494	83.43	9.869	9.82
370.308319	498.29	271.83	2.20152998	2.08814764	83.35	9.871	9.82
370.057892	494.12	271.54	-1.96801937	2.06742287	83.32	9.874	9.82
369.974152	490.35	271.19	0.96375942	2.10881186	83.28	9.871	9.82
369.70932	487.75	270.75	-0.18802664	2.10881472	83.24	9.873	9.82
369.44809	485.04	270.64	3.98263979	2.21233606	83.17	9.870	9.82
369.332764	481.70	270.42	-1.47952068	2.19160771	83.12	9.873	9.82
368.972656	478.26	270.12	-2.70120263	2.23299789	83.05	9.879	9.82
368.96991	474.72	269.65	4.5138402	2.10878301	83.03	9.878	9.82
368.67569	470.82	269.44	-2.48801708	2.16126108	82.96	9.878	9.82
368.531982	467.07	269.09	-2.47772241	2.19162607	82.90	9.875	9.82
368.144501	463.69	268.87	-0.86091775	2.26408219	82.86	9.874	9.82
368.205933	460.95	268.19	-1.25817311	2.19161701	82.79	9.878	9.82
368.057648	457.46	267.59	4.39224148	2.2322793	82.73	9.881	9.82
367.888458	455.46	267.28	4.28364182	2.2123456	82.73	9.877	9.82

367.305359	452.69	266.66	3.20057702	2.21207976	82.71	9.875	9.82
367.100586	449.30	265.86	2.12416291	2.1916213	82.69	9.877	9.82
366.69339	445.26	265.25	-0.21263376	2.23299789	82.74	9.878	9.82
366.603394	441.91	264.48	-2.80875826	2.19161105	82.76	9.874	9.82
366.606903	438.21	263.77	-3.47917604	2.23301506	82.78	9.874	9.82
366.175903	434.45	263.04	4.06649208	2.26408672	82.83	9.877	9.82
366.143097	428.47	261.90	-2.53090715	2.21257472	82.89	9.875	9.82
365.870911	423.60	261.52	4.47667599	2.23301053	82.88	9.875	9.82
365.948425	417.67	260.62	-2.92672563	2.21235013	82.91	9.878	9.82
365.794373	412.61	259.64	-0.14377995	2.23300385	82.92	9.874	9.82
365.687256	407.03	258.43	-1.2041254	2.13988733	82.92	9.874	9.82
365.580688	402.81	257.81	4.10366344	2.16058993	82.96	9.873	9.82
365.444763	398.52	256.77	2.81705785	2.16054153	82.93	9.870	9.81
365.343201	394.89	255.87	-2.6071651	2.26405883	82.91	9.866	9.81
365.149231	391.41	255.23	4.21480131	2.26407313	82.87	9.866	9.81
364.985077	388.82	254.42	-0.23072591	2.13989472	82.86	9.866	9.81
364.770142	385.62	253.19	0.17029584	2.21233726	82.83	9.864	9.81
364.838379	383.59	252.26	4.57550335	2.13988376	82.79	9.862	9.81
365.256439	380.94	251.41	1.62203956	2.16055036	82.78	9.862	9.80
365.305573	378.26	250.88	1.39222205	2.13989043	82.75	9.859	9.80
365.574554	376.06	249.90	-1.25917494	2.19162083	82.69	9.860	9.80
365.435455	373.44	249.12	-3.0053978	2.21233344	82.63	9.859	9.80
365.55896	371.44	248.09	-3.25647283	2.19160652	82.60	9.860	9.80
365.845001	368.83	246.62	2.73448944	2.13987684	82.55	9.859	9.80
366.036835	366.78	246.06	4.63307238	2.23298764	82.53	9.857	9.79
366.170074	364.77	245.09	4.96700001	2.21234155	82.53	9.855	9.80
366.852722	363.68	244.10	4.73538828	2.23291087	82.53	9.853	9.79
367.354309	361.82	243.07	4.89154768	2.19159746	82.53	9.851	9.79
367.917145	360.21	242.10	-1.40981913	2.16056561	82.60	9.850	9.79
368.45697	358.90	241.16	4.60324812	2.10882616	82.66	9.851	9.79
368.869507	357.58	240.02	4.57282829	2.13981509	82.72	9.850	9.79
369.657623	356.38	239.17	2.46601582	2.13988495	82.77	9.847	9.79
370.050751	356.01	238.55	4.01765299	2.1915772	82.87	9.847	9.79
370.507813	355.10	237.88	-2.83933282	2.19163322	82.95	9.847	9.79
371.07016	353.95	237.05	-3.09165382	2.1399045	83.07	9.846	9.78
371.685913	353.71	236.47	-3.24266386	2.13988113	83.17	9.845	9.78
372.590942	352.56	235.86	1.70091939	2.1573472	83.29	9.846	9.78
372.79303	352.39	235.10	0.35168219	2.19159603	83.38	9.844	9.78

373.60965	351.59	234.75	-3.21158385	2.23297715	83.51	9.847	9.78
374.359436	351.33	234.10	-1.2529856	2.21231818	83.61	9.842	9.78
375.114502	351.38	233.79	3.92704201	2.19159532	83.72	9.844	9.78
375.999969	351.58	233.31	-1.37258983	2.19381428	83.79	9.843	9.78
376.506927	351.67	233.04	3.52363372	2.2123251	83.95	9.843	9.78
377.12912	351.74	232.79	1.41910958	2.13990784	84.07	9.843	9.78
377.80069	351.12	232.59	-2.60319114	2.16056061	84.19	9.846	9.78
378.756622	352.09	232.53	3.48118162	2.22066236	84.27	9.846	9.78
379.4263	352.29	232.37	-0.03316471	2.21231699	84.36	9.847	9.78
380.023895	351.77	232.28	-1.00002956	2.08814001	84.43	9.845	9.78
380.790283	351.26	232.20	3.86667418	2.08814645	84.48	9.846	9.78
381.395538	350.73	232.16	-2.18532157	2.10879087	84.50	9.846	9.78
382.418732	350.06	231.99	2.94128036	2.1087749	84.53	9.846	9.78
383.235992	349.75	231.93	4.1058135	2.1090064	84.57	9.844	9.78
383.834839	349.40	231.69	-2.79772496	2.08813882	84.56	9.847	9.78
384.562683	349.47	231.49	-0.14687194	2.10878396	84.59	9.842	9.78
385.378876	349.34	231.65	-3.340446	2.06736922	84.6064148	9.843	9.78
386.419769	349.58	231.34	0.57878298	2.10878634	84.6248245	9.841	9.77
386.984375	350.18	230.98	4.1063571	2.0673852	84.6585159	9.840	9.78
387.648529	351.58	231.17	-0.49057859	2.10876966	84.6862411	9.842	9.78
388.471069	352.61	230.96	1.33207428	2.10877728	84.7356796	9.843	9.78
388.851868	353.93	231.02	-2.74167991	2.21229053	84.7867508	9.841	9.77
389.763458	354.69	230.67	1.75391662	2.13987303	84.8558426	9.840	9.77
390.247711	355.65	230.76	3.54808187	2.19156504	84.94664	9.840	9.77
391.065857	356.58	230.68	3.20180964	2.19154286	85.0153198	9.840	9.77
391.879272	357.40	230.62	-3.48581052	2.08753967	85.0819016	9.842	9.78
392.513306	357.96	230.73	-2.43607068	2.10876703	85.1628799	9.844	9.77
393.380554	357.63	230.52	-3.3109889	2.10870671	85.2294846	9.844	9.77
393.962006	358.70	230.75	4.25708675	2.16051817	85.2627563	9.842	9.78
394.599457	358.80	230.73	-0.42867744	2.16051555	85.2908707	9.844	9.78
395.250092	359.01	230.80	4.04055309	2.1605165	85.3141937	9.843	9.78
395.978119	360.20	230.94	-2.65985227	2.1604948	85.3222122	9.842	9.78
396.467712	360.87	231.08	-2.93908381	2.10877204	85.3148651	9.843	9.77
396.860077	361.40	231.47	-2.13559484	2.05775428	85.3146591	9.841	9.77
397.546265	363.12	231.50	-3.11690116	2.06738162	85.3076324	9.841	9.77
398.21225	365.44	231.62	-1.59054828	2.0881021	85.3364487	9.841	9.77
398.644409	367.23	231.80	-3.1969192	2.06738806	85.3244019	9.842	9.77
399.355988	369.34	231.89	3.83310652	2.08810043	85.3347778	9.842	9.77

399.767395	370.75	232.31	4.66817474	2.08810902	85.2965393	9.842	9.77
400.179016	373.05	232.48	0.15847057	2.19154978	85.3173447	9.843	9.77
400.792084	374.85	232.51	-2.42765737	2.16051126	85.2957611	9.841	9.77
401.225586	375.87	233.18	-2.20224738	2.13985324	85.3326797	9.844	9.77
401.89035	376.07	233.34	0.2814706	2.19154215	85.3093262	9.839	9.77
402.399017	375.95	233.54	3.97067451	2.08810329	85.3270416	9.838	9.77
402.704742	374.83	234.02	-1.99139977	2.08811378	85.3970947	9.838	9.77
403.247681	373.63	234.21	4.4868679	2.08810282	85.4769592	9.838	9.77
403.601471	372.81	234.60	3.91643453	2.03666592	85.5236206	9.837	9.77
404.245758	370.31	234.80	3.08919835	2.06737137	85.6094589	9.838	9.77
404.651276	367.98	234.98	4.70004225	2.03857636	85.7078247	9.837	9.77
405.179718	364.83	235.19	4.69574738	2.10875916	85.7834396	9.837	9.77
405.29007	361.59	235.51	4.65936279	2.08810377	85.8510056	9.838	9.77
405.628265	358.61	235.71	-2.22612739	2.08800077	85.885994	9.837	9.77
405.741364	356.02	235.74	-3.02155447	2.08810735	85.9615707	9.839	9.77
405.663971	352.47	235.81	3.9264009	2.06736183	85.9426498	9.841	9.77
405.566437	349.66	235.92	4.92912388	2.08808589	85.9661713	9.838	9.77
405.686371	346.85	235.78	0.04760999	2.0363338	85.9902954	9.839	9.77
405.810852	344.55	235.74	3.07716298	2.10879755	85.9852142	9.838	9.77
405.785828	342.04	235.69	3.30733609	2.06738687	85.9870377	9.839	9.77
405.653229	339.47	235.61	4.65580034	2.16053176	85.9856644	9.839	9.77
405.438782	337.60	235.55	-1.31041229	2.08809114	85.9726868	9.839	9.77
405.404694	334.82	235.17	3.85059977	2.06737089	85.9757538	9.838	9.77
405.30069	333.86	234.97	4.84111404	2.10875583	85.9569473	9.840	9.77
405.357758	330.94	234.33	-2.0911262	2.08810306	85.9139404	9.839	9.77
405.262207	328.74	234.30	-1.23565912	2.08808661	85.8928146	9.839	9.77
405.181549	327.00	233.89	4.38268137	2.10876751	85.8669968	9.840	9.77
404.802246	325.50	233.58	4.47031403	2.14150167	85.8294678	9.840	9.77
404.941528	323.44	233.39	4.12649775	2.13983417	85.8086014	9.840	9.77
404.901062	321.76	232.93	-0.24792068	2.13976479	85.7871857	9.840	9.77
405.064941	320.81	232.42	-2.43431497	2.08808994	85.7343597	9.841	9.77
405.23996	318.59	231.67	3.73030043	2.1087532	85.7137756	9.843	9.77
405.460754	317.87	231.18	-1.7780906	2.03633881	85.6744003	9.841	9.77
405.423889	315.84	230.65	-0.77342767	2.06736922	85.6241684	9.841	9.77
405.347504	315.02	230.32	2.73295903	2.08808398	85.593811	9.841	9.77
405.650513	313.26	230.19	4.58863878	2.06736803	85.5358658	9.843	9.77
405.726929	312.82	229.75	2.19039154	2.0880928	85.4891739	9.841	9.77
405.952057	312.11	229.23	4.47482395	2.06735969	85.4850159	9.838	9.77

406.293396	310.87	228.73	-2.0859499	2.067379	85.4792862	9.838	9.77
406.29126	310.36	228.34	1.57569325	2.08801723	85.5140305	9.839	9.77
406.597778	309.15	227.98	-1.5973109	2.21187901	85.5445557	9.838	9.77
407.123047	308.16	227.35	4.32832146	2.10877538	85.574646	9.838	9.77
407.100861	307.60	227.00	4.40265322	2.1604774	85.6222839	9.839	9.77
407.544861	306.91	226.71	0.20136765	2.08808994	85.6519394	9.839	9.77
407.916199	305.94	226.20	-2.2204802	2.16039371	85.6738892	9.837	9.77
408.125763	305.01	225.81	3.93999362	2.1643281	85.6853256	9.837	9.77
408.39743	304.79	225.59	2.21085501	2.13982558	85.6797485	9.839	9.77
408.952271	304.18	225.14	0.63006628	2.10874844	85.6724014	9.840	9.77
409.286865	303.62	224.85	2.65476108	2.13981438	85.6314774	9.839	9.77
409.796844	303.39	224.30	-2.70674205	2.16049671	85.6003342	9.838	9.77
410.207001	302.95	224.00	-2.62889051	2.08808732	85.564003	9.839	9.77
410.545288	302.68	223.52	3.22366381	2.16048622	85.5228424	9.841	9.77
410.907196	302.80	223.28	-2.6200614	2.06737709	85.4890137	9.840	9.77
411.561584	301.90	222.91	0.27628359	2.08807492	85.4779358	9.843	9.77
411.894073	302.40	222.69	-2.9385066	2.06735277	85.4346848	9.843	9.77
412.191467	302.15	222.39	-0.27314603	2.03633404	85.4051743	9.840	9.77
412.592407	301.87	222.01	-0.81325799	2.10876012	85.3565826	9.842	9.77
413.108307	301.44	221.88	3.47306252	2.08129239	85.3164673	9.844	9.77
413.400543	301.56	221.51	2.24134421	2.08809233	85.2925415	9.846	9.77
413.841248	301.42	221.31	3.14800453	2.08808446	85.253746	9.843	9.77
414.453125	301.92	221.23	-2.90702391	2.06745028	85.1875153	9.842	9.77
415.013611	301.38	220.73	4.21712208	2.06732941	85.1575546	9.845	9.77
415.304749	301.42	220.45	-2.47231889	2.08808374	85.0870285	9.842	9.77
415.786377	300.85	220.07	-2.84414601	2.06740642	85.039032	9.842	9.77
416.071747	300.55	219.83	-0.9149518	2.08810949	84.9816589	9.839	9.77
416.739838	300.08	219.60	-2.0618217	2.16049337	84.927063	9.842	9.77
417.538422	299.42	219.34	-2.48400354	2.13983345	84.8662338	9.843	9.77
418.141113	300.20	219.25	-0.99876499	2.03632736	84.8354416	9.843	9.77
418.711121	299.42	218.79	-2.93507814	1.96393752	84.7893066	9.841	9.77
419.352478	299.45	218.76	0.85521156	2.03630948	84.7888641	9.841	9.77
419.725494	299.07	218.45	4.62910652	1.99493241	84.7866516	9.839	9.77
420.136444	298.73	218.42	4.84065962	2.03631949	84.7860413	9.839	9.77
420.789032	298.73	218.29	-2.42518735	2.07226968	84.7998505	9.842	9.77
421.460114	298.42	218.08	4.29791832	2.06735921	84.8388138	9.842	9.77
422.039917	298.51	218.09	4.30733919	2.06741238	84.8342133	9.842	9.77
422.555145	298.07	217.99	4.05360222	2.0363183	84.8264389	9.841	9.77

422.987976	297.84	217.82	0.10981791	2.08807445	84.8094482	9.841	9.77
423.570435	297.50	217.76	3.64914656	2.06733274	84.8246994	9.842	9.77
424.062531	297.10	217.74	3.07914448	2.07886004	84.8033829	9.841	9.77
424.438721	296.68	217.67	3.02904987	2.13981104	84.7653809	9.841	9.77
424.992889	296.80	217.59	3.50923133	2.10876513	84.7405319	9.842	9.77
425.265991	296.67	217.54	-0.08213115	2.10875463	84.6995316	9.841	9.77
425.718872	296.41	217.52	0.89315486	2.19151711	84.663414	9.842	9.77
426.358978	296.45	217.50	1.17938399	2.21225882	84.6188278	9.842	9.77
426.945282	296.21	217.32	1.5518471	2.08806777	84.5627213	9.842	9.77
427.571686	296.12	217.22	-2.98248219	2.03627372	84.5158157	9.843	9.77
428.387329	295.91	217.00	-1.50236166	2.08808088	84.445694	9.839	10
428.781555	295.86	216.81	-0.7545644	2.10875511	84.4028168	9.840	10
429.367676	295.70	216.75	-1.93790948	2.06736302	84.3706589	9.838	10
429.867889	295.68	216.54	-1.163445	2.06735682	84.330307	9.840	10
430.582184	295.80	216.54	-1.21099091	2.08807755	84.2639389	9.840	10
431.02948	295.35	216.27	-2.41767764	2.06735182	84.2305527	9.840	10
431.770416	295.33	216.06	-2.05024552	2.08807445	84.159996	9.840	10
432.064728	295.49	215.82	-2.64583087	2.08807945	84.1363602	9.838	10
432.732056	295.35	215.56	3.84398723	2.06738067	84.0765457	9.836	10
433.661804	295.33	215.84	1.68876302	2.08805847	84.0241623	9.839	10
434.386932	295.46	215.82	4.36139679	2.06834149	83.9798584	9.839	10
435.165314	294.98	215.72	0.81476468	2.08807755	83.9710159	9.836	10
435.682831	295.34	215.65	4.30708122	2.06736517	83.9408264	9.837	10
436.291718	295.72	215.46	-1.88268661	2.06901789	83.9347229	9.838	10
437.143097	295.99	215.47	4.48412085	2.0880847	83.957283	9.837	10
437.819	296.39	215.50	-2.17972183	2.06735444	83.9633484	9.837	10
438.430084	296.46	215.60	1.39878428	2.06736803	84.0060959	9.840	10
439.220154	296.92	215.55	3.88528085	1.9951421	84.0328827	9.837	10
439.744537	297.15	215.41	4.59974051	2.08808255	84.053215	9.838	10
440.477234	297.41	215.29	3.96900749	2.06736827	84.0513229	9.838	10
441.242584	297.56	215.17	-2.35750604	2.10874772	84.0378494	9.838	10
441.15213	297.83	215.03	-2.1342988	2.21204114	84.0246353	9.838	10
440.595276	298.05	215.09	-1.36904371	2.21218514	84.0294571	9.838	10
441.154816	298.20	215.01	-1.31991482	2.19154119	84.0136871	9.838	10
441.143707	298.27	214.89	0.92019188	2.19154668	83.9844437	9.838	10
441.138977	298.14	214.74	0.70698696	2.16056514	83.962883	9.838	10
441.784332	298.28	214.66	3.89123178	2.1915648	83.9508286	9.839	10
442.344727	297.88	214.55	3.64120841	2.1604929	83.9158707	9.838	10

442.158356	297.96	214.47	-1.81885862	2.19153476	83.877861	9.838	10
443.098389	298.12	214.49	-3.12732148	2.08810782	83.8321075	9.839	10
443.509674	297.86	214.63	1.97606099	2.08809757	83.791008	9.839	10
443.796082	297.97	214.65	-2.43227768	2.08809757	83.7263565	9.838	10
444.873779	297.80	214.63	3.02606249	2.12672257	83.7072067	9.838	10
445.260925	297.76	214.67	4.06228352	2.08807874	83.663681	9.838	10
445.547119	297.44	214.64	-3.00835967	2.10876679	83.6068497	9.839	10
446.626526	297.49	214.44	-0.89423442	2.0880909	83.5695496	9.839	10
448.259796	297.21	214.61	3.58105731	2.08124971	83.5242004	9.838	10
449.169556	297.47	214.85	-2.995924	2.06736255	83.4652252	9.841	10
450.331696	297.15	214.84	-3.42630053	2.08807659	83.4191742	9.836	10
451.234772	296.78	214.69	-2.63397026	2.10875678	83.3989563	9.837	10
451.30188	296.86	214.72	2.8966949	2.08809423	83.395813	9.838	10
451.758881	296.90	214.76	2.58116055	2.10875249	83.4155426	9.837	10
451.994293	296.49	214.60	-1.55067563	2.06682134	83.4188538	9.838	10
453.183075	296.67	214.71	0.52786982	2.13982677	83.4538498	9.837	10
453.432129	296.19	214.51	3.13337374	2.19153595	83.4895706	9.837	10
454.203644	296.32	214.44	3.74811482	2.16050696	83.504631	9.840	10
454.154755	295.68	214.42	2.07086277	2.19153881	83.5339279	9.836	10
453.639984	295.81	214.21	-2.11556029	2.19154191	83.5376205	9.839	10
454.408356	295.66	214.10	-3.09099078	2.21225882	83.5292969	9.839	10
453.987213	295.29	213.97	3.47081232	2.19154334	83.5120087	9.839	10
453.769928	295.07	213.97	-0.45055676	2.10875964	83.5291824	9.839	10
453.288757	295.21	213.59	-1.88048089	2.1087563	83.5052719	9.839	10
453.885101	294.99	213.56	-0.84183037	2.09230828	83.4876328	9.838	10
453.823181	294.82	213.55	4.60946226	2.08809304	83.4477234	9.837	10
454.275909	294.75	213.28	-1.27733278	2.08809328	83.4178696	9.839	10
454.222382	294.67	213.19	3.80349898	2.08808327	83.4039536	9.839	10
455.159546	294.47	212.81	4.58929491	2.10875368	83.3433685	9.836	10
455.707214	294.40	212.57	4.35834932	2.10875726	83.3116989	9.839	10
456.10675	294.26	212.51	-2.87822914	2.1087606	83.2806244	9.837	10
456.849976	294.36	212.37	-3.00657272	2.10875916	83.2289963	9.837	10
457.093597	294.17	212.14	-0.56807971	2.0880847	83.2027054	9.837	10
457.791138	293.83	212.11	2.75977278	2.10876203	83.1432724	9.839	10
459.479492	293.58	212.08	-3.27789402	2.13984346	83.1151352	9.838	10
460.424469	294.43	212.16	-3.74264956	2.21225953	83.0842514	9.839	10
461.304993	294.36	212.06	-3.31799293	2.21226907	83.0394516	9.836	10
460.954865	294.09	211.82	-2.1177628	2.19154382	83.0159454	9.836	10

460.935699	294.29	211.53	-3.48320222	2.160501	82.9979858	9.839	10
460.757141	294.31	211.39	-2.05573821	2.16050339	83.02565	9.837	10
461.241791	293.98	211.33	-3.51528931	2.1605072	83.0443192	9.837	10
462.151581	294.43	211.22	-3.7152586	2.21225667	83.0727463	9.835	10
462.642303	294.47	211.06	2.88458967	2.21227431	83.1070023	9.837	10
463.21701	294.29	210.74	2.33711553	2.16049314	83.1367569	9.839	10
463.271027	293.87	210.61	3.75829864	2.1915431	83.1567001	9.838	10
462.929413	294.15	210.48	-1.15965223	2.21224332	83.1462173	9.837	10
462.599121	294.02	210.25	4.42657566	2.19152546	83.1671066	9.837	10
462.837799	294.31	210.03	4.38907385	2.19155169	83.1804962	9.837	10
463.568207	294.23	209.96	4.35123825	2.10874772	83.1585007	9.838	10
463.904449	294.20	209.67	3.30116916	2.10875797	83.1292648	9.837	10
464.36673	294.20	209.55	-1.79373407	2.10874701	83.1120071	9.839	9.77
464.401245	294.14	209.39	1.76245606	2.08810782	83.1078644	9.837	9.77
464.361908	293.93	209.23	3.69476914	2.13982511	83.0860672	9.838	9.77
464.501678	293.93	209.16	3.81423736	2.08808804	83.0736237	9.837	9.77
465.173431	293.47	209.10	-2.6431942	2.10875607	83.0426178	9.837	9.77
465.455597	293.61	208.84	1.16703892	2.10874486	83.0011597	9.837	9.77
465.674774	293.47	208.89	-0.96944344	2.06735945	82.9655457	9.838	9.77
465.696106	293.27	208.75	4.05071497	2.16048932	82.9184875	9.835	9.77
466.106171	293.39	208.62	-2.33399558	2.16167092	82.8877563	9.837	9.77
467.789856	293.30	208.65	3.79853487	2.21226287	82.855545	9.836	9.77
468.318085	293.36	208.69	4.21018791	2.16050243	82.8331146	9.841	9.77
468.576111	293.94	208.54	3.12777424	2.16044593	82.8044281	9.837	9.77
469.41922	293.38	208.44	4.44815826	2.23292708	82.7975388	9.836	9.77
469.494171	293.08	208.22	3.63029885	2.21227026	82.7924728	9.838	9.77
469.771851	292.98	207.96	4.34607124	2.1604979	82.7739334	9.837	9.77
468.612854	292.93	207.88	-1.28092754	2.19154572	82.8000412	9.837	9.77
468.912872	293.22	207.84	-2.52909112	2.19155002	82.8282776	9.837	9.77
469.365448	293.26	207.51	-1.54877329	2.21228004	82.8688736	9.835	9.77
469.299896	293.64	207.31	1.9192512	2.19155049	82.9140854	9.835	9.77
468.31488	293.42	207.12	2.6737318	2.21226931	82.9203033	10	9.77
468.838196	293.48	207.10	-2.3734591	2.1915462	82.9397964	10	9.77
468.533112	293.49	206.89	-2.534127	2.19154048	82.9400177	10	9.77
468.700592	293.43	206.75	-1.78112268	2.21226144	82.955162	10	9.77
468.64563	293.66	206.57	2.75650644	2.19148302	82.9538498	10	9.77
468.295105	293.67	206.48	4.27500963	2.21226621	82.9376984	10	9.77
468.160522	293.56	206.24	-0.75460887	2.16050816	82.9209747	10	9.77

468.157013	293.49	206.00	-1.90971458	2.1915226	82.8794327	10	9.77
468.271698	293.22	205.89	4.5842042	2.21187043	82.8713837	10	9.77
468.667236	292.92	205.81	-2.51132441	2.21226645	82.8576736	10	9.77
468.264496	293.02	205.59	2.09175968	2.19153643	82.8014755	10	9.77
468.033752	292.87	205.44	-2.9274199	2.21226263	82.7702637	10	9.77
467.783813	292.82	205.48	-2.20087028	2.21224427	82.74617	10	9.77
468.436066	292.42	205.22	1.88612473	2.19154501	82.7196198	10	9.77
468.816559	292.02	205.16	3.76181006	2.13987136	82.6932373	10	9.77
469.719238	292.31	204.95	-0.4438673	2.19152093	82.655159	10	9.77
470.232269	291.51	205.06	3.99633551	2.19154763	82.6499023	10	9.77
470.772125	291.92	204.86	3.91232586	2.21227837	82.5856934	10	9.77
471.094849	291.50	204.62	-0.20754132	2.06053233	82.5858765	10	9.77
471.041718	290.65	204.35	4.0067482	2.0673821	82.5840988	10	9.77
470.154022	290.75	204.22	2.97216868	2.21226287	82.5737305	10	9.77
469.131012	290.30	203.96	3.49852133	2.19154429	82.6041794	10	9.77
469.206848	289.87	203.73	3.86028147	2.16050267	82.622963	10	9.77
469.802582	289.12	203.64	2.94273567	2.23293495	82.6452179	10	9.77
468.792084	289.30	203.41	-3.07590675	2.21226788	82.6686478	10	9.77
468.453491	288.55	203.24	1.97429657	2.19154453	82.7063065	10	9.77
468.760925	288.32	203.07	1.69146597	2.19156718	82.7175446	10	9.77
468.651062	287.56	202.95	-3.22863889	2.23292828	82.7315979	10	9.77
468.005859	287.00	202.85	3.05966902	2.21226621	82.7448807	10	9.77
468.427185	286.67	202.73	-3.57539272	2.19153094	82.7260895	10	9.77
468.371765	286.46	202.41	2.4848156	2.16048765	82.7179337	10	9.77
468.120087	285.93	202.32	-3.64830208	2.21228004	82.7238541	10	9.77
467.789825	285.42	202.15	2.78363109	2.21225166	82.7060471	10	9.77
467.854675	285.12	201.91	3.68649149	2.24717045	82.6628952	10	9.77
467.628387	284.45	201.70	4.01431561	2.23293018	82.6355972	10	9.77
467.601501	284.16	201.45	4.08817673	2.16050887	82.6403351	10	9.77
467.206909	283.95	201.23	4.23415279	2.19153166	82.5856018	10	9.77
466.993011	283.74	200.98	3.86461234	2.19154143	82.5559235	10	9.77
466.58429	283.35	200.87	4.16286182	2.06719494	82.5128479	10	9.77
466.869385	282.94	200.73	3.9763844	2.10876822	82.4774628	10	9.77
467.3862	282.06	200.59	-2.39472699	2.16048408	82.4315414	10	9.77
467.526306	282.56	200.24	1.33766496	2.08809876	82.3931808	10	9.77
468.087616	282.53	200.13	-3.15746784	2.10875297	82.3755188	10	9.77
468.092163	282.42	199.77	-2.05483508	2.13981843	82.3675842	10	9.77
467.90744	281.42	199.53	-3.63946486	2.06737304	82.3326797	10	9.77

468.192169	281.77	199.44	-0.67185134	2.13986659	82.3522186	9.83406734	9.77
467.971649	281.59	199.25	-1.37369323	2.2329421	82.3378372	9.83594894	9.77
468.017334	281.18	199.00	3.08068871	2.16050339	82.3581238	9.83492756	9.77
468.522675	281.14	198.91	-2.4337554	2.19155741	82.3414154	9.83469296	9.77
468.247955	280.68	198.48	3.39317346	2.21226215	82.3871841	9.83597565	9.77
468.075745	280.66	198.18	-1.82876718	2.21225142	82.3807678	9.83952427	9.77
467.623352	280.05	197.93	3.88323283	2.19149232	82.388588	9.83955669	9.77
466.923828	279.98	197.74	-0.83160037	2.264009	82.3846054	9.83971214	9.77
466.58136	279.70	197.40	4.41244555	2.18424773	82.3650436	9.84084702	9.77
466.128052	278.55	197.20	-1.18338466	2.26398516	82.3532486	9.84052277	9.77
466.617279	278.27	196.94	-2.56649852	2.19154692	82.3340149	9.84004498	9.77
466.708893	277.92	196.80	2.48643017	2.19153571	82.3358917	9.839921	9.77
466.814758	277.28	196.45	-2.16437936	2.21224427	82.3349991	9.83844662	9.77
466.555115	276.61	196.17	-0.17967321	2.26397991	82.3080826	9.83905983	9.77
467.076324	275.90	196.07	1.45610321	2.22288752	82.282692	9.83795261	9.77
467.339172	275.67	195.82	3.80733347	2.16052723	82.2699738	9.83708477	9.77
467.118347	275.13	195.50	1.95436537	2.21228147	82.2637711	9.83668518	9.77
467.538727	274.64	195.28	3.79334903	2.21212649	82.2397614	9.83982372	9.77
467.634125	274.18	195.09	4.06577301	2.2329433	82.2191696	9.8371973	9.77
467.8591	273.44	194.95	-1.50154972	2.19156218	82.1942215	9.83586979	9.77
467.442505	273.21	194.63	-1.97153509	2.19153833	82.1781998	9.83456612	9.77
467.879181	272.45	194.51	4.63800859	2.23234487	82.157608	9.83560181	9.77
468.583405	272.40	194.24	4.53943253	2.1915493	82.1179886	9.8349905	9.77
469.197784	272.65	194.14	-1.77266669	2.13937998	82.1064148	9.83659363	9.77
469.466461	272.43	193.73	-2.3179965	2.19154668	82.1033325	9.83611679	9.77
469.667511	271.71	193.53	0.62493128	2.232939	82.1058197	9.83561325	9.77
469.819458	271.21	193.12	-2.03670907	2.18897152	82.1023712	9.83403492	9.77
468.892517	270.71	192.83	4.11501217	2.25591946	82.1192017	9.83607864	9.77
468.923798	270.03	192.62	1.91577458	2.21242332	82.1228485	9.83470535	9.77
469.602936	269.94	192.41	-0.15922423	2.25144982	82.1356201	9.83802414	9.77
469.169525	269.47	192.05	-1.34276891	2.21228743	82.1734543	9.8384285	9.77
469.34433	269.04	191.62	2.99056697	2.21046495	82.2088394	9.83760071	9.77
468.472015	268.31	191.24	3.16730928	2.13981223	82.2197571	9.83899021	9.77
467.774017	267.81	190.90	-2.99824238	2.26400304	82.2342987	9.8412075	9.77
467.768646	267.43	190.58	-3.66232681	2.26398706	82.2400055	9.83965778	9.77
467.825043	266.67	190.25	-0.9273966	2.2639842	82.2260513	9.83927059	9.77
467.737976	266.19	189.96	4.38200474	2.23291349	82.2200546	9.8366766	9.77
467.862427	265.83	189.62	4.7157526	2.21225286	82.2016907	9.83765793	9.77

467.561554	265.43	189.25	3.07030606	2.23292613	82.1954269	9.84042549	9.77
467.714142	264.75	188.88	4.12147474	2.0880785	82.2020264	9.84092331	9.77
467.003754	264.27	188.62	-0.50920367	2.08832479	82.1674194	9.83979702	9.77
467.353516	263.60	188.30	4.12339449	2.10874462	82.1652069	9.84081936	9.77
467.406372	263.11	188.06	2.103585	2.16048002	82.1391296	9.84169865	9.77
467.325989	262.47	187.78	4.25493097	2.08807802	82.1173172	9.8414793	9.77
467.636017	262.17	187.59	3.55750299	2.26198721	82.0814743	9.83816814	9.77
468.418579	262.07	187.21	4.59735727	2.19156742	82.0490799	9.84128761	9.77
468.616974	261.05	186.57	-0.15168633	2.30533648	81.9856186	9.84001255	9.77

Paramètres

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

Code verrouillage:	JOT	

Description du test

Test standard	EPA	
Run #	1	
Date	30-04-2019	
Technicien	M.M	
Project #	PI 20194	

Description de l'unité

Manufacturier	JOTUL	
Modèle	F45 V2	
Combustion system	Non-Cat	
Appliance type	WOOD STOVE	
Firebox volume	2,37	cu ft.
Appliance weight empty	n.a	lbs
Fan (no, Standard, Option)	OPTION	

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):	1,010	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,987	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	300	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	PI 20194
Date	30-04-2019
Technicien	m.m

Fuel data

Fuel type	Cord	
Fuel specie	Oak	
HHV	20207,0	kJ/kg
%C	49,5	
%H	6,6	
%O	43,7	
%Ash	0,2	
HHV	8689,9	Btu/lb
LHV	7600,4	Btu/lb

Default Fuel Values

	D. Fir	Oak/Maple
HHV	19 810	20 207
%C	48,73	49,5
%H	6,87	6,62
%O	43,9	43,7
%Ash	0,5	0,2
HHV (Btu/lb)	8519	8690
LHV (Btu/lb)	7451	7600

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)		10	lb/ft^3			
Usable Firebox Volume		2,37	ft^3			
Total Nom. Load Wt. Target		23,70	lb			
Total Load Wt. Allowable Range		22,50	to	24,90	lb	
Core Target Wt. Allowable Range		10,70	to	15,40	lb	
Remainder Load Wt. Allowable Range		8,30	to	13,00	lb	
						Mid-Point
Core Load Pc. Wt. Allowable Range		3,60	to	5,90	lb	4,75
Remainder Load Pc. Wt. Allowable Range		2,40	to	13,00	lb	7,70
	Pc. #					
Core Load Piece Wt. Actual	1	3,60	lb	In Range		
	2	4,35	lb	In Range		
	3	5,42	lb	In Range		
Core Load Total. Wt. Actual		13,37	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3,77	lb	In Range		
(1 to 3 Pcs.)	2	6,49	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		10,26	lb	In Range		
Total Load Wt. Actual		23,63	lb	In Range		
Core % of Total Wt.		57%		In Range		45-65%
Remainder % of Total Wt.		43%		In Range		35-55%
Actual Load % of Nominal Target		100%		In Range		95-105%
Actual Fuel Load Density		10,0	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4,73	lb			
Actual Kindling Wt.		3,82	lb	In Range		16,2%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		7,09	lb			
Actual Start-up Fuel Wt.		6,84	lb	In Range		28,9%
Allowable Residual Start-up Fuel Wt. Range	2,4	to	4,7	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		3,4	lb	In Range		3,5
Total Wt. All Fuel Added (wet basis)		34,29	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	2,1	to	2,6	lb		2,4
Actual Fuel Load Ending Wt.		2,2	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)					Pc. Wt. Dry Basis			
1	2	3	Ave.					
19,6	19,3	20	19,6	In Range	3,01	lb	1,36	kg
19,9	20	19,1	19,7	In Range	3,63	lb	1,65	kg
20,6	20	19,4	20,0	In Range	4,52	lb	2,05	kg
20,3	20,4	20,8	20,5	In Range	3,13	lb	1,42	kg
21,1	20,8	20,3	20,7	In Range	5,38	lb	2,44	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC (%-dry basis)			20,2	In Range				
Total Load Ave. MC % (wet basis)			16,8					
Total Test Load Weight (dry basis)					19,67	lb	8,92	kg
Kindling Moisture (%-dry basis)								
9	9	9	9,0	In Range	3,50	lb	1,59	kg
Start-up Fuel Moisture Readings (%-dry basis)								
19	19	19	19,0	In Range	5,75	lb	2,61	kg
Total Wt. All Fuel Added (dry basis)					28,92	lb	13,12	kg
Total Wt. All Fuel Burned (dry basis)					23,4	lb	10,6	kg

Load pieces Length in.	16	in.

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 12 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For Usable Firebox Volumes up to 3.0 ft³ - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft³				
Usable Firebox Volume	2,37	ft³				
Total Nom. Load Wt. Target	28,44	lb				
Total Load Wt. Allowable Range	27,02	to	29,86	lb		
Core Target Wt. Allowable Range	12,798	to	18,49	lb		
Remainder Load Wt. Allowable Range	9,95	to	15,64	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	4,27	to	7,11	lb		5,69
Remainder Load Pc. Wt. Allowable Range	2,84	to	8,53	lb		5,69
	Pc. #					
Core Load Piece Wt. Actual	1	4,88	lb	In Range		
	2	5,98	lb	In Range		
	3	6,50	lb	In Range		
Core Load Total. Wt. Actual		17,36	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3,54	lb	In Range		
(2 or 3 Pcs.)	2	6,48	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		55%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		10,02	lb	In Range		
Total Load Wt. Actual		27,38	lb	In Range		
Core % of Total Wt.		63%		In Range		45-65%
Remainder % of Total Wt.		37%		In Range		35-55%
Actual Load % of Nominal Target		96%		In Range		95-105%
Actual Fuel Load Density		11,6	lb/ft³			
Allowable Charcoal Bed Wt. Range (lb)	2,8	to	5,4			Mid-Point
Actual Charcoal Bed Wt.		2,9	lb	In Range		4,1
Actual Fuel Load Ending Wt.		0,0	lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		27,4	lb			
Load pieces Length in.		16	in.			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
19,2	19,8	19,3	19,4	In Range	4,09	lb	1,85	kg
19,1	22,1	19,6	20,3	In Range	4,97	lb	2,26	kg
19,3	19,3	19,6	19,4	In Range	5,44	lb	2,47	kg
19,6	19,4	19,8	19,6	In Range	2,96	lb	1,34	kg
22,1	19,3	19,8	20,4	In Range	5,38	lb	2,44	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			19,9	In Range				
Total Load Ave. MC % (wet basis)			16,6					
Total Test Load Weight (dry basis)				→	22,84	lb	10,36	kg
Total Fuel Weight Burned During Test Run (dry basis)					22,8	lb	10,36	kg

For Usable Firebox Volumes above 3.0 ft³ - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft³				
Usable Firebox Volume		ft³				
Total Nom. Load Wt. Target	0	lb				
Total Load Wt. Allowable Range	0,00	to	0,00	lb		
Core Target Wt. Allowable Range	0,00	to	0,00	lb		
Remainder Load Wt. Allowable Range	0,00	to	0,00	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	0,00	to	0,00	lb		0,00
Remainder Load Pc. Wt. Allowable Range	0,00	to	0,00	lb		0,00
	Pc. #					
Core Load Piece Wt. Actual	1		lb	In Range		
	2		lb	In Range		
	3		lb	In Range		
Core Load Total. Wt. Actual		0,00	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1		lb	In Range		
(3 or 4 Pcs.)	2		lb	In Range		
	3		lb	In Range		
	4		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!		#NOMBRE!		≤ 67%
Remainder Load Tot. Wt. Act		0,00	lb	In Range		
Total Load Wt. Actual		0,00	lb	In Range		
Core % of Total Wt.		#DIV/0!		#DIV/0!		45-65%
Remainder % of Total Wt.		#DIV/0!		#DIV/0!		35-55%
Actual Load % of Nominal Target		#DIV/0!		#DIV/0!		95-105%
Actual Fuel Load Density		#DIV/0!	lb/ft³			
Allowable Charcoal Bed Wt. Range (lb)	0,1	to	-0,1			Mid-Point
Actual Charcoal Bed Wt.			lb	Out of Range		0,0
Actual Fuel Load Ending Wt.			lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0,0	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			#DIV/0!	#DIV/0!				
Total Load Ave. MC % (wet basis)			#DIV/0!					
Total Test Load Weight (dry basis)				→	#DIV/0!	lb	#DIV/0!	kg
Total Fuel Weight Burned During Test Run (dry basis)					#DIV/0!	lb	#DIV/0!	kg

	Start	End
Barometer (kPa):	102,5	101,2
Barometer (in.Hg):	30,268239	29,88434875
Dry Bulb (F):	74,3	80,6
Humidity (%):	26	23,1
Air velocity (ft/min)	0	0

High fire test						
DGM #1	Final:	32015,114	cuft	Final:	906567,040	Liter
	Initial:	31990,123	cuft	Initial:	905859,390	Liter
DGM #2	Final:	30231,417	cuft	Final:	856058,390	Liter
	Initial:	30206,611	cuft	Initial:	855355,940	Liter
DGM room				Final:	689,390	cuft
				Initial:	660,980	cuft

min or med burnrate						
DGM #1	Final:	32101,859	cuft	Final:	909023,390	Liter
	Initial:	32015,204	cuft	Initial:	906569,590	Liter
DGM #2	Final:	30316,610	cuft	Final:	858470,790	Liter
	Initial:	30231,535	cuft	Initial:	856061,720	Liter
DGM room				Final:	804,220	cuft
				Initial:	689,390	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	71
Numéro de la ligne dans "Raw data" à partir duquel les données du highfire test commence	111
Numéro de la ligne dans "Raw data" à partir duquel les données du min ou medium fire test commence	258

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

Project nu.	PI 20194
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Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure:		in. H20
Barometer:	30,268	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=
0,956

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,072	65,1	0,2683
B center	0,071	65,71	0,2665
A1	0,065	65,33	0,2550
A2	0,080	65,41	0,2828
A3	0,058	65,63	0,2408
A4	0,060	65,67	0,2449
B1	0,059	65,810	0,2429
B2	0,072	65,910	0,2683
B3	0,061	66,030	0,2470
B4	0,058	66,030	0,2408
AVERAGE	0,0656	65,6630	0,2557

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Filter set weight highfire

	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	438	439	18	32	440	441	28	33	442	443	29	444		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,1001	0,0874	0,0868	34,9885	110,1779	0,0862	0,0872	34,5653	109,3625	0,0863	0,0869	35,1804	0,0861	2019-04-29	17:00
Before (6)	61,1002	0,0873	0,0868	34,9884	110,1778	0,0863	0,0873	34,5654	109,3626	0,0864	0,0870	35,1805	0,0862	2019-04-30	07:00
After (1)	61,1004	0,0884	0,0849	34,9935	110,1778	0,0861	0,0859	34,5699	109,3628	0,0870	0,0850	35,1862	0,0867	2019-04-30	14:00
After (2)	61,1003	0,0882	0,0847	34,9930	110,1778	0,0861	0,0859	34,5686	109,3628	0,0867	0,0850	35,1855	0,0864	2019-05-06	08:00
After (3)	61,1003	0,0882	0,0847	34,9920	110,1778	0,0861	0,0859	34,5680	109,3628	0,0867	0,0850	35,1855	0,0864	2019-05-08	08:00
After (4)	61,1003	0,0882	0,0847	34,9920	110,1778	0,0861	0,0859	34,5680	109,3628	0,0867	0,0850	35,1855	0,0863	2019-05-09	08:00
After (5)															
After (6)	61,1003	0,0882	0,0847	34,9920	110,1778	0,0861	0,0859	34,5680	109,3628	0,0867	0,0850	35,1855	0,0863	2019-05-09	08:00
Difference	0,0001	0,0009	-0,0021	0,0036	0,0000	-0,0002	-0,0014	0,0026	0,0002	0,0003	-0,0020	0,0050	0,0001		
Total (mg)		2,5				3,5				3,5			0,1		
Total ajusté (mg)		**2,40**				**3,40**				**3,40**					

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

Filter set weight Low/ medium fire

	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	16	435	437	9	39	445	447	42	33	442	443	29	462		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108,7530	0,0863	0,0876	34,9175	110,2776	0,0870	0,0865	35,3299	109,1646	0,0822	0,0825	35,1250	0,0831	2019-04-29	17:00
Before (6)	108,7531	0,0863	0,0877	34,9176	110,2775	0,0871	0,0866	35,3298	109,1647	0,0823	0,0826	35,1251	0,0832	2019-04-30	07:00
After (1)	108,7534	0,0887	0,0841	34,9231	110,2777	0,0875	0,0854	35,3318	109,1649	0,0823	0,0793	35,132	0,0836	2019-04-30	22:00
After (2)	108,7534	0,0887	0,0841	34,9223	110,2777	0,0875	0,0854	35,3318	109,1649	0,0823	0,0793	35,1318	0,0835	2019-05-06	08:00
After (3)	108,7534	0,0887	0,0841	34,9213	110,2777	0,0875	0,0854	35,3312	109,1649	0,0823	0,0793	35,1318	0,0835	2019-05-08	08:00
After (4)	108,7534	0,0887	0,0841	34,9213	110,2777	0,0875	0,0854	35,3312	109,1649	0,0823	0,0793	35,1318	0,0835	2019-05-09	08:00
After (5)															
After (6)	108,7534	0,0887	0,0841	34,9213	110,2777	0,0875	0,0854	35,3312	109,1649	0,0823	0,0793	35,1318	0,0835	2019-05-09	08:00
Difference	0,0003	0,0024	-0,0036	0,0037	0,0002	0,0004	-0,0012	0,0014	0,0002	0,0000	-0,0033	0,0067	0,0003		
Total (mg)		2,8				3,6				3,6			0,3		
Total ajusté (mg)		**2,50**				**3,30**				**3,30**					

Project nu.	PI 20194
Date	30-04-2019
Technicien	M.M

SFBA EPA EMISSION RESULTS

				RESULTS			
				Average emission rate:		2,8	g/hr
				Burn Rate :		5,401	Dry kg/hr
Test Duration:		**128**	min				
PRESSURE FACTOR:	DGM 1	0,96944		BAROMETRIC PRESSURE			
	DGM 2	0,96954			Average:	30,07629368	in Hg
	DGM 3	1,00522			Start:	30,26823861	in Hg
					End:	29,88434875	in Hg
TEMPERATURE FACTORS	DGM 1	0,98439					
	DGM 2	0,98412		DGM CONTROLLER VALUES			
	DGM 3	0,99326					
				DGM 1	Final:	32015,114	Cuft
					Initial:	31990,123	Cuft
VOLUMES SAMPLED	DGM 1	24,089	SCft	DGM 2	Final:	30231,417	Cuft
	DGM 2	23,369	Scft		Initial:	30206,611	Cuft
	DGM 3	28,246	SCft				
				DGM #3	Final:	689,390	Cuft
					Initial:	660,980	Cuft
TOTAL TUNNEL VOLUME :		41095					
				TEMPERATURES			
SAMPLE RATIOS					DGM 1	536,373	°R
Sample Train 1:		1705,980			DGM 2	536,519	°R
Sample Train 2:		1758,557					
				CALIBRATION FACTORS			
Paticulate concentration					DGM 1	1,0101	
	Sample Train 1	**0,000145**	g/dscf		DGM 2	0,9873	
	Sample Train 2	**0,000150**	g/dscf		DGM #3	0,9958	
	Room	**0,000004**	g/dscf				
				TUNNEL FLOW RATE:		321,055	Dscfm
TOTAL EMISSIONS				PARTICULATE CATCH			
Sample Train 1		**5,83**	g		Total Sample Train 1:	3,50	mg
Sample Train 2		**6,01**	g		Total Sample Train 2:	3,50	mg
					Total Sample Train 1 1st hour:	2,50	mg
EMISSION RATES							
Sample Train 1		**2,73**	g/hr				
Sample Train 2		**2,82**	g/hr				
1st hour emission rate		**4,26**	g/hr				
				DEVIATION:		1,55%	
	Train 1	Train 2					
Cs	0,0001453	0,00014977					

*		*	*	*	*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	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom								
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF
0,00	71,00	10,6	0,6	3,2	69,2	66,3	72,8	67,2	63,9	65,2	65,1	63,8	0,24	69,31	69,80	86,50	0,23	69,94	69,80	87,92
1,0	72,0	10,6	0,0	0,3	96,6	66,4	74,9	69,2	64,0	65,2	65,1	63,8	0,19	69,02	69,66	85,58	0,18	69,78	69,50	86,63
2,0	73,0	10,6	0,0	0,6	103,3	66,5	74,1	72,7	64,3	65,3	65,1	63,8	0,19	69,01	69,56	84,74	0,18	69,67	69,39	85,57
3,0	74,0	10,6	0,0	0,6	102,2	66,5	73,1	78,1	64,5	65,3	65,1	63,8	0,19	68,99	69,46	83,95	0,18	69,59	69,28	84,62
4,0	75,0	10,5	0,0	1,0	95,7	66,4	73,1	80,1	64,7	65,3	65,2	63,8	0,19	68,96	69,36	83,12	0,18	69,49	69,21	83,73
5,0	76,0	10,6	0,0	0,5	95,5	66,5	73,3	80,6	65,0	65,4	65,2	63,9	0,19	68,91	69,27	82,39	0,18	69,43	69,13	82,89
6,0	77,0	10,5	0,0	0,4	101,6	66,5	72,9	83,4	65,2	65,4	65,2	63,8	0,19	68,85	69,16	81,70	0,18	69,34	69,08	82,09
7,0	78,0	10,5	0,0	1,2	110,0	66,5	75,2	88,1	65,4	65,5	65,3	63,9	0,19	68,91	69,12	81,00	0,18	69,31	69,03	81,35
8,0	79,0	10,5	0,0	1,4	121,6	66,7	77,6	94,9	65,6	65,6	65,3	63,9	0,19	68,97	69,09	80,35	0,18	69,31	69,01	80,58
9,0	80,0	10,5	0,0	1,5	126,5	66,9	80,0	102,4	65,8	65,7	65,4	63,9	0,19	69,09	69,08	80,35	0,18	69,31	69,01	80,58
10,0	81,0	10,4	0,0	1,4	124,7	67,0	81,8	106,6	66,0	65,9	65,5	63,9	0,19	69,27	69,12	82,39	0,18	69,49	69,05	80,71
11,0	82,0	10,4	0,0	1,2	123,0	67,2	83,5	109,1	66,3	65,9	65,6	64,0	0,19	69,49	69,19	84,24	0,18	69,62	69,10	81,24
12,0	83,0	10,4	0,0	1,0	121,6	67,3	84,5	108,2	66,7	66,0	65,6	64,0	0,19	69,72	69,25	83,69	0,18	69,79	69,18	80,88
13,0	84,0	10,3	0,0	0,5	130,9	67,2	83,9	107,6	67,4	66,1	65,8	64,0	0,19	69,95	69,35	83,00	0,18	69,97	69,26	80,34
14,0	85,0	10,3	0,0	0,7	182,3	67,3	83,0	121,1	68,2	66,2	65,9	64,0	0,19	70,08	69,40	82,36	0,18	70,08	69,35	80,34
15,0	86,0	10,0	0,1	2,9	343,4	67,4	89,0	192,3	69,1	66,3	66,0	64,1	0,19	70,14	69,45	81,78	0,18	70,15	69,40	80,34
16,0	87,0	9,9	0,1	6,1	478,8	67,2	96,7	293,8	70,8	66,5	66,2	64,1	0,19	70,12	69,47	85,96	0,18	70,17	69,43	82,31
17,0	88,0	9,6	0,1	8,8	568,5	67,1	104,3	402,7	74,4	66,7	66,3	64,2	0,19	70,12	69,47	86,54	0,18	70,18	69,43	84,33
18,0	89,0	9,3	0,2	11,3	680,4	66,9	116,1	514,9	80,6	66,9	66,6	64,3	0,19	70,13	69,48	86,04	0,18	70,20	69,46	84,28
19,0	90,0	8,8	0,5	14,7	717,9	67,3	123,5	603,9	90,1	67,3	66,9	64,3	0,19	70,18	69,53	85,40	0,18	70,24	69,49	83,76
20,0	91,0	8,4	0,6	16,3	688,3	67,3	124,6	650,5	102,0	67,9	67,6	64,5	0,19	70,25	69,55	84,82	0,18	70,32	69,57	83,17
21,0	92,0	8,1	0,4	14,7	674,9	67,1	124,6	668,6	115,8	68,7	68,4	64,8	0,19	70,38	69,60	84,26	0,18	70,41	69,62	82,61
22,0	93,0	7,7	0,3	13,9	739,6	67,3	130,8	699,9	131,3	69,9	69,5	65,2	0,19	70,43	69,64	83,75	0,18	70,48	69,69	82,11
23,0	94,0	7,4	0,6	16,0	726,3	67,4	131,8	729,7	148,8	71,5	71,1	65,8	0,19	70,52	69,68	83,34	0,18	70,52	69,73	81,68
24,0	95,0	7,0	0,4	15,2	706,5	67,6	130,5	737,5	164,7	73,4	73,0	66,7	0,19	70,64	69,73	82,90	0,18	70,63	69,82	81,31
25,0	96,0	6,8	0,2	13,8	711,9	67,8	131,5	743,4	182,0	75,8	75,3	68,1	0,19	70,78	69,79	82,55	0,18	70,74	69,87	80,97
26,0	97,0	6,4	0,2	13,7	710,8	67,9	131,2	746,2	200,6	78,5	78,2	69,8	0,19	70,93	69,84	82,24	0,18	70,86	69,96	80,75
27,0	98,0	6,1	0,3	14,1	707,5	67,8	131,2	745,3	220,1	81,8	81,3	71,9	0,19	71,03	69,89	81,99	0,18	70,96	70,04	80,52
28,0	99,0	5,8	0,2	13,8	707,5	67,7	130,9	743,2	240,0	85,3	85,0	74,5	0,19	71,15	69,93	82,58	0,18	71,06	70,11	82,42
29,0	100,0	5,5	0,2	13,8	702,6	67,8	130,3	743,6	258,3	89,3	89,2	77,5	0,19	71,22	69,99	83,01	0,18	71,14	70,18	84,16
30,0	101,0	5,3	0,2	13,2	697,5	67,8	129,9	742,6	275,8	93,6	93,8	81,0	0,19	71,34	70,04	82,87	0,18	71,24	70,25	84,29
31,0	102,0	5,0	0,2	12,8	692,5	68,2	129,3	740,8	292,8	98,3	98,6	84,8	0,19	71,60	70,11	82,69	0,18	71,39	70,33	84,06
32,0	103,0	4,7	0,1	12,6	692,8	68,3	130,9	741,3	309,2	103,1	103,7	89,2	0,19	71,80	70,20	83,54	0,18	71,55	70,43	83,76
33,0	104,0	4,5	0,2	12,5	684,8	68,6	130,2	742,1	325,3	108,4	109,1	93,9	0,19	72,11	70,32	85,21	0,18	71,78	70,53	83,44
34,0	105,0	4,3	0,2	12,1	662,1	68,9	129,2	731,4	341,6	113,8	114,6	99,2	0,19	72,47	70,45	85,08	0,18	72,07	70,69	83,24
35,0	106,0	4,2	0,2	10,5	647,1	69,2	127,5	716,0	355,5	119,4	120,2	105,0	0,19	72,76	70,60	84,87	0,18	72,35	70,82	83,09
36,0	107,0	4,0	0,2	9,7	632,3	69,1	126,9	699,9	366,0	124,8	125,8	111,4	0,19	73,06	70,76	84,70	0,18	72,62	70,97	82,95
37,0	108,0	3,9	0,2	8,8	615,8	69,1	125,8	682,4	373,8	130,3	131,4	118,3	0,19	73,35	70,96	84,52	0,18	72,89	71,14	82,81
38,0	109,0	3,7	0,2	8,3	609,6	69,5	125,5	665,2	381,1	135,7	136,8	125,8	0,19	73,64	71,12	84,35	0,18	73,20	71,32	82,72
39,0	110,0	3,5	0,3	8,2	610,3	69,5	125,9	655,5	388,6	141,0	141,9	133,6	0,19	73,91	71,32	84,24	0,18	73,49	71,49	82,61
40,0	111,0	22,7	0,2	8,6	597,8	70,1	169,6	644,0	397,5	145,5	147,0	142,0	0,19	74,20	71,52	84,17	0,18	73,76	71,67	85,33
41,0	112,0	26,5	0,2	6,6	609,5	70,0	141,5	635,6	396,2	150,5	152,0	150,7	0,19	74,51	71,73	84,13	0,18	74,07	71,87	86,34
42,0	113,0	26,2	0,3	8,5	668,5	69,9	138,6	655,7	383,4	154,5	156,8	159,7	0,19	74,79	71,95	84,05	0,18	74,36	72,06	86,47
43,0	114,0	25,9	0,2	11,2	718,6	70,0	141,5	691,2	369,9	159,0	161,4	168,8	0,19	75,08	72,17	84,01	0,18	74,66	72,27	86,39
44,0	115,0	25,5	0,2	13,6	764,3	69,8	146,5	729,7	358,6	163,4	165,9	177,8	0,19	75,41	72,40	84,07	0,18	74,99	72,49	86,30
45,0	116,0	25,2	0,4	15,2	784,3	70,1	148,8	763,7	349,8	167,0	170,2	186,8	0,19	75,65	72,63	84,10	0,18	75,30	72,70	86,19
46,0	117,0	24,8	0,5	15,8	791,1	70,4	151,4	785,7	343,2	171,2	174,8	194,0	0,19	75,91	72,86	84,13	0,18	75,60	72,91	86,11
47,0	118,0	24,5	0,5	15,5	792,7	70,7	152,2	800,5	338,3	175,4	179,2	199,8	0,19	76,24	73,12	84,18	0,18	75,94	73,14	86,04
48,0	119,0	24,1	0,5	15,4	792,6	70,8	152,8	809,7	334,7	179,8	184,0	204,8	0,19	76,53	73,35	84,17	0,18	76,23	73,36	85,91
49,0	120,0	23,7	0,4	15,1	791,0	71,1	153,5	816,5	332,0	184,5	188,8	210,1	0,19	76,88	73,60	84,22	0,18	76,57	73,61	85,84
50,0	121,0	23,4	0,4	14,9	792,4	71,3	153,6	822,6	330,1	189,1	193,6	215,7	0,19	77,23	73,85	84,30	0,18	76,90	73,85	85,82
51,0	122,0	23,1	0,4	14,9	795,4	71,3	154,5	829,9	328,8	193,3	198,7	220,8	0,19	77,54	74,09	84,47	0,18	77,22	74,07	85,85
52,0	123,0	22,7	0,4	14,8	795,4	71,6	154,5	836,6	327,9	198,1	203,9	225,6	0,19	77,83	74,31	84,68	0,18	77,53	74,28	85,93
53,0	124,0	22,4	0,4	14,7	795,1	71,6	154,6	842,2	327,3	202,7	209,3	230,2	0,19	78,10	74,53	84,87	0,18	77,83	74,48	85,97
54,0	125,0	22,1	0,4	14,7	788,9	71,6	155,5	842,0	327,4	207,4	214,6	234,3	0,19	78,38	74,77	85,08	0,18	78,13	74,73	86,01
55,0	126,0	21,8	0,4	14,2	788,9	71,7	154,7	843,4	328,1	212,5	220,2	238,1	0,19	78,57	74,99	85,24	0,18	78,41	74,94	86,07
56,0	127,0	21,4	0,4	14,2	792,7	72,0	155,8	845,8	329,4	217,3	225,4	241,7	0,19	78,87	75,21	85,43	0,18	78,70	75,18	86,13
57,0	128,0	21,1	0,4	14,4	798,7	72,3	156,6	851,9	330,7	222,4	231,0	245,0	0,19	79,15	75,45	85,63	0,18	78,97	75,39	86,24
58,0	129,0	20,7	0,4	14,6	801,3	72,2	156,9	857,7	332,0	227,6	236,4	248,3	0,19	79,45	75,66	85,86	0,18	79,27	75,60	86,35
59,0	130,0	20,5	0,4	14,6	810,6	71,8	157,8	863,6	333,5	232,7	241,5	251,4	0,19	79,73	75,91	86,09	0,18	79,57	75,85	86,47
60,0	131,0	20,1	0,4	14,7	822,7	72,4	159,8	873,1	335,1	238,0	247,0	254,3	0,19	80,00	76,10	86,34	0,18	79,86	76,07	86,56
61,0	132,0	19,7	0,4	15,1	824,2	72,8	158,8	880,4	336,8	242,4	251,6	256,8	0,19	80,13	76,30	86,14	0,18	80,05	76,25	86,67
62,0	133,0	19,5	0,4	15,0	828,3	72,6	158,5	884,7	338,5	247,7	257,0	259,6	0,19	80,16	76,39	85,79	0,18	80,15	76,40	86,71
63,0	134,0	19,1	0,4	14,9	830,7	72,7	158,5	886,0	340,4	251,6	262,0	262,5	0,19	80,15	76,49	85,67	0,18	80,20	76,52	86,68
64,0	135,0	18,8	0,4	15,0	836,7	72,4	158,9	890,6	342,7	256,5	266,8	265,6	0,19	80,14	76,57	80,52	0,18	80,25	76,66	86,75
65,0	136,0	18,5	0,4	15,1	840,0	72,7	158,8	894,6	345,2	261,6	271,8	268,4	0,19	80,09	76,62	80,87	0,18	80,23	76,73	86,85
66,0	137,0	18,2	0,4	15,2	844,2	72,4	158,6	897,4	347,8	266,2	276,4	271,0	0,19	80,03	76,66	81,08	0,18	80,21	76,82	86,97
67,0	138,0	17,8	0,4	15,3	848,7	72,7	159,7	902,2	350,7	271,0	281,1	274,2	0,19	79,99	76,71	81,30	0,18	80,20	76,90	87,07
68,0	139,0	17,4	0,4	15,3	852,7	73,0	159,2	909,4	353,6	276,6	285,8	277,2	0,19	79,99	76,75	81,51	0,18	80,21	76,98	87,20
69,0	140,0	17,0	0,4	15,4	858,0	73,0	160,0	912,9	357,0	280,9	290,4	280,2	0,19	79,98	76,79	81,74	0,18	80,23	77,05	87,31
70,0	141,0	16,7	0,4	15,5	861,7	73,0	161,3	917,9	360,6	285,4	295,2	283,4	0,19	80,00	76,86	82,04	0,18	80,28	77,15	87,40
71,0	142,0	16,5	0,4	15,5	856,2	73,5	161,7	919,7	364,6	290,1	299,6	286,3	0,19	80,26	76,95	82,35	0,18	80,41	77,26	87,55
72,0	143,0	16,1	0,4	15,2	851,0	73,3	161,5	917,7	369,2	294,5	304,3	289,7	0,19	80,52	77,08	82,67	0,18	80,61	77,40	87,70
73,0	144,0	15,8	0,4	15,0	848,9	73,4	161,7	915,5	374,1	299,5	308,6	293,0	0,19	80,87	77,21	83,01	0,18	80,84	77,56	87,84
74,0	145,0	15,6	0,4	14,8	841,8	73,9	161,5	913,4	379,0	304,0	312,5	295,9	0,19	81,14	77,37	83,40	0,18	81,06	77,70	88,02
75,0	146,0	15,3	0,4	14,7	837,7	74,0	161,8	910,3	384,1	308,7	317,2	299,5	0,19	81,47	77,56	83,74	0,18	81,32	77,89	88,13
76,0	147,0	14,9	0,4	14,5	834,3	74,4	161,2	905,9	389,1	312,6	321,0	302,7	0,19	81,83	77,73	84,10	0,18	81,58	78,06	88,27
77,0	148,0	14,6	0,4	14,5	833,4	74,4	162,1	901,6	393,8	317,0	324,9	306,8	0,19	82,13	77,92	84,47	0,18	81,87	78,26	88,39
78,0	149,0	14,3	0,3	14,5	832,9	74,0	161,4	900,5	398,5	320,1	329,2	310,9	0,19	82,37	78,10	84,84	0,18	82,11	78,46	88,53
79,0	150,0	14,1	0,4	14,4	835,3	73,8	159,9	900,3	403,1	323,6	332,8	315,0	0,19	82,46	78,25	85,19	0,18	82,26	78,62	88,65
80,0	151,0	13,8	0,4	14,5	836,0	74,2	160,2	900,4	407,7	327,1	336,5	319,4	0,19	82,46	78,37	85,53	0,18	82,32	78,76	88,74
81,0	152,0	13,5	0,4	14,6	836,5	73,8	158,3	902,0	412,1	330,3	340,1	323,4	0,19	82,44	78,44	85,90	0,18	82,33	78,85	88,85

82,0	153,0	13,1	0,4	14,6	837,3	74,1	157,5	901,5	416,5	333,9	343,3	327,9	0,19	82,27	78,50	86,17	0,18	82,24	78,92	88,97
83,0	154,0	12,9	0,4	14,6	838,9	74,5	156,7	902,0	420,9	337,9	346,2	332,7	0,19	82,16	78,53	86,42	0,18	82,17	79,01	89,08
84,0	155,0	12,6	0,4	14,5	840,0	73,2	158,1	903,2	425,5	341,4	349,6	336,9	0,19	82,09	78,60	86,73	0,18	82,20	79,09	89,17
85,0	156,0	12,3	0,4	14,6	839,3	74,0	156,9	902,9	429,8	343,6	352,4	341,9	0,19	82,02	78,62	87,02	0,18	82,17	79,14	89,10
86,0	157,0	12,1	0,4	14,5	840,1	73,9	156,8	904,6	434,2	346,4	355,5	347,1	0,19	81,91	78,67	87,24	0,18	82,11	79,23	88,02
87,0	158,0	11,7	0,4	14,5	839,1	73,8	157,0	905,5	438,7	348,9	358,5	352,1	0,19	81,83	78,70	87,52	0,18	82,07	79,28	87,00
88,0	159,0	11,5	0,4	14,4	836,6	74,3	156,1	906,2	434,5	352,3	361,1	357,3	0,19	81,84	78,71	87,77	0,18	82,04	79,32	86,21
89,0	160,0	11,2	0,4	14,3	828,8	74,6	155,9	904,5	418,4	355,5	363,8	362,8	0,19	81,95	78,79	87,99	0,18	82,04	79,39	85,58
90,0	161,0	11,0	0,4	14,1	819,0	74,6	154,7	900,0	411,9	358,3	366,2	368,1	0,19	82,00	78,84	88,19	0,18	82,08	79,45	85,12
91,0	162,0	10,7	0,3	13,9	816,7	74,1	152,8	899,0	407,8	360,6	369,0	373,2	0,19	82,00	78,85	87,06	0,18	82,01	79,50	84,89
92,0	163,0	10,5	0,3	13,7	810,3	74,6	152,6	896,4	405,6	363,4	371,5	378,7	0,19	82,08	78,90	85,97	0,18	82,06	79,57	85,04
93,0	164,0	10,2	0,3	13,7	807,1	74,0	151,3	892,9	404,1	366,7	373,8	384,3	0,19	82,05	78,93	85,33	0,18	82,06	79,60	85,22
94,0	165,0	10,0	0,3	13,6	803,4	74,0	150,6	890,7	403,6	368,7	376,1	389,9	0,19	81,87	78,93	85,06	0,18	81,98	79,63	85,44
95,0	166,0	9,7	0,3	13,5	795,8	74,7	150,7	883,5	403,7	370,8	377,7	395,7	0,19	81,81	78,93	85,36	0,18	81,86	79,64	85,64
96,0	167,0	9,5	0,3	13,3	789,8	74,6	149,8	878,8	404,3	373,6	379,6	401,3	0,19	81,83	78,89	85,74	0,18	81,76	79,66	85,83
97,0	168,0	9,3	0,3	13,2	777,4	74,8	146,8	872,4	405,5	374,9	381,0	406,7	0,19	81,87	78,95	86,08	0,18	81,84	79,70	86,00
98,0	169,0	9,1	0,2	13,0	766,2	74,4	146,7	865,5	408,7	377,1	382,3	411,6	0,19	81,91	79,01	86,37	0,18	81,91	79,77	86,14
99,0	170,0	8,9	0,2	12,6	752,0	74,9	146,8	857,2	412,3	379,3	383,8	416,0	0,19	82,18	79,11	86,69	0,18	82,06	79,82	86,30
100,0	171,0	8,7	0,2	12,1	734,6	74,6	145,1	845,9	416,4	381,0	385,5	422,0	0,19	82,42	79,24	86,99	0,18	82,28	79,97	86,46
101,0	172,0	8,5	0,1	11,3	720,4	75,0	144,2	832,0	421,6	383,0	386,6	426,4	0,19	82,71	79,39	87,30	0,18	82,52	80,13	86,66
102,0	173,0	8,5	0,1	10,5	706,3	74,7	143,6	816,9	425,3	384,5	388,0	432,0	0,19	83,06	79,52	87,58	0,18	82,75	80,25	86,83
103,0	174,0	8,3	0,1	10,1	694,5	74,4	141,8	800,6	429,2	385,6	389,3	436,0	0,19	83,34	79,69	87,83	0,18	82,99	80,40	86,92
104,0	175,0	8,1	0,1	9,8	687,4	74,2	139,5	783,7	432,1	386,0	390,3	441,2	0,19	83,49	79,79	88,01	0,18	83,15	80,55	87,05
105,0	176,0	8,0	0,1	9,7	681,9	74,7	137,9	770,9	433,9	386,5	391,0	446,0	0,19	83,49	79,86	88,14	0,18	83,20	80,60	87,13
106,0	177,0	7,9	0,1	9,6	678,8	75,1	136,8	761,2	435,4	386,8	391,4	450,1	0,19	83,42	79,93	88,31	0,18	83,17	80,68	87,18
107,0	178,0	7,7	0,1	9,7	676,1	74,8	135,5	754,8	436,8	386,4	391,9	454,0	0,19	83,25	79,95	88,39	0,18	83,08	80,72	87,25
108,0	179,0	7,6	0,1	9,7	674,2	74,9	135,2	750,6	437,4	386,8	392,2	458,4	0,19	83,03	79,97	88,49	0,18	82,96	80,75	87,28
109,0	180,0	7,4	0,1	9,8	673,2	75,1	134,3	747,1	438,1	386,3	392,1	462,7	0,19	82,91	79,97	88,54	0,18	82,87	80,78	87,29
110,0	181,0	7,3	0,1	9,8	671,3	75,0	132,5	745,1	438,8	386,2	391,4	466,2	0,19	82,71	79,96	88,59	0,18	82,78	80,79	87,33
111,0	182,0	7,2	0,1	9,9	671,5	74,7	133,1	746,0	440,1	386,2	390,9	469,4	0,19	82,74	80,00	88,62	0,18	82,76	80,82	87,33
112,0	183,0	7,0	0,1	10,1	667,6	74,6	132,3	743,9	441,8	385,6	390,2	473,4	0,19	82,84	80,03	88,65	0,18	82,76	80,85	87,33
113,0	184,0	6,9	0,1	9,9	665,7	74,4	132,3	740,7	444,5	385,6	389,8	476,8	0,19	82,78	80,03	88,66	0,18	82,72	80,86	87,33
114,0	185,0	6,7	0,1	10,0	666,0	75,0	131,1	739,2	447,7	385,3	389,8	480,8	0,19	82,70	80,05	88,64	0,18	82,60	80,85	87,31
115,0	186,0	6,6	0,1	10,0	664,1	74,6	131,9	737,5	451,7	384,8	388,8	485,5	0,19	82,63	80,04	88,62	0,18	82,56	80,88	87,27
116,0	187,0	6,5	0,0	9,9	658,7	74,8	131,3	733,0	456,1	384,6	388,2	488,6	0,19	82,51	80,05	88,58	0,18	82,50	80,87	87,26
117,0	188,0	6,4	0,0	9,6	653,2	74,8	130,6	728,6	459,6	384,0	387,8	492,0	0,19	82,47	80,05	88,56	0,18	82,44	80,88	87,24
118,0	189,0	6,3	0,1	9,3	646,4	74,7	129,3	722,1	462,4	383,3	387,7	496,4	0,19	82,33	80,06	88,51	0,18	82,34	80,88	87,18
119,0	190,0	6,2	0,1	9,0	637,6	74,7	127,2	711,3	465,2	383,0	387,0	499,4	0,19	82,08	80,00	88,44	0,18	82,15	80,84	87,09
120,0	191,0	6,1	0,1	8,7	629,6	74,6	126,3	702,2	468,2	382,9	386,7	503,5	0,19	81,86	79,99	88,37	0,18	82,10	80,84	87,01
121,0	192,0	6,0	0,1	8,3	621,7	74,3	126,0	693,4	470,4	382,2	386,3	506,5	0,19	81,63	79,94	88,30	0,18	81,93	80,80	86,95
122,0	193,0	6,0	0,2	8,1	613,9	74,7	125,7	682,0	471,9	381,1	385,0	510,1	0,19	81,60	79,90	88,21	0,18	81,82	80,79	86,88
123,0	194,0	5,9	0,2	8,0	607,8	74,8	125,0	672,5	472,6	380,2	384,4	512,8	0,19	81,60	79,86	88,14	0,18	81,66	80,78	86,81
124,0	195,0	5,8	0,2	7,9	600,7	74,3	123,6	662,4	473,2	378,4	383,3	516,4	0,19	81,63	79,83	88,05	0,18	81,62	80,76	86,73
125,0	196,0	5,7	0,3	7,7	597,4	74,6	122,7	654,9	474,4	377,6	382,8	519,1	0,19	81,54	79,78	87,86	0,18	81,52	80,73	86,60
126,0	197,0	5,6	0,3	7,6	594,1	74,2	122,1	647,8	475,1	376,4	382,3	522,8	0,19	81,45	79,76	87,75	0,18	81,40	80,71	86,53
127,0	198,0	5,6	0,3	7,5	589,9	73,9	121,4	641,7	475,5	375,5	381,5	525,8	0,19	81,29	79,69	87,68	0,18	81,33	80,69	86,43
128,0	199,0	5,5	0,4	7,4	581,0	73,7	120,7	634,1	475,2	373,7	380,4	528,9	0,19	81,26	79,68	87,55	0,18	81,25	80,66	86,37

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 0,85 g/hr

Burn Rate : 1,471 Dry kg/hr

Test Duration: **418** min

PRESSURE FACTOR:	DGM 1	0,96944	
	DGM 2	0,96954	
	DGM 3	1,00522	
TEMPERATURE FACTORS	DGM 1	0,97608	
	DGM 2	0,97423	
	DGM 3	0,98682	
VOLUMES SAMPLED	DGM 1	82,824	SCft
	DGM 2	79,338	Scft
	DGM 3	113,426	SCft
TOTAL TUNNEL VOLUME :		141797	
SAMPLE RATIOS			
Sample Train 1:		1712,029	
Sample Train 2:		1787,253	
Paticulate concentration			
	Sample Train 1	**0,000043**	g/dscf
	Sample Train 2	**0,000045**	g/dscf
	Room	**0,000003**	g/dscf
TOTAL EMISSIONS			
Sample Train 1		**5,79**	g
Sample Train 2		**6,06**	g
EMISSION RATES			
Sample Train 1		**0,83**	g/hr
Sample Train 2		**0,87**	g/hr
1st hour emission rate		**4,79**	g/hr

	Train 1	Train 2
Cs	4,347E-05	4,5376E-05

BAROMETRIC PRESSURE			
	Average:	30,07629368	in Hg
	Start:	30,26823861	in Hg
	End:	29,88434875	in Hg
DGM CONTROLLER VALUES			
DGM 1	Final:	32101,859	Cuft
	Initial:	32015,204	Cuft
DGM 2	Final:	30316,610	Cuft
	Initial:	30231,535	Cuft
DGM #3	Final:	804,220	Cuft
	Initial:	689,390	Cuft
TEMPERATURES			
	DGM 1	540,939	°R
	DGM 2	541,966	°R
CALIBRATION FACTORS			
	DGM 1	1,0101	
	DGM 2	0,9873	
	DGM #3	0,9958	
TUNNEL FLOW RATE:		339,227	Dscfm
PARTICULATE CATCH			
	Total Sample Train 1:	3,60	mg
	Total Sample Train 2:	3,60	mg
	Total Sample Train 1 1st hour:	2,80	mg
DEVIATION:		2,29%	

*		*	*	*	*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	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom								
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF
0,00	258,00	27,1	0,8	4,2	353,8	73,9	125,6	413,3	436,2	282,9	299,4	594,0	0,20	77,61	78,17	82,60	0,19	78,47	79,05	82,15
1,0	259,0	26,5	0,3	1,9	384,7	73,7	111,4	403,7	429,8	280,9	298,3	593,8	0,20	77,96	78,36	83,09	0,19	78,64	79,22	86,24
2,0	260,0	26,3	0,6	3,7	452,0	73,7	113,1	412,1	417,1	279,2	297,7	594,0	0,20	78,26	78,48	83,01	0,19	78,78	79,30	86,63
3,0	261,0	26,1	0,7	6,3	520,1	73,7	115,6	448,3	404,8	276,8	296,1	593,1	0,20	78,54	78,59	82,87	0,19	78,92	79,39	86,61
4,0	262,0	25,9	0,5	9,1	498,6	73,2	112,8	472,8	393,5	275,7	294,8	591,4	0,20	78,69	78,66	82,75	0,19	79,02	79,50	86,28
5,0	263,0	25,7	0,6	7,7	525,8	73,8	114,1	493,7	383,3	274,1	293,1	589,6	0,20	78,78	78,72	82,63	0,19	79,07	79,52	86,10
6,0	264,0	25,4	0,3	9,6	542,9	73,9	113,6	523,3	374,4	271,7	291,5	590,2	0,20	78,81	78,76	83,29	0,19	79,13	79,56	85,94
7,0	265,0	25,2	0,3	11,2	532,5	74,1	112,0	546,2	366,0	271,1	289,8	589,2	0,20	78,85	78,79	83,62	0,19	79,12	79,58	85,74
8,0	266,0	25,1	0,2	10,0	511,5	73,8	109,1	555,2	358,8	270,0	287,8	587,4	0,20	78,85	78,81	83,67	0,19	79,17	79,61	85,55
9,0	267,0	24,9	0,3	8,5	491,9	73,6	107,6	548,7	352,7	269,0	286,4	585,9	0,20	78,74	78,82	83,63	0,19	79,15	79,63	85,34
10,0	268,0	24,8	0,4	7,4	490,3	73,9	107,9	539,8	347,3	268,7	284,8	584,2	0,20	78,68	78,80	83,59	0,19	79,09	79,64	85,23
11,0	269,0	24,6	0,5	7,5	485,5	73,3	107,0	532,8	342,0	268,4	283,0	582,2	0,20	78,62	78,77	83,54	0,19	79,04	79,63	85,10
12,0	270,0	24,5	0,4	7,8	467,3	73,6	105,2	524,3	337,4	267,9	281,4	582,3	0,20	78,58	78,76	83,48	0,19	79,00	79,61	84,96
13,0	271,0	24,4	0,5	6,7	450,7	73,4	104,4	515,2	333,1	267,2	279,6	579,0	0,20	78,53	78,75	83,47	0,19	78,98	79,61	84,81
14,0	272,0	24,3	0,6	6,0	440,4	73,6	103,3	505,2	329,3	266,4	278,2	578,9	0,20	78,44	78,73	83,34	0,19	78,92	79,58	84,63
15,0	273,0	24,2	0,6	5,8	436,0	73,5	103,3	497,2	325,6	265,7	276,8	576,3	0,20	78,37	78,72	83,27	0,19	78,88	79,56	84,56
16,0	274,0	24,0	0,6	6,0	430,8	73,5	103,1	490,1	322,1	265,1	275,0	573,3	0,20	78,29	78,67	83,24	0,19	78,77	79,54	84,47
17,0	275,0	23,9	0,6	5,9	429,9	73,4	102,6	487,0	318,9	264,3	273,8	570,9	0,20	78,23	78,64	83,19	0,19	78,73	79,52	84,35
18,0	276,0	23,8	0,6	6,1	426,5	73,5	101,5	482,3	316,1	263,2	272,0	567,2	0,20	78,23	78,63	83,14	0,19	78,73	79,50	84,23
19,0	277,0	23,7	0,5	6,1	425,0	73,8	101,0	477,2	313,5	261,6	270,3	565,8	0,20	78,18	78,61	83,09	0,19	78,71	79,49	84,13
20,0	278,0	23,6	0,5	6,1	425,2	72,8	99,4	472,0	310,8	260,0	268,5	564,0	0,20	78,10	78,57	82,90	0,19	78,61	79,45	83,98
21,0	279,0	23,4	0,5	6,2	424,5	72,8	100,3	469,4	308,4	259,2	266,8	561,2	0,20	77,92	78,52	82,72	0,19	78,51	79,41	83,83
22,0	280,0	23,3	0,5	6,3	425,4	72,9	100,8	466,1	306,0	257,8	264,9	557,2	0,20	77,82	78,47	82,58	0,19	78,39	79,35	83,67
23,0	281,0	23,2	0,5	6,4	427,8	72,7	100,3	464,8	303,3	256,7	262,9	554,1	0,20	77,74	78,43	82,53	0,19	78,33	79,31	83,59
24,0	282,0	23,1	0,5	6,5	430,1	73,0	99,9	463,5	300,6	255,8	261,5	551,4	0,20	77,76	78,39	82,43	0,19	78,30	79,27	83,48
25,0	283,0	23,0	0,4	6,7	433,4	72,9	100,5	464,9	298,2	253,8	259,8	548,8	0,20	77,76	78,36	82,30	0,19	78,26	79,24	83,37
26,0	284,0	22,8	0,4	6,9	443,9	73,0	101,6	472,6	295,6	252,9	258,3	546,6	0,20	77,73	78,34	82,23	0,19	78,23	79,19	83,34
27,0	285,0	22,6	0,4	7,7	457,7	72,9	101,8	484,4	293,1	251,8	256,9	542,9	0,20	77,77	78,29	82,11	0,19	78,23	79,18	83,28
28,0	286,0	22,5	0,3	8,4	473,7	72,9	103,0	500,1	291,0	250,6	255,6	540,4	0,20	77,74	78,27	82,07	0,19	78,20	79,16	83,30
29,0	287,0	22,3	0,2	9,3	487,5	73,0	103,6	517,8	289,2	249,4	254,0	538,0	0,20	77,68	78,24	82,00	0,19	78,15	79,13	83,31
30,0	288,0	22,2	0,2	9,8	496,0	72,8	104,2	533,6	288,0	248,1	252,7	536,4	0,20	77,68	78,21	81,97	0,19	78,11	79,12	83,29
31,0	289,0	22,0	0,1	10,0	505,6	73,0	104,4	547,4	287,0	247,3	251,5	533,7	0,20	77,62	78,21	81,87	0,19	78,07	79,10	83,31
32,0	290,0	21,8	0,1	10,4	518,3	72,9	105,2	565,3	286,1	246,5	250,5	530,9	0,20	77,66	78,18	81,82	0,19	78,05	79,08	83,35
33,0	291,0	21,6	0,1	10,9	537,7	73,2	106,9	590,6	285,3	245,5	249,3	529,6	0,20	77,64	78,15	81,78	0,19	78,01	79,08	83,39
34,0	292,0	21,4	0,1	12,2	546,1	73,2	107,4	612,2	285,1	244,9	248,5	526,7	0,20	77,66	78,10	81,70	0,19	77,97	79,04	83,47
35,0	293,0	21,2	0,1	12,2	552,6	73,3	106,7	629,2	285,0	244,2	248,0	524,1	0,20	77,71	78,09	81,64	0,19	77,97	79,02	83,46
36,0	294,0	21,1	0,1	12,1	554,3	73,1	108,9	642,2	285,3	243,8	247,4	522,9	0,20	77,78	78,05	85,24	0,19	78,01	78,96	88,33
37,0	295,0	20,8	0,1	12,0	555,8	73,4	108,2	648,9	285,5	243,2	246,9	520,8	0,20	77,99	78,09	85,79	0,19	78,09	78,98	89,28
38,0	296,0	20,7	0,1	11,7	555,8	73,6	110,0	654,4	285,9	243,1	247,4	519,4	0,20	78,23	78,14	85,49	0,19	78,25	79,02	89,03
39,0	297,0	20,4	0,1	11,6	552,6	73,9	112,3	658,0	286,5	243,0	247,4	517,2	0,20	78,57	78,21	85,22	0,19	78,46	79,07	88,74
40,0	298,0	20,3	0,1	11,4	551,2	74,4	112,7	658,0	287,4	243,1	247,5	515,4	0,20	78,88	78,31	84,98	0,19	78,70	79,13	88,47
41,0	299,0	20,1	0,1	11,2	550,1	74,6	112,3	657,2	288,3	242,9	247,8	513,3	0,20	79,22	78,43	84,77	0,19	78,97	79,24	88,17
42,0	300,0	19,9	0,1	11,0	548,7	73,9	113,0	658,6	289,1	243,6	248,5	511,2	0,20	79,54	78,54	84,64	0,19	79,21	79,37	87,93
43,0	301,0	19,7	0,1	10,9	547,7	73,9	112,7	658,1	289,9	244,0	249,0	508,5	0,20	79,79	78,63	84,58	0,19	79,43	79,43	87,79
44,0	302,0	19,6	0,1	10,8	546,4	74,4	113,0	657,3	290,8	244,7	249,7	507,2	0,20	79,89	78,70	84,49	0,19	79,54	79,49	87,60
45,0	303,0	19,4	0,1	10,7	544,8	74,2	112,8	656,7	291,6	245,3	250,1	503,7	0,20	79,88	78,74	84,35	0,19	79,60	79,53	87,45
46,0	304,0	19,2	0,1	10,6	544,7	74,0	112,2	655,1	292,6	245,8	250,6	502,6	0,20	79,82	78,74	84,28	0,19	79,62	79,57	87,30
47,0	305,0	19,1	0,1	10,6	546,2	74,1	110,6	652,5	293,6	246,6	251,3	501,1	0,20	79,81	78,75	84,13	0,19	79,63	79,57	87,11
48,0	306,0	18,9	0,1	10,6	545,6	74,4	109,8	653,6	294,6	247,0	252,0	498,6	0,20	79,82	78,76	84,03	0,19	79,66	79,58	86,89
49,0	307,0	18,7	0,1	10,6	547,0	74,3	109,9	654,6	295,5	247,7	252,7	495,9	0,20	79,82	78,79	83,99	0,19	79,71	79,62	86,75
50,0	308,0	18,6	0,1	10,7	546,6	74,1	110,7	656,0	296,5	248,3	253,6	493,2	0,20	79,90	78,80	83,95	0,19	79,77	79,63	86,70
51,0	309,0	18,4	0,1	10,7	548,1	74,1	109,7	656,7	297,5	248,5	253,8	491,9	0,20	79,90	78,82	83,85	0,19	79,78	79,64	86,55
52,0	310,0	18,2	0,1	10,7	548,2	74,4	109,9	659,1	298,6	249,0	254,6	490,7	0,20	79,92	78,82	83,77	0,19	79,81	79,64	86,49
53,0	311,0	18,1	0,1	10,7	548,2	74,4	110,5	659,8	299,7	249,5	255,3	487,5	0,20	79,93	78,83	83,75	0,19	79,83	79,66	86,45
54,0	312,0	17,8	0,1	10,7	548,3	73,8	110,8	660,2	300,8	250,2	256,0	485,3	0,20	79,96	78,86	83,71	0,19	79,85	79,66	86,40
55,0	313,0	17,7	0,1	10,6	548,4	74,0	110,6	659,7	302,0	250,7	256,6	483,6	0,20	79,96	78,86	83,68	0,19	79,88	79,66	86,36
56,0	314,0	17,5	0,1	10,7	549,5	74,1	111,0	662,0	303,4	251,3	257,0	482,2	0,20	79,96	78,84	83,63	0,19	79,82	79,65	86,31
57,0	315,0	17,3	0,1	10,7	549,3	73,9	111,1	663,0	304,5	252,1	257,6	481,3	0,20	79,99	78,82	83,62	0,19	79,80	79,64	86,29
58,0	316,0	17,3	0,1	10,7	549,1	74,0	110,4	661,8	305,7	252,2	257,8	480,4	0,20	80,03	78,82	83,84	0,19	79,81	79,63	86,23
59,0	317,0	17,0	0,1	10,7	549,2	74,1	110,0	663,1	307,1	253,0	258,6	479,1	0,20	79,97	78,80	83,76	0,19	79,77	79,62	86,15
60,0	318,0	16,8	0,1	10,7	550,6	74,0	110,4	664,3	308,5	253,6	259,0	478,8	0,20	79,98	78,77	83,63	0,19	79,77	79,61	86,12
61,0	319,0	16,7	0,1	10,8	551,2	73,9	111,2	665,0	310,0	254,1	259,4	477,4	0,20	80,01	78,76	83,53	0,19	79,78	79,63	86,15
62,0	320,0	16,5	0,1	10,8	551,0	73,7	110,8	666,8	311,9	255,0	259,7	475,0	0,20	80,08	78,77	83,44	0,19	79,80	79,63	86,10
63,0	321,0	16,5	0,1	10,8	551,3	73,8	110,8	667,2	313,8	255,5	260,1	473,2	0,20	80,13	78,76	83,31	0,19	79,85	79,61	86,06
64,0	322,0	16,2	0,1	10,7	550,7	73,9	110,5	667,4	315,9	256,3	260,1	472,1	0,20	80,15	78,77	83,21	0,19	79,88	79,62	86,02
65,0	323,0	16,1	0,1	10,8	551,6	73,9	110,6	668,0	318,1	257,1	260,7	470,3	0,20	80,18	78,75	83,11	0,19	79,87	79,60	85,97
66,0	324,0	15,9	0,1	10,8	552,2	73,7	111,4	669,4	320,1	257,7	261,2	469,0	0,20	80,25	78,75	83,03	0,19	79,88	79,58	85,95
67,0	325,0	15,8	0,1	10,9	552,8	73,9	111,6	670,5	322,1	258,4	261,4	468,3	0,20	80,21	78,74	82,98	0,19	79,86	79,58	85,98
68,0	326,0	15,6	0,1	10,9	553,5	73,8	110,5	671,9	324,1	259,2	261,9	467,6	0,20	80,19	78,70	82,90	0,19	79,81	79,57	85,93
69,0	327,0	15,4	0,1	10,9	553,3	73,9	110,7	673,0	326,1	260,0	262,2	466,2	0,20	80,22	78,68	82,88	0,19	79,82	79,56	85,92
70,0	328,0	15,3	0,1	11,0	553,7	73,8	111,5	673,7	328,0	260,9	262,6	464,7	0,20	80,27	78,68	82,84	0,19	79,81	79,56	85,94
71,0	329,0	15,2	0,1	11,0	554,6	73,8	110,4	672,9	329,6	261,4	263,0	463,6	0,20	80,29	78,65	82,83	0,19	79,82	79,54	85,89
72,0	330,0	15,0	0,1	11,1	554,9	73,8	110,9	674,2	331,0	262,1	263,3	462,4	0,20	80,35	78,64	82,79	0,19	79,82	79,52	85,91
73,0	331,0	14,7	0,1	11,1	554,7	73,9	110,8	675,1	332,4	262,8	263,9	462,3	0,20	80,40	78,62	82,79	0,19	79,80	79,51	85,92
74,0	332,0	14,6	0,1	11,1	555,5	73,8	110,5	675,4	333,7	263,6	264,3	461,3	0,20	80,45	78,61	82,80	0,19	79,85	79,51	85,91
75,0	333,0	14,5	0,1	11,2	555,6	73,9	111,3	676,5	335,0	264,3	264,6	460,2	0,20	80,50	78,58	82,79	0,19	79,86	79,51	85,90
76,0	334,0	14,4	0,1	11,2	554,0	73,9	110,7	675,2	336,4	264,9	265,0	458,5	0,20	80,52	78,58	82,81	0,19	79,86	79,51	85,89
77,0	335,0	14,2	0,1	11,2	554,2	73,9	110,7	675,9	337,4	265,6	265,7	457,8	0,20	80,54	78,59	82,81	0,19	79,88	79,48	85,89
78,0	336,0	14,0	0,1	11,2	553,9	73,8	110,5	676,4	338,4	266,1	266,2	456,9	0,20	80,58	78,58	82,82	0,19	79,89	79,49	85,82
79,0	337,0	13,8	0,1	11,1	552,9	73,8	110,6	675,4	339,6	266,7	266,7	456,1	0,20	80,64	78,55	82,81	0,19	79,90	79,49	85,82
80,0	338,0	13,7	0,1	11,1	552,8	74,0	110,4	673,6	341,0	267,4	267,3	455,1	0,20	80,67	78,56	82,86	0,19	79,93	79,49	85,83
81,0	339,0	13,6	0,1	11,0	552,3	73,9	110,1	672,8	342,6	268,0	268,0	454,2	0,20	80,72	78,56	82,85	0,19	79,95	79,46	85,81

82,0	340,0	13,4	0,1	11,1	551,5	73,8	110,2	672,8	344,0	268,6	268,6	453,6	0,20	80,72	78,57	82,84	0,19	79,97	79,47	85,78
83,0	341,0	13,3	0,1	11,1	552,1	74,0	110,0	673,7	345,6	268,9	269,2	453,5	0,20	80,75	78,57	82,89	0,19	80,01	79,48	85,76
84,0	342,0	13,0	0,1	11,2	552,3	73,9	110,2	675,4	346,9	269,5	269,9	452,4	0,20	80,76	78,57	82,89	0,19	80,01	79,46	85,75
85,0	343,0	13,0	0,1	11,3	553,5	74,1	110,2	675,8	348,2	269,9	270,6	452,0	0,20	80,78	78,57	82,91	0,19	80,01	79,45	85,77
86,0	344,0	12,8	0,1	11,3	553,6	74,0	110,3	678,4	349,6	270,5	271,3	452,1	0,20	80,79	78,59	82,95	0,19	80,05	79,47	85,77
87,0	345,0	12,6	0,1	11,3	554,9	74,1	110,4	680,0	350,7	271,1	271,9	451,5	0,20	80,80	78,57	82,97	0,19	80,04	79,48	85,78
88,0	346,0	12,4	0,1	11,4	555,3	74,1	110,0	681,3	352,0	271,6	272,9	452,2	0,20	80,82	78,56	82,99	0,19	80,05	79,45	85,76
89,0	347,0	12,3	0,1	11,4	555,2	74,1	109,4	682,0	353,5	271,7	273,5	451,5	0,20	80,80	78,57	83,00	0,19	80,06	79,46	85,71
90,0	348,0	12,2	0,1	11,4	555,0	73,9	109,8	682,4	355,0	272,4	274,2	450,9	0,20	80,82	78,56	83,03	0,19	80,08	79,48	85,69
91,0	349,0	12,0	0,1	11,4	555,5	74,2	109,9	682,9	356,4	272,8	274,9	450,3	0,20	80,83	78,58	83,02	0,19	80,08	79,46	85,69
92,0	350,0	11,9	0,1	11,4	554,9	74,2	109,5	683,5	357,8	273,3	276,0	451,2	0,20	80,83	78,59	83,02	0,19	80,10	79,46	85,66
93,0	351,0	11,7	0,1	11,3	555,4	73,5	111,3	684,4	359,2	273,6	276,8	451,8	0,20	80,79	78,57	83,05	0,19	80,06	79,46	85,70
94,0	352,0	11,6	0,1	11,4	555,8	73,4	111,6	684,4	360,1	274,1	277,6	452,4	0,20	80,73	78,58	83,04	0,19	80,02	79,43	85,69
95,0	353,0	11,4	0,1	11,4	556,5	73,3	110,9	684,5	360,9	274,6	278,0	452,7	0,20	80,60	78,57	83,03	0,19	79,94	79,42	85,60
96,0	354,0	11,3	0,1	11,4	557,6	73,3	108,8	684,0	361,8	275,2	278,9	452,1	0,20	80,48	78,54	82,96	0,19	79,86	79,40	85,41
97,0	355,0	11,1	0,1	11,5	559,9	72,8	109,4	683,3	362,5	275,9	279,3	452,0	0,20	80,38	78,50	82,92	0,19	79,79	79,39	85,33
98,0	356,0	10,8	0,1	11,5	561,4	72,7	110,3	684,9	363,2	276,2	280,3	451,8	0,20	80,35	78,50	82,90	0,19	79,77	79,38	85,33
99,0	357,0	10,7	0,1	11,7	562,8	72,6	110,4	686,2	363,6	276,9	281,3	452,0	0,20	80,29	78,49	82,91	0,19	79,73	79,36	85,30
100,0	358,0	10,6	0,1	11,8	566,3	72,9	110,1	689,3	364,0	277,7	281,9	451,2	0,20	80,33	78,48	82,88	0,19	79,75	79,37	85,30
101,0	359,0	10,5	0,1	11,9	568,1	73,2	110,1	692,3	364,6	277,9	282,5	450,9	0,20	80,38	78,47	82,88	0,19	79,76	79,36	85,31
102,0	360,0	10,3	0,1	12,0	570,6	73,2	110,2	695,4	365,2	278,4	283,5	450,9	0,20	80,45	78,47	82,89	0,19	79,76	79,36	85,30
103,0	361,0	10,2	0,2	12,1	575,8	73,6	111,1	699,9	366,0	279,6	284,6	450,4	0,20	80,46	78,45	82,90	0,19	79,75	79,36	85,34
104,0	362,0	10,0	0,2	12,3	579,2	73,1	111,0	703,9	366,7	280,6	285,6	451,2	0,20	80,39	78,42	82,91	0,19	79,71	79,34	85,37
105,0	363,0	9,8	0,2	12,5	586,1	73,8	110,0	708,4	367,1	281,5	286,6	451,6	0,20	80,39	78,44	82,94	0,19	79,70	79,35	85,33
106,0	364,0	9,7	0,2	12,8	590,3	74,1	112,2	716,6	367,5	282,6	287,9	452,1	0,20	80,47	78,47	82,92	0,19	79,79	79,36	85,38
107,0	365,0	9,5	0,2	13,2	594,4	74,4	113,9	723,6	368,2	283,9	288,8	451,5	0,20	80,82	78,55	83,04	0,19	79,98	79,42	85,53
108,0	366,0	9,3	0,2	13,2	594,4	74,8	115,0	729,3	368,4	285,1	289,9	451,4	0,20	81,21	78,64	83,15	0,19	80,23	79,49	85,66
109,0	367,0	9,2	0,2	13,0	595,1	74,7	116,4	733,1	368,5	286,4	291,1	451,2	0,20	81,64	78,75	83,28	0,19	80,51	79,61	85,83
110,0	368,0	9,0	0,2	13,1	595,0	74,8	117,6	735,3	368,7	287,9	291,9	451,4	0,20	81,98	78,89	83,39	0,19	80,79	79,71	86,00
111,0	369,0	8,8	0,2	13,0	593,4	74,4	116,1	735,7	369,2	289,0	293,1	451,6	0,20	82,23	78,99	83,48	0,19	81,00	79,82	86,04
112,0	370,0	8,7	0,1	12,5	589,8	74,9	115,6	734,4	369,6	290,6	294,0	451,1	0,20	82,35	79,06	83,56	0,19	81,17	79,91	86,13
113,0	371,0	8,5	0,1	12,1	583,6	74,8	115,2	732,7	370,4	291,6	295,4	451,9	0,20	82,37	79,15	83,58	0,19	81,24	79,95	86,15
114,0	372,0	8,3	0,1	11,8	580,6	74,6	114,0	728,4	371,4	292,9	296,4	452,1	0,20	82,25	79,17	83,63	0,19	81,25	80,01	86,16
115,0	373,0	8,2	0,2	11,6	580,6	74,1	114,7	724,6	372,1	294,0	297,4	452,6	0,20	82,19	79,21	83,69	0,19	81,27	80,05	86,24
116,0	374,0	8,1	0,1	11,7	579,2	74,5	113,3	721,5	373,1	295,1	298,3	452,8	0,20	82,17	79,25	83,72	0,19	81,31	80,08	86,23
117,0	375,0	8,0	0,1	11,5	572,2	74,6	112,2	718,7	374,3	296,4	299,2	453,2	0,20	82,20	79,28	83,74	0,19	81,29	80,09	86,21
118,0	376,0	7,8	0,1	10,9	565,9	74,7	112,0	713,6	375,9	297,4	300,0	453,4	0,20	82,15	79,30	83,76	0,19	81,28	80,14	86,21
119,0	377,0	7,7	0,2	10,7	561,5	74,6	112,0	708,2	378,0	298,0	300,8	453,8	0,20	82,14	79,32	83,78	0,19	81,28	80,13	86,18
120,0	378,0	7,6	0,1	10,6	559,5	74,8	111,2	703,2	380,2	298,3	301,2	453,6	0,20	82,11	79,34	83,82	0,19	81,27	80,15	86,14
121,0	379,0	7,5	0,2	10,7	557,9	74,9	109,8	700,2	383,2	297,9	301,9	453,4	0,20	82,09	79,35	83,78	0,19	81,27	80,17	86,04
122,0	380,0	7,3	0,2	10,7	555,5	75,0	111,5	697,6	386,2	298,7	302,9	453,8	0,20	82,05	79,37	83,84	0,19	81,27	80,19	86,05
123,0	381,0	7,2	0,2	10,8	555,2	74,8	111,1	696,1	389,0	299,1	303,3	454,0	0,20	82,01	79,39	83,85	0,19	81,28	80,20	86,05
124,0	382,0	7,1	0,2	10,9	554,2	74,1	111,1	695,8	391,3	299,4	303,6	453,3	0,20	81,96	79,39	83,88	0,19	81,28	80,22	86,05
125,0	383,0	7,0	0,2	11,0	553,6	74,4	110,7	695,1	393,9	299,1	303,9	453,0	0,20	81,99	79,40	83,89	0,19	81,30	80,24	86,04
126,0	384,0	6,9	0,2	10,9	549,9	74,2	110,0	692,8	396,3	299,1	304,4	453,5	0,20	82,02	79,37	83,91	0,19	81,27	80,26	86,04
127,0	385,0	6,7	0,2	10,6	543,5	74,8	109,7	686,9	399,0	299,0	304,9	454,1	0,20	82,00	79,35	83,90	0,19	81,20	80,24	86,00
128,0	386,0	6,6	0,1	9,9	542,1	74,6	109,8	681,5	402,0	298,9	305,2	454,6	0,20	81,95	79,35	83,93	0,19	81,16	80,24	85,99
129,0	387,0	6,5	0,1	9,7	537,2	74,6	109,0	676,7	405,5	299,1	305,7	455,1	0,20	81,90	79,36	83,92	0,19	81,13	80,23	85,93
130,0	388,0	6,5	0,1	9,4	531,4	74,8	108,5	670,7	409,1	298,8	306,0	455,6	0,20	81,90	79,36	83,90	0,19	81,14	80,24	85,91
131,0	389,0	6,4	0,1	9,1	525,0	74,2	107,8	664,2	412,9	298,4	306,2	455,9	0,20	81,91	79,37	83,91	0,19	81,13	80,23	85,82
132,0	390,0	6,3	0,1	8,9	518,6	74,4	107,2	656,0	416,5	298,0	306,4	456,3	0,20	81,90	79,36	83,86	0,19	81,12	80,23	85,75
133,0	391,0	6,2	0,1	8,4	510,2	73,8	108,3	647,2	419,9	297,8	307,0	456,2	0,20	81,82	79,36	83,84	0,19	81,06	80,23	85,69
134,0	392,0	6,2	0,1	8,0	503,6	73,9	106,8	636,6	423,2	297,7	307,0	456,4	0,20	81,77	79,31	83,83	0,19	81,00	80,22	85,64
135,0	393,0	6,1	0,1	7,8	499,8	74,2	105,9	627,5	425,9	297,1	306,9	456,7	0,20	81,78	79,29	83,80	0,19	80,97	80,21	85,55
136,0	394,0	6,1	0,1	7,8	497,3	74,3	105,2	620,1	428,1	296,9	306,8	456,8	0,20	81,79	79,26	83,76	0,19	80,95	80,19	85,45
137,0	395,0	6,0	0,1	7,8	495,6	74,2	105,6	613,4	430,2	296,6	306,7	456,9	0,20	81,81	79,28	83,72	0,19	80,94	80,21	85,40
138,0	396,0	5,9	0,1	7,9	494,3	74,2	105,1	608,7	432,2	295,4	306,2	457,3	0,20	81,79	79,26	83,69	0,19	80,95	80,21	85,31
139,0	397,0	5,8	0,1	7,9	491,9	74,3	105,6	605,9	434,3	295,4	306,0	457,9	0,20	81,53	79,25	83,65	0,19	80,83	80,18	85,23
140,0	398,0	5,8	0,1	8,0	489,2	74,6	104,8	602,7	436,2	295,1	305,5	459,1	0,20	81,49	79,20	83,59	0,19	80,78	80,17	85,16
141,0	399,0	5,7	0,1	7,7	483,2	74,2	103,8	596,6	437,7	294,9	304,6	459,3	0,20	81,47	79,23	83,57	0,19	80,77	80,19	85,08
142,0	400,0	5,7	0,1	7,3	473,8	74,8	102,4	586,5	439,0	294,8	303,7	460,7	0,20	81,51	79,24	83,48	0,19	80,77	80,17	84,99
143,0	401,0	5,7	0,2	6,8	467,1	74,3	101,9	577,3	440,4	294,4	303,1	460,8	0,20	81,49	79,25	83,42	0,19	80,74	80,18	84,83
144,0	402,0	5,6	0,2	6,6	460,3	74,6	103,1	568,0	441,7	294,0	302,0	461,3	0,20	81,45	79,24	83,36	0,19	80,68	80,18	84,82
145,0	403,0	5,6	0,2	6,5	455,1	74,5	101,1	560,4	443,0	292,9	301,0	462,7	0,20	81,49	79,26	83,30	0,19	80,69	80,17	84,67
146,0	404,0	5,6	0,2	6,4	450,7	74,3	101,5	552,9	444,5	292,7	300,5	463,0	0,20	81,52	79,27	83,23	0,19	80,70	80,17	84,56
147,0	405,0	5,5	0,2	6,4	445,8	74,4	100,9	545,1	445,7	292,0	299,5	463,7	0,20	81,49	79,27	83,18	0,19	80,68	80,15	84,44
148,0	406,0	5,5	0,2	6,2	440,3	74,2	100,9	538,0	447,1	291,4	298,5	464,1	0,20	81,46	79,30	83,09	0,19	80,66	80,16	84,35
149,0	407,0	5,5	0,2	6,1	435,8	74,2	100,7	531,6	448,2	290,5	297,3	465,2	0,20	81,37	79,27	83,00	0,19	80,63	80,12	84,29
150,0	408,0	5,4	0,3	6,1	431,9	74,1	99,8	525,0	449,6	290,0	296,2	466,2	0,20	81,32	79,25	84,00	0,19	77,88	78,38	83,64
151,0	409,0	5,4	0,3	6,0	427,1	74,0	99,8	519,0	450,7	289,1	295,1	467,3	0,20	81,26	79,25	84,03	0,19	77,95	78,39	83,36
152,0	410,0	5,4	0,3	6,0	424,3	73,6	99,7	513,0	451,9	288,2	294,0	467,9	0,20	81,24	79,20	83,83	0,19	78,08	78,42	83,08
153,0	411,0	5,3	0,3	5,9	420,3	73,5	99,4	507,1	453,3	287,5	292,4	468,7	0,20	81,21	79,17	83,70	0,19	78,25	78,46	82,87
154,0	412,0	5,3	0,3	5,9	416,6	73,4	98,9	502,6	454,4	286,6	291,1	469,0	0,20	81,18	79,14	83,50	0,19	78,46	78,53	82,69
155,0	413,0	5,3	0,3	5,9	413,2	73,5	99,0	496,7	455,4	285,8	289,6	470,0	0,20	81,05	79,07	83,33	0,19	78,66	78,62	82,53
156,0	414,0	5,2	0,3	5,9	409,9	73,3	98,5	492,1	456,0	284,9	288,5	470,8	0,20	80,94	79,01	83,16	0,19	78,91	78,74	82,44
157,0	415,0	5,2	0,4	5,8	406,6	73,9	97,0	486,6	456,5	283,9	287,0	471,8	0,20	80,90	79,01	83,00	0,19	79,19	78,85	82,35
158,0	416,0	5,2	0,4	5,8	403,7	73,7	96,9	481,9	457,1	282,9	285,5	472,5	0,20	80,68	78,96	82,89	0,19	79,44	78,98	82,33
159,0	417,0	5,1	0,4	5,8	400,2	74,0	97,8	476,4	457,3	281,7	283,9	473,5	0,20	80,52	78,91	82,79	0,19	79,71	79,13	82,34
160,0	418,0	5,1	0,4	5,8	396,8	74,1	97,5	472,9	457,5	280,8	282,6	474,3	0,20	80,45	78,92	82,69	0,19	80,02	79,27	82,36
161,0	419,0	5,1	0,4	5,8	394,4	74,0	97,2	468,8	457,6	280,4	281,3	475,4	0,20	80,44	78,91	82,59	0,19	80,27	79,43	82,37
162,0	420,0	5,1	0,5	5,7	391,5	73,5	97,1	464,7	457,5	279,3	280,1	476,2	0,20	80,38	78,88	82,54	0,19	80,55	79,60	82,42
163,0	421,0	5,0	0,5	5,7	388,0	73,7	97,7	461,4	456,8	278,5	278,8	477,3	0,20	80,34	78,89	82,46	0,19	80,80	79,74	82,47
164,0	422,0	5,0	0,5	5,7	386,2	73,5	96,9	456,0	456,7	277,8	277,5	477,8	0,20	80,30	78,85	82,47	0,19	81,07	79,90	82,57
165,0	423,0	5,0	0,5	5,7	383,3	73,2	96,9	453,1	456,7	276,6	276,3	479,2	0,20	80,28	78,83	82,44	0,19	81,35	80,06	82,66
166,0	424,0	5,0	0,5	5,7	380,9	73,2	96,4	449,6	456,7	276,0	274,9	480,3	0,20	80,25	78,82	82,44	0,19	81,58	80,20	82,76
167,0	425,0	5,0	0,5	5,6	379,7	73,2	96,2	446,0	456,5	275,2	273,7	480,8	0,20	80,21	78,79	82,42	0,19	81,82	80,37	82,86

168,0	426,0	4,9	0,5	5,6	377,5	73,6	95,9	442,6	456,0	274,4	272,6	481,9	0,20	80,19	78,77	82,43	0,19	82,09	80,51	83,00
169,0	427,0	4,9	0,5	5,7	374,7	73,5	95,8	439,2	455,2	273,6	271,3	482,8	0,20	80,14	78,71	82,47	0,19	82,32	80,68	83,13
170,0	428,0	4,8	0,6	5,6	372,5	73,2	96,1	436,3	454,0	272,7	270,1	483,5	0,20	80,12	78,69	82,47	0,19	82,55	80,83	83,23
171,0	429,0	4,8	0,6	5,7	371,4	73,2	96,0	433,8	453,4	272,0	268,9	484,5	0,20	80,09	78,68	82,52	0,19	82,75	80,96	83,36
172,0	430,0	4,8	0,6	5,7	370,0	73,1	95,3	430,8	453,1	271,1	267,6	484,0	0,20	80,03	78,66	82,55	0,19	82,97	81,12	83,49
173,0	431,0	4,8	0,6	5,7	368,6	73,3	95,3	428,4	453,1	270,2	266,5	485,0	0,20	80,01	78,63	82,59	0,19	83,14	81,26	83,57
174,0	432,0	4,7	0,6	5,7	366,5	73,1	95,3	426,4	452,8	269,4	265,4	486,5	0,20	80,00	78,59	82,65	0,19	83,35	81,42	83,71
175,0	433,0	4,7	0,6	5,6	364,9	73,3	94,9	423,8	452,3	268,8	264,3	487,4	0,20	80,02	78,58	82,71	0,19	83,55	81,56	83,82
176,0	434,0	4,7	0,6	5,6	363,2	73,4	94,7	421,8	451,6	267,9	263,3	488,1	0,20	80,01	78,54	82,77	0,19	83,75	81,72	83,94
177,0	435,0	4,7	0,6	5,6	362,0	73,4	94,0	419,4	451,2	267,0	262,3	489,2	0,20	79,94	78,54	82,85	0,19	83,95	81,87	84,09
178,0	436,0	4,7	0,6	5,6	360,0	73,5	92,9	417,2	450,6	266,5	261,2	490,5	0,20	79,79	78,50	82,92	0,19	84,13	82,00	84,23
179,0	437,0	4,6	0,7	5,6	358,8	73,8	93,4	414,6	449,9	265,4	260,3	491,6	0,20	79,69	78,48	82,97	0,19	84,31	82,16	84,39
180,0	438,0	4,6	0,7	5,5	356,9	73,7	93,6	412,8	449,5	264,6	259,3	492,6	0,20	79,66	78,48	83,07	0,19	84,48	82,32	84,45
181,0	439,0	4,5	0,7	5,5	356,1	73,4	92,4	410,7	448,9	264,1	258,4	492,5	0,20	79,58	78,47	83,10	0,19	84,58	82,44	84,44
182,0	440,0	4,5	0,6	5,5	354,4	73,7	93,1	409,1	448,5	263,5	257,2	493,4	0,20	79,50	78,45	83,10	0,19	84,57	82,50	84,44
183,0	441,0	4,5	0,7	5,5	352,5	73,3	93,4	407,8	447,9	262,6	256,8	493,8	0,20	79,46	78,45	83,13	0,19	84,50	82,54	84,41
184,0	442,0	4,5	0,6	5,5	351,0	73,6	93,7	405,3	447,0	261,5	255,9	494,9	0,20	79,38	78,41	83,14	0,19	84,37	82,56	84,36
185,0	443,0	4,4	0,6	5,5	350,1	73,7	93,2	403,9	446,1	261,1	255,0	496,4	0,20	79,37	78,38	83,18	0,19	84,21	82,56	84,34
186,0	444,0	4,4	0,6	5,5	349,1	73,8	92,0	401,9	445,6	260,6	254,0	497,0	0,20	79,37	78,36	83,17	0,19	84,05	82,55	84,31
187,0	445,0	4,4	0,6	5,5	347,9	73,7	92,9	400,5	445,8	259,8	253,7	498,0	0,20	79,41	78,38	83,17	0,19	83,89	82,52	84,25
188,0	446,0	4,4	0,6	5,5	347,3	73,4	91,6	398,7	445,1	259,5	252,9	498,6	0,20	79,41	78,39	83,16	0,19	83,80	82,52	84,24
189,0	447,0	4,3	0,6	5,5	345,6	73,5	93,0	397,3	444,9	258,8	252,4	499,8	0,20	79,36	78,35	84,00	0,19	77,88	78,38	83,64
190,0	448,0	4,3	0,6	5,5	345,3	73,5	92,9	395,7	444,3	258,1	251,4	499,9	0,20	79,35	78,34	84,03	0,19	77,95	78,39	83,36
191,0	449,0	4,3	0,6	5,5	344,7	73,5	92,7	394,9	443,7	257,6	251,0	500,4	0,20	79,34	78,29	83,83	0,19	78,08	78,42	83,08
192,0	450,0	4,2	0,6	5,5	343,7	73,5	92,7	393,2	443,0	256,8	250,2	500,1	0,20	79,34	78,28	83,70	0,19	78,25	78,46	82,87
193,0	451,0	4,2	0,6	5,5	343,5	73,6	92,3	392,1	442,8	256,4	249,6	500,9	0,20	79,33	78,28	83,50	0,19	78,46	78,53	82,69
194,0	452,0	4,2	0,6	5,5	342,7	73,6	92,7	390,9	442,2	255,8	249,2	502,4	0,20	79,32	78,26	83,33	0,19	78,66	78,62	82,53
195,0	453,0	4,2	0,6	5,5	341,3	73,4	91,9	389,5	441,6	255,2	248,3	503,2	0,20	79,29	78,26	83,16	0,19	78,91	78,74	82,44
196,0	454,0	4,2	0,7	5,5	341,1	73,9	91,4	388,4	441,4	254,7	247,8	503,9	0,20	79,24	78,24	83,00	0,19	79,19	78,85	82,35
197,0	455,0	4,1	0,6	5,5	340,1	73,6	91,8	387,4	441,1	254,4	247,2	504,3	0,20	79,16	78,19	82,89	0,19	79,44	78,98	82,33
198,0	456,0	4,1	0,6	5,5	338,7	73,7	92,6	386,3	440,4	253,8	246,7	504,5	0,20	79,17	78,22	82,79	0,19	79,71	79,13	82,34
199,0	457,0	4,1	0,7	5,5	338,1	73,3	92,8	385,7	439,8	253,3	246,3	505,2	0,20	79,12	78,18	82,69	0,19	80,02	79,27	82,36
200,0	458,0	4,0	0,7	5,5	337,5	73,4	92,4	384,4	439,5	252,8	245,7	506,1	0,20	79,14	78,18	82,59	0,19	80,27	79,43	82,37
201,0	459,0	4,0	0,7	5,5	336,3	73,4	92,3	383,2	439,3	252,6	245,1	506,8	0,20	79,15	78,16	82,54	0,19	80,55	79,60	82,42
202,0	460,0	4,0	0,6	5,4	335,3	73,6	92,3	381,8	439,1	252,2	244,5	506,9	0,20	79,13	78,15	82,46	0,19	80,80	79,74	82,47
203,0	461,0	3,9	0,7	5,4	334,6	73,5	92,3	381,2	439,0	251,7	244,0	507,4	0,20	79,11	78,13	82,47	0,19	81,07	79,90	82,57
204,0	462,0	3,9	0,7	5,4	333,8	73,5	92,2	379,6	438,9	251,1	243,7	508,3	0,20	79,09	78,10	82,44	0,19	81,35	80,06	82,66
205,0	463,0	3,9	0,7	5,4	333,3	73,4	92,3	378,7	438,8	250,9	243,1	508,9	0,20	79,07	78,09	82,44	0,19	81,58	80,20	82,76
206,0	464,0	3,9	0,7	5,5	332,6	73,5	92,1	377,5	438,9	250,4	242,5	509,8	0,20	79,08	78,08	82,42	0,19	81,82	80,37	82,86
207,0	465,0	3,9	0,7	5,4	332,1	73,5	92,1	376,7	438,8	250,0	242,1	510,3	0,20	79,05	78,06	82,43	0,19	82,09	80,51	83,00
208,0	466,0	3,9	0,7	5,4	331,7	73,5	92,1	375,6	438,8	249,5	241,6	510,5	0,20	79,06	78,07	82,47	0,19	82,32	80,68	83,13
209,0	467,0	3,8	0,7	5,4	331,7	73,4	91,3	375,0	438,4	248,9	241,2	512,3	0,20	78,93	78,04	82,47	0,19	82,55	80,83	83,23
210,0	468,0	3,8	0,7	5,4	330,1	73,6	92,4	374,5	438,0	248,3	240,9	513,9	0,20	78,89	78,02	82,52	0,19	82,75	80,96	83,36
211,0	469,0	3,8	0,7	5,4	329,9	73,7	91,7	372,7	437,8	247,8	240,5	514,8	0,20	78,89	78,02	82,55	0,19	82,97	81,12	83,49
212,0	470,0	3,8	0,7	5,4	330,2	73,4	91,6	372,0	437,3	247,4	240,2	514,2	0,20	78,87	78,00	82,59	0,19	83,14	81,26	83,57
213,0	471,0	3,7	0,7	5,4	329,5	73,3	91,0	371,2	437,1	246,9	240,0	515,0	0,20	78,82	78,00	82,65	0,19	83,35	81,42	83,71
214,0	472,0	3,7	0,7	5,4	328,2	73,2	91,7	370,6	437,1	246,6	239,4	515,7	0,20	78,78	77,97	82,71	0,19	83,55	81,56	83,82
215,0	473,0	3,7	0,7	5,4	328,5	73,0	91,6	369,7	436,7	246,2	239,0	516,4	0,20	78,79	77,95	82,77	0,19	83,75	81,72	83,94
216,0	474,0	3,6	0,7	5,4	328,1	73,2	91,6	368,9	436,6	245,8	238,7	516,9	0,20	78,75	77,91	82,85	0,19	83,95	81,87	84,09
217,0	475,0	3,7	0,7	5,4	327,2	73,2	91,8	368,8	436,5	245,5	238,5	518,5	0,20	78,75	77,90	82,92	0,19	84,13	82,00	84,23
218,0	476,0	3,6	0,7	5,4	326,7	73,2	91,7	367,5	436,2	245,2	238,0	518,7	0,20	78,74	77,86	82,97	0,19	84,31	82,16	84,39
219,0	477,0	3,6	0,7	5,4	325,2	73,2	91,4	366,6	436,1	245,0	237,5	519,7	0,20	78,72	77,87	83,07	0,19	84,48	82,32	84,45
220,0	478,0	3,5	0,6	4,9	323,3	73,3	91,0	365,6	435,5	244,5	237,0	520,3	0,20	78,70	77,84	84,00	0,19	77,88	78,38	83,64
221,0	479,0	3,6	0,6	4,8	321,2	73,4	90,7	364,4	435,3	244,4	236,5	521,4	0,20	78,70	77,82	84,03	0,19	77,95	78,39	83,36
222,0	480,0	3,5	0,7	4,7	319,6	73,6	90,1	363,1	435,0	243,9	236,1	521,5	0,20	78,72	77,81	83,83	0,19	78,08	78,42	83,08
223,0	481,0	3,5	0,7	4,7	317,6	73,4	90,7	361,0	434,3	243,6	235,9	522,3	0,20	78,74	77,80	83,70	0,19	78,25	78,46	82,87
224,0	482,0	3,5	0,7	4,7	316,4	73,6	90,5	360,0	433,5	243,1	235,4	522,4	0,20	78,71	77,80	83,50	0,19	78,46	78,53	82,69
225,0	483,0	3,5	0,7	4,7	314,8	73,3	90,6	358,8	432,8	242,8	235,2	523,3	0,20	78,66	77,81	83,33	0,19	78,66	78,62	82,53
226,0	484,0	3,5	0,6	4,7	313,7	73,4	89,4	356,2	431,8	242,4	234,9	524,8	0,20	78,63	77,78	83,16	0,19	78,91	78,74	82,44
227,0	485,0	3,4	0,6	4,7	312,5	73,1	90,6	355,2	430,9	242,1	234,7	525,5	0,20	78,61	77,76	83,00	0,19	79,19	78,85	82,35
228,0	486,0	3,4	0,6	4,7	311,6	73,4	90,7	353,4	429,9	241,6	234,5	526,2	0,20	78,61	77,80	82,89	0,19	79,44	78,98	82,33
229,0	487,0	3,4	0,6	4,7	310,2	73,7	89,9	352,3	428,9	241,1	234,1	527,1	0,20	78,61	77,80	82,79	0,19	79,71	79,13	82,34
230,0	488,0	3,3	0,6	4,7	310,1	73,7	90,2	350,7	427,9	240,4	234,0	526,2	0,20	78,60	77,80	82,69	0,19	80,02	79,27	82,36
231,0	489,0	3,4	0,6	4,7	308,3	73,5	90,6	350,1	426,7	239,8	233,9	527,6	0,20	78,61	77,79	82,59	0,19	80,27	79,43	82,37
232,0	490,0	3,3	0,6	4,7	307,7	73,3	90,7	348,9	425,6	239,2	233,7	528,2	0,20	78,56	77,79	82,54	0,19	80,55	79,60	82,42
233,0	491,0	3,3	0,6	4,7	307,1	73,3	90,9	347,6	424,6	238,8	233,2	527,8	0,20	78,55	77,77	82,46	0,19	80,80	79,74	82,47
234,0	492,0	3,3	0,6	4,7	305,9	73,3	90,8	345,9	423,7	238,2	232,9	529,4	0,20	78,51	77,75	82,47	0,19	81,07	79,90	82,57
235,0	493,0	3,3	0,6	4,7	305,5	73,4	88,9	344,1	422,7	237,7	232,3	530,3	0,20	78,50	77,74	82,44	0,19	81,35	80,06	82,66
236,0	494,0	3,2	0,6	4,7	304,8	73,4	89,4	342,9	421,9	237,2	231,8	530,5	0,20	78,52	77,75	82,44	0,19	81,58	80,20	82,76
237,0	495,0	3,2	0,6	4,7	304,5	73,5	89,5	342,1	421,0	236,5	231,7	529,4	0,20	78,55	77,77	82,42	0,19	81,82	80,37	82,86
238,0	496,0	3,2	0,6	4,7	303,8	73,6	89,2	340,9	420,1	236,2	231,2	529,6	0,20	78,55	77,77	82,43	0,19	82,09	80,51	83,00
239,0	497,0	3,2	0,6	4,7	303,2	73,8	89,2	340,2	419,1	235,5	231,0	529,4	0,20	78,56	77,77	82,47	0,19	82,32	80,68	83,13
240,0	498,0	3,2	0,6	4,7	303,3	73,6	89,4	339,3	418,2	234,9	230,7	528,9	0,20	78,57	77,76	82,47	0,19	82,55	80,83	83,23
241,0	499,0	3,1	0,6	4,8	302,1	73,6	88,8	338,1	417,2	234,0	230,2	530,9	0,20	78,52	77,76	82,52	0,19	82,75	80,96	83,36
242,0	500,0	3,1	0,6	4,7	301,9	73,4	88,3	337,2	416,4	233,2	229,9	531,3	0,20	78,40	77,72	82,55	0,19	82,97	81,12	83,49
243,0	501,0	3,1	0,6	4,7	301,1	73,4	88,9	336,8	415,6	232,8	229,3	531,7	0,20	78,36	77,72	82,59	0,19	83,14	81,26	83,57
244,0	502,0	3,0	0,6	4,8	300,3	73,4	89,4	336,4	414,8	232,2	229,0	532,5	0,20	78,37	77,71	82,65	0,19	83,35	81,42	83,71
245,0	503,0	3,1	0,6	4,8	300,0	73,4	89,9	335,9	414,1	231,7	228,7	532,4	0,20	78,38	77,67	82,71	0,19	83,55	81,56	83,82
246,0	504,0	3,0	0,6	4,8	299,0	73,6	89,2	334,7	413,5	231,2	228,3	531,9	0,20	78,37	77,68	82,77	0,19	83,75	81,72	83,94
247,0	505,0	3,0	0,6	4,6	297,9	73,3	89,7	334,3	412,5	230,6	228,3	533,0	0,20	78,37	77,65	82,85	0,19	83,95	81,87	84,09
248,0	506,0	3,0	0,6	4,6	297,3	73,4	89,7	333,1	411,6	230,1	227,9	532,9	0,20	78,35	77,64	82,92	0,19	84,13	82,00	84,23
249,0	507,0	3,0	0,6	4,5	296,9	73,3	89,9	332,5	410,6	229,7	227,7	532,9	0,20	78,33	77,64	82,97	0,19	84,31	82,16	84,39
250,0	508,0	3,0	0,6	4,5	296,2	73,2	90,0	331,6	409,7	229,1	227,4	533,8	0,20	78,37	77,61	83,07	0,19	84,48	82,32	84,45
251,0	509,0	2,9	0,6	4,7	296,2	73,4	89,5	331,2	408,7	228,6	227,0	534,3	0,20	78,30	77,61	83,10	0,19	84,58	82,44	84,44
252,0	510,0	2,9	0,6	4,7	295,5	73,6	89,7	330,5	407,7	227,6	226,8	535,3	0,20	78,30	77,59	83,10	0,19	84,57	82,50	84,44
253,0	511,0	3,0	0,6	4,7	294,9	73,7	89,3	329,5	407,1	227,2	226,6	535,5	0,20	78,29	77,58	83,13	0,19	84,50	82,54	84,41

254,0	512,0	2,9	0,6	4,7	294,6	73,2	89,4	329,1	406,2	226,6	226,4	535,7	0,20	78,28	77,56	83,14	0,19	84,37	82,56	84,36
255,0	513,0	2,9	0,6	4,7	293,7	73,2	89,4	328,8	405,4	226,3	225,9	535,8	0,20	78,32	77,57	83,18	0,19	84,21	82,56	84,34
256,0	514,0	2,8	0,6	4,7	293,7	73,3	89,0	328,7	404,6	225,8	225,4	535,0	0,20	78,31	77,57	83,17	0,19	84,05	82,55	84,31
257,0	515,0	2,9	0,6	4,6	293,6	73,4	88,7	327,2	404,0	224,6	225,2	536,4	0,20	78,23	77,56	83,17	0,19	83,89	82,52	84,25
258,0	516,0	2,8	0,6	4,6	293,0	73,3	88,4	326,3	403,2	224,1	224,8	536,4	0,20	78,23	77,57	83,16	0,19	83,80	82,52	84,24
259,0	517,0	2,8	0,6	4,7	292,4	73,3	88,8	326,4	402,6	223,7	224,9	536,5	0,20	78,17	77,55	83,17	0,19	83,78	82,55	84,27
260,0	518,0	2,8	0,6	4,7	292,2	73,6	88,1	325,1	402,0	222,8	224,3	537,1	0,20	78,23	77,55	83,21	0,19	83,84	82,61	84,33
261,0	519,0	2,8	0,6	4,7	291,5	73,7	89,2	325,8	401,3	222,6	224,8	537,1	0,20	78,34	77,61	83,31	0,19	83,98	82,70	84,45
262,0	520,0	2,7	0,6	4,6	290,8	74,0	91,1	325,3	400,8	222,5	224,2	537,0	0,20	78,55	77,64	83,36	0,19	84,13	82,81	84,57
263,0	521,0	2,7	0,6	4,6	290,0	74,1	92,4	324,8	400,3	222,1	224,2	535,2	0,20	78,85	77,72	83,46	0,19	84,29	82,92	84,70
264,0	522,0	2,6	0,6	4,6	289,2	74,4	93,4	324,3	399,8	221,9	223,9	534,4	0,20	79,11	77,81	83,53	0,19	84,48	83,03	84,82
265,0	523,0	2,7	0,6	4,6	288,4	74,6	94,7	323,8	399,5	221,4	224,0	534,3	0,20	79,39	77,92	83,60	0,19	84,68	83,16	84,96
266,0	524,0	2,7	0,6	4,6	287,9	74,6	95,3	323,7	398,6	221,1	224,0	534,7	0,20	79,69	78,06	83,66	0,19	84,86	83,31	85,11
267,0	525,0	2,6	0,6	4,6	287,2	74,8	95,9	323,2	397,8	220,8	223,8	533,6	0,20	80,00	78,21	83,76	0,19	85,07	83,45	85,23
268,0	526,0	2,6	0,6	4,6	286,7	74,9	97,0	322,4	397,2	220,4	223,8	533,8	0,20	80,28	78,39	83,80	0,19	85,22	83,56	85,26
269,0	527,0	2,6	0,5	4,6	286,2	74,8	97,2	322,7	396,7	220,1	223,8	534,3	0,20	80,56	78,57	83,81	0,19	85,33	83,66	85,25
270,0	528,0	2,6	0,5	4,6	285,9	75,1	97,8	321,8	396,3	219,7	223,7	534,9	0,20	80,85	78,77	83,81	0,19	85,29	83,73	85,23
271,0	529,0	2,6	0,5	4,6	284,9	75,2	97,6	321,2	395,9	219,4	223,3	534,3	0,20	81,07	78,96	83,81	0,19	85,24	83,75	85,18
272,0	530,0	2,6	0,5	4,6	284,6	74,9	98,4	320,9	395,5	218,9	223,2	533,9	0,20	81,33	79,15	83,83	0,19	85,09	83,77	85,10
273,0	531,0	2,5	0,5	4,6	284,5	75,2	98,8	320,7	395,1	218,7	223,1	532,8	0,20	81,56	79,33	83,79	0,19	84,94	83,77	85,04
274,0	532,0	2,6	0,5	4,6	284,1	75,4	99,2	320,2	394,7	218,3	223,0	531,6	0,20	81,80	79,52	83,77	0,19	84,75	83,75	84,95
275,0	533,0	2,5	0,5	4,6	283,6	75,6	99,8	319,9	394,2	218,2	222,6	530,9	0,20	82,05	79,69	83,75	0,19	84,62	83,75	84,88
276,0	534,0	2,5	0,5	4,6	283,5	75,9	100,1	319,5	393,8	217,8	222,6	530,9	0,20	82,26	79,88	83,73	0,19	84,47	83,73	84,80
277,0	535,0	2,4	0,5	4,6	283,1	75,7	100,5	318,9	393,6	217,3	222,8	530,9	0,20	82,50	80,07	83,71	0,19	84,33	83,69	84,73
278,0	536,0	2,4	0,5	4,6	282,0	75,9	100,9	318,8	393,2	216,9	222,5	530,2	0,20	82,70	80,23	83,69	0,19	84,22	83,68	84,70
279,0	537,0	2,4	0,5	4,6	282,2	75,8	101,1	317,9	392,8	216,8	222,1	529,9	0,20	82,91	80,42	83,71	0,19	84,18	83,67	84,72
280,0	538,0	2,4	0,5	4,6	282,2	75,9	101,3	317,9	392,6	216,4	221,9	528,7	0,20	83,11	80,59	83,72	0,19	84,22	83,70	84,71
281,0	539,0	2,4	0,5	4,6	281,8	75,7	101,8	317,6	392,3	216,1	221,8	528,4	0,20	83,26	80,74	83,75	0,19	84,33	83,78	84,82
282,0	540,0	2,4	0,5	4,6	281,2	76,0	102,0	316,8	392,0	215,8	221,6	528,7	0,20	83,44	80,91	83,80	0,19	84,50	83,85	84,93
283,0	541,0	2,3	0,5	4,6	280,9	76,1	102,0	316,5	391,9	215,5	221,6	529,0	0,20	83,55	81,05	82,59	0,19	83,14	81,26	83,57
284,0	542,0	2,4	0,5	4,5	280,8	76,4	102,8	316,1	391,4	215,0	221,2	529,3	0,20	83,72	81,24	82,65	0,19	83,35	81,42	83,71
285,0	543,0	2,3	0,5	4,5	280,5	76,4	102,5	315,9	390,9	214,7	220,9	528,8	0,20	83,88	81,41	82,71	0,19	83,55	81,56	83,82
286,0	544,0	2,3	0,5	4,6	279,9	76,5	103,2	315,2	390,3	214,5	220,8	527,8	0,20	84,07	81,56	82,77	0,19	83,75	81,72	83,94
287,0	545,0	2,3	0,5	4,6	279,8	76,5	103,7	314,6	389,9	214,2	220,4	526,9	0,20	84,23	81,74	82,85	0,19	83,95	81,87	84,09
288,0	546,0	2,2	0,5	4,6	279,8	76,6	103,8	314,0	389,6	214,0	220,1	526,7	0,20	84,42	81,89	82,92	0,19	84,13	82,00	84,23
289,0	547,0	2,2	0,5	4,6	279,6	76,7	104,1	313,7	389,2	213,6	220,1	527,8	0,20	84,56	82,04	82,97	0,19	84,31	82,16	84,39
290,0	548,0	2,2	0,5	4,5	278,4	76,6	102,3	313,4	388,6	213,3	219,8	527,6	0,20	84,70	82,19	83,07	0,19	84,48	82,32	84,45
291,0	549,0	2,2	0,5	4,5	278,8	76,8	100,0	313,1	388,1	213,0	219,4	527,3	0,20	84,76	82,31	83,10	0,19	84,58	82,44	84,44
292,0	550,0	2,2	0,5	4,5	278,8	76,6	98,8	312,9	387,5	212,8	219,1	526,8	0,20	84,69	82,37	83,10	0,19	84,57	82,50	84,44
293,0	551,0	2,2	0,5	4,5	279,2	76,6	97,8	312,4	387,1	212,6	218,6	526,2	0,20	84,48	82,38	83,13	0,19	84,50	82,54	84,41
294,0	552,0	2,1	0,5	4,5	279,4	76,6	97,1	311,7	386,8	212,3	218,5	525,9	0,20	84,23	82,39	83,14	0,19	84,37	82,56	84,36
295,0	553,0	2,1	0,5	4,5	279,3	76,5	96,3	311,6	386,2	212,1	217,9	525,8	0,20	84,03	82,38	83,18	0,19	84,21	82,56	84,34
296,0	554,0	2,1	0,5	4,4	279,5	76,4	95,8	311,3	385,5	211,8	217,7	525,2	0,20	83,80	82,32	83,17	0,19	84,05	82,55	84,31
297,0	555,0	2,0	0,5	4,4	278,9	76,4	95,4	310,9	385,4	211,5	217,7	525,8	0,20	83,60	82,29	83,17	0,19	83,89	82,52	84,25
298,0	556,0	2,0	0,5	4,4	278,6	77,0	96,0	310,6	385,0	211,0	217,5	526,7	0,20	83,52	82,29	83,16	0,19	83,80	82,52	84,24
299,0	557,0	2,0	0,5	4,4	278,0	76,9	97,1	310,9	384,7	210,9	217,2	527,3	0,20	83,50	82,30	83,17	0,19	83,78	82,55	84,27
300,0	558,0	2,0	0,5	4,4	277,3	77,3	98,2	310,4	384,2	210,6	216,8	526,8	0,20	83,64	82,36	83,21	0,19	83,84	82,61	84,33
301,0	559,0	2,0	0,5	4,4	276,9	77,2	99,4	310,2	384,0	210,3	216,7	525,9	0,20	83,84	82,46	83,31	0,19	83,98	82,70	84,45
302,0	560,0	2,0	0,5	4,4	276,4	77,2	100,7	309,6	383,5	210,1	216,3	525,2	0,20	84,09	82,54	83,36	0,19	84,13	82,81	84,57
303,0	561,0	2,0	0,5	4,4	275,5	77,4	101,5	309,3	383,0	209,9	216,2	524,5	0,20	84,37	82,67	83,46	0,19	84,29	82,92	84,70
304,0	562,0	2,0	0,5	4,3	275,0	77,4	102,1	308,6	382,5	209,6	215,9	524,7	0,20	84,63	82,80	83,53	0,19	84,48	83,03	84,82
305,0	563,0	1,9	0,5	4,3	274,7	77,4	103,4	308,0	382,1	209,6	215,6	524,6	0,20	84,85	82,95	83,60	0,19	84,68	83,16	84,96
306,0	564,0	1,9	0,5	4,3	274,2	77,2	104,0	307,5	381,5	209,2	215,6	524,1	0,20	85,07	83,11	83,66	0,19	84,86	83,31	85,11
307,0	565,0	1,9	0,5	4,3	273,7	77,3	103,7	307,3	380,9	208,8	215,6	523,9	0,20	85,26	83,26	83,76	0,19	85,07	83,45	85,23
308,0	566,0	1,8	0,5	4,3	273,3	77,5	101,7	306,7	380,3	208,5	215,2	524,8	0,20	85,42	83,38	83,80	0,19	85,22	83,56	85,26
309,0	567,0	1,9	0,5	4,3	273,3	77,1	100,1	306,2	379,7	208,3	215,1	524,0	0,20	85,47	83,48	83,81	0,19	85,33	83,66	85,25
310,0	568,0	1,8	0,5	4,3	273,3	77,3	98,9	305,8	379,1	208,0	214,9	524,1	0,20	85,35	83,52	83,81	0,19	85,29	83,73	85,23
311,0	569,0	1,8	0,5	4,3	273,4	77,2	98,0	305,1	378,7	207,7	214,5	523,2	0,20	85,17	83,53	83,81	0,19	85,24	83,75	85,18
312,0	570,0	1,8	0,5	4,3	273,9	77,1	97,2	304,8	378,3	207,4	214,4	522,9	0,20	84,93	83,54	83,83	0,19	85,09	83,77	85,10
313,0	571,0	1,8	0,5	4,4	274,0	77,2	96,6	305,1	377,9	206,9	214,4	523,1	0,20	84,65	83,51	83,79	0,19	84,94	83,77	85,04
314,0	572,0	1,8	0,5	4,4	274,2	77,6	96,0	303,9	377,4	206,6	214,0	523,8	0,20	84,45	83,48	83,77	0,19	84,75	83,75	84,95
315,0	573,0	1,8	0,5	4,4	273,9	76,9	95,3	304,1	377,2	206,6	213,6	524,0	0,20	84,21	83,48	83,75	0,19	84,62	83,75	84,88
316,0	574,0	1,8	0,5	4,4	274,3	76,6	95,1	304,1	377,0	206,3	213,3	523,2	0,20	84,03	83,43	83,73	0,19	84,47	83,73	84,80
317,0	575,0	1,7	0,5	4,4	274,5	76,7	94,8	303,7	376,8	206,0	213,0	522,0	0,20	83,90	83,38	83,71	0,19	84,33	83,69	84,73
318,0	576,0	1,7	0,5	4,4	274,3	77,2	95,4	303,5	376,7	205,4	212,9	522,4	0,20	83,82	83,35	83,69	0,19	84,22	83,68	84,70
319,0	577,0	1,7	0,6	4,4	274,2	77,2	96,6	303,3	376,8	205,0	213,0	522,4	0,20	83,78	83,36	83,71	0,19	84,18	83,67	84,72
320,0	578,0	1,7	0,5	4,4	273,4	77,5	97,5	303,2	376,7	204,6	212,7	522,3	0,20	83,94	83,38	83,72	0,19	84,22	83,70	84,71
321,0	579,0	1,6	0,5	4,5	272,8	77,6	98,9	303,2	376,8	204,4	212,5	521,3	0,20	84,20	83,46	83,75	0,19	84,33	83,78	84,82
322,0	580,0	1,7	0,5	4,5	272,5	77,6	100,7	303,4	377,0	204,1	212,5	521,0	0,20	84,49	83,56	83,80	0,19	84,50	83,85	84,93
323,0	581,0	1,6	0,5	4,5	272,0	77,7	101,7	302,9	377,1	203,9	212,2	520,1	0,20	84,78	83,66	83,87	0,19	84,69	83,95	85,06
324,0	582,0	1,6	0,5	4,4	271,8	77,6	102,7	302,4	377,1	203,6	212,1	519,9	0,20	85,06	83,79	83,93	0,19	84,90	84,08	85,19
325,0	583,0	1,5	0,5	4,4	271,2	77,6	103,7	302,5	377,5	203,4	211,9	519,1	0,20	85,31	83,96	84,00	0,19	85,14	84,19	85,32
326,0	584,0	1,6	0,5	4,4	270,9	77,8	104,6	302,4	377,4	203,1	212,0	519,4	0,20	85,56	84,09	84,09	0,19	85,31	84,32	85,46
327,0	585,0	1,5	0,5	4,5	270,9	77,7	103,9	301,9	377,3	202,9	211,9	519,8	0,20	85,77	84,22	84,15	0,19	85,55	84,47	85,59
328,0	586,0	1,5	0,5	4,5	271,0	78,0	102,4	301,1	377,4	202,5	211,6	520,3	0,20	85,86	84,33	84,18	0,19	85,68	84,58	85,61
329,0	587,0	1,5	0,5	4,5	271,3	77,6	100,4	301,1	377,5	202,3	211,5	520,2	0,20	85,86	84,44	84,17	0,19	85,75	84,67	85,57
330,0	588,0	1,5	0,5	4,6	271,8	78,0	99,4	301,3	377,9	202,0	211,4	521,1	0,20	85,67	84,48	84,18	0,19	85,71	84,71	85,52
331,0	589,0	1,5	0,6	4,6	272,1	77,9	98,1	301,0	378,0	201,7	211,1	520,7	0,20	85,45	84,50	84,15	0,19	85,61	84,74	85,46
332,0	590,0	1,5	0,6	4,6	272,2	77,8	97,5	301,3	378,3	201,5	211,2	519,2	0,20	85,21	84,49	84,13	0,19	85,49	84,75	85,40
333,0	591,0	1,5	0,6	4,6	272,2	77,7	96,9	301,6	378,5	201,2	211,2	518,8	0,20	85,02	84,48	84,12	0,19	85,36	84,73	85,35
334,0	592,0	1,5	0,6	4,5	272,8	77,3	96,3	301,5	378,8	201,0	211,1	517,9	0,20	84,85	84,45	84,11	0,19	85,20	84,74	85,29
335,0	593,0	1,4	0,6	4,5	272,9	77,1	96,0	301,7	379,1	200,9	211,1	517,4	0,20	84,70	84,45	84,12	0,19	85,10	84,73	85,24
336,0	594,0	1,4	0,6	4,5	272,9	76,9	95,7	301,3	379,1	200,5	210,8	517,5	0,20	84,54	84,40	84,10	0,19	84,96	84,72	85,19
337,0	595,0	1,4	0,6	4,5	273,3	77,5	95,0	300,9	379,3	200,3	210,6	518,3	0,20	84,31	84,36	84,08	0,19	84,82	84,70	85,10
338,0	596,0	1,4	0,6	4,5	273,2	77,9	94,8	301,0	379,4	200,3	210,5	518,4	0,20	84,20	84,31	84,03	0,19	84,66	84,68	85,04
339,0	597,0	1,3	0,6	4,4	272,9	77,5	95,0	301,2	379,9	200,1	210,4	518,3	0,20	84,09	84,27	84,03	0,19	84,56	84,63	84,98

340,0	598,0	1,3	0,6	4,5	272,7	78,0	96,5	301,4	380,2	199,9	210,6	518,7	0,20	84,13	84,29	84,00	0,19	84,53	84,64	84,95
341,0	599,0	1,3	0,6	4,5	271,9	78,1	98,1	301,8	381,0	199,7	210,7	518,6	0,20	84,26	84,30	84,03	0,19	84,58	84,67	85,03
342,0	600,0	1,3	0,6	4,6	271,9	78,3	99,0	301,2	381,5	199,5	210,6	517,9	0,20	84,52	84,37	84,06	0,19	84,70	84,72	85,12
343,0	601,0	1,3	0,6	4,6	272,0	78,3	101,0	301,0	381,8	199,3	210,7	516,8	0,20	84,77	84,45	84,15	0,19	84,87	84,78	85,27
344,0	602,0	1,3	0,6	4,6	271,6	77,7	101,9	301,6	382,4	199,1	210,7	518,0	0,20	85,07	84,58	84,20	0,19	85,08	84,87	85,37
345,0	603,0	1,2	0,6	4,6	271,8	77,8	103,3	300,9	382,7	199,2	210,3	516,3	0,20	85,25	84,67	84,27	0,19	85,24	84,96	85,49
346,0	604,0	1,2	0,6	4,6	272,1	77,7	104,5	300,8	383,5	199,1	210,4	516,0	0,20	85,45	84,78	84,32	0,19	85,43	85,07	85,64
347,0	605,0	1,2	0,6	4,6	271,6	77,8	103,7	300,6	383,9	198,8	210,4	516,2	0,20	85,62	84,91	84,37	0,19	85,60	85,17	85,72
348,0	606,0	1,2	0,6	4,6	272,3	78,0	101,5	300,8	384,3	198,6	210,1	515,4	0,20	85,78	85,02	84,40	0,19	85,77	85,28	85,72
349,0	607,0	1,1	0,6	4,6	272,5	77,9	100,2	300,8	384,8	198,5	210,3	514,3	0,20	85,79	85,09	84,37	0,19	85,84	85,36	85,70
350,0	608,0	1,1	0,6	4,6	272,1	77,9	99,3	300,7	385,3	198,3	210,4	514,9	0,20	85,60	85,11	84,35	0,19	85,79	85,38	85,66
351,0	609,0	1,1	0,8	4,2	272,0	77,3	97,9	300,3	385,5	197,9	210,2	515,8	0,20	85,43	85,13	84,36	0,19	85,71	85,40	85,60
352,0	610,0	1,1	0,7	4,2	272,3	76,6	96,8	300,2	386,1	197,2	209,9	516,2	0,20	84,97	85,04	84,28	0,19	85,46	85,36	85,45
353,0	611,0	1,1	0,7	4,2	272,1	77,0	96,1	299,8	386,9	197,2	209,8	516,1	0,20	84,56	84,96	84,22	0,19	85,19	85,30	85,32
354,0	612,0	1,0	0,6	4,2	271,8	76,7	95,9	299,8	387,5	197,1	209,7	515,8	0,20	84,27	84,89	84,16	0,19	84,97	85,22	85,18
355,0	613,0	1,1	0,6	4,2	271,6	76,6	95,6	299,4	388,1	197,0	209,9	514,5	0,20	84,11	84,83	84,12	0,19	84,87	85,18	85,13
356,0	614,0	1,0	0,6	4,2	271,6	76,6	95,3	299,6	388,4	197,0	210,0	514,5	0,20	83,97	84,80	84,08	0,19	84,70	85,16	85,04
357,0	615,0	1,0	0,6	4,2	271,4	76,8	95,0	299,2	388,9	196,9	210,0	512,9	0,20	83,87	84,73	84,03	0,19	84,58	85,12	85,00
358,0	616,0	1,0	0,6	4,2	271,3	76,8	95,0	299,1	389,5	196,8	210,2	513,3	0,20	83,82	84,67	84,01	0,19	84,49	85,07	84,94
359,0	617,0	1,0	0,6	4,2	270,8	77,3	95,8	298,1	389,7	195,8	210,0	514,0	0,20	83,74	84,65	83,98	0,19	84,42	85,06	84,92
360,0	618,0	0,9	0,6	4,2	269,7	77,4	97,2	298,6	390,1	196,0	209,7	513,8	0,20	83,82	84,65	83,97	0,19	84,42	85,05	84,93
361,0	619,0	0,9	0,6	4,2	269,5	77,7	98,6	298,1	390,5	196,0	209,6	512,6	0,20	84,08	84,71	84,02	0,19	84,54	85,09	85,00
362,0	620,0	0,9	0,6	4,2	268,8	77,8	100,6	298,2	390,7	195,9	209,7	511,3	0,20	84,43	84,79	84,08	0,19	84,73	85,16	85,15
363,0	621,0	0,9	0,6	4,2	267,9	78,1	102,1	298,1	390,6	195,8	209,8	510,6	0,20	84,74	84,89	84,12	0,19	84,93	85,24	85,29
364,0	622,0	0,9	0,6	4,2	267,2	78,3	103,4	297,5	390,5	195,8	209,7	509,7	0,20	85,08	85,03	84,23	0,19	85,18	85,33	85,44
365,0	623,0	0,9	0,6	4,2	266,9	78,2	104,6	297,0	390,5	195,6	209,7	509,8	0,20	85,42	85,18	84,29	0,19	85,45	85,46	85,63
366,0	624,0	0,8	0,6	4,2	266,3	78,3	105,0	297,1	390,7	195,6	209,7	508,9	0,20	85,75	85,33	84,41	0,19	85,71	85,59	85,81
367,0	625,0	0,8	0,6	4,2	266,4	78,5	103,2	296,6	390,5	195,5	209,7	509,1	0,20	86,06	85,50	84,46	0,19	85,96	85,74	85,91
368,0	626,0	0,8	0,6	4,2	266,4	78,6	101,4	296,4	390,3	195,3	209,4	509,2	0,20	86,29	85,62	84,50	0,19	86,19	85,87	85,92
369,0	627,0	0,8	0,6	4,2	266,5	78,6	100,1	296,3	390,3	195,0	209,5	508,0	0,20	86,30	85,73	84,54	0,19	86,30	85,97	85,92
370,0	628,0	0,7	0,6	4,2	266,7	78,4	99,0	295,8	390,4	195,0	209,2	507,2	0,20	86,21	85,74	84,54	0,19	86,31	85,99	85,91
371,0	629,0	0,8	0,6	4,1	266,2	78,3	98,3	295,4	390,5	195,0	209,2	506,6	0,20	86,07	85,76	84,57	0,19	86,26	86,03	85,90
372,0	630,0	0,7	0,6	4,1	265,9	78,4	97,7	294,7	390,7	194,9	209,1	506,0	0,20	85,90	85,79	84,57	0,19	86,20	86,03	85,88
373,0	631,0	0,7	0,6	4,1	265,8	78,1	97,0	294,6	391,0	194,7	208,9	505,3	0,20	85,73	85,76	84,58	0,19	86,08	86,04	85,85
374,0	632,0	0,7	0,6	4,1	265,3	78,4	96,5	293,6	391,1	194,3	208,8	505,1	0,20	85,56	85,74	84,61	0,19	85,98	86,05	85,80
375,0	633,0	0,7	0,6	4,1	265,2	78,6	96,2	293,4	391,2	194,2	208,9	504,8	0,20	85,34	85,72	84,58	0,19	85,85	86,03	85,77
376,0	634,0	0,6	0,6	4,0	264,7	78,7	95,9	292,9	390,6	194,0	208,8	504,4	0,20	85,17	85,67	84,58	0,19	85,73	86,00	85,73
377,0	635,0	0,7	0,6	3,9	264,3	78,7	95,8	292,6	390,2	193,8	208,5	504,0	0,20	85,01	85,64	84,57	0,19	85,60	86,00	85,68
378,0	636,0	0,6	0,6	3,9	263,6	78,3	95,7	292,3	389,7	193,7	208,4	502,7	0,20	84,91	85,59	84,55	0,19	85,49	85,97	85,63
379,0	637,0	0,6	0,6	3,9	263,3	78,1	95,3	291,7	389,3	193,5	208,2	502,2	0,20	84,78	85,56	84,53	0,19	85,42	85,93	85,59
380,0	638,0	0,6	0,6	3,9	263,1	78,0	95,2	291,2	388,8	193,3	208,2	501,4	0,20	84,68	85,51	84,52	0,19	85,31	85,91	85,53
381,0	639,0	0,6	0,6	3,9	262,4	78,0	95,1	291,0	388,5	193,2	207,9	500,9	0,20	84,58	85,46	84,49	0,19	85,20	85,89	85,48
382,0	640,0	0,6	0,6	3,9	262,5	77,4	94,1	289,9	388,0	192,6	207,7	501,6	0,20	84,48	85,40	84,47	0,19	85,11	85,85	85,42
383,0	641,0	0,5	0,6	3,9	262,1	77,6	93,3	289,3	387,6	191,7	207,3	502,2	0,20	84,00	85,29	84,39	0,19	84,83	85,77	85,23
384,0	642,0	0,6	0,6	3,8	261,6	77,1	93,2	288,7	387,3	191,9	207,2	501,9	0,20	83,69	85,17	84,27	0,19	84,55	85,65	85,09
385,0	643,0	0,5	0,6	3,8	261,2	77,0	93,4	288,1	386,9	191,4	207,0	501,9	0,20	83,48	85,08	84,21	0,19	84,36	85,57	84,98
386,0	644,0	0,5	0,6	3,8	260,5	77,5	94,5	286,9	386,2	190,8	206,6	502,0	0,20	83,45	85,02	84,13	0,19	84,26	85,48	84,90
387,0	645,0	0,5	0,6	3,9	260,1	77,6	96,0	287,2	385,8	190,7	206,6	501,7	0,20	83,57	85,01	84,14	0,19	84,28	85,47	84,92
388,0	646,0	0,5	0,6	3,9	259,3	77,7	97,2	286,6	385,1	190,5	206,0	500,9	0,20	83,78	85,04	84,11	0,19	84,36	85,48	84,96
389,0	647,0	0,5	0,6	3,9	258,1	77,9	99,3	286,8	384,5	190,2	205,8	498,9	0,20	84,11	85,08	84,15	0,19	84,53	85,52	85,09
390,0	648,0	0,5	0,6	3,9	257,5	78,0	100,8	286,8	384,2	190,1	205,6	497,7	0,20	84,44	85,17	84,19	0,19	84,73	85,59	85,20
391,0	649,0	0,4	0,6	3,9	257,0	78,3	101,9	286,3	383,8	190,0	205,4	496,7	0,20	84,76	85,28	84,26	0,19	84,97	85,70	85,34
392,0	650,0	0,5	0,6	3,9	256,6	78,4	103,1	285,8	383,5	189,8	205,1	495,8	0,20	85,11	85,42	84,34	0,19	85,23	85,80	85,51
393,0	651,0	0,4	0,6	3,9	255,7	78,5	102,7	285,2	383,2	189,8	204,9	494,4	0,20	85,41	85,55	84,41	0,19	85,47	85,90	85,64
394,0	652,0	0,4	0,6	3,9	255,8	78,7	100,8	284,6	382,4	189,4	204,5	494,8	0,20	85,67	85,66	84,44	0,19	85,71	86,01	85,66
395,0	653,0	0,4	0,6	3,9	256,1	78,6	99,4	284,6	382,1	189,2	204,5	494,3	0,20	85,80	85,75	84,48	0,19	85,82	86,09	85,66
396,0	654,0	0,4	0,6	3,9	255,9	78,6	98,3	284,5	381,6	189,1	204,2	492,8	0,20	85,79	85,81	84,45	0,19	85,87	86,13	85,64
397,0	655,0	0,4	0,6	3,9	255,9	78,6	97,5	283,6	380,9	188,9	203,8	491,8	0,20	85,70	85,81	84,46	0,19	85,87	86,15	85,61
398,0	656,0	0,4	0,6	3,8	255,7	78,5	96,9	283,8	380,3	188,7	203,7	490,7	0,20	85,59	85,81	84,47	0,19	85,81	86,14	85,62
399,0	657,0	0,3	0,6	3,8	255,6	78,2	96,3	283,5	379,7	188,5	203,4	489,8	0,20	85,44	85,79	84,44	0,19	85,72	86,16	85,58
400,0	658,0	0,3	0,6	3,8	255,2	78,3	96,0	283,0	379,1	188,4	203,1	489,0	0,20	85,26	85,77	84,46	0,19	85,62	86,16	85,55
401,0	659,0	0,3	0,6	3,8	255,0	78,2	95,6	282,6	378,6	188,2	202,8	487,8	0,20	85,13	85,74	84,44	0,19	85,56	86,14	85,49
402,0	660,0	0,3	0,6	3,8	255,0	78,2	95,2	282,3	378,4	188,0	202,6	487,0	0,20	84,96	85,71	84,44	0,19	85,42	86,11	85,46
403,0	661,0	0,3	0,6	3,8	254,7	78,1	94,9	281,8	378,3	187,7	202,2	486,4	0,20	84,85	85,66	84,39	0,19	85,33	86,08	85,42
404,0	662,0	0,2	0,6	3,8	254,1	78,0	94,7	281,5	378,2	187,4	202,1	485,9	0,20	84,70	85,63	84,38	0,19	85,24	86,06	85,37
405,0	663,0	0,2	0,6	3,8	254,1	78,1	94,5	280,9	378,1	187,2	201,8	485,1	0,20	84,58	85,57	84,35	0,19	85,14	86,02	85,32
406,0	664,0	0,2	0,6	3,8	253,6	77,9	94,3	280,6	378,6	187,0	201,5	484,5	0,20	84,47	85,52	84,32	0,19	85,03	85,98	85,30
407,0	665,0	0,2	0,6	3,8	253,6	77,9	94,0	280,4	378,9	186,8	201,3	483,9	0,20	84,36	85,46	84,30	0,19	84,95	85,97	85,22
408,0	666,0	0,2	0,6	3,8	253,1	78,0	94,0	279,9	379,0	186,5	201,0	483,3	0,20	84,27	85,44	84,25	0,19	84,86	85,92	85,19
409,0	667,0	0,2	0,5	3,8	252,8	77,8	93,9	279,5	379,1	186,3	200,7	483,3	0,20	84,17	85,36	84,26	0,19	84,76	85,86	85,13
410,0	668,0	0,2	0,5	3,7	252,7	77,8	93,6	278,8	379,2	185,9	200,5	482,5	0,20	84,12	85,31	84,22	0,19	84,67	85,84	85,06
411,0	669,0	0,2	0,5	3,7	252,2	77,8	93,6	278,6	379,2	185,7	200,2	482,0	0,20	84,03	85,25	84,17	0,19	84,59	85,80	85,03
412,0	670,0	0,1	0,5	3,7	252,2	77,8	93,4	278,1	379,1	185,5	199,8	482,1	0,20	83,98	85,22	84,16	0,19	84,55	85,77	84,96
413,0	671,0	0,1	0,5	3,7	251,7	77,8	93,4	277,4	379,1	185,1	199,6	481,4	0,20	83,90	85,14	84,13	0,19	84,45	85,74	84,89
414,0	672,0	0,1	0,5	3,7	251,6	77,7	93,2	277,2	379,0	184,9	199,3	481,2	0,20	83,85	85,10	84,09	0,19	84,41	85,70	84,88
415,0	673,0	0,1	0,5	3,7	251,4	77,7	93,1	276,6	378,9	184,6	199,2	481,4	0,20	83,79	85,05	84,05	0,19	84,33	85,64	84,82
416,0	674,0	0,1	0,5	3,7	251,0	78,2	93,6	275,6	378,8	184,1	198,8	482,1	0,20	83,78	85,02	84,02	0,19	84,29	85,60	84,77
417,0	675,0	0,1	0,5	3,7	250,5	78,4	95,4	275,7	378,8	183,9	198,9	483,0	0,20	83,86	85,03	84,02	0,19	84,30	85,59	84,80
418,0	676,0	0,0	0,5	3,7	250,0	78,8	96,4	274,9	378,7	183,5	198,4	482,6	0,20	84,03	85,05	84,00	0,19	84,40	85,59	84,83

Manufacturer: JOTUL
Model: F45 V2

Run: 1
Project #: PI 20194
Test Duration: 418 min

	HHV	LHV
Eff	68,54%	73,75%
Comb Eff	98,16%	98,16%
HT Eff	69,83%	75,13%
Output	61 835	kJ/h
Burn Rate	4,46	kg/h
Grams CO	168	g
Input	90 213	kJ/h
MC wet	16,78	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19,86
F_0
1,051

Overall Heating Efficiency: 68,54%
Combustion Efficiency: 98,16%
Heat Transfer Efficiency: 69,83%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	30,32
Dry Moles Exhaust Gas (N_T):	297,85
Air Fuel Ratio (A/F)	8,52

Heat Output:	58 657	Btu/h	61 835	kJ/h
Heat Input:	85 577	Btu/h	90 213	kJ/h
Burn Duration:	1,45	h		
Burn Rate:	9,84	lb/h	4,464	kg/h
Stack Temp:	760,8	Deg. F	404,9	Deg. C

Manufacturer: JOTUL
Model: F45 V2

Run: 1
Project #: PI 20194
Test Duration: 418 min

	HHV	LHV
Eff	69,56%	74,85%
Comb Eff	97,01%	97,01%
HT Eff	71,71%	77,16%
Output	20 683	kJ/h
Burn Rate	1,47	kg/h
Grams CO	488	g
Input	29 734	kJ/h
MC wet	16,56	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19,86
F_0
1,048

Overall Heating Efficiency:	69,56%
Combustion Efficiency:	97,01%
Heat Transfer Efficiency:	71,71%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	29,60
Dry Moles Exhaust Gas (N_r):	512,79
Air Fuel Ratio (A/F)	14,67

Heat Output:	19 620	Btu/h	20 683	kJ/h
Heat Input:	28 206	Btu/h	29 734	kJ/h
Burn Duration:	6,97	h		
Burn Rate:	3,24	lb/h	1,471	kg/h
Stack Temp:	380,5	Deg. F	193,6	Deg. C

POLYTESTS
TESTING THROUGH YOUR REALITY

Date: 2019 04 30 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 1 Tech: M M Reviewer: [illegible]

- kindling 10,6 LBS start Fan (1 min torche)
- After 1 min close Door Fan High (mode auto)
- At 1 min close Door
- 34 LBS insert load
- At close Door immediatly
At 5,5 LBS stop pompe
At 36 LBS ~~Break~~ coal Remove
At 30 LBS set Fan low (mode auto)
At 29 LBS insert load
At close Door immediatly
After 2 min close air inlet (1/2)
After 3 min close air inlet 3/4
At 11 min close air inlet completement

TEST LOAD CONFIGURATION

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE / POST CHECKS

Date: 2019-04-30 Manufacturer: Jotul Model: F45 V2

Project #: PT 2194 Run: 1 Tech: MM Reviewer: [illegible]

	Equipment #	Time	12%	22%
Moisture Meter Calibration Check:	LM-191	7:30	ok	ok

Facility Conditions:

	Pre-Test	Post-Test
Air Velocity from less than 2 feet	0 (max50 Fpm)	0 (max50 Fpm)
Smoke Capture Check (Tunnel velocity)	ok	NA
Picture	4 sides ok	ok

Wood Heater Conditions:

	Pre-Test
Date Wood Heater Stack Cleaned	2019-04-30
Date Dilution Tunnel Cleaned	2019-04-30
Induced Draft Check (max 0.005 H2O)	ok
Traverse before ignition	ok

Temperature System:

	Post-Test
Ambient (65°-90°F)	ok °F

Proportional Checks:

	Pre-Test
Thermocouple check	ok
Pitot Clean	ok
Pitot verification	ok

Sampling Train ID Numbers:

	High fire test			Medium low fire test		
	1st hour	Train 1	Train 2	1st hour	Train 1	Train 2
Probe	02	36	33	16	39	43
Filter Front	438	440	442	435	445	460
Filter Back	439	441	443	437	447	461
Filter Thermocouple	h	h	12	11	11	11
Filter (80°F ≥ <90°F)	ok	ok	ok	ok	ok	ok

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-04-30 Manufacturer: Jotul Model: F 45 V2

Project #: PI 20194 Run: 1 Tech: MM Reviewer: [illegible]

Leakage Checks Tunnel Samplers

High fire test	System 1st 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	-18	-15	-18	-15	-15
Final 1minute DGM (Liter)	905858,20	906568,00	855354,74	906568,06	855354,74	856059,32
Initial 1minute DGM (Liter)	905858,04	906568,00	855354,73	906568,05	855354,73	856059,32
Change © (Liter)	0,16	Ø	0,01	0,01	0,01	Ø
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

Low medium fire test	System 1st 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)	906568,90	909024,32	906569,04	909024,47	856060,69	858471,76
Initial 1minute DGM (Liter)	906568,86	909024,32	906569,02	909024,48	856060,68	858471,76
Change © (Liter)	0,04	Ø	0,02	0,01	0,01	
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019.04-30 Manufacturer: Jo fu Model: F45 V2

Project #: PI 2.194 Run: 1 Tech: MM Reviewer: YO

Leakage Checks Flue Gas Sampler

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

Leakage Checks Pitot

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

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE-TEST SCALE AUDIT

Date: 2019-04-30 Manufacturer: Jotul Model: F45 V2
Project #: PJ 20194 Run: 1 Tech: MM Reviewer: 8P

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	100mg, Class S	100 mg
Analytical	EM 129	200 g, Class S	200 g

LIMITS OF WEIGHT RANGES

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

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019.04.30 Manufacturer: Jo ful Model: F45 V2

Project #: PT 20194 Run: 1 Tech: M M Reviewer: 80

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 102.5 (KPa.) Static pressure (P_q) 0.22 (inches w.c.)

Inside diameter: Port A _______ Port B ____.

Tunnel cross sectional area: .1963Ft^2

Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.072	65.6
B - Centroid	3.00	3.50	4	0.071	65.71
A-1	0.40	0.50	0.50	0.065	65.33
A-2	1.50	1.75	2	0.080	65.41
A-3	4.50	5.25	6	0.058	65.63
A-4	5.60	6.5	7.5	0.060	65.67
B-1	0.40	0.50	0.50	0.059	65.81
B-2	1.50	1.75	2	0.072	65.91
B-3	4.50	5.25	6	0.061	66.03
B-4	5.60	6.5	7.5	0.058	66.03
				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 H_2O)

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 $\frac{\text{in. } H_2O}{\{13.6\}}$

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.

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019-04-30 Manufacturer: Joki Model: F45-V2
Project #: PI 26194 Run: 1 Tech: M M Reviewer: SD

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2.981	3.00	0.992	1.00
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO_2	0	0	17.92	18.00	9.74	10.00
Tolerance CO2		+/- 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	2.993	0.999	0	0.02	0.012	0.15	0.007	0.05	✓	
CO_2	0	17.86	9.78	0	0.02	0.06	0.5	0.04	0.5	✓	

POLYTESTS
TESTING THROUGH YOUR REALITY

TEST DATA LOG

Date: 2019-04-30 Manufacturer: Jo fil Model: F45 V2
Project #: PT 20194 Run: 1 Tech: M M Reviewer: DP

RAW DRY GAS METER READINGS

		System 1	System 2	Blank
High fire test	Final (Liter)	906567,04	856058,39	689,39
	Initial (Liter)	905859,39	855355,94	660,98
Low medium fire test	Final (Liter)	909023,39	858470,79	804,22
	Initial (Liter)	906569,59	856061,72	689,39

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102,5	101,2
Dry Bulb (F):	74,30	80,60
Humidity (%):	260	~~86~~ 231

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-04-30 Manufacturer: Jotul Model: F 45 V2
Project #: PJ 20174 Run: 1 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

KINDLING AND START-UP LOAD

Piece Size				Weight		Meter Moisture Content (% dry)				
	x	x 16	in.	3,82	lbs.	9		9		9
	x	x 12	in.		lbs.					
	x	x	in.		lbs.					
	x	x 16	in.	6 84	lbs.	19		19		19
	x	x 12	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					

HIGHFIRE TEST LOAD

Piece Size				Weight		Meter Moisture Content (% dry)				
3 1/4	x 3 1/4	x 16	in.	3550	lbs.	196		193		20
3 3/4	x 350	x 16	in.	4346	lbs.	199		200		191
450	x 425	x 16	in.	5424	lbs.	206		200		194
	x	x	in.		lbs.					
300	x 350	x 16	in.	3770	lbs.	203		204		208
500	x 400	x 16	in.	6494	lbs.	211		208		203
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-04-30 Manufacturer: Jotul Model: F45 V2
Project #: PT 20194 Run: 1 Tech: MN Reviewer: DP

FUEL DESCRIPTION:
Type of wood:

LOW OR MEDIUM TEST LOAD

Piece Size		Weight		Meter Moisture Content (% dry)				
400 x 400 x 16	in.	4 884	lbs.	192		198		193
450 x 400 x 16	in.	5 980	lbs.	191		221		196
425 x 450 x 16	in.	6 496	lbs.	193		193		196
x x	in.		lbs.					
300 x 300 x 16	in.	m.m ~~334~~ 3540	lbs.	196		194		198
425 x 425 x 16	in.	5 18	lbs.	221		193		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.					

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019.04.30 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 1 Tech: MM Reviewer: [illegible]

LOW OR MEDIUM FIRE TEST FILTERS					
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	43	460	461	45
2019-04-29	17:00	109 1646	00 822	00825	35 1250
2019-04-30	7:00	109 1647	00823	00826	35 1251

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	43	460	461	45
2019.04.30	22:00	109 1649	00823	00793	35 1320
2019.05.06	8:00	109 1649	00 823	00793	35 1318
2019.05.08	8:00	109.1649	0.0823	0.0793	35.1318
2019.05.09	8:00	109.1649	0.0823	0.0793	35.1318

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-04-30　Manufacturer: Jotul　Model: F45 v2

Project #: PI 20194　Run: 1　Tech: MR　Reviewer: [signature]

		LOW OR MEDIUM TEST FILTERS								
		SYSTEM 1 – 1st 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	Blanck
Date	Time	16	435	437	9	39	445	447	42	462
2019.04.29	17:30	108.7530	0.0863	0.0876	34.9175	110.2776	0.0870	0.0865	35.3299	0.0831
2019.04.30	7:30	108.7531	0.0863	0.0877	34.9176	110.2775	0.0871	0.0866	35.3298	0.0832

		SYSTEM 1 – 1st 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	Blanck
Date	Time	16	435	437	9	39	445	447	42	462
2019-04-30	22:00	108.7534	0.0887	0.0841	34.9231	110.2777	0.0875	0.0854	35.3318	0.0836
2019.05.06	8:00	108.7534	0.0887	0.0841	34.9223	110.2777	0.0875	0.0854	35.3318	0.0835
2019.05.08	8:00	108.7534	0.0887	0.0841	34.9213	110.2777	0.0875	0.0854	35.3312	0.0835
2019.05.09	8:00	108.7534	0.0887	0.0841	34.9213	110.2777	0.0875	0.0854	35.3312	0.0835

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-04-30 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 1 Tech: MM Reviewer: DP

Pre-test Weight Record		HIGHFIRE TEST FILTERS								
		SYSTEM 1 – 1st hour				SYSTEM 1				
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	02	438	439	18	32	440	441	28	444
2019-04-29	17:30	61.1001	00874	00868	34.9885	110.1779	00862	00872	34.5653	00861
2019-04-30	7:30	61.1002	00873 ~~00875~~	00868	34.9884	110.1778	00863	00873	34.5654	00862

Post-test Weight Record		SYSTEM 1 – 1st hour				SYSTEM 1				
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	02	438	439	18	32	440	441	28	444
2019.04.30	14:20	61.1004	00884	00849	34.9935	110.1778	00861	00859	34.5699	00867
2019.05.04	8:00	61.1003	00882	00847	34.9930	110.1778	00861	00859	34.5686	00864
2019.05.08	8:00	61.1003	0.0882	0.0847	34.9920	110.1778	0.0861	0.0859	34.5680	0.0863
2019.05.09	8:00	61.1003	0.0882	0.0847	34.9920	110.1778	0.0861	0.0859	34.5680	0.0863

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-04-30 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 1 Tech: M M Reviewer: [illegible]

		HIGH FIRE TEST FILTERS			
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	33	442	443	29
2019.04.29	17:00	109.3625	0.0863	00869	35.1804
2019.04.30	7:30	109.3626	00864	00870	35,1805

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	33	442	MR443	29
2019.04.30	14:30	109.3628	00870	~~0.0580~~ ~~00870~~	35.1862
2019.05.06	8:00	109.3628	00.867	0.0850 MR	35.1855
2019-05-08	8:00	109.3628	0.0867	00850 0.0850	35.1855
2019.05.09	8:00	109.3628	0.0867	0.0850	35.1855

Paramètres

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

Code verrouillage:	JOT	

Description du test

Test standard	EPA	
Run #	2	
Date	01-05-2019	
Technicien	M.M	
Project #	PI 20194	

Description de l'unité

Manufacturier	JOTULL	
Modèle	F45 V2	
Combustion system	Non-Cat	
Appliance type	WOODSTOVE	
Firebox volume	2,37	cu ft.
Appliance weight empty	n.a	lbs
Fan (no, Standard, Option)	OPTION	

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):	1,010	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,987	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	300	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	PI 20194
Date	01-05-2019
Technicien	m.m

Fuel data

Fuel type	Cord	
Fuel specie	Oak	
HHV	20207,0	kJ/kg
%C	49,5	
%H	6,6	
%O	43,7	
%Ash	0,2	
HHV	8689,9	Btu/lb
LHV	7600,4	Btu/lb

Default Fuel Values

	D. Fir	Oak/Maple
HHV	19 810	20 207
%C	48,73	49,5
%H	6,87	6,62
%O	43,9	43,7
%Ash	0,5	0,2
HHV (Btu/lb)	8519	8690
LHV (Btu/lb)	7451	7600

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	2,37	ft^3				
Total Nom. Load Wt. Target	23,70	lb				
Total Load Wt. Allowable Range	22,50	to	24,90	lb		
Core Target Wt. Allowable Range	10,70	to	15,40	lb		
Remainder Load Wt. Allowable Range	8,30	to	13,00	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	3,60	to	5,90	lb		4,75
Remainder Load Pc. Wt. Allowable Range	2,40	to	13,00	lb		7,70
	Pc. #					
Core Load Piece Wt. Actual	1	4,46	lb	In Range		
	2	5,30	lb	In Range		
	3	3,66	lb	In Range		
Core Load Total. Wt. Actual		13,42	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	6,55	lb	In Range		
(1 to 3 Pcs.)	2	3,85	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		10,40	lb	In Range		
Total Load Wt. Actual		23,82	lb	In Range		
Core % of Total Wt.		56%		In Range		45-65%
Remainder % of Total Wt.		44%		In Range		35-55%
Actual Load % of Nominal Target		101%		In Range		95-105%
Actual Fuel Load Density		10,1	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4,76	lb			
Actual Kindling Wt.		3,59	lb	In Range		15,1%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		7,15	lb			
Actual Start-up Fuel Wt.		6,43	lb	In Range		27,0%
Allowable Residual Start-up Fuel Wt. Range	2,4	to	4,8	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		3,4	lb	In Range		3,6
Total Wt. All Fuel Added (wet basis)		33,84	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	2,1	to	2,6	lb		2,4
Actual Fuel Load Ending Wt.		2,2	lb	In Range		

Load pieces Length in. 16 in.

Fuel Piece Moisture Reading (%-dry basis)					Pc. Wt. Dry Basis			
1	2	3	Ave.					
19	20,6	20,2	19,9	In Range	3,72	lb	1,69	kg
19,3	19,4	19,9	19,5	In Range	4,43	lb	2,01	kg
20,1	20,3	20,6	20,3	In Range	3,04	lb	1,38	kg
19,6	19,4	20,6	19,9	In Range	5,46	lb	2,48	kg
20,3	20,8	20,2	20,4	In Range	3,20	lb	1,45	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC (%-dry basis)			20,0	In Range				
Total Load Ave. MC % (wet basis)			16,6					
Total Test Load Weight (dry basis)					19,86	lb	9,01	kg
Kindling Moisture (%-dry basis)								
9	9	9	9,0	In Range	3,29	lb	1,49	kg
Start-up Fuel Moisture Readings (%-dry basis)								
19	19	19	19,0	In Range	5,40	lb	2,45	kg
Total Wt. All Fuel Added (dry basis)					28,55	lb	12,95	kg
Total Wt. All Fuel Burned (dry basis)					23,0	lb	10,4	kg

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	2,37	ft^3				
Total Nom. Load Wt. Target	28,44	lb				
Total Load Wt. Allowable Range	27,02	to	29,86	lb		
Core Target Wt. Allowable Range	12,798	to	18,49	lb		
Remainder Load Wt. Allowable Range	9,95	to	15,64	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	4,27	to	7,11	lb		5,69
Remainder Load Pc. Wt. Allowable Range	2,84	to	8,53	lb		5,69
	Pc. #					
Core Load Piece Wt. Actual	1	5,02	lb	In Range		
	2	6,05	lb	In Range		
	3	6,51	lb	In Range		
Core Load Total. Wt. Actual		17,57	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3,40	lb	In Range		
(2 or 3 Pcs.)	2	7,11	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		48%		In Range	≤ 67%	
Remainder Load Tot. Wt. Act		10,51	lb	In Range		
Total Load Wt. Actual		28,08	lb	In Range		
Core % of Total Wt.		63%		In Range	45-65%	
Remainder % of Total Wt.		37%		In Range	35-55%	
Actual Load % of Nominal Target		99%		In Range	95-105%	
Actual Fuel Load Density		11,8	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	2,9	to	5,6			Mid-Point
Actual Charcoal Bed Wt.		2,9	lb	In Range		4,2
Actual Fuel Load Ending Wt.		0,0	lb	Valid Test	≥ 90%	
Total Wt. of Fuel Burned During Test Run lb.		28,1	lb			
Load pieces Length in.		16	in.			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
20,3	20,6	19,9	20,3	In Range	4,17	lb	1,89	kg
19,3	19,8	19,9	19,7	In Range	5,06	lb	2,29	kg
19,9	19,7	20,4	20,0	In Range	5,42	lb	2,46	kg
19,4	20	19,3	19,6	In Range	2,84	lb	1,29	kg
20,4	20,8	19,9	20,4	In Range	5,91	lb	2,68	kg
			NA	NA	NA	lb	NA	kg

Total Load Ave. MC % (dry basis)	20,0	In Range				
Total Load Ave. MC % (wet basis)	16,7					
Total Test Load Weight (dry basis)			23,40	lb	10,61	kg
Total Fuel Weight Burned During Test Run (dry basis)			23,4	lb	10,61	kg

For Usable Firebox Volumes above 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume		ft^3				
Total Nom. Load Wt. Target	0	lb				
Total Load Wt. Allowable Range	0,00	to	0,00	lb		
Core Target Wt. Allowable Range	0,00	to	0,00	lb		
Remainder Load Wt. Allowable Range	0,00	to	0,00	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	0,00	to	0,00	lb		0,00
Remainder Load Pc. Wt. Allowable Range	0,00	to	0,00	lb		0,00
	Pc. #					
Core Load Piece Wt. Actual	1		lb	In Range		
	2		lb	In Range		
	3		lb	In Range		
Core Load Total. Wt. Actual		0,00	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1		lb	In Range		
(3 or 4 Pcs.)	2		lb	In Range		
	3		lb	In Range		
	4		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!		#NOMBRE!	≤ 67%	
Remainder Load Tot. Wt. Act		0,00	lb	In Range		
Total Load Wt. Actual		0,00	lb	In Range		
Core % of Total Wt.		#DIV/0!		#DIV/0!	45-65%	
Remainder % of Total Wt.		#DIV/0!		#DIV/0!	35-55%	
Actual Load % of Nominal Target		#DIV/0!		#DIV/0!	95-105%	
Actual Fuel Load Density		#DIV/0!	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	0,1	to	-0,1			Mid-Point
Actual Charcoal Bed Wt.			lb	Out of Range		0,0
Actual Fuel Load Ending Wt.			lb	Valid Test	≥ 90%	
Total Wt. of Fuel Burned During Test Run lb.		0,0	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			NA	NA	NA	lb	NA	kg

Total Load Ave. MC % (dry basis)	#DIV/0!	#DIV/0!				
Total Load Ave. MC % (wet basis)	#DIV/0!					
Total Test Load Weight (dry basis)			#DIV/0!	lb	#DIV/0!	kg
Total Fuel Weight Burned During Test Run (dry basis)			#DIV/0!	lb	#DIV/0!	kg

	Start	End
Barometer (kPa):	102,9	102,3
Barometer (in.Hg):	30,386359	30,20917863
Dry Bulb (F):	71,06	73,04
Humidity (%):	22,3	26,3
Air velocity (ft/min)	0	0

High fire test						
DGM #1	Final:	0,000	cuft	Final:		Liter
	Initial:	0,000	cuft	Initial:		Liter
DGM #2	Final:	0,000	cuft	Final:		Liter
	Initial:	0,000	cuft	Initial:		Liter
DGM room				Final:		cuft
				Initial:		cuft

min or med burnrate						
DGM #1	Final:	32199,026	cuft	Final:	911774,850	Liter
	Initial:	32101,910	cuft	Initial:	909024,830	Liter
DGM #2	Final:	30412,094	cuft	Final:	861174,580	Liter
	Initial:	30316,699	cuft	Initial:	858473,310	Liter
DGM room				Final:	933,600	cuft
				Initial:	804,240	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	233
Numéro de la ligne dans "Raw data" à partir duquel les données du highfire test commence	
Numéro de la ligne dans "Raw data" à partir duquel les données du min ou medium fire test commence	233

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

Project nu.	PI 20194
Date	01-05-2019
Technicien	M.M

Tunnel Traverse Worksheet (for velocity calculations)

Static Pressure:	0,23	in. H20
Barometer:	30,386	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=
0,955

Pour un tunnel moins de 12", prendre 4 lectures

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
	In. wc	°F	
A center	0,071	68,55	0,2665
B center	0,070	68,43	0,2646
A1	0,058	68,5	0,2408
A2	0,082	68,5	0,2864
A3	0,059	68,42	0,2429
A4	0,060	68,36	0,2449
B1	0,058	68,280	0,2408
B2	0,070	68,240	0,2646
B3	0,062	68,290	0,2490
B4	0,055	68,310	0,2345
AVERAGE	0,0645	68,3880	0,2535

Project nu.	PI 20194
Date	01-05-2019
Technicien	M.M

Filter set weight Low/ medium fire

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	11	463	464	1	18	465	466	37	50	467	468	40	469		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	93,7221	0,0831	0,0806	34,5183	108,9482	0,0832	0,0825	35,2353	107,6463	0,0831	0,0844	33,3827	0,0843	2019-04-30	16:45
Before (6)	93,7220	0,0830	0,0806	34,5184	108,9481	0,0833	0,0826	35,2353	107,6463	0,0832	0,0845	33,3827	0,0843	2019-05-01	07:45
After (1)	93,7227	0,0836	0,081	34,52	108,9488	0,0917	0,0815	35,2375	107,6472	0,0925	0,0848	33,3834	0,0847	2019-05-01	22:45
After (2)	93,7222	0,0834	0,0808	34,5192	108,9485	0,0913	0,0812	35,2370	107,6468	0,0923	0,0844	33,3830	0,0846	2019-05-08	08:00
After (3)	93,7222	0,0834	0,0808	34,5192	108,9485	0,0913	0,0812	35,2370	107,6468	0,0923	0,0844	33,3830	0,0845	2019-05-09	08:00
After (4)															
After (5)															
After (6)	93,7222	0,0834	0,0808	34,5192	108,9485	0,0913	0,0812	35,2370	107,6468	0,0923	0,0844	33,3830	0,0845	2019-05-09	08:00
Difference	0,0002	0,0004	0,0002	0,0008	0,0004	0,0080	-0,0015	0,0017	0,0005	0,0091	-0,0001	0,0003	0,0002		
Total (mg)		1,6				10,25				9,8			0,2		
Total ajusté (mg)		**1,40**				**10,05**				**9,60**					

Project nu.	PI 20194
Date	01-05-2019
Technicien	M.M

SFBA EPA EMISSION RESULTS

RESULTS

Average emission rate: 2,13 g/hr

Burn Rate : 1,281 Dry kg/hr

Test Duration: **497** min

PRESSURE FACTOR:	DGM 1	0,98642	
	DGM 2	0,98524	
	DGM 3	1,01263	
TEMPERATURE FACTORS	DGM 1	0,97527	
	DGM 2	0,97415	
	DGM 3	0,98433	
VOLUMES SAMPLED	DGM 1	94,370	SCft
	DGM 2	90,394	Scft
	DGM 3	128,395	SCft
TOTAL TUNNEL VOLUME :		164847	
SAMPLE RATIOS			
	Sample Train 1:	1746,817	
	Sample Train 2:	1823,649	
Paticulate concentration			
	Sample Train 1	**0,000109**	g/dscf
	Sample Train 2	**0,000108**	g/dscf
	Room	**0,000002**	g/dscf
TOTAL EMISSIONS			
	Sample Train 1	**17,65**	g
	Sample Train 2	**17,61**	g
EMISSION RATES			
	Sample Train 1	**2,13**	g/hr
	Sample Train 2	**2,13**	g/hr
1st hour emission rate		**2,79**	g/hr

BAROMETRIC PRESSURE				
		Average:	30,2977686	in Hg
		Start:	30,38635856	in Hg
		End:	30,20917863	in Hg
DGM CONTROLLER VALUES				
DGM 1		Final:	32199,026	Cuft
		Initial:	32101,910	Cuft
DGM 2		Final:	30412,094	Cuft
		Initial:	30316,699	Cuft
DGM #3		Final:	933,600	Cuft
		Initial:	804,240	Cuft
TEMPERATURES				
	DGM 1		541,389	°R
	DGM 2		542,012	°R
CALIBRATION FACTORS				
	DGM 1		1,0101	
	DGM 2		0,9873	
	DGM #3		0,9958	
TUNNEL FLOW RATE:			331,683	Dscfm
PARTICULATE CATCH				
		Total Sample Train 1:	10,25	mg
		Total Sample Train 2:	9,80	mg
		Total Sample Train 1 1st hour:	1,60	mg

DEVIATION: 0,09%

	Train 1	Train 2
Cs	0,0001086	0,00010841

*		*	*	*	*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	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom								
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF
0,00	233,00	25,9	0,2	3,9	326,3	71,5	129,1	421,6	418,6	269,6	285,8	522,9	0,19	73,49	72,72	86,16	0,18	73,69	73,41	90,58
1,0	234,0	27,8	0,3	1,2	415,4	71,7	111,1	421,5	408,6	269,1	284,4	524,2	0,19	74,27	72,93	85,78	0,18	74,08	73,58	89,74
2,0	235,0	27,6	0,5	4,7	468,7	71,6	111,9	437,4	395,1	268,3	283,4	524,1	0,19	74,72	73,10	85,43	0,18	74,39	73,76	88,98
3,0	236,0	27,4	0,4	6,1	494,5	71,5	111,5	451,7	381,6	267,1	282,5	524,2	0,19	75,04	73,27	85,06	0,18	74,66	73,87	88,29
4,0	237,0	27,2	0,4	8,1	485,8	71,8	109,7	462,6	369,4	266,1	281,2	524,8	0,19	75,39	73,44	84,74	0,18	74,94	74,03	87,66
5,0	238,0	27,1	0,4	8,5	482,9	72,0	108,5	470,3	357,9	265,4	279,7	525,3	0,19	75,70	73,62	84,46	0,18	75,24	74,18	87,09
6,0	239,0	26,9	0,4	8,4	459,3	72,0	107,1	479,8	347,7	264,3	278,3	525,3	0,19	75,95	73,78	84,18	0,18	75,51	74,32	86,57
7,0	240,0	26,8	0,4	7,4	453,4	72,4	106,6	481,9	338,6	263,7	277,0	525,8	0,19	76,22	73,95	83,90	0,18	75,77	74,46	86,08
8,0	241,0	26,6	0,4	7,4	450,5	72,3	105,9	486,7	330,3	262,5	276,1	526,6	0,19	76,46	74,12	83,70	0,18	76,03	74,62	85,65
9,0	242,0	26,5	0,4	7,5	450,7	72,4	106,1	489,4	322,8	261,6	274,5	525,6	0,19	76,70	74,30	83,50	0,18	76,27	74,78	85,29
10,0	243,0	26,3	0,4	7,7	452,3	72,4	105,5	494,0	315,7	261,0	272,9	524,7	0,19	76,93	74,48	83,34	0,18	76,51	74,94	84,92
11,0	244,0	26,2	0,4	7,7	457,7	72,6	104,4	498,5	309,2	260,3	271,5	523,5	0,19	77,11	74,60	83,16	0,18	76,72	75,07	84,54
12,0	245,0	26,1	0,4	8,1	456,0	72,5	104,4	498,9	303,6	259,5	270,1	522,3	0,19	77,13	74,71	83,01	0,18	76,80	75,18	84,21
13,0	246,0	25,9	0,4	8,0	455,0	72,4	103,6	499,3	297,8	258,5	268,6	522,0	0,19	77,06	74,78	82,82	0,18	76,83	75,25	83,91
14,0	247,0	25,8	0,4	8,1	463,4	72,6	103,3	503,9	293,6	257,5	267,1	520,5	0,19	76,98	74,84	82,69	0,18	76,84	75,30	83,61
15,0	248,0	25,6	0,4	8,5	474,2	72,0	104,6	513,3	289,6	256,7	266,2	518,8	0,19	77,01	74,90	82,54	0,18	76,90	75,38	83,36
16,0	249,0	25,4	0,3	9,2	485,4	72,4	106,5	528,8	285,8	255,9	264,5	517,3	0,19	77,18	75,00	82,43	0,18	77,00	75,44	83,14
17,0	250,0	25,2	0,2	10,0	502,4	72,2	108,4	546,4	282,7	254,7	263,0	515,5	0,19	77,39	75,09	82,38	0,18	77,17	75,56	82,98
18,0	251,0	25,0	0,1	10,9	523,4	72,5	110,1	574,9	280,3	253,7	262,1	513,6	0,19	77,63	75,21	82,31	0,18	77,35	75,65	82,78
19,0	252,0	24,8	0,1	12,1	533,0	72,7	111,4	598,8	278,3	252,7	261,1	512,3	0,19	77,82	75,35	82,22	0,18	77,53	75,76	82,62
20,0	253,0	24,6	0,1	12,1	538,8	72,3	111,7	617,0	276,8	251,9	260,3	510,7	0,19	77,99	75,47	82,20	0,18	77,71	75,88	82,45
21,0	254,0	24,4	0,1	11,9	541,9	72,3	112,4	631,0	275,4	250,9	259,5	508,0	0,19	78,24	75,60	82,19	0,18	77,91	76,02	82,31
22,0	255,0	24,2	0,1	11,8	542,3	72,3	113,6	641,9	274,6	250,2	258,8	505,3	0,19	78,53	75,76	82,18	0,18	78,13	76,15	82,22
23,0	256,0	24,1	0,1	11,6	543,3	72,3	114,4	649,6	273,9	249,8	258,2	502,9	0,19	78,82	75,93	82,19	0,18	78,37	76,30	82,15
24,0	257,0	23,8	0,1	11,5	543,5	72,6	114,8	655,0	273,6	249,5	257,9	499,2	0,19	79,12	76,10	82,22	0,18	78,63	76,46	82,06
25,0	258,0	23,7	0,1	11,3	544,0	72,6	115,3	658,9	273,3	249,4	257,7	497,2	0,19	79,41	76,27	82,26	0,18	78,89	76,62	82,05
26,0	259,0	23,5	0,1	11,3	543,3	72,8	115,6	661,2	273,3	249,2	257,8	494,9	0,19	79,69	76,47	82,33	0,18	79,15	76,77	82,00
27,0	260,0	23,3	0,1	11,2	543,1	73,0	115,7	663,6	273,4	249,2	257,7	492,4	0,19	79,95	76,62	82,40	0,18	79,39	76,93	82,01
28,0	261,0	23,2	0,1	11,1	542,7	73,2	116,2	663,3	273,6	249,3	257,8	489,1	0,19	80,22	76,81	82,48	0,18	79,65	77,11	82,03
29,0	262,0	23,0	0,1	11,1	541,3	73,1	116,3	663,3	273,9	249,3	258,0	487,2	0,19	80,47	76,98	82,60	0,18	79,90	77,27	82,02
30,0	263,0	22,8	0,1	11,0	540,8	73,3	116,5	662,8	274,2	249,4	258,2	485,2	0,19	80,73	77,16	82,66	0,18	80,14	77,43	82,04
31,0	264,0	22,6	0,1	11,0	539,7	73,7	114,7	662,0	274,5	249,7	258,2	483,4	0,19	80,88	77,30	82,73	0,18	80,31	77,58	82,07
32,0	265,0	22,5	0,1	10,9	539,1	73,7	113,6	660,8	274,8	250,2	258,2	482,0	0,19	80,82	77,38	82,80	0,18	80,37	77,68	82,07
33,0	266,0	22,2	0,1	10,8	539,1	73,3	113,7	658,9	275,6	250,3	258,9	479,6	0,19	80,66	77,46	82,87	0,18	80,34	77,78	82,08
34,0	267,0	22,1	0,1	10,8	538,2	73,1	112,7	656,9	276,1	250,8	259,0	477,3	0,19	80,49	77,50	82,92	0,18	80,31	77,84	82,07
35,0	268,0	21,9	0,1	10,7	538,0	73,0	112,9	656,2	276,8	251,2	259,2	473,9	0,19	80,31	77,53	82,98	0,18	80,25	77,88	82,08
36,0	269,0	21,8	0,1	10,8	537,0	73,1	112,6	655,0	277,5	251,7	259,6	471,2	0,19	80,20	77,56	83,01	0,18	80,18	77,95	82,08
37,0	270,0	21,6	0,1	10,7	537,1	73,3	112,1	653,9	278,5	252,0	260,4	469,4	0,19	80,07	77,58	83,07	0,18	80,11	77,99	82,08
38,0	271,0	21,4	0,1	10,7	537,1	73,5	111,6	653,2	279,4	252,2	260,7	467,7	0,19	79,90	77,57	83,07	0,18	79,99	78,01	82,06
39,0	272,0	21,2	0,1	10,8	536,1	73,1	111,8	652,9	280,3	252,8	260,9	464,4	0,19	79,82	77,58	83,08	0,18	79,92	78,04	82,04
40,0	273,0	21,1	0,1	10,8	535,8	73,2	111,7	651,5	281,4	252,8	261,2	461,8	0,19	79,74	77,60	83,09	0,18	79,87	78,07	82,03
41,0	274,0	20,9	0,1	10,8	536,5	73,6	109,7	650,1	282,4	253,3	261,7	460,6	0,19	79,70	77,61	83,11	0,18	79,81	78,10	82,02
42,0	275,0	20,7	0,1	10,7	536,2	73,8	110,6	649,4	283,5	253,9	262,5	459,0	0,19	79,69	77,63	83,11	0,18	79,80	78,11	81,97
43,0	276,0	20,5	0,1	10,8	535,2	73,8	112,7	648,9	284,5	254,4	262,7	456,3	0,19	79,84	77,69	83,15	0,18	79,84	78,17	81,99
44,0	277,0	20,4	0,1	10,8	534,1	74,0	113,5	647,6	285,5	254,9	263,2	453,4	0,19	80,06	77,76	83,22	0,18	79,97	78,24	82,02
45,0	278,0	20,2	0,1	10,7	532,0	73,7	113,3	646,4	286,6	255,1	263,8	451,4	0,19	80,29	77,83	83,25	0,18	80,12	78,34	82,03
46,0	279,0	20,1	0,1	10,6	531,3	73,6	114,3	644,8	287,8	256,0	264,7	450,2	0,19	80,52	77,94	83,27	0,18	80,25	78,43	82,07
47,0	280,0	19,9	0,1	10,6	530,8	73,9	113,7	641,6	289,1	256,8	264,8	449,2	0,19	80,67	78,05	83,29	0,18	80,41	78,55	82,05
48,0	281,0	19,8	0,1	10,6	528,8	73,7	114,7	641,3	290,3	257,1	265,3	445,9	0,19	80,85	78,19	83,35	0,18	80,56	78,65	82,06
49,0	282,0	19,6	0,1	10,5	527,7	73,6	115,5	639,4	291,4	257,9	265,8	444,0	0,19	81,05	78,33	83,39	0,18	80,73	78,77	82,09
50,0	283,0	19,4	0,1	10,5	526,7	73,3	115,0	638,4	292,7	258,6	266,3	442,4	0,19	81,20	78,46	83,44	0,18	80,90	78,87	82,12
51,0	284,0	19,3	0,1	10,4	525,2	73,2	114,2	636,9	293,9	258,6	266,9	440,2	0,19	81,23	78,51	83,48	0,18	80,95	78,97	82,12
52,0	285,0	19,1	0,1	10,3	523,6	73,1	113,4	635,4	295,1	259,0	267,0	437,8	0,19	81,12	78,57	83,49	0,18	80,89	79,05	82,14
53,0	286,0	18,9	0,1	10,3	522,6	73,1	112,6	633,4	296,2	259,4	267,7	435,8	0,19	80,95	78,57	83,52	0,18	80,81	79,09	82,15
54,0	287,0	18,8	0,1	10,2	521,5	73,5	111,5	630,6	297,6	260,3	268,2	434,7	0,19	80,79	78,58	83,51	0,18	80,71	79,13	82,11
55,0	288,0	18,7	0,1	10,2	520,3	73,9	110,1	628,3	298,4	260,8	268,5	433,0	0,19	80,60	78,59	83,46	0,18	80,58	79,13	82,07
56,0	289,0	18,5	0,2	10,1	518,7	73,6	110,1	625,0	299,6	261,3	268,9	431,6	0,19	80,41	78,58	83,45	0,18	80,53	79,14	82,06
57,0	290,0	18,3	0,2	10,1	518,0	73,7	107,9	623,8	300,8	261,7	269,1	430,2	0,19	80,32	78,59	83,37	0,18	80,43	79,15	82,02
58,0	291,0	18,2	0,2	10,0	516,7	73,8	109,1	621,7	301,9	262,4	269,8	427,6	0,19	80,25	78,58	83,34	0,18	80,35	79,16	81,96
59,0	292,0	18,2	0,2	10,0	514,9	73,5	108,9	621,0	303,0	263,1	270,3	426,7	0,19	80,18	78,61	82,97	0,18	80,31	79,20	81,94
60,0	293,0	18,0	0,2	10,0	513,2	73,8	107,5	618,7	303,9	263,9	270,4	425,2	0,19	80,05	78,60	82,58	0,18	80,22	79,20	81,88
61,0	294,0	17,8	0,2	9,9	511,3	73,8	108,1	615,8	305,0	264,1	271,1	423,6	0,19	79,99	78,59	82,58	0,18	80,16	79,18	81,81
62,0	295,0	17,7	0,2	9,9	510,4	74,0	109,2	614,8	306,1	264,2	271,9	422,0	0,19	79,94	78,62	82,19	0,18	80,14	79,20	81,78
63,0	296,0	17,5	0,2	9,9	510,2	74,0	108,0	612,2	307,2	264,9	271,8	420,1	0,19	79,97	78,66	84,01	0,18	80,14	79,21	81,74
64,0	297,0	17,4	0,2	9,9	510,1	74,3	107,3	612,3	308,4	265,4	272,3	418,6	0,19	80,11	78,67	84,07	0,18	80,19	79,24	81,76
65,0	298,0	17,3	0,2	10,0	509,8	74,4	109,3	611,7	309,7	265,8	272,8	416,6	0,19	80,33	78,78	83,89	0,18	80,29	79,31	81,78
66,0	299,0	17,0	0,2	10,0	509,3	74,9	111,0	609,9	310,6	266,2	273,2	415,7	0,19	80,64	78,85	83,77	0,18	80,47	79,38	81,84
67,0	300,0	16,9	0,2	10,0	509,7	74,9	110,7	609,5	311,6	266,8	273,7	413,2	0,19	80,88	78,93	83,63	0,18	80,62	79,46	81,88
68,0	301,0	16,8	0,2	10,0	508,9	75,0	111,9	608,8	312,4	267,2	274,1	411,4	0,19	81,13	79,05	83,47	0,18	80,80	79,58	81,93
69,0	302,0	16,6	0,2	9,9	509,0	75,4	111,6	607,8	313,3	267,5	274,0	410,3	0,19	81,35	79,18	83,34	0,18	81,00	79,70	81,98
70,0	303,0	16,6	0,2	9,9	506,7	75,3	112,8	606,9	314,3	267,9	274,6	409,1	0,19	81,58	79,29	83,23	0,18	81,21	79,82	81,99
71,0	304,0	16,4	0,2	9,8	505,5	75,4	112,7	607,1	315,4	267,7	275,4	407,9	0,19	81,79	79,44	83,12	0,18	81,39	79,96	82,07
72,0	305,0	16,2	0,2	9,7	504,5	75,1	111,6	605,3	316,2	267,9	275,6	406,2	0,19	81,91	79,56	83,00	0,18	81,51	80,06	82,06
73,0	306,0	16,1	0,2	9,6	503,9	74,4	111,4	605,3	317,1	268,2	276,4	404,9	0,19	81,79	79,60	82,87	0,18	81,52	80,13	82,11
74,0	307,0	16,0	0,2	9,5	503,6	74,7	110,2	602,9	317,7	268,3	276,9	403,7	0,19	81,55	79,62	82,78	0,18	81,43	80,16	82,11
75,0	308,0	15,8	0,2	9,5	503,0	74,4	108,6	600,3	318,4	268,5	277,1	402,5	0,19	81,26	79,60	82,67	0,18	81,30	80,19	82,11
76,0	309,0	15,8	0,2	9,4	502,0	74,1	109,0	599,4	319,2	268,5	277,8	401,3	0,19	80,95	79,58	82,59	0,18	81,17	80,17	82,08
77,0	310,0	15,7	0,2	9,3	500,8	74,2	107,9	597,3	319,7	268,5	277,7	400,3	0,19	80,66	79,58	82,54	0,18	81,04	80,20	82,08
78,0	311,0	15,4	0,2	9,2	500,0	74,0	107,1	596,3	320,5	268,7	278,6	399,1	0,19	80,44	79,53	82,43	0,18	80,85	80,18	82,04
79,0	312,0	15,3	0,2	9,2	499,2	74,3	107,7	594,6	321,0	268,8	278,7	398,1	0,19	80,24	79,50	82,38	0,18	80,67	80,17	82,02
80,0	313,0	15,2	0,2	9,2	497,7	74,5	107,3	593,6	321,6	268,9	279,0	396,4	0,19	80,10	79,47	82,33	0,18	80,59	80,16	81,98
81,0	314,0	15,1	0,2	9,2	497,8	74,1	107,4	592,4	322,1	269,0	279,4	394,7	0,19	80,02	79,47	82,30	0,18	80,49	80,16	81,99

82,0	315,0	15,1	0,2	9,1	497,5	74,3	106,1	590,4	322,7	269,0	279,9	393,9	0,19	79,95	79,44	82,26	0,18	80,40	80,14	81,96
83,0	316,0	14,9	0,2	9,1	496,6	74,2	106,0	591,3	323,2	269,3	280,0	392,2	0,19	79,86	79,42	82,20	0,18	80,36	80,12	81,94
84,0	317,0	14,7	0,1	9,1	495,1	74,2	106,7	590,3	323,8	268,6	280,2	391,1	0,19	79,79	79,40	82,15	0,18	80,27	80,12	81,93
85,0	318,0	14,7	0,2	9,0	494,6	74,2	107,3	590,5	324,1	268,7	280,3	389,8	0,19	79,76	79,37	82,12	0,18	80,18	80,12	81,89
86,0	319,0	14,6	0,2	9,1	493,6	74,2	107,4	590,1	324,3	268,9	280,5	388,5	0,19	79,72	79,35	82,09	0,18	80,16	80,12	81,85
87,0	320,0	14,5	0,1	9,1	492,6	74,0	106,9	590,0	324,8	268,8	280,8	387,6	0,19	79,68	79,32	82,04	0,18	80,10	80,10	81,86
88,0	321,0	14,4	0,1	9,0	492,6	73,9	105,1	587,6	325,3	268,9	280,7	387,0	0,19	79,68	79,32	82,01	0,18	80,08	80,08	81,80
89,0	322,0	14,2	0,1	9,0	491,0	74,1	105,3	586,3	325,8	269,1	281,1	386,1	0,19	79,63	79,30	81,97	0,18	80,03	80,06	81,77
90,0	323,0	14,1	0,1	9,0	490,4	74,0	105,2	585,3	326,1	269,0	281,4	385,2	0,19	79,59	79,29	81,97	0,18	80,00	80,05	81,76
91,0	324,0	13,9	0,1	9,0	489,6	73,7	104,8	583,4	326,7	269,0	281,7	384,2	0,19	79,56	79,28	81,94	0,18	79,91	80,06	81,73
92,0	325,0	13,8	0,1	9,0	489,4	74,2	104,7	582,4	327,6	269,1	281,7	383,5	0,19	79,60	79,31	81,94	0,18	79,92	80,04	81,69
93,0	326,0	13,7	0,3	8,9	485,7	74,2	106,4	582,9	328,9	269,1	282,2	383,2	0,19	79,70	79,32	81,90	0,18	79,98	80,04	81,68
94,0	327,0	13,7	0,4	8,7	482,1	74,7	107,0	578,1	330,4	269,4	282,0	382,1	0,19	79,97	79,40	81,89	0,18	80,14	80,07	81,70
95,0	328,0	13,6	0,4	8,6	477,9	74,9	107,3	576,0	331,8	269,6	281,9	381,4	0,19	80,21	79,46	81,89	0,18	80,27	80,13	81,72
96,0	329,0	13,5	0,4	8,5	474,2	74,9	108,2	571,8	333,1	269,5	282,1	380,8	0,19	80,53	79,58	81,93	0,18	80,52	80,24	81,76
97,0	330,0	13,4	0,4	8,4	471,3	75,2	108,2	568,0	334,0	269,5	282,3	380,4	0,19	80,83	79,70	81,93	0,18	80,74	80,33	81,79
98,0	331,0	13,2	0,5	8,3	468,3	75,4	108,5	564,7	334,9	269,4	282,2	379,5	0,19	81,09	79,81	82,00	0,18	80,97	80,44	81,82
99,0	332,0	13,1	0,5	8,2	465,8	75,3	107,9	561,2	335,1	269,7	282,1	378,5	0,19	81,29	79,91	82,03	0,18	81,14	80,55	81,83
100,0	333,0	13,1	0,5	8,1	462,9	75,3	107,7	558,5	335,3	269,8	282,2	376,9	0,19	81,30	79,97	82,08	0,18	81,19	80,62	81,88
101,0	334,0	13,0	0,5	8,0	460,2	75,5	106,9	554,3	335,7	269,9	282,1	376,7	0,19	81,19	79,99	82,13	0,18	81,19	80,66	81,93
102,0	335,0	12,8	0,4	8,1	459,9	75,5	106,6	552,3	336,4	269,3	281,8	376,5	0,19	81,04	80,01	82,14	0,18	81,13	80,68	81,92
103,0	336,0	12,8	0,4	8,2	458,5	75,5	105,1	549,0	336,9	269,7	281,4	375,7	0,19	80,89	80,06	82,19	0,18	81,13	80,70	81,95
104,0	337,0	12,7	0,3	8,1	456,3	75,2	105,5	546,6	337,7	269,7	281,1	375,1	0,19	80,75	80,05	82,18	0,18	81,03	80,73	81,93
105,0	338,0	12,6	0,3	8,1	453,8	75,2	106,0	544,1	338,5	269,2	280,7	375,3	0,19	80,66	80,02	82,22	0,18	80,93	80,72	81,97
106,0	339,0	12,5	0,3	8,0	452,2	75,2	106,1	541,7	339,1	269,1	280,4	375,0	0,19	80,58	80,01	82,21	0,18	80,88	80,74	81,94
107,0	340,0	12,4	0,3	8,0	452,0	75,3	105,8	539,5	339,5	269,1	280,3	374,7	0,19	80,49	79,99	82,21	0,18	80,81	80,75	81,97
108,0	341,0	12,3	0,3	8,0	451,2	75,6	104,9	538,0	339,9	270,0	280,1	374,7	0,19	80,47	79,99	82,22	0,18	80,76	80,76	82,01
109,0	342,0	12,2	0,4	7,9	449,9	75,5	103,9	536,5	340,5	270,0	279,5	374,2	0,19	80,44	79,98	82,22	0,18	80,74	80,77	82,02
110,0	343,0	12,1	0,4	7,8	449,0	75,6	104,0	535,1	341,2	269,5	279,2	374,1	0,19	80,36	79,98	82,24	0,18	80,70	80,77	82,01
111,0	344,0	12,0	0,4	7,8	448,6	75,3	103,3	534,0	341,7	269,5	278,9	373,8	0,19	80,32	79,96	82,25	0,18	80,69	80,80	82,01
112,0	345,0	12,0	0,4	7,8	449,1	75,1	102,1	533,4	342,5	269,4	278,4	373,7	0,19	80,30	79,99	82,25	0,18	80,67	80,82	82,04
113,0	346,0	11,9	0,3	7,8	448,3	75,3	102,9	532,6	343,5	269,1	278,3	373,6	0,19	80,26	79,99	82,25	0,18	80,67	80,82	82,03
114,0	347,0	11,8	0,3	7,8	447,8	75,3	103,1	532,5	344,2	268,9	278,4	373,3	0,19	80,23	79,98	82,26	0,18	80,68	80,82	82,01
115,0	348,0	11,7	0,3	7,8	448,3	75,3	102,4	531,9	345,1	269,2	277,7	373,2	0,19	80,20	80,00	82,27	0,18	80,68	80,85	82,01
116,0	349,0	11,6	0,3	7,9	448,1	75,0	102,9	532,5	346,1	269,3	277,2	373,4	0,19	80,21	80,01	82,27	0,18	80,68	80,86	82,01
117,0	350,0	11,5	0,3	7,9	448,4	75,2	103,1	531,7	346,7	269,1	276,4	373,0	0,19	80,24	80,01	82,31	0,18	80,67	80,88	82,00
118,0	351,0	11,4	0,3	7,9	448,6	75,4	103,6	531,7	347,2	268,8	276,0	372,6	0,19	80,21	80,01	82,30	0,18	80,64	80,87	82,00
119,0	352,0	11,3	0,3	8,0	449,0	75,4	103,4	532,5	348,1	268,5	275,9	372,2	0,19	80,14	79,98	82,31	0,18	80,57	80,87	82,02
120,0	353,0	11,2	0,3	8,1	449,3	75,3	103,9	532,1	349,0	268,5	275,4	372,1	0,19	80,11	79,94	82,33	0,18	80,52	80,87	81,96
121,0	354,0	11,1	0,3	8,1	448,9	75,3	103,8	531,7	349,9	268,1	275,2	371,6	0,19	80,04	79,94	82,32	0,18	80,44	80,86	81,97
122,0	355,0	11,0	0,3	8,1	451,8	75,4	103,7	532,4	350,9	268,1	274,7	371,4	0,19	79,98	79,93	82,32	0,18	80,38	80,88	81,95
123,0	356,0	10,9	0,4	8,2	454,5	74,9	103,5	534,2	352,1	268,8	274,3	371,4	0,19	79,93	79,91	82,33	0,18	80,37	80,85	81,91
124,0	357,0	10,9	0,4	7,9	452,1	74,7	103,7	534,7	353,0	268,5	273,7	371,3	0,19	79,92	79,94	82,32	0,18	80,39	80,88	81,93
125,0	358,0	10,8	0,4	7,7	445,8	74,9	103,4	533,6	353,7	268,2	273,4	371,2	0,19	79,84	79,92	82,33	0,18	80,35	80,83	81,91
126,0	359,0	10,7	0,4	7,3	439,4	74,8	101,8	529,8	354,2	268,7	272,9	370,8	0,19	79,78	79,89	82,31	0,18	80,27	80,84	81,91
127,0	360,0	10,7	0,5	6,9	434,9	74,9	101,2	525,6	355,0	268,2	272,9	371,0	0,19	79,61	79,91	82,26	0,18	80,21	80,83	81,89
128,0	361,0	10,6	0,5	6,8	432,3	74,9	100,5	521,7	355,5	268,0	272,9	370,9	0,19	79,52	79,88	82,23	0,18	80,15	80,81	81,82
129,0	362,0	10,5	0,5	6,8	430,0	74,8	100,2	516,5	355,9	268,1	272,7	370,5	0,19	79,46	79,87	82,21	0,18	80,14	80,79	81,76
130,0	363,0	10,4	0,5	6,7	426,3	74,9	100,8	512,5	356,6	267,2	272,5	370,6	0,19	79,42	79,88	82,18	0,18	80,10	80,80	81,73
131,0	364,0	10,3	0,5	6,7	419,7	74,7	100,6	506,8	356,9	266,7	272,1	370,6	0,19	79,32	79,84	82,18	0,18	80,01	80,80	81,71
132,0	365,0	10,3	0,6	6,3	416,5	74,5	100,5	502,8	357,0	265,2	271,8	370,4	0,19	79,24	79,83	82,15	0,18	79,99	80,78	81,66
133,0	366,0	10,2	0,6	6,3	413,2	74,3	100,7	498,3	357,1	264,4	271,8	370,3	0,19	79,17	79,79	82,09	0,18	79,95	80,74	81,59
134,0	367,0	10,2	0,6	6,2	411,5	74,5	100,0	494,1	357,2	263,5	271,5	370,1	0,19	79,08	79,77	82,02	0,18	79,92	80,73	81,54
135,0	368,0	10,1	0,6	6,3	411,3	73,8	99,4	490,3	357,4	262,7	271,2	370,0	0,19	79,03	79,74	81,98	0,18	79,84	80,69	81,51
136,0	369,0	10,0	0,6	6,4	410,6	74,3	99,9	487,7	357,6	261,7	270,7	369,7	0,19	78,98	79,70	81,93	0,18	79,76	80,69	81,48
137,0	370,0	10,0	0,6	6,5	407,7	74,3	100,3	485,0	357,8	260,6	270,6	369,4	0,19	78,94	79,65	81,86	0,18	79,63	80,64	81,40
138,0	371,0	9,8	0,6	6,4	407,1	74,1	99,2	481,7	357,8	260,2	270,4	369,3	0,19	78,88	79,64	81,87	0,18	79,55	80,62	81,36
139,0	372,0	9,8	0,6	6,3	403,2	74,0	99,1	478,3	358,2	259,6	270,1	369,0	0,19	78,82	79,60	81,82	0,18	79,47	80,59	81,31
140,0	373,0	9,7	0,5	6,3	399,2	74,1	97,9	474,7	358,9	259,0	269,6	369,0	0,19	78,78	79,59	81,76	0,18	79,45	80,57	81,22
141,0	374,0	9,6	0,5	6,1	395,2	74,3	97,8	470,8	359,6	258,6	269,4	368,7	0,19	78,67	79,57	81,72	0,18	79,39	80,55	81,17
142,0	375,0	9,5	0,6	5,9	392,9	74,1	97,4	467,1	360,4	257,9	269,1	368,5	0,19	78,60	79,51	81,60	0,18	79,34	80,53	81,13
143,0	376,0	9,5	0,6	5,9	389,6	74,0	97,2	463,7	361,1	256,9	268,9	368,1	0,19	78,61	79,51	81,56	0,18	79,31	80,50	81,07
144,0	377,0	9,4	0,6	5,8	388,5	74,1	96,4	460,9	361,3	256,5	268,2	368,2	0,19	78,59	79,49	81,47	0,18	79,31	80,49	81,02
145,0	378,0	9,4	0,6	5,9	387,0	73,9	96,0	457,5	361,4	255,5	267,6	368,1	0,19	78,58	79,51	81,38	0,18	79,33	80,45	80,94
146,0	379,0	9,3	0,6	5,9	385,5	74,0	97,4	455,5	361,1	255,0	267,3	367,9	0,19	78,65	79,51	81,32	0,18	79,41	80,46	80,92
147,0	380,0	9,2	0,5	5,9	382,2	74,3	99,4	452,7	360,6	254,1	266,7	367,3	0,19	78,88	79,58	81,28	0,18	79,52	80,49	80,91
148,0	381,0	9,2	0,6	5,8	377,3	74,6	99,1	449,3	359,9	253,5	265,9	367,1	0,19	79,14	79,64	81,25	0,18	79,68	80,55	80,87
149,0	382,0	9,1	0,7	5,6	373,0	74,8	100,6	445,3	358,7	252,6	265,3	366,7	0,19	79,43	79,74	81,31	0,18	79,89	80,64	80,91
150,0	383,0	9,1	0,7	5,6	369,5	75,0	100,6	441,9	357,3	252,7	264,5	366,6	0,19	79,72	79,84	81,29	0,18	80,11	80,71	80,90
151,0	384,0	9,0	0,7	5,5	365,6	75,1	100,0	438,2	355,8	251,7	263,8	366,6	0,19	79,94	79,95	81,29	0,18	80,29	80,79	80,90
152,0	385,0	9,0	0,7	5,4	362,4	75,0	98,9	434,5	354,7	251,4	263,0	366,2	0,19	80,09	80,05	81,27	0,18	80,47	80,87	80,93
153,0	386,0	8,9	0,7	5,2	353,4	75,1	98,2	428,5	353,0	250,7	261,9	366,1	0,19	80,17	80,12	81,31	0,18	80,57	80,96	80,95
154,0	387,0	8,9	0,2	4,5	346,7	75,3	97,8	423,6	350,7	250,2	261,5	365,9	0,19	80,18	80,15	81,34	0,18	80,61	80,98	80,95
155,0	388,0	8,8	0,2	22,1	342,5	75,0	97,5	417,7	347,9	249,4	260,6	365,9	0,19	80,15	80,21	81,34	0,18	80,66	81,03	80,92
156,0	389,0	8,7	0,2	21,9	339,7	74,9	96,1	412,6	345,0	248,8	259,6	365,8	0,19	80,09	80,23	81,34	0,18	80,65	81,05	80,96
157,0	390,0	8,7	0,2	22,0	336,3	75,1	96,4	407,0	342,2	248,2	258,4	365,7	0,19	80,01	80,25	81,37	0,18	80,66	81,08	80,96
158,0	391,0	8,7	0,2	22,0	333,0	75,1	96,6	402,8	339,6	247,2	257,8	365,6	0,19	79,92	80,25	81,36	0,18	80,63	81,10	80,89
159,0	392,0	8,6	0,2	21,9	330,4	75,1	96,0	398,5	336,8	246,5	256,8	365,4	0,19	79,84	80,27	81,35	0,18	80,60	81,10	80,91
160,0	393,0	8,5	0,2	22,0	329,0	75,1	95,8	394,9	334,3	245,0	255,9	365,3	0,19	79,74	80,23	81,34	0,18	80,55	81,09	80,90
161,0	394,0	8,5	0,2	22,3	328,1	75,1	95,8	391,4	331,8	243,6	255,2	365,1	0,19	79,64	80,24	81,31	0,18	80,48	81,10	80,88
162,0	395,0	8,4	0,2	23,2	326,9	74,8	96,0	388,8	329,7	242,5	254,4	365,0	0,19	79,61	80,22	81,34	0,18	80,47	81,09	80,87
163,0	396,0	8,4	0,9	23,2	325,9	74,7	94,6	385,6	327,7	241,6	253,2	364,8	0,19	79,54	80,23	81,32	0,18	80,43	81,12	80,85
164,0	397,0	8,3	0,9	23,1	325,5	74,8	95,0	383,6	325,8	240,4	252,3	364,8	0,19	79,49	80,21	81,30	0,18	80,39	81,10	80,81
165,0	398,0	8,3	0,9	23,2	322,6	74,8	94,9	380,9	324,4	239,0	251,4	365,3	0,19	79,44	80,20	81,30	0,18	80,32	81,08	80,78
166,0	399,0	8,2	0,9	23,0	320,7	74,6	94,8	378,3	322,9	237,7	250,9	365,3	0,19	79,38	80,20	81,27	0,18	80,28	81,10	80,75
167,0	400,0	8,2	0,9	22,9	319,5	74,6	94,7	376,1	321,3	236,5	249,9	365,6	0,19	79,31	80,18	81,26	0,18	80,22	81,10	80,70

168,0	401,0	8,1	0,9	22,5	319,1	74,1	94,1	373,4	319,6	235,2	249,1	365,4	0,19	79,24	80,14	81,21	0,18	80,13	81,07	80,62
169,0	402,0	8,1	0,8	23,0	316,6	74,1	93,9	371,4	318,1	234,3	248,1	365,6	0,19	79,17	80,16	81,19	0,18	80,09	81,05	80,60
170,0	403,0	8,0	0,9	22,1	315,5	74,4	93,6	368,8	316,7	233,5	246,6	365,8	0,19	79,14	80,15	82,10	0,18	80,07	81,06	80,54
171,0	404,0	8,0	0,9	22,5	314,7	74,5	94,6	366,8	315,6	232,4	246,1	366,0	0,19	79,10	80,13	85,23	0,18	80,04	81,04	83,16
172,0	405,0	8,0	0,8	23,1	313,6	74,7	93,8	364,8	314,3	231,5	245,1	366,2	0,19	79,26	80,19	85,21	0,18	80,14	81,08	87,95
173,0	406,0	7,9	0,8	22,9	311,2	75,3	95,7	363,7	313,1	230,6	244,1	366,9	0,19	79,50	80,23	85,02	0,18	80,26	81,08	88,73
174,0	407,0	7,8	0,8	22,7	310,6	75,1	96,6	361,8	311,8	229,6	243,1	367,4	0,19	79,81	80,32	84,82	0,18	80,46	81,14	88,55
175,0	408,0	7,8	0,8	23,0	310,2	75,6	97,8	360,2	310,7	228,6	242,1	367,9	0,19	80,12	80,43	84,68	0,18	80,70	81,24	88,19
176,0	409,0	7,7	0,8	23,5	310,0	75,9	98,5	358,9	309,5	227,0	241,2	368,5	0,19	80,40	80,55	84,57	0,18	80,91	81,33	87,81
177,0	410,0	7,7	0,8	23,8	309,1	76,2	99,2	357,6	308,5	226,5	240,0	368,9	0,19	80,70	80,66	84,43	0,18	81,17	81,44	87,43
178,0	411,0	7,6	0,8	23,9	309,2	76,3	100,3	356,4	307,7	225,6	239,2	369,7	0,19	80,99	80,81	84,32	0,18	81,43	81,56	87,09
179,0	412,0	7,6	0,8	24,2	308,4	76,8	100,6	356,0	306,7	224,5	238,6	370,1	0,19	81,32	80,98	84,23	0,18	81,70	81,69	86,82
180,0	413,0	7,5	0,8	24,1	308,1	77,1	100,9	355,1	305,9	223,4	237,9	370,5	0,19	81,60	81,11	84,16	0,18	81,95	81,82	86,56
181,0	414,0	7,5	0,7	24,4	307,9	77,1	101,2	354,0	305,2	222,3	237,0	371,1	0,19	81,86	81,28	84,08	0,18	82,19	81,95	86,35
182,0	415,0	7,4	0,7	24,9	307,5	77,1	101,8	353,7	304,8	221,5	236,5	371,7	0,19	82,12	81,44	84,05	0,18	82,46	82,08	86,13
183,0	416,0	7,4	0,7	24,9	307,1	77,2	102,5	352,6	304,3	221,0	235,9	372,6	0,19	82,35	81,61	83,99	0,18	82,72	82,21	85,90
184,0	417,0	7,3	0,7	5,0	307,1	77,5	102,9	352,4	304,4	220,2	235,1	372,8	0,19	82,59	81,78	83,94	0,18	82,93	82,37	85,74
185,0	418,0	7,3	0,7	5,1	307,0	77,5	103,0	351,6	304,6	219,4	234,7	373,6	0,19	82,76	81,93	83,97	0,18	83,17	82,48	85,60
186,0	419,0	7,2	0,7	5,0	308,0	77,4	103,9	351,3	305,2	218,7	234,1	374,4	0,19	82,93	82,09	83,96	0,18	83,36	82,62	85,50
187,0	420,0	7,2	0,7	5,2	309,1	77,6	103,6	351,4	305,6	217,9	233,8	375,1	0,19	83,11	82,26	83,94	0,18	83,60	82,78	85,39
188,0	421,0	7,1	0,7	5,3	309,3	77,6	104,7	351,6	306,2	217,3	233,3	376,0	0,19	83,28	82,42	83,96	0,18	83,79	82,91	85,26
189,0	422,0	7,1	0,7	5,2	308,8	77,7	104,5	351,7	307,1	216,4	233,0	376,5	0,19	83,46	82,60	83,96	0,18	84,01	83,07	85,22
190,0	423,0	7,0	0,7	5,2	309,1	77,8	102,5	351,7	308,1	215,4	232,8	377,1	0,19	83,62	82,70	84,00	0,18	84,16	83,18	85,13
191,0	424,0	7,0	0,7	5,2	309,0	77,7	101,0	351,1	309,1	214,8	232,6	377,8	0,19	83,69	82,81	84,02	0,18	84,29	83,30	85,04
192,0	425,0	6,9	0,7	5,2	308,6	77,6	100,2	352,1	310,3	213,8	232,5	378,8	0,19	83,61	82,90	84,05	0,18	84,31	83,38	84,98
193,0	426,0	6,9	0,7	5,2	308,3	77,6	99,2	352,3	311,4	213,5	232,4	379,4	0,19	83,46	82,93	84,04	0,18	84,26	83,43	84,88
194,0	427,0	6,8	0,8	5,2	307,7	77,6	98,3	351,8	312,5	212,3	232,3	380,0	0,19	83,26	82,93	84,06	0,18	84,15	83,45	84,83
195,0	428,0	6,8	0,8	5,1	307,4	77,7	98,1	351,3	313,5	211,8	232,2	380,8	0,19	83,06	82,93	84,07	0,18	84,06	83,48	84,77
196,0	429,0	6,7	0,8	5,1	305,6	77,8	97,6	350,7	314,3	210,9	232,2	381,4	0,19	82,88	82,91	84,06	0,18	83,93	83,46	84,68
197,0	430,0	6,6	0,8	5,0	306,3	77,7	97,1	350,1	315,2	210,5	232,0	382,4	0,19	82,72	82,91	84,05	0,18	83,82	83,46	84,59
198,0	431,0	6,6	0,8	5,0	303,6	77,5	96,6	349,7	316,0	209,8	231,9	383,2	0,19	82,53	82,87	84,06	0,18	83,69	83,46	84,54
199,0	432,0	6,5	0,9	4,7	304,4	77,5	96,5	349,4	316,4	209,4	231,7	383,8	0,19	82,39	82,84	84,07	0,18	83,59	83,46	84,48
200,0	433,0	6,5	0,8	5,0	303,1	77,6	96,1	349,5	317,2	209,1	231,5	384,6	0,19	82,32	82,82	84,03	0,18	83,50	83,41	84,40
201,0	434,0	6,5	0,8	5,1	304,2	77,7	96,9	349,3	318,1	208,8	231,6	385,4	0,19	82,36	82,82	84,02	0,18	83,49	83,43	84,34
202,0	435,0	6,4	0,8	5,2	307,3	77,8	98,3	349,6	318,7	208,3	231,3	386,4	0,19	82,43	82,85	84,06	0,18	83,50	83,45	84,29
203,0	436,0	6,3	0,7	5,5	310,3	78,1	99,3	350,2	320,1	208,0	231,0	387,0	0,19	82,62	82,93	84,04	0,18	83,64	83,50	84,25
204,0	437,0	6,3	0,7	5,6	311,8	78,2	100,5	351,6	322,0	207,2	231,2	387,6	0,19	82,85	83,01	84,04	0,18	83,77	83,57	84,22
205,0	438,0	6,2	0,7	5,6	311,6	78,3	101,7	352,6	323,5	206,9	231,0	388,5	0,19	83,07	83,13	84,08	0,18	83,95	83,66	84,20
206,0	439,0	6,2	0,7	5,5	312,8	78,2	102,5	353,9	325,0	206,6	231,0	388,9	0,19	83,31	83,24	84,09	0,18	84,12	83,76	84,19
207,0	440,0	6,2	0,7	5,5	312,8	78,4	102,9	354,7	326,4	206,4	230,7	389,8	0,19	83,53	83,35	84,14	0,18	84,29	83,86	84,17
208,0	441,0	6,1	0,7	5,5	312,7	78,5	103,4	355,6	327,8	205,8	230,8	390,2	0,19	83,78	83,50	84,20	0,18	84,50	84,00	84,22
209,0	442,0	6,0	0,7	5,5	313,7	78,2	102,2	356,6	329,0	205,3	230,7	391,1	0,19	83,96	83,60	84,23	0,18	84,66	84,09	84,21
210,0	443,0	6,0	0,6	5,5	313,7	78,2	101,1	357,4	330,2	205,0	230,6	391,9	0,19	84,09	83,69	84,28	0,18	84,80	84,18	84,19
211,0	444,0	5,9	0,7	5,5	314,0	78,1	100,5	358,0	331,6	204,6	230,7	392,5	0,19	84,06	83,76	84,31	0,18	84,83	84,26	84,23
212,0	445,0	5,9	0,7	5,5	315,1	78,6	99,5	357,6	332,8	204,9	230,5	393,4	0,19	83,95	83,78	84,32	0,18	84,78	84,29	84,21
213,0	446,0	5,8	0,6	5,5	315,9	78,5	99,2	358,7	334,1	204,2	230,8	394,0	0,19	83,78	83,78	84,36	0,18	84,68	84,30	84,20
214,0	447,0	5,8	0,6	5,5	316,4	77,9	99,0	358,8	335,5	203,9	230,7	394,6	0,19	83,60	83,77	84,38	0,18	84,57	84,31	84,16
215,0	448,0	5,7	0,6	5,6	317,3	77,9	98,3	359,0	337,2	204,1	230,8	395,3	0,19	83,51	83,78	84,39	0,18	84,50	84,32	84,17
216,0	449,0	5,7	0,6	5,6	318,6	77,9	98,6	360,2	338,9	203,5	230,9	396,0	0,19	83,36	83,75	84,41	0,18	84,41	84,32	84,15
217,0	450,0	5,6	0,6	5,7	319,9	77,7	98,2	360,9	340,5	203,5	231,1	396,5	0,19	83,19	83,72	84,40	0,18	84,29	84,31	84,14
218,0	451,0	5,6	0,6	5,7	322,1	77,9	97,9	361,4	341,8	203,4	231,5	396,9	0,19	83,08	83,70	84,43	0,18	84,19	84,30	84,09
219,0	452,0	5,5	0,6	5,8	325,1	77,9	97,1	363,1	343,0	203,5	231,5	397,5	0,19	83,00	83,67	84,41	0,18	84,11	84,30	84,08
220,0	453,0	5,5	0,5	5,8	327,5	78,0	97,2	365,4	344,3	203,8	231,6	398,2	0,19	82,92	83,65	84,41	0,18	84,05	84,31	84,04
221,0	454,0	5,4	0,5	6,0	330,4	77,8	97,5	367,2	345,3	203,8	231,8	398,6	0,19	82,83	83,64	84,41	0,18	83,97	84,30	84,01
222,0	455,0	5,3	0,5	6,0	332,2	77,8	98,1	369,3	346,4	204,0	231,9	399,4	0,19	82,76	83,62	84,41	0,18	83,90	84,29	84,02
223,0	456,0	5,3	0,4	6,1	334,1	78,0	97,4	370,7	347,5	204,1	232,3	399,8	0,19	82,67	83,59	84,38	0,18	83,83	84,26	83,97
224,0	457,0	5,3	0,4	6,0	334,7	78,1	96,7	373,0	348,8	204,4	232,5	400,2	0,19	82,61	83,60	84,37	0,18	83,77	84,27	83,94
225,0	458,0	5,3	0,4	5,9	332,7	77,9	96,9	374,8	350,2	204,9	232,5	400,8	0,19	82,55	83,58	84,36	0,18	83,73	84,28	83,93
226,0	459,0	5,2	0,5	5,6	331,5	78,2	98,2	375,9	351,4	204,9	233,2	401,2	0,19	82,67	83,61	84,35	0,18	83,79	84,28	83,91
227,0	460,0	5,2	0,5	5,2	328,4	78,4	99,5	376,1	352,3	205,3	233,3	401,9	0,19	82,87	83,64	84,39	0,18	83,89	84,33	83,93
228,0	461,0	5,1	0,6	4,9	324,9	78,6	100,1	375,9	352,6	205,4	233,5	402,4	0,19	83,12	83,75	84,38	0,18	84,07	84,38	83,95
229,0	462,0	5,0	0,6	4,8	321,5	78,7	101,5	374,8	352,4	205,8	234,0	402,7	0,19	83,42	83,85	84,43	0,18	84,27	84,47	83,99
230,0	463,0	5,1	0,7	4,7	318,7	78,9	102,0	373,6	352,0	205,8	234,2	403,2	0,19	83,69	83,94	84,48	0,18	84,47	84,58	84,02
231,0	464,0	5,1	0,7	4,6	316,0	78,7	103,1	372,8	351,8	205,9	234,6	403,6	0,19	83,94	84,08	84,54	0,18	84,67	84,67	84,08
232,0	465,0	5,0	0,7	4,6	313,6	78,7	102,8	370,3	351,1	206,1	234,8	404,2	0,19	84,20	84,20	84,57	0,18	84,88	84,80	84,12
233,0	466,0	4,9	0,7	4,5	308,6	79,0	101,4	368,0	350,1	206,2	235,0	404,7	0,19	84,37	84,33	84,63	0,18	85,05	84,89	84,16
234,0	467,0	4,9	0,2	20,2	305,9	78,9	100,5	364,8	348,5	206,3	235,2	405,2	0,19	84,41	84,37	84,65	0,18	85,13	84,98	84,15
235,0	468,0	4,9	0,2	20,0	303,2	78,9	99,5	361,6	346,4	206,3	235,5	405,3	0,19	84,36	84,46	84,69	0,18	85,16	85,03	84,17
236,0	469,0	4,9	0,2	19,9	301,1	79,0	99,2	358,6	344,1	206,4	235,7	405,6	0,19	84,29	84,47	84,76	0,18	85,13	85,06	84,22
237,0	470,0	4,8	0,2	19,6	298,8	79,0	98,7	356,0	341,4	206,6	235,7	405,7	0,19	84,13	84,47	84,78	0,18	85,06	85,09	84,21
238,0	471,0	4,8	0,2	19,6	296,7	79,0	98,1	352,5	339,0	206,0	235,8	405,7	0,19	83,95	84,48	84,80	0,18	84,98	85,08	84,23
239,0	472,0	4,8	0,2	19,5	294,9	78,9	97,7	349,7	336,4	206,0	235,9	405,6	0,19	83,82	84,44	84,81	0,18	84,89	85,08	84,22
240,0	473,0	4,7	0,2	19,5	293,1	79,1	97,2	346,8	334,1	205,7	235,8	405,7	0,19	83,73	84,44	84,82	0,18	84,83	85,08	84,26
241,0	474,0	4,7	0,2	19,5	291,2	78,6	96,9	344,6	331,7	205,6	235,7	405,8	0,19	83,65	84,43	84,82	0,18	84,76	85,09	84,22
242,0	475,0	4,7	0,2	19,5	289,3	79,0	97,0	342,0	329,7	205,0	235,7	405,8	0,19	83,60	84,43	84,84	0,18	84,70	85,08	84,23
243,0	476,0	4,7	0,2	19,6	288,2	78,6	96,7	339,5	327,7	204,9	235,6	405,7	0,19	83,47	84,41	84,84	0,18	84,63	85,06	84,22
244,0	477,0	4,7	0,2	19,6	286,7	78,5	96,3	337,6	325,6	204,7	235,6	405,4	0,19	83,41	84,39	84,83	0,18	84,55	85,06	84,19
245,0	478,0	4,6	0,2	19,5	285,4	78,4	95,7	334,8	323,9	204,5	235,2	405,4	0,19	83,36	84,37	84,84	0,18	84,50	85,05	84,21
246,0	479,0	4,6	0,2	19,4	284,3	78,2	96,0	333,9	322,4	204,2	235,0	405,3	0,19	83,28	84,36	84,80	0,18	84,43	85,04	84,17
247,0	480,0	4,6	0,2	19,4	282,9	78,7	95,6	330,9	320,7	203,9	234,3	405,4	0,19	83,18	84,33	84,76	0,18	84,36	85,02	84,12
248,0	481,0	4,6	0,2	19,5	281,8	78,6	95,2	328,7	319,4	203,2	234,3	405,3	0,19	83,11	84,30	84,75	0,18	84,28	85,02	84,10
249,0	482,0	4,5	0,2	19,4	280,8	78,5	95,5	327,0	318,3	202,6	233,9	405,2	0,19	83,06	84,29	84,74	0,18	84,24	85,01	84,08
250,0	483,0	4,5	0,2	19,4	279,5	78,7	95,2	325,5	317,2	202,2	233,6	404,8	0,19	83,00	84,26	84,74	0,18	84,16	84,98	84,05
251,0	484,0	4,5	0,2	19,5	278,6	78,4	95,0	323,4	316,0	201,9	233,4	404,9	0,19	82,96	84,24	84,69	0,18	84,11	84,98	84,06
252,0	485,0	4,5	0,2	19,5	277,6	78,1	94,9	321,8	315,0	201,6	232,9	404,9	0,19	82,92	84,25	84,68	0,18	84,06	84,97	83,99
253,0	486,0	4,5	0,2	19,6	276,6	78,4	94,8	320,8	313,9	201,2	232,4	405,1	0,19	82,85	84,21	84,67	0,18	84,03	84,97	84,00

254,0	487,0	4,5	0,2	19,7	276,0	78,3	94,5	318,6	313,0	200,8	231,7	405,2	0,19	82,77	84,16	84,64	0,18	83,96	84,93	83,94
255,0	488,0	4,4	0,2	19,8	275,4	77,9	94,4	317,9	312,3	200,2	231,2	405,5	0,19	82,71	84,13	84,61	0,18	83,88	84,92	83,91
256,0	489,0	4,4	0,2	19,9	274,9	78,2	94,0	315,8	311,4	200,0	230,7	405,4	0,19	82,69	84,10	84,54	0,18	83,84	84,90	83,87
257,0	490,0	4,4	0,2	19,9	273,7	78,3	93,8	315,0	310,8	199,2	230,3	405,3	0,19	82,64	84,07	84,47	0,18	83,77	84,86	83,82
258,0	491,0	4,4	0,2	19,9	272,8	78,3	94,1	313,3	310,3	199,0	230,2	405,7	0,19	82,63	84,05	84,45	0,18	83,73	84,84	83,78
259,0	492,0	4,4	0,2	19,9	272,2	78,5	95,0	312,8	309,8	198,7	229,7	405,7	0,19	82,78	84,08	84,43	0,18	83,81	84,85	83,75
260,0	493,0	4,4	0,2	20,0	270,9	78,8	96,6	312,1	309,5	198,2	229,2	406,0	0,19	82,97	84,13	84,46	0,18	83,93	84,87	83,76
261,0	494,0	4,3	0,2	20,2	270,1	79,0	97,9	310,9	309,5	197,7	228,7	406,3	0,19	83,22	84,20	84,44	0,18	84,11	84,91	83,75
262,0	495,0	4,3	0,2	20,3	269,4	78,7	99,0	310,4	309,4	197,5	228,3	406,3	0,19	83,45	84,27	84,41	0,18	84,29	84,99	83,77
263,0	496,0	4,3	0,2	20,4	268,7	79,2	100,0	309,1	309,3	197,2	228,0	406,6	0,19	83,68	84,38	84,44	0,18	84,48	85,05	83,80
264,0	497,0	4,2	0,2	20,4	268,1	79,3	98,6	308,2	309,2	196,7	227,4	407,1	0,19	83,89	84,49	84,45	0,18	84,65	85,16	83,81
265,0	498,0	4,3	0,2	20,4	268,0	79,1	97,4	307,6	309,1	196,4	227,0	407,1	0,19	84,04	84,54	84,47	0,18	84,78	85,22	83,83
266,0	499,0	4,2	0,2	20,4	267,6	78,8	97,2	306,9	309,1	195,9	226,7	407,5	0,19	84,01	84,57	84,47	0,18	84,78	85,26	83,86
267,0	500,0	4,2	0,9	20,5	267,0	79,1	96,3	305,9	309,0	195,8	226,2	407,9	0,19	83,95	84,59	84,48	0,18	84,78	85,28	83,87
268,0	501,0	4,2	0,8	20,5	266,7	79,0	95,7	305,0	309,1	195,1	225,8	408,1	0,19	83,83	84,58	84,45	0,18	84,72	85,26	83,86
269,0	502,0	4,2	0,8	20,4	266,5	78,9	95,0	304,8	309,1	194,9	225,6	408,4	0,19	83,71	84,57	84,45	0,18	84,65	85,26	83,85
270,0	503,0	4,1	0,8	20,4	266,0	79,0	94,8	304,2	309,0	194,6	225,1	409,0	0,19	83,55	84,54	84,44	0,18	84,56	85,26	83,83
271,0	504,0	4,1	0,8	20,4	266,3	78,7	94,2	303,6	309,1	194,1	224,9	409,3	0,19	83,42	84,51	84,44	0,18	84,45	85,22	83,81
272,0	505,0	4,1	0,8	20,7	266,3	78,7	94,3	303,4	309,4	193,6	224,3	409,8	0,19	83,30	84,49	84,46	0,18	84,37	85,20	83,82
273,0	506,0	4,0	0,8	20,8	266,7	78,8	93,9	302,9	309,6	193,2	224,0	410,2	0,19	83,14	84,44	84,41	0,18	84,28	85,16	83,81
274,0	507,0	4,0	0,9	21,1	266,9	78,5	93,7	302,7	309,9	192,9	223,5	410,5	0,19	83,04	84,40	84,39	0,18	84,19	85,13	83,75
275,0	508,0	4,0	0,9	21,1	267,0	78,8	93,1	302,8	310,0	192,6	223,3	410,9	0,19	82,94	84,39	84,34	0,18	84,13	85,11	83,74
276,0	509,0	4,0	0,9	21,1	267,0	78,8	93,5	301,9	310,1	192,4	222,9	411,6	0,19	82,89	84,34	84,31	0,18	84,06	85,08	83,71
277,0	510,0	4,0	0,9	21,1	266,4	78,4	93,6	302,4	310,3	191,9	222,7	411,9	0,19	82,82	84,32	84,29	0,18	83,99	85,06	83,68
278,0	511,0	4,0	0,9	21,1	266,1	78,6	93,8	302,1	310,4	191,7	222,4	412,2	0,19	82,77	84,31	84,28	0,18	83,93	85,05	83,66
279,0	512,0	4,0	0,9	21,2	266,2	78,8	93,0	301,9	310,5	191,7	222,0	412,6	0,19	82,72	84,26	84,22	0,18	83,84	85,03	83,63
280,0	513,0	4,0	0,9	21,1	266,1	78,6	93,0	301,4	310,6	190,9	221,9	413,1	0,19	82,67	84,24	84,16	0,18	83,81	85,00	83,58
281,0	514,0	3,9	0,9	21,2	265,8	78,5	93,3	301,6	310,7	190,5	221,5	413,4	0,19	82,61	84,20	84,12	0,18	83,74	84,97	83,56
282,0	515,0	3,9	0,9	21,3	265,5	78,4	93,1	301,4	310,8	190,7	221,3	413,8	0,19	82,51	84,17	84,11	0,18	83,69	84,94	83,53
283,0	516,0	3,8	0,9	21,3	265,0	78,5	93,3	301,9	310,9	190,5	221,2	414,5	0,19	82,48	84,14	84,08	0,18	83,65	84,91	83,51
284,0	517,0	3,9	0,9	21,1	265,1	78,1	93,3	301,4	310,9	190,4	220,7	415,0	0,19	82,41	84,11	84,03	0,18	83,61	84,87	83,46
285,0	518,0	3,9	0,9	21,2	264,7	78,1	93,6	301,4	311,0	190,3	220,5	415,3	0,19	82,36	84,10	84,00	0,18	83,57	84,84	83,42
286,0	519,0	3,9	0,9	21,3	264,4	78,2	93,0	300,9	311,1	190,0	220,1	415,8	0,19	82,30	84,06	83,94	0,18	83,46	84,82	83,38
287,0	520,0	3,9	0,9	21,3	264,4	78,1	92,7	300,6	311,2	189,8	219,8	416,1	0,19	82,20	84,02	83,88	0,18	83,36	84,77	83,34
288,0	521,0	3,8	0,9	21,3	264,2	77,9	92,9	300,1	311,5	189,4	219,6	416,7	0,19	82,12	83,95	83,87	0,18	83,28	84,73	83,27
289,0	522,0	3,8	0,9	21,4	263,9	78,3	92,8	299,4	311,9	189,5	219,3	417,5	0,19	82,16	83,94	83,82	0,18	83,24	84,71	83,24
290,0	523,0	3,8	0,9	21,5	263,9	78,5	94,0	300,2	312,2	189,3	219,2	418,1	0,19	82,25	83,92	83,77	0,18	83,28	84,66	83,20
291,0	524,0	3,7	0,9	21,7	263,4	78,5	95,3	299,4	312,2	189,4	218,8	418,7	0,19	82,41	83,95	83,78	0,18	83,37	84,67	83,19
292,0	525,0	3,7	0,9	21,8	262,6	78,7	96,6	299,4	312,8	188,7	218,8	419,4	0,19	82,61	83,98	83,77	0,18	83,49	84,70	83,19
293,0	526,0	3,7	0,9	21,7	262,3	78,8	97,6	299,1	313,0	188,7	218,4	419,7	0,19	82,84	84,05	83,75	0,18	83,66	84,72	83,17
294,0	527,0	3,6	0,9	21,7	261,5	78,8	98,5	298,7	313,3	188,7	218,4	420,1	0,19	83,06	84,13	83,76	0,18	83,84	84,80	83,17
295,0	528,0	3,6	0,9	21,7	261,2	78,7	98,0	298,7	313,5	188,5	218,3	420,8	0,19	83,23	84,19	83,78	0,18	83,96	84,86	83,20
296,0	529,0	3,6	0,9	21,7	261,8	78,9	96,8	298,4	313,8	188,3	218,1	421,5	0,19	83,35	84,22	83,79	0,18	84,05	84,91	83,20
297,0	530,0	3,6	0,9	21,7	261,6	78,6	96,1	298,5	313,9	187,8	218,1	422,0	0,19	83,36	84,27	83,78	0,18	84,09	84,92	83,24
298,0	531,0	3,6	0,9	21,7	261,8	78,6	95,6	298,1	314,0	187,6	218,0	422,6	0,19	83,32	84,27	83,80	0,18	84,05	84,92	83,22
299,0	532,0	3,6	0,8	21,6	262,0	78,7	94,8	297,8	314,2	187,4	217,8	423,0	0,19	83,20	84,23	83,77	0,18	83,99	84,91	83,22
300,0	533,0	3,5	0,8	21,7	262,2	78,4	94,1	297,5	314,4	187,2	217,8	423,6	0,19	83,06	84,19	83,78	0,18	83,90	84,87	83,18
301,0	534,0	3,5	0,8	21,8	262,2	78,4	94,2	297,1	314,6	186,9	217,7	424,1	0,19	82,91	84,15	83,76	0,18	83,83	84,85	83,18
302,0	535,0	3,5	0,9	21,8	262,5	78,3	93,7	296,7	314,9	186,8	217,7	424,4	0,19	82,78	84,07	83,74	0,18	83,72	84,83	83,12
303,0	536,0	3,5	0,9	21,2	262,1	78,2	93,2	296,8	315,2	186,5	217,6	425,0	0,19	82,62	84,01	83,68	0,18	83,59	84,77	83,11
304,0	537,0	3,4	0,9	21,0	261,9	77,9	93,1	296,7	315,5	186,3	217,5	425,3	0,19	82,49	83,94	83,67	0,18	83,46	84,75	83,08
305,0	538,0	3,4	0,9	20,9	261,9	77,9	92,9	296,4	315,7	186,2	217,5	425,7	0,19	82,34	83,88	83,63	0,18	83,32	84,69	83,05
306,0	539,0	3,4	0,8	21,0	262,1	77,8	92,9	296,4	315,8	186,0	217,5	426,4	0,19	82,23	83,83	83,62	0,18	83,19	84,61	83,02
307,0	540,0	3,4	0,9	21,0	262,1	77,8	92,7	296,2	316,0	185,8	217,3	426,9	0,19	82,11	83,77	83,58	0,18	83,08	84,58	83,01
308,0	541,0	3,4	0,8	21,0	261,9	77,5	92,8	296,1	316,2	185,8	217,2	427,6	0,19	82,02	83,71	83,50	0,18	82,96	84,52	82,96
309,0	542,0	3,4	0,8	21,1	261,6	77,6	92,9	295,9	316,2	185,7	217,0	428,4	0,19	81,96	83,65	83,49	0,18	82,86	84,49	82,92
310,0	543,0	3,4	0,8	21,1	262,0	77,7	92,7	295,9	316,4	185,4	216,8	428,8	0,19	81,90	83,61	83,46	0,18	82,79	84,46	82,90
311,0	544,0	3,3	0,8	21,2	261,6	77,6	92,8	295,7	316,8	185,4	216,7	429,4	0,19	81,84	83,57	83,43	0,18	82,75	84,41	82,86
312,0	545,0	3,3	0,8	21,2	261,2	77,6	92,9	295,7	317,0	185,2	216,5	429,9	0,19	81,82	83,50	83,38	0,18	82,71	84,38	82,85
313,0	546,0	3,3	0,8	21,3	261,2	77,5	92,9	295,8	317,3	184,9	216,5	430,6	0,19	81,79	83,47	83,33	0,18	82,68	84,33	82,82
314,0	547,0	3,3	0,9	21,5	261,5	77,5	92,5	295,4	317,7	184,8	216,3	431,0	0,19	81,74	83,42	83,30	0,18	82,65	84,30	82,77
315,0	548,0	3,2	0,8	21,6	261,5	77,4	92,5	295,3	318,0	184,7	216,1	431,8	0,19	81,66	83,34	83,28	0,18	82,60	84,25	82,71
316,0	549,0	3,2	0,8	21,6	261,9	77,3	92,5	295,5	318,6	184,6	215,8	432,1	0,19	81,56	83,29	83,23	0,18	82,51	84,22	82,69
317,0	550,0	3,2	0,8	21,7	262,3	77,7	91,8	295,4	319,2	184,9	215,6	432,7	0,19	81,50	83,27	83,16	0,18	82,41	84,17	82,66
318,0	551,0	3,2	0,8	21,7	262,2	77,9	92,3	295,3	319,6	184,8	215,8	433,7	0,19	81,56	83,25	83,14	0,18	82,43	84,14	82,60
319,0	552,0	3,2	0,8	21,8	261,7	78,1	94,1	295,5	320,0	184,9	215,8	434,4	0,19	81,69	83,25	83,09	0,18	82,47	84,13	82,56
320,0	553,0	3,1	0,8	21,9	261,8	78,3	95,6	295,0	320,6	185,1	215,7	435,2	0,19	81,89	83,31	83,08	0,18	82,62	84,15	82,55
321,0	554,0	3,1	0,8	22,2	261,6	78,3	96,5	295,3	321,2	185,0	215,6	435,7	0,19	82,12	83,35	83,06	0,18	82,75	84,17	82,52
322,0	555,0	3,1	0,8	22,4	261,6	78,3	97,6	295,7	321,9	185,0	215,5	436,3	0,19	82,40	83,41	83,07	0,18	82,92	84,21	82,56
323,0	556,0	3,1	0,8	22,5	261,4	78,4	98,1	296,0	322,6	185,1	215,5	437,1	0,19	82,62	83,50	83,12	0,18	83,10	84,26	82,56
324,0	557,0	3,0	0,8	22,5	261,9	78,3	97,3	296,4	323,4	185,0	215,5	437,8	0,19	82,84	83,56	83,11	0,18	83,26	84,32	82,60
325,0	558,0	3,0	0,8	22,5	262,5	78,3	96,3	296,5	323,9	184,9	215,6	438,4	0,19	82,98	83,62	83,11	0,18	83,40	84,36	82,60
326,0	559,0	3,0	0,8	22,3	263,0	78,3	95,7	296,9	324,5	184,9	215,5	439,2	0,19	82,97	83,65	83,12	0,18	83,44	84,39	82,64
327,0	560,0	3,0	0,9	22,4	263,0	78,1	94,9	297,2	325,2	184,9	215,4	439,7	0,19	82,91	83,65	83,11	0,18	83,42	84,38	82,64
328,0	561,0	3,0	0,8	22,4	263,2	77,9	94,5	297,4	325,6	184,8	215,3	440,5	0,19	82,84	83,65	83,13	0,18	83,38	84,38	82,64
329,0	562,0	2,9	0,9	22,4	263,5	77,9	94,3	297,6	326,2	184,9	215,2	441,2	0,19	82,74	83,62	83,14	0,18	83,35	84,36	82,62
330,0	563,0	2,9	0,9	22,4	263,7	77,9	93,9	297,8	326,7	184,8	215,0	441,2	0,19	82,59	83,57	83,13	0,18	83,28	84,32	82,61
331,0	564,0	2,9	0,9	22,4	263,8	77,8	93,7	298,1	327,4	184,7	215,1	440,6	0,19	82,45	83,53	83,09	0,18	83,19	84,30	82,60
332,0	565,0	2,9	0,9	22,4	264,1	77,7	93,3	298,2	327,8	184,6	215,0	441,2	0,19	82,30	83,50	83,08	0,18	83,08	84,26	82,56
333,0	566,0	2,9	0,9	22,4	263,8	77,6	93,4	298,3	328,4	184,5	214,9	441,1	0,19	82,18	83,42	83,05	0,18	82,95	84,22	82,55
334,0	567,0	2,9	0,8	22,4	263,5	77,5	93,2	298,1	328,9	184,4	214,7	441,1	0,19	82,06	83,39	83,01	0,18	82,86	84,18	82,52
335,0	568,0	2,8	0,8	22,4	264,2	77,4	93,0	298,3	329,4	184,3	214,7	441,8	0,19	81,96	83,36	83,00	0,18	82,74	84,16	82,52
336,0	569,0	2,8	0,8	22,1	263,7	77,4	92,8	297,9	329,9	184,3	214,6	442,3	0,19	81,84	83,31	82,97	0,18	82,65	84,10	82,50
337,0	570,0	2,8	0,8	22,1	264,3	77,3	92,4	298,0	330,5	184,3	214,5	442,2	0,19	81,76	83,26	82,95	0,18	82,55	84,05	82,48
338,0	571,0	2,8	0,8	22,1	263,6	77,2	92,6	298,1	331,2	184,3	214,5	443,1	0,19	81,66	83,22	82,90	0,18	82,45	84,02	82,44
339,0	572,0	2,8	0,8	22,1	263,7	77,1	92,5	297,9	331,7	184,4	214,6	443,5	0,19	81,56	83,16	82,86	0,18	82,35	83,99	82,43

340,0	573,0	2,7	0,8	22,0	263,6	77,1	92,4	298,0	332,4	184,4	214,6	443,8	0,19	81,48	83,11	82,82	0,18	82,27	83,91	82,39
341,0	574,0	2,7	0,8	21,9	263,1	77,1	92,2	297,8	332,7	184,3	214,6	444,9	0,19	81,40	83,07	82,77	0,18	82,16	83,90	82,35
342,0	575,0	2,7	0,8	22,0	262,7	77,0	92,1	297,8	333,3	184,3	214,7	445,3	0,19	81,32	83,02	82,76	0,18	82,10	83,84	82,31
343,0	576,0	2,7	0,8	21,8	262,7	77,1	92,0	297,4	333,6	184,4	214,6	445,5	0,19	81,24	82,96	82,70	0,18	81,99	83,78	82,30
344,0	577,0	2,7	0,8	21,8	262,6	77,0	92,1	297,5	333,6	184,4	214,4	446,6	0,19	81,16	82,89	82,65	0,18	81,93	83,76	82,26
345,0	578,0	2,7	0,8	21,8	262,5	77,4	91,5	297,2	334,0	184,7	214,6	448,3	0,19	81,15	82,87	82,62	0,18	81,88	83,69	82,20
346,0	579,0	2,6	0,8	21,7	262,4	77,5	93,0	297,5	334,4	185,2	214,8	449,2	0,19	81,24	82,85	82,58	0,18	81,95	83,67	82,15
347,0	580,0	2,6	0,8	21,8	261,7	77,7	93,9	297,2	334,6	185,4	214,8	450,3	0,19	81,41	82,84	82,57	0,18	82,03	83,66	82,15
348,0	581,0	2,6	0,8	21,8	261,4	78,0	95,4	296,8	334,8	185,6	214,7	451,2	0,19	81,60	82,88	82,54	0,18	82,17	83,69	82,15
349,0	582,0	2,6	0,8	21,6	260,7	77,9	96,5	296,9	335,1	185,6	214,7	451,3	0,19	81,85	82,95	82,55	0,18	82,34	83,70	82,14
350,0	583,0	2,5	0,8	21,7	260,6	78,0	97,9	296,9	335,3	185,8	214,8	451,8	0,19	82,10	83,02	82,58	0,18	82,52	83,77	82,18
351,0	584,0	2,6	0,8	21,8	260,2	78,0	98,2	296,5	335,4	186,1	214,6	452,0	0,19	82,34	83,07	82,59	0,18	82,70	83,82	82,21
352,0	585,0	2,5	0,8	21,8	260,5	77,9	97,0	296,7	335,5	186,0	214,7	453,2	0,19	82,55	83,16	82,62	0,18	82,87	83,87	82,23
353,0	586,0	2,5	0,8	21,9	260,1	78,2	95,9	296,2	335,7	186,2	214,5	453,4	0,19	82,67	83,21	82,62	0,18	82,98	83,91	82,25
354,0	587,0	2,5	0,8	21,9	260,0	77,7	95,2	296,3	335,9	186,0	214,4	454,2	0,19	82,66	83,24	82,65	0,18	83,03	83,94	82,26
355,0	588,0	2,4	0,8	22,0	260,5	77,8	94,5	295,7	336,6	186,3	214,4	454,2	0,19	82,59	83,23	82,65	0,18	83,03	83,94	82,26
356,0	589,0	2,4	0,8	22,0	260,1	77,8	94,1	295,8	336,9	186,2	214,2	453,6	0,19	82,48	83,22	82,63	0,18	82,99	83,93	82,27
357,0	590,0	2,5	0,8	22,0	260,6	77,4	93,7	295,7	337,4	186,2	214,1	454,4	0,19	82,36	83,18	82,65	0,18	82,95	83,92	82,28
358,0	591,0	2,4	0,8	22,0	260,5	77,4	93,2	295,3	338,0	186,0	214,0	454,0	0,19	82,24	83,15	82,64	0,18	82,88	83,89	82,25
359,0	592,0	2,4	0,8	22,0	260,5	77,4	93,2	295,1	338,4	186,1	214,0	453,8	0,19	82,09	83,07	82,62	0,18	82,79	83,87	82,27
360,0	593,0	2,4	0,8	22,2	260,5	77,2	93,1	295,2	338,8	185,9	213,6	453,3	0,19	81,94	83,01	82,58	0,18	82,69	83,82	82,23
361,0	594,0	2,4	0,8	22,1	260,6	77,2	92,9	295,0	339,4	185,9	213,6	453,9	0,19	81,83	82,96	82,59	0,18	82,58	83,79	82,22
362,0	595,0	2,3	0,8	22,2	260,4	77,1	92,6	294,8	339,9	185,9	213,5	453,8	0,19	81,72	82,93	82,55	0,18	82,47	83,73	82,20
363,0	596,0	2,3	0,8	22,2	260,9	77,1	92,5	294,7	340,5	185,9	213,3	454,3	0,19	81,60	82,88	82,53	0,18	82,36	83,69	82,17
364,0	597,0	2,3	0,8	22,2	260,6	77,1	92,4	294,7	341,1	185,9	213,2	454,2	0,19	81,48	82,82	82,51	0,18	82,24	83,65	82,16
365,0	598,0	2,3	0,8	22,2	260,7	77,0	92,2	294,5	341,7	185,8	212,8	455,2	0,19	81,38	82,78	82,48	0,18	82,12	83,60	82,13
366,0	599,0	2,2	0,8	22,2	260,8	76,9	92,1	294,4	342,5	186,0	212,6	455,7	0,19	81,29	82,73	82,45	0,18	82,03	83,55	82,12
367,0	600,0	2,2	0,8	22,3	260,7	76,9	91,9	294,3	343,4	185,8	212,5	456,1	0,19	81,19	82,67	82,42	0,18	81,91	83,50	82,07
368,0	601,0	2,2	0,8	22,2	260,7	76,8	92,1	294,4	344,0	186,0	212,4	456,8	0,19	81,12	82,63	82,40	0,18	81,84	83,45	82,05
369,0	602,0	2,2	0,8	22,4	260,8	76,7	91,8	294,2	344,8	186,1	212,1	457,1	0,19	81,05	82,57	82,36	0,18	81,75	83,41	82,02
370,0	603,0	2,1	0,8	22,3	261,2	77,0	91,5	293,8	345,9	186,2	212,1	457,8	0,19	80,98	82,54	82,31	0,18	81,65	83,35	81,96
371,0	604,0	2,1	0,8	22,2	261,3	77,3	91,3	293,6	346,9	186,5	212,1	459,5	0,19	81,02	82,51	82,28	0,18	81,67	83,34	81,96
372,0	605,0	2,1	0,8	22,2	260,9	77,3	92,9	294,4	347,9	186,7	212,2	460,4	0,19	81,12	82,50	82,23	0,18	81,73	83,29	81,89
373,0	606,0	2,1	0,8	22,3	260,5	77,6	94,4	294,4	348,9	186,9	212,1	461,3	0,19	81,28	82,50	82,24	0,18	81,82	83,26	81,89
374,0	607,0	2,1	0,8	22,4	260,1	77,6	95,3	294,1	349,9	187,2	211,8	461,0	0,19	81,46	82,54	82,23	0,18	81,95	83,27	81,87
375,0	608,0	2,1	0,8	22,4	259,7	77,8	96,3	294,3	350,9	187,4	211,5	460,9	0,19	81,71	82,60	82,23	0,18	82,12	83,33	81,87
376,0	609,0	2,0	0,8	22,5	259,9	77,7	97,7	294,3	352,0	187,6	211,4	460,8	0,19	81,91	82,67	82,24	0,18	82,28	83,38	81,91
377,0	610,0	2,0	0,8	22,5	259,8	77,8	98,4	294,0	353,0	187,8	211,3	461,2	0,19	82,14	82,73	82,28	0,18	82,44	83,43	81,95
378,0	611,0	2,0	0,8	22,6	260,0	77,7	96,9	294,4	353,9	187,8	211,2	462,2	0,19	82,32	82,81	82,28	0,18	82,62	83,50	81,97
379,0	612,0	2,0	0,8	22,6	260,1	77,7	95,8	294,5	354,9	187,9	211,1	462,6	0,19	82,47	82,87	82,29	0,18	82,76	83,55	81,99
380,0	613,0	2,0	0,8	22,5	260,6	77,6	95,0	294,3	355,9	188,2	210,7	463,2	0,19	82,47	82,90	82,29	0,18	82,80	83,57	81,99
381,0	614,0	1,9	0,8	22,4	261,2	77,5	94,3	293,9	356,4	188,4	210,6	463,3	0,19	82,36	82,89	82,31	0,18	82,79	83,59	82,02
382,0	615,0	1,9	0,8	22,5	261,1	77,5	94,1	294,1	357,1	188,5	210,5	462,9	0,19	82,27	82,88	82,34	0,18	82,77	83,57	82,03
383,0	616,0	1,9	0,8	22,2	260,9	77,4	93,7	294,0	357,8	188,7	210,3	462,6	0,19	82,18	82,84	82,32	0,18	82,72	83,56	82,03
384,0	617,0	1,9	0,8	22,2	261,2	77,2	93,4	294,3	358,2	188,6	210,0	462,8	0,19	82,05	82,81	82,33	0,18	82,68	83,56	82,03
385,0	618,0	1,8	0,8	22,1	261,3	77,1	93,2	294,2	358,6	188,5	210,0	463,6	0,19	81,91	82,77	82,32	0,18	82,57	83,52	82,03
386,0	619,0	1,8	0,8	22,1	261,5	77,1	93,0	294,2	358,9	188,5	209,7	463,9	0,19	81,75	82,74	82,32	0,18	82,44	83,47	82,03
387,0	620,0	1,9	0,8	22,2	261,6	77,1	92,8	294,2	359,2	188,6	209,6	464,4	0,19	81,62	82,66	82,32	0,18	82,32	83,45	82,00
388,0	621,0	1,8	0,8	22,2	261,5	77,0	92,6	294,1	359,4	188,5	209,4	464,4	0,19	81,51	82,61	82,30	0,18	82,22	83,41	81,98
389,0	622,0	1,8	0,8	22,2	261,6	77,0	92,4	293,9	359,7	188,7	209,2	464,4	0,19	81,42	82,56	82,27	0,18	82,11	83,36	81,97
390,0	623,0	1,8	0,8	22,0	261,8	76,8	92,3	293,9	360,0	188,6	209,2	464,5	0,19	81,31	82,50	82,27	0,18	81,99	83,32	81,95
391,0	624,0	1,7	0,8	22,0	261,7	76,8	92,2	293,5	360,3	188,8	209,1	465,2	0,19	81,22	82,46	82,27	0,18	81,88	83,28	81,91
392,0	625,0	1,7	0,8	21,9	261,7	76,7	91,9	293,6	361,0	188,7	208,8	465,5	0,19	81,13	82,39	82,24	0,18	81,79	83,22	81,90
393,0	626,0	1,7	0,8	21,8	262,5	76,6	91,4	293,5	361,5	188,8	208,9	465,7	0,19	81,07	82,36	82,20	0,18	81,71	83,19	81,89
394,0	627,0	1,7	0,8	21,8	262,2	76,7	91,4	293,3	361,9	188,8	208,7	465,7	0,19	80,96	82,31	82,17	0,18	81,65	83,13	81,84
395,0	628,0	1,7	0,8	21,8	262,2	76,5	91,5	293,4	362,5	188,9	208,6	466,1	0,19	80,90	82,26	82,17	0,18	81,57	83,09	81,79
396,0	629,0	1,7	0,8	21,8	262,4	77,0	90,9	293,3	363,3	189,0	208,7	467,8	0,19	80,88	82,22	82,12	0,18	81,52	83,06	81,78
397,0	630,0	1,6	0,8	21,7	261,9	77,0	92,4	293,4	364,0	189,6	208,7	468,3	0,19	80,96	82,24	82,08	0,18	81,58	83,05	81,72
398,0	631,0	1,6	0,8	21,7	261,3	77,3	93,8	293,9	364,6	189,9	208,5	468,6	0,19	81,08	82,24	82,06	0,18	81,67	83,03	81,71
399,0	632,0	1,6	0,8	21,7	260,8	77,4	95,2	293,4	365,4	190,4	208,4	469,4	0,19	81,30	82,31	82,07	0,18	81,82	83,07	81,72
400,0	633,0	1,6	0,8	21,7	260,6	77,6	96,0	293,1	366,2	190,7	208,2	469,5	0,19	81,53	82,34	82,05	0,18	81,96	83,10	81,72
401,0	634,0	1,6	0,8	21,7	260,5	77,7	97,4	293,0	366,8	190,8	208,0	469,8	0,19	81,78	82,41	82,09	0,18	82,13	83,13	81,73
402,0	635,0	1,6	0,8	21,8	260,4	77,9	97,7	292,9	367,3	191,0	207,9	468,6	0,19	82,00	82,49	82,11	0,18	82,29	83,19	81,76
403,0	636,0	1,5	0,8	21,2	260,4	77,7	97,3	293,2	367,5	191,1	207,8	468,9	0,19	82,23	82,58	82,12	0,18	82,49	83,25	81,80
404,0	637,0	1,5	0,8	21,2	260,7	77,8	95,8	293,3	367,3	191,2	207,5	469,4	0,19	82,41	82,66	82,14	0,18	82,65	83,33	81,83
405,0	638,0	1,5	0,8	21,3	260,9	77,5	95,3	293,6	367,3	191,4	207,3	469,3	0,19	82,45	82,70	82,16	0,18	82,71	83,37	81,88
406,0	639,0	1,5	0,8	21,3	261,1	77,7	94,6	293,4	367,5	191,5	207,1	468,3	0,19	82,38	82,71	82,17	0,18	82,72	83,36	81,87
407,0	640,0	1,4	0,8	21,3	261,3	77,3	94,1	293,5	367,5	191,5	207,1	468,8	0,19	82,24	82,68	82,18	0,18	82,68	83,36	81,90
408,0	641,0	1,5	0,8	21,1	261,4	77,3	93,6	293,5	367,7	191,6	206,9	468,5	0,19	82,14	82,67	82,20	0,18	82,65	83,36	81,91
409,0	642,0	1,5	0,8	21,2	261,2	77,1	93,1	293,4	367,8	191,5	206,7	468,7	0,19	82,05	82,65	82,17	0,18	82,60	83,35	81,90
410,0	643,0	1,4	0,8	21,1	261,1	77,0	93,0	293,7	367,8	191,4	206,6	468,6	0,19	81,91	82,62	82,20	0,18	82,54	83,34	81,89
411,0	644,0	1,4	0,8	20,9	261,0	77,0	92,7	293,7	367,6	191,3	206,5	468,3	0,19	81,77	82,55	82,19	0,18	82,43	83,30	81,87
412,0	645,0	1,4	0,8	20,8	261,0	76,9	92,6	293,6	367,1	191,3	206,2	468,2	0,19	81,64	82,51	82,15	0,18	82,28	83,28	81,87
413,0	646,0	1,3	0,7	20,3	260,5	76,8	92,4	293,5	366,9	191,2	206,0	468,2	0,19	81,52	82,47	82,16	0,18	82,20	83,24	81,87
414,0	647,0	1,3	0,7	20,3	260,5	76,8	92,1	293,2	366,3	191,2	205,9	468,3	0,19	81,39	82,42	82,12	0,18	82,08	83,17	81,86
415,0	648,0	1,3	0,7	20,2	260,2	76,7	91,9	292,9	365,9	191,2	205,8	468,7	0,19	81,29	82,37	82,13	0,18	81,97	83,14	81,84
416,0	649,0	1,3	0,7	20,3	259,9	76,6	91,7	293,0	365,4	191,1	205,6	468,3	0,19	81,18	82,31	82,09	0,18	81,87	83,10	81,84
417,0	650,0	1,3	0,7	20,3	259,9	76,6	91,6	292,9	364,9	191,0	205,4	468,0	0,19	81,06	82,26	82,08	0,18	81,77	83,05	81,79
418,0	651,0	1,3	0,7	20,3	259,8	76,5	91,2	292,8	364,3	190,9	205,5	467,8	0,19	80,99	82,22	82,02	0,18	81,66	83,02	81,76
419,0	652,0	1,2	0,7	20,0	259,6	76,5	91,5	292,4	363,7	190,9	205,2	468,4	0,19	80,91	82,16	81,99	0,18	81,58	82,96	81,72
420,0	653,0	1,2	0,7	20,1	259,5	76,4	90,9	292,0	363,2	190,9	205,2	468,8	0,19	80,84	82,11	81,94	0,18	81,48	82,90	81,70
421,0	654,0	1,2	0,7	20,1	259,3	76,9	90,5	292,3	362,7	191,1	204,9	469,7	0,19	80,78	82,07	81,93	0,18	81,42	82,86	81,67
422,0	655,0	1,2	0,7	20,1	258,9	77,2	91,4	291,5	362,3	191,1	205,1	470,2	0,19	80,87	82,09	81,91	0,18	81,45	82,84	81,64
423,0	656,0	1,2	0,7	19,9	258,2	77,1	93,1	291,9	361,8	190,8	204,9	470,8	0,19	81,00	82,06	81,90	0,18	81,52	82,84	81,58
424,0	657,0	1,2	0,7	19,9	257,4	77,5	94,6	291,5	361,1	191,1	204,6	471,1	0,19	81,19	82,12	81,87	0,18	81,67	82,85	81,60
425,0	658,0	1,2	0,7	20,0	257,0	77,6	95,4	290,6	360,6	191,3	204,4	471,0	0,19	81,41	82,18	81,87	0,18	81,82	82,87	81,60

426,0	659,0	1,1	0,7	20,2	256,8	77,7	96,4	290,8	360,2	191,2	204,2	470,2	0,19	81,62	82,22	81,87	0,18	81,95	82,93	81,59
427,0	660,0	1,1	0,7	20,1	256,7	77,5	97,5	290,3	359,7	191,3	204,0	469,1	0,19	81,83	82,29	81,91	0,18	82,13	82,97	81,61
428,0	661,0	1,1	0,7	20,1	256,1	77,6	97,7	289,9	359,2	191,3	203,7	469,2	0,19	82,07	82,40	81,92	0,18	82,31	83,03	81,66
429,0	662,0	1,1	0,7	20,3	255,8	77,8	96,2	289,1	358,8	191,2	203,6	469,8	0,19	82,25	82,46	81,95	0,18	82,48	83,10	81,70
430,0	663,0	1,1	0,7	20,3	256,1	77,5	95,2	289,3	358,3	191,2	203,4	468,8	0,19	82,34	82,51	81,97	0,18	82,57	83,14	81,70
431,0	664,0	1,1	0,7	19,8	255,9	77,6	94,5	288,6	357,8	191,1	203,2	468,5	0,19	82,29	82,52	81,99	0,18	82,59	83,17	81,72
432,0	665,0	1,0	0,7	19,7	255,8	77,4	93,9	288,3	356,9	190,9	203,1	468,8	0,19	82,23	82,54	82,00	0,18	82,59	83,18	81,75
433,0	666,0	1,0	0,7	19,7	255,3	77,1	93,3	287,6	356,1	190,8	202,9	468,7	0,19	82,08	82,52	81,99	0,18	82,54	83,18	81,73
434,0	667,0	1,0	0,7	19,7	255,6	77,1	92,8	287,0	355,4	190,4	202,8	468,0	0,19	81,96	82,47	82,01	0,18	82,49	83,17	81,75
435,0	668,0	1,0	0,7	19,6	254,8	77,0	92,5	286,7	354,6	189,9	202,7	468,4	0,19	81,80	82,45	82,01	0,18	82,41	83,17	81,75
436,0	669,0	0,9	0,6	19,3	254,2	76,9	92,3	286,5	354,0	189,9	202,4	468,4	0,19	81,66	82,41	81,98	0,18	82,31	83,12	81,75
437,0	670,0	1,0	0,6	19,4	254,1	76,8	91,9	285,9	353,4	189,6	202,3	468,1	0,19	81,55	82,36	81,99	0,18	82,20	83,10	81,74
438,0	671,0	0,9	0,6	19,4	253,6	76,6	91,7	285,4	352,6	189,4	202,2	467,8	0,19	81,42	82,30	81,97	0,18	82,10	83,07	81,73
439,0	672,0	0,9	0,6	19,5	253,5	76,6	91,2	285,1	352,2	189,1	201,9	467,9	0,19	81,31	82,25	81,94	0,18	82,00	83,03	81,68
440,0	673,0	0,9	0,6	19,6	253,6	76,7	91,3	284,4	351,6	189,0	201,7	467,6	0,19	81,19	82,19	81,92	0,18	81,93	82,97	81,65
441,0	674,0	0,9	0,6	19,7	253,2	76,6	91,1	284,2	351,2	188,9	201,4	467,6	0,19	81,09	82,16	81,88	0,18	81,82	82,95	81,63
442,0	675,0	0,9	0,6	19,7	253,2	76,5	91,0	284,0	350,9	188,6	201,2	467,2	0,19	81,00	82,10	81,82	0,18	81,70	82,90	81,61
443,0	676,0	0,9	0,6	19,6	252,5	76,4	91,0	283,7	350,6	188,4	201,0	467,0	0,19	80,92	82,05	81,82	0,18	81,62	82,85	81,58
444,0	677,0	0,9	0,6	19,7	252,9	76,4	90,9	283,4	350,5	188,1	200,9	466,6	0,19	80,86	82,01	81,77	0,18	81,55	82,83	81,54
445,0	678,0	0,8	0,6	19,7	252,8	76,3	90,7	282,9	350,1	187,9	200,7	466,9	0,19	80,79	81,95	81,75	0,18	81,48	82,79	81,48
446,0	679,0	0,8	0,6	19,4	252,8	76,6	90,5	282,1	349,8	187,7	200,6	467,4	0,19	80,74	81,90	81,69	0,18	81,44	82,73	81,47
447,0	680,0	0,8	0,6	19,4	252,3	77,0	90,7	282,6	349,6	187,6	200,2	467,5	0,19	80,74	81,89	81,66	0,18	81,41	82,71	81,42
448,0	681,0	0,8	0,6	19,4	251,7	77,0	92,3	282,5	349,5	187,2	200,1	468,1	0,19	80,84	81,88	81,64	0,18	81,45	82,69	81,41
449,0	682,0	0,7	0,6	19,5	251,6	77,3	93,8	282,4	349,3	187,2	199,8	468,1	0,19	81,00	81,92	81,65	0,18	81,54	82,70	81,39
450,0	683,0	0,7	0,6	19,6	251,4	77,3	94,7	281,4	349,2	187,2	199,5	467,9	0,19	81,17	81,94	81,65	0,18	81,64	82,71	81,41
451,0	684,0	0,7	0,6	19,7	251,2	77,2	95,7	281,8	349,2	186,8	199,4	468,2	0,19	81,33	82,02	81,64	0,18	81,74	82,75	81,39
452,0	685,0	0,7	0,6	19,7	250,3	77,6	96,7	281,6	349,1	186,5	199,2	468,0	0,19	81,55	82,09	81,67	0,18	81,90	82,80	81,39
453,0	686,0	0,7	0,6	19,8	250,4	77,9	97,6	281,2	349,0	186,4	199,0	468,0	0,19	81,76	82,18	81,67	0,18	82,06	82,86	81,42
454,0	687,0	0,7	0,6	19,8	250,1	77,6	96,9	281,1	348,9	186,2	198,9	468,5	0,19	81,96	82,28	81,72	0,18	82,25	82,95	81,43
455,0	688,0	0,7	0,6	19,8	249,8	77,8	95,4	280,7	348,8	186,1	198,5	468,2	0,19	82,12	82,36	81,72	0,18	82,37	83,01	81,47
456,0	689,0	0,7	0,6	19,9	250,3	77,4	94,5	280,7	348,7	185,9	198,2	468,1	0,19	82,16	82,40	81,75	0,18	82,44	83,04	81,47
457,0	690,0	0,7	0,6	19,9	250,2	77,4	93,8	280,0	348,8	185,7	197,9	467,6	0,19	82,11	82,42	81,74	0,18	82,45	83,06	81,48
458,0	691,0	0,6	0,6	20,0	249,9	77,3	93,1	280,0	348,7	185,5	197,7	466,9	0,19	82,04	82,42	81,77	0,18	82,42	83,07	81,49
459,0	692,0	0,6	0,7	18,6	249,6	77,0	92,7	279,7	348,7	185,4	197,4	466,6	0,19	81,93	82,41	81,77	0,18	82,38	83,05	81,50
460,0	693,0	0,6	0,7	18,5	249,0	77,1	92,1	278,6	348,4	185,3	197,2	466,1	0,19	81,81	82,40	81,76	0,18	82,37	83,05	81,54
461,0	694,0	0,6	0,7	18,5	248,4	76,8	91,9	278,3	348,2	185,3	196,9	466,6	0,19	81,68	82,37	81,74	0,18	82,29	83,04	81,52
462,0	695,0	0,6	0,7	18,6	248,2	76,9	91,6	277,9	348,2	185,2	196,8	466,7	0,19	81,56	82,31	81,74	0,18	82,23	83,02	81,51
463,0	696,0	0,6	0,7	18,6	247,9	76,9	91,5	277,3	348,3	185,1	196,5	466,8	0,19	81,43	82,29	81,73	0,18	82,14	83,02	81,48
464,0	697,0	0,5	0,7	18,6	247,5	76,8	91,3	276,6	348,5	185,0	196,2	466,6	0,19	81,34	82,25	81,72	0,18	82,06	82,98	81,46
465,0	698,0	0,5	0,7	18,6	247,2	76,8	91,2	275,9	348,7	185,0	196,1	467,1	0,19	81,23	82,19	81,73	0,18	81,99	82,96	81,45
466,0	699,0	0,5	0,7	18,5	247,1	76,7	90,9	275,7	348,1	184,7	195,8	467,3	0,19	81,16	82,18	81,69	0,18	81,89	82,93	81,43
467,0	700,0	0,5	0,7	18,6	246,5	76,6	90,9	275,1	347,7	184,6	195,5	467,1	0,19	81,08	82,12	81,69	0,18	81,81	82,90	81,42
468,0	701,0	0,4	0,7	18,5	246,0	76,7	90,4	274,6	347,4	184,3	195,3	467,5	0,19	81,01	82,09	81,67	0,18	81,71	82,85	81,42
469,0	702,0	0,5	0,7	18,6	245,7	76,5	90,4	274,2	347,4	183,9	195,1	467,6	0,19	80,94	82,03	81,66	0,18	81,63	82,83	81,39
470,0	703,0	0,5	0,7	18,6	245,3	76,5	90,4	273,4	347,7	183,7	195,0	467,9	0,19	80,86	81,99	81,62	0,18	81,57	82,80	81,34
471,0	704,0	0,4	0,7	18,7	245,1	76,5	90,3	273,2	347,7	183,6	194,6	467,4	0,19	80,80	81,96	81,58	0,18	81,49	82,75	81,33
472,0	705,0	0,4	0,7	18,7	245,1	76,7	90,1	272,5	348,1	183,4	194,5	467,9	0,19	80,73	81,93	81,55	0,18	81,44	82,73	81,28
473,0	706,0	0,4	0,7	18,7	244,6	77,1	90,4	272,4	348,5	183,1	194,2	468,6	0,19	80,80	81,92	81,52	0,18	81,44	82,69	81,23
474,0	707,0	0,4	0,7	18,5	243,6	77,0	91,9	272,7	349,2	182,6	194,1	469,2	0,19	80,92	81,91	81,52	0,18	81,49	82,70	81,23
475,0	708,0	0,3	0,7	18,1	242,6	77,5	93,5	272,4	349,5	182,5	193,7	469,5	0,19	81,08	81,95	81,52	0,18	81,62	82,70	81,23
476,0	709,0	0,3	0,7	18,3	241,9	77,5	94,4	271,7	349,7	182,4	193,5	469,7	0,19	81,27	82,01	81,53	0,18	81,73	82,74	81,26
477,0	710,0	0,3	0,7	18,1	241,6	77,6	95,7	271,2	349,9	182,1	193,1	469,8	0,19	81,48	82,09	81,57	0,18	81,88	82,80	81,26
478,0	711,0	0,3	0,7	18,1	240,9	77,8	96,7	270,7	349,7	181,8	192,8	468,9	0,19	81,73	82,17	81,59	0,18	82,06	82,85	81,29
479,0	712,0	0,3	0,7	18,1	240,8	77,9	97,3	270,0	349,5	181,7	192,6	468,9	0,19	81,97	82,27	81,63	0,18	82,23	82,92	81,33
480,0	713,0	0,3	0,7	18,2	240,6	77,7	96,2	269,9	349,4	181,3	192,4	469,6	0,19	82,21	82,37	81,67	0,18	82,44	82,99	81,40
481,0	714,0	0,3	0,7	18,3	240,2	77,7	94,7	269,5	349,2	181,1	192,0	469,2	0,19	82,36	82,44	81,70	0,18	82,55	83,06	81,42
482,0	715,0	0,3	0,7	18,2	240,1	77,5	93,8	269,0	349,2	181,0	191,6	469,3	0,19	82,38	82,50	81,73	0,18	82,64	83,10	81,46
483,0	716,0	0,2	0,7	18,1	240,5	77,6	93,1	268,3	348,9	180,7	191,2	468,5	0,19	82,32	82,52	81,73	0,18	82,64	83,12	81,49
484,0	717,0	0,2	0,7	18,1	240,2	77,3	92,5	267,8	348,7	180,6	190,9	467,8	0,19	82,19	82,52	81,77	0,18	82,59	83,14	81,51
485,0	718,0	0,2	0,7	18,1	239,9	77,4	92,0	267,4	348,6	180,5	190,6	467,8	0,19	82,08	82,49	81,80	0,18	82,58	83,12	81,52
486,0	719,0	0,2	0,7	18,1	239,5	77,3	91,7	266,7	348,1	180,4	190,2	467,8	0,19	81,95	82,47	81,78	0,18	82,52	83,11	81,52
487,0	720,0	0,2	0,7	17,6	238,9	77,0	91,5	266,2	347,6	180,2	190,0	467,7	0,19	81,84	82,43	81,78	0,18	82,46	83,09	81,51
488,0	721,0	0,2	0,7	17,5	238,6	77,0	91,1	265,8	346,9	180,0	189,6	467,9	0,19	81,75	82,44	81,76	0,18	82,40	83,07	81,53
489,0	722,0	0,2	0,7	17,4	238,5	77,0	90,8	265,4	346,5	179,9	189,3	467,6	0,19	81,65	82,40	81,76	0,18	82,35	83,08	81,51
490,0	723,0	0,1	0,7	17,4	237,6	76,8	90,6	264,8	345,9	179,9	188,9	467,7	0,19	81,52	82,36	81,74	0,18	82,25	83,04	81,52
491,0	724,0	0,1	0,7	17,0	236,8	76,8	90,4	264,3	345,3	179,8	188,6	467,0	0,19	81,37	82,32	81,72	0,18	82,14	83,02	81,49
492,0	725,0	0,1	0,7	16,2	236,5	76,8	90,2	263,6	344,5	179,7	188,3	467,4	0,19	81,27	82,26	81,68	0,18	82,02	82,98	81,48
493,0	726,0	0,1	0,7	16,2	236,1	76,7	90,1	263,1	343,4	179,5	188,1	467,4	0,19	81,17	82,22	81,69	0,18	81,94	82,95	81,46
494,0	727,0	0,1	0,7	16,3	235,4	76,5	89,9	262,5	342,6	179,3	187,8	467,3	0,19	81,10	82,19	81,67	0,18	81,87	82,92	81,44
495,0	728,0	0,1	0,7	16,4	234,9	76,4	89,3	262,2	342,1	178,8	187,6	467,6	0,19	81,00	82,13	81,64	0,18	81,74	82,86	81,39
496,0	729,0	0,1	0,7	16,3	234,9	75,5	89,2	262,1	341,2	178,3	187,2	468,4	0,19	80,85	82,07	81,56	0,18	81,64	82,81	81,33
497,0	730,0	0,0	0,7	16,4	234,6	76,1	88,9	261,1	340,8	178,0	186,6	468,6	0,19	80,68	82,01	81,50	0,18	81,53	82,75	81,28

Manufacturer: JOTULL
Model: F45 V2

Run: 2
Project #: PI 20194
Test Duration: 497 min

	HHV	LHV
Eff	74,03%	79,66%
Comb Eff	95,36%	95,36%
HT Eff	77,64%	83,54%
Output	17 655	kJ/h
Burn Rate	1,18	kg/h
Grams CO	664	g
Input	23 848	kJ/h
MC wet	16,68	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19,86
F_0
1,048

Overall Heating Efficiency:	74,03%	
Combustion Efficiency:	95,36%	
Heat Transfer Efficiency:	77,64%	

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	29,49
Dry Moles Exhaust Gas (N_T):	556,79
Air Fuel Ratio (A/F)	15,91

Heat Output:	16 748	Btu/h	17 655	kJ/h
Heat Input:	22 622	Btu/h	23 848	kJ/h
Burn Duration:	8,28	h		
Burn Rate:	2,60	lb/h	1,180	kg/h
Stack Temp:	336,5	Deg. F	169,2	Deg. C

POLYTESTS
TESTING THROUGH YOUR REALITY

Date: 2019-04-01 Manufacturer: Jotul Model: F45 V2

Project #: PJ 20194 Run: 2 Tech: MM Reviewer: SP

- 9 LBS kindling start fire (1 min torche)
- Δ 8 min close Door
- Fan High mode auto
- Δ 3.4 LBS insert load
Δ 5.2 LBS set Fan low (mode auto)
Δ 5.2 LBS Remove coal
Δ 2.9 LBS insert load
Δ 3 min set air inlet 1/2
Δ 4 min set air inlet 3/4
Δ 8 min ~~set~~ close air inlet completement

TEST LOAD CONFIGURATION

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE / POST CHECKS

Date: 2019-05-01 Manufacturer: Jotul Model: F45V2

Project #: ~~PT 2018~~ PI 20194 Run: 2 Tech: MM Reviewer: JP

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

Moisture Meter Calibration Check:

	Pre-Test		Post-Test	
Facility Conditions:				
Air Velocity from less than 2 feet	0	(max50 Fpm)	0	(max50 Fpm)
Smoke Capture Check (Tunnel velocity)	ok		NA	
Picture	4 sides ok		ok	
Wood Heater Conditions:				
Date Wood Heater Stack Cleaned	2019-03-30			
Date Dilution Tunnel Cleaned	2019-03-30			
Induced Draft Check (max 0.005 H2O)	ok			
Traverse before ignition	ok			
Temperature System:				
Ambient (65°-90°F)			ok	°F
Proportional Checks:				
Thermocouple check	ok			
Pitot Clean	ok			
Pitot verification	ok			

Sampling Train ID Numbers:

	~~High~~ Low fire test			Medium low fire test		
	1st hour	Train 1	Train 2	1st hour	Train 1	Train 2
Probe	11	18	50			
Filter Front	463	465	467			
Filter Back	464	466	468			
Filter Thermocouple	11	11	12			
Filter (80°F ≥ <90°F)	ok	ok	ok			

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-01 Manufacturer: JU h? Model: F45 V2

Project #: PI 20194 Run: 2 Tech: M F Reviewer: TP

Leakage Checks Tunnel Samplers

High fire test	System 1st 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	
Final 1minute DGM (Liter)	909024,54		909024,65		858472,50	
Initial 1minute DGM (Liter)	909024,54		909024,64		858472,46	
Change © (Liter)	∅		0,01		0,04	
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)			N.A			
Check OK						

Low medium fire test	System 1st 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)	909024,54	911775,91	909024,65	911776,04	858472,50	861175,72
Initial 1minute DGM (Liter)	909024,54	911775,89	909024,64	911776,01	858472,46	861175,68
Change © (Liter)	∅	0,01	0,01	0,04	0,04	0,04
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-01 Manufacturer: Jutul Model: F45 V2

Project #: PI 10194 Run: 2 Tech: MP Reviewer: DP

Leakage Checks Flue Gas Sampler

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

Leakage Checks Pitot

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

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE-TEST SCALE AUDIT

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2
Project #: PJ 20194 Run: 2 Tech: MM Reviewer: SP

Scale Type	Audit		Measured Weight
	Equipment #	Weight	
Platform	EM-090	4,4 lbs, Class F	44 lbs
Wood	EM-090	4,4 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%

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 2 Tech: AL M Reviewer: NP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 102,9 (KPa.) Static pressure (P_q) 0,23 (inches w.c.)
Inside diameter: Port A _______ Port B _____.
Tunnel cross sectional area: .1963Ft^2
Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0,071	68,55
B - Centroid	3.00	3.50	4	0,070	68,43
A-1	0.40	0.50	0.50	0,058	68,50
A-2	1.50	1.75	2	0,082	68,50
A-3	4.50	5.25	6	0,059	68,42
A-4	5.60	6.5	7.5	0,060	68,36
B-1	0.40	0.50	0.50	0,058	68,28
B-2	1.50	1.75	2	0,070	68,24
B-3	4.50	5.25	6	0,062	68,29
B-4	5.60	6.5	7.5	0,058	68,31
				AVERAGE	

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

Where,

C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.
Δ_p = manometer reading (inches H_2O)
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 $\frac{\text{in. } H_2O}{\{13.6\}}$
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)

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

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2
Project #: pJ 20194 Run: 2 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2981	3000	0992	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO_2	0	0	1794	1800	986	1000
Tolerance CO2		+/- 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	2983	0998	0	0.02	0002	0.15	0,006	0.05	✓	
CO_2	0	1788	996	0	0.02	006	0.5	0,10	0.5	✓	

POLYTESTS
TESTING THROUGH YOUR REALITY

TEST DATA LOG

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 2 Tech: M M Reviewer: SP

RAW DRY GAS METER READINGS

SP		System 1	System 2	Blank
LOW ~~High fire test~~	Final (Liter)	914774.85	861174.58	93360
	Initial (Liter)	909024.83	858473.31	80424
~~Low medium fire test~~	~~Final (Liter)~~			
	~~Initial (Liter)~~			

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102.9	102.3
Dry Bulb (F):	71.06	73.04
Humidity (%):	22.3	26.3

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-01 Manufacturer: Jotul Model: F 45 V2

Project #: PI 20194 Run: 2 Tech: M R Reviewer: 80

FUEL DESCRIPTION:

Type of wood:

KINDLING AND START-UP LOAD

Piece Size				Weight		Meter Moisture Content (% dry)				
	x	x 16	in.	3.59	lbs.	9		9		9
	x	x 12	in.		lbs.					
	x	x	in.		lbs.					
	x	x 16	in.	6.43	lbs.	19		19		19
	x	x 12	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					

HIGHFIRE TEST LOAD

Piece Size				Weight		Meter Moisture Content (% dry)				
3.50	x 4.00	x 16	in.	4.46	lbs.	19.0		20.6		20.2
3.50	x 4.00	x 16	in.	5.30	lbs.	19.3		19.4		19.9
3.50	x 2.25	x 16	in.	3.56	lbs.	20.1		20.3		20.6
	x	x	in.		lbs.					
3 1/4	x 3 1/2	x 16	in.	3.85	lbs.	19.6		19.4		20.6
4.50	x 4.50	x 16	in.	6.55	lbs.	20.3		20.8		20.2
	x	x	in.		lbs.					
	x	x	in.		lbs.					
	x	x	in.		lbs.					

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2
Project #: PI 20194 Run: 2 Tech: MM Reviewer: BP

FUEL DESCRIPTION:
Type of wood:

LOW OR MEDIUM TEST LOAD

Piece Size		Weight		Meter Moisture Content (% dry)				
4,00 x 4,00 x 16	in.	5016	lbs.	203		206		199
4.5 x 4,00 x 16	in.	6'05	lbs.	193		198		199
4,00 x 5,00 x 16	in.	6 508	lbs.	199		197		20 4
x x	in.		lbs.					
350 x 3,50 x 16	in.	3 40	lbs.	194		20		193
450 x 4,75 x 16	in.	~~636~~ 7,11	lbs.	204		208		199
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.					

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2

Project #: pI 20194 Run: 2 Tech: M M Reviewer: JP

low
~~HIGHF~~IRE TEST FILTERS

Pre-test Weight Record		SYSTEM 1 – 1st hour Probe & Housing Number	SYSTEM 1 – 1st hour Front Filter Number	SYSTEM 1 – 1st hour Back Filter Number	SYSTEM 1 – 1st hour gaskets	SYSTEM 1 Probe & Housing Number	SYSTEM 1 Front Filter Number	SYSTEM 1 Back Filter Number	SYSTEM 1 gaskets	Blanck
Date	Time	11	463	464	1	18	465	466	37	469
2019.04.30	16:45	93 7221	0.0831	00806	34 5183	108 9482	00832	0.0825	35 2353	00843
2019.05.01	7:45	93 7220	00830	00806	34 5184	108 9481	00833	00826	35 2353	00843

Post-test Weight Record		SYSTEM 1 – 1st hour Probe & Housing Number	SYSTEM 1 – 1st hour Front Filter Number	SYSTEM 1 – 1st hour Back Filter Number	SYSTEM 1 – 1st hour gaskets	SYSTEM 1 Probe & Housing Number	SYSTEM 1 Front Filter Number	SYSTEM 1 Back Filter Number	SYSTEM 1 gaskets	Blanck
Date	Time	11	463	464	1	18	465	466	37	469
2019.05.01	22:48	93 7227	00836	00810	34 5200	108 9488	00917	0.0815	35 2375	00847
2019.05.08	8:00	93 7222	00834	00808	34 5192	108 9485	00913	0.0815	35 2370	00846
2019.05.09	8:00	93.7222	0.0834	0.0808	34.5192	108.9485	0.0913	0.0815	35.2370	0.0845

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-01 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 2 Tech: MM Reviewer: SP

Low

		~~HIGH~~ FIRE TEST FILTERS			
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	50	467	468	40
2019-03-30	16:45	107,6463	0,0831	0,0844	33,3827
2019-05-01	7:45	1076463	00832	00845	33 3827

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	50	467	468	40
2019.05.01	22:45	107 6472	0,0925	00848	33 3834
2019.05.08	8:00	107 6468	0,0923	00844	33 3830
2019.05.09	8:00	107.6468	0,0923	0,0844	33,3830

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019 05-01 Manufacturer: Jotul Model: F 45 V2

Project #: PJ 20194 Run: 2 Tech: M M Reviewer: ____

		LOW OR MEDIUM TEST FILTERS								
		SYSTEM 1 – 1st 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	Blanck
Date	Time	17	470	421	5	19	472	474	25	481
		108,9494	00821	00839	35,4346	109 0905	00810	00805	34 9588	00791
		108,9494	00820	00840	35,4347	109 0906	00809	00805	34,9589	00792

		SYSTEM 1 – 1st 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	Blanck
Date	Time									
					NA					

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-08-01 Manufacturer: Jotul Model: F45 V2

Project #: PI 20194 Run: 2 Tech: M M Reviewer: ______

		LOW OR MEDIUM FIRE TEST FILTERS			
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	34	475	480	26
		110 1030	00805	00805	34 6815
		110 1031	00806	00805	34 6816

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time				

NS

APPENDIX 2: Proportionality results

Average	Average	Average	Proportional	Highfire				Average
17,53	Inlet +	Inlet +						0,261
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	99,14	100,03	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
17,346	529,6	529,9			0,246	0,231	0	0,273134
17,439	529,3	529,6	90,36	91,13	0,217	0,205	1	0,2740719
17,200	529,3	529,5	91,40	92,23	0,188	0,180	2	0,2704917
17,493	529,2	529,4	89,72	90,65	0,188	0,180	3	0,2753784
17,207	529,2	529,4	91,22	91,97	0,188	0,180	4	0,270871
17,579	529,1	529,3	89,42	90,16	0,188	0,180	5	0,2766816
17,418	529,0	529,2	90,19	90,88	0,188	0,180	6	0,2742255
17,372	529,0	529,2	90,66	91,67	0,188	0,180	7	0,2729315
17,449	529,0	529,2	90,76	91,51	0,188	0,180	8	0,2735088
17,462	529,1	529,2	91,10	91,84	0,188	0,180	9	0,2731331
17,432	529,2	529,3	91,58	92,35	0,188	0,180	10	0,2721936
17,399	529,3	529,4	92,06	92,76	0,188	0,180	11	0,2712502
17,139	529,5	529,5	93,57	94,38	0,188	0,180	12	0,2669746
17,503	529,6	529,6	91,42	92,35	0,188	0,180	13	0,2727769
17,341	529,7	529,7	92,03	92,97	0,188	0,180	14	0,2704931
17,290	529,8	529,8	93,34	94,10	0,188	0,180	15	0,2682044
17,392	529,8	529,8	94,00	94,94	0,188	0,179	16	0,2679196
17,495	529,8	529,8	94,96	95,66	0,188	0,179	17	0,2676846
17,622	529,8	529,8	96,13	96,77	0,188	0,179	18	0,2668623
17,387	529,9	529,9	98,67	99,72	0,188	0,179	19	0,2616191
17,138	529,9	529,9	100,25	101,19	0,188	0,180	20	0,2576221
17,442	530,0	530,0	98,50	99,20	0,188	0,179	21	0,2622072
17,085	530,0	530,1	101,64	102,75	0,188	0,179	22	0,2554676
17,071	530,1	530,1	101,81	102,60	0,188	0,179	23	0,2550591
17,098	530,2	530,2	101,52	102,34	0,188	0,179	24	0,2557314
17,295	530,3	530,3	100,45	101,30	0,188	0,179	25	0,2584693
17,037	530,4	530,4	102,03	102,92	0,188	0,179	26	0,2546635
17,224	530,5	530,5	100,74	101,90	0,188	0,180	27	0,2574686
17,247	530,5	530,6	100,56	101,61	0,187	0,180	28	0,2578692
17,435	530,6	530,7	99,49	100,25	0,187	0,179	29	0,2608316
17,483	530,7	530,7	99,14	100,09	0,188	0,179	30	0,2616185
17,381	530,9	530,9	99,33	100,20	0,187	0,179	31	0,2602424
17,405	531,0	531,0	99,61	100,53	0,187	0,179	32	0,2602422
17,275	531,2	531,2	100,21	101,04	0,187	0,179	33	0,2584589
17,353	531,5	531,4	99,58	100,48	0,187	0,179	34	0,2598467
17,037	531,7	531,6	101,05	101,93	0,187	0,179	35	0,2554686
17,405	531,9	531,8	98,78	99,52	0,187	0,179	36	0,2611196
17,172	532,2	532,0	99,80	100,81	0,187	0,179	37	0,2578674
17,417	532,4	532,3	98,40	99,56	0,187	0,179	38	0,2616203
17,081	532,6	532,5	100,35	101,24	0,187	0,179	39	0,2564733
17,453	532,9	532,7	105,35	106,60	0,187	0,179	40	0,2528149
17,305	533,1	533,0	101,64	102,46	0,187	0,179	41	0,2564572
17,305	533,4	533,2	101,08	102,18	0,187	0,179	42	0,2570712
17,346	533,6	533,5	101,24	102,18	0,186	0,179	43	0,2570718
17,377	533,9	533,7	101,83	102,93	0,186	0,178	44	0,2564568
17,343	534,1	534,0	102,56	103,38	0,186	0,178	45	0,2554619
17,325	534,4	534,3	102,94	103,88	0,186	0,178	46	0,2546653
17,337	534,7	534,5	102,82	103,85	0,186	0,178	47	0,2546668
17,208	534,9	534,8	103,61	104,87	0,186	0,178	48	0,2526455
17,148	535,2	535,1	104,10	105,14	0,186	0,178	49	0,2516284
17,218	535,5	535,4	103,74	104,75	0,186	0,178	50	0,2526444
17,282	535,8	535,6	103,54	104,60	0,186	0,178	51	0,2533954
17,159	536,1	535,9	104,34	105,05	0,186	0,178	52	0,2515791
17,630	536,3	536,2	101,48	102,32	0,186	0,178	53	0,2584667

17,411	536,6	536,4	102,66	103,99	0,186	0,178	54	0,2550723
17,295	536,8	536,7	103,30	104,26	0,185	0,178	55	0,2535444
17,318	537,0	536,9	103,49	104,49	0,186	0,178	56	0,2536601
17,399	537,3	537,2	102,95	104,09	0,186	0,178	57	0,2546691
17,418	537,6	537,4	102,92	103,81	0,185	0,178	58	0,2548906
17,347	537,8	537,7	103,42	104,46	0,185	0,177	59	0,2536587
17,570	538,0	538,0	102,52	103,33	0,185	0,177	60	0,256511
17,333	538,2	538,2	103,81	104,90	0,186	0,178	61	0,2532542
17,454	538,3	538,3	103,15	104,21	0,186	0,178	62	0,2550763
17,530	538,3	538,4	102,67	103,28	0,186	0,178	63	0,2561807
17,432	538,4	538,5	103,37	104,41	0,186	0,178	64	0,2546748
17,595	538,4	538,5	102,38	103,21	0,186	0,178	65	0,2570802
17,782	538,3	538,5	101,16	102,06	0,186	0,178	66	0,2598578
17,607	538,3	538,6	102,37	103,36	0,186	0,178	67	0,2570792
17,628	538,4	538,6	102,12	103,18	0,186	0,178	68	0,257479
17,896	538,4	538,6	100,80	101,80	0,186	0,178	69	0,2612393
17,590	538,4	538,7	102,73	103,73	0,186	0,178	70	0,2564985
17,690	538,6	538,8	102,19	103,05	0,186	0,178	71	0,2578687
17,661	538,8	539,0	102,31	103,25	0,186	0,177	72	0,2574809
17,429	539,0	539,2	103,62	104,59	0,185	0,177	73	0,2540712
17,524	539,3	539,4	102,92	103,94	0,185	0,177	74	0,2554935
17,760	539,5	539,6	101,71	102,51	0,185	0,177	75	0,2588728
17,682	539,8	539,8	102,07	103,06	0,185	0,177	76	0,2578567
17,764	540,0	540,1	101,52	102,30	0,185	0,177	77	0,2588721
17,944	540,2	540,3	100,56	101,49	0,185	0,177	78	0,2616327
17,868	540,4	540,4	100,71	101,56	0,185	0,177	79	0,2608472
17,844	540,4	540,5	100,87	101,69	0,185	0,177	80	0,2604137
17,967	540,4	540,6	100,02	100,92	0,185	0,177	81	0,2626129
17,671	540,4	540,6	101,51	102,60	0,186	0,178	82	0,2584786
17,892	540,3	540,6	100,05	100,97	0,185	0,177	83	0,261863
18,030	540,3	540,6	99,68	100,53	0,185	0,177	84	0,2635891
17,879	540,3	540,7	100,26	100,94	0,186	0,177	85	0,2616349
18,028	540,3	540,7	99,50	100,17	0,186	0,177	86	0,2638235
18,012	540,3	540,7	99,59	100,31	0,186	0,177	87	0,263564
17,841	540,3	540,7	100,44	101,37	0,186	0,177	88	0,2612417
17,652	540,4	540,7	101,48	102,14	0,186	0,177	89	0,258536
18,074	540,4	540,8	98,78	99,84	0,186	0,177	90	0,2649486
17,820	540,4	540,8	99,88	100,85	0,185	0,178	91	0,2616332
18,037	540,5	540,8	98,76	99,58	0,186	0,177	92	0,2648599
18,127	540,5	540,8	97,97	98,89	0,186	0,177	93	0,2664819
17,895	540,4	540,8	99,36	100,26	0,186	0,178	94	0,2632014
17,988	540,4	540,7	98,62	99,71	0,186	0,178	95	0,2645618
17,910	540,4	540,7	99,06	99,93	0,186	0,178	96	0,2636149
18,205	540,4	540,8	96,97	97,64	0,186	0,177	97	0,2686062
17,517	540,5	540,8	100,64	101,57	0,186	0,177	98	0,2584784
17,383	540,6	540,9	101,42	102,48	0,185	0,178	99	0,2564869
17,426	540,8	541,1	100,70	101,64	0,185	0,177	100	0,2574854
17,440	541,1	541,3	100,54	101,45	0,185	0,177	101	0,2578835
17,310	541,3	541,5	101,13	102,30	0,185	0,177	102	0,2560877
17,888	541,5	541,7	97,71	98,57	0,185	0,177	103	0,2650429
17,625	541,6	541,8	98,80	99,65	0,185	0,177	104	0,2616388
17,602	541,7	541,9	98,64	99,58	0,185	0,177	105	0,261639
17,938	541,7	541,9	96,67	97,69	0,185	0,178	106	0,2668863
17,764	541,6	541,9	97,49	98,18	0,186	0,177	107	0,2645661
17,668	541,5	541,9	97,90	98,98	0,186	0,178	108	0,2632024
17,680	541,4	541,8	97,85	98,59	0,186	0,178	109	0,2635955
17,873	541,3	541,8	96,36	97,22	0,186	0,177	110	0,2668836
18,020	541,4	541,8	95,78	96,55	0,186	0,178	111	0,2689303
17,806	541,4	541,8	96,76	97,50	0,186	0,177	112	0,2659221
17,921	541,4	541,8	96,19	96,85	0,186	0,177	113	0,2676532
18,117	541,4	541,7	94,91	95,71	0,186	0,177	114	0,2708343

17,395	541,3	541,7	98,85	99,92	0,186	0,178	115	0,2598671
17,641	541,3	541,7	97,56	98,49	0,186	0,178	116	0,2636895
17,468	541,3	541,7	98,33	99,31	0,186	0,178	117	0,2612492
17,475	541,2	541,6	98,21	98,87	0,186	0,178	118	0,2616408
17,391	541,0	541,5	98,35	99,09	0,186	0,178	119	0,2608545
17,377	540,9	541,5	98,31	98,89	0,186	0,178	120	0,2608556
17,464	540,8	541,4	97,70	98,44	0,186	0,177	121	0,2622286
17,421	540,8	541,3	97,95	98,65	0,186	0,178	122	0,2616413
17,441	540,7	541,2	97,68	98,35	0,186	0,178	123	0,2621068
17,390	540,7	541,2	97,84	98,65	0,186	0,178	124	0,2616404
17,166	540,7	541,1	98,90	99,77	0,186	0,178	125	0,258482
17,158	540,6	541,1	98,82	99,71	0,186	0,178	126	0,2584845
17,842	540,5	541,0	94,96	95,79	0,186	0,178	127	0,2689356
17,961	540,5	541,0	94,18	95,13	0,186	0,178	128	0,270893

Average	Average	Average	Proportional Rates Medium/low fire					Average
17,44	Inlet +	Inlet +						0,268
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	99,55	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
17,213	537,9	538,8			0,196	0,184	0	0,2585384
17,658	538,2	538,9	100,58	100,91	0,196	0,184	1	0,2684843
17,842	538,4	539,0	99,69	99,99	0,196	0,184	2	0,2708902
17,425	538,6	539,2	102,63	102,80	0,196	0,183	3	0,2639811
17,191	538,7	539,3	103,42	103,72	0,196	0,183	4	0,2610637
17,286	538,7	539,3	103,07	103,52	0,196	0,184	5	0,262226
17,343	538,8	539,3	102,77	103,05	0,196	0,184	6	0,263202
17,216	538,8	539,3	103,21	103,60	0,196	0,184	7	0,2616383
17,234	538,8	539,4	102,48	102,66	0,196	0,184	8	0,2625764
17,378	538,8	539,4	101,38	101,69	0,196	0,183	9	0,2651127
17,154	538,7	539,4	102,77	103,08	0,196	0,184	10	0,2616322
17,023	538,7	539,3	103,45	103,74	0,196	0,184	11	0,2598448
17,268	538,7	539,3	101,84	102,09	0,196	0,184	12	0,2639811
17,165	538,6	539,3	102,14	102,22	0,196	0,184	13	0,2626174
17,084	538,6	539,3	102,54	102,73	0,196	0,183	14	0,2616367
17,187	538,5	539,2	101,81	101,88	0,196	0,183	15	0,2632002
17,272	538,5	539,2	101,32	101,85	0,196	0,184	16	0,2645639
17,553	538,4	539,1	99,67	100,11	0,196	0,184	17	0,2689895
17,796	538,4	539,1	98,00	98,42	0,196	0,184	18	0,2729684
17,740	538,4	539,1	98,27	98,68	0,196	0,184	19	0,2722241
17,652	538,3	539,0	98,53	98,71	0,196	0,184	20	0,2712695
16,950	538,2	539,0	102,80	102,90	0,196	0,184	21	0,2602621
17,047	538,1	538,9	102,30	102,65	0,196	0,184	22	0,2616383
17,319	538,1	538,8	100,60	100,97	0,196	0,184	23	0,2659163
17,549	538,1	538,8	99,23	99,62	0,196	0,184	24	0,2695609
17,567	538,1	538,7	99,22	99,65	0,196	0,184	25	0,2696959
17,402	538,0	538,7	100,31	100,75	0,196	0,184	26	0,2668824
17,960	538,0	538,7	97,26	97,58	0,196	0,184	27	0,2754006
17,597	538,0	538,7	99,50	99,88	0,196	0,184	28	0,2695611
17,753	538,0	538,6	98,79	99,07	0,196	0,184	29	0,2718028
17,641	537,9	538,6	99,49	99,59	0,196	0,184	30	0,2699425
17,829	537,9	538,6	98,38	98,62	0,196	0,184	31	0,2727774
17,596	537,9	538,6	99,96	100,25	0,196	0,184	32	0,2690046
17,455	537,9	538,5	100,85	101,14	0,196	0,184	33	0,2664577
17,690	537,9	538,5	99,69	100,21	0,196	0,184	34	0,2699384
17,617	537,9	538,5	100,08	100,38	0,196	0,184	35	0,2689899
17,208	537,9	538,5	102,69	102,89	0,196	0,184	36	0,262227
17,377	538,0	538,5	101,75	102,27	0,196	0,184	37	0,2649669
17,251	538,2	538,6	102,65	103,08	0,196	0,184	38	0,2626222
17,350	538,4	538,8	102,46	102,86	0,196	0,184	39	0,263592
17,227	538,6	538,9	103,25	103,60	0,196	0,184	40	0,2616376
17,257	538,8	539,1	103,03	103,23	0,196	0,184	41	0,262179
17,335	539,0	539,3	102,60	103,10	0,196	0,184	42	0,2632021
17,439	539,2	539,4	101,87	102,10	0,196	0,184	43	0,2648621
17,452	539,3	539,5	101,85	102,25	0,196	0,183	44	0,2650026
17,382	539,3	539,6	102,11	102,67	0,196	0,184	45	0,2639805
17,048	539,3	539,6	104,14	104,51	0,196	0,184	46	0,2590465
17,230	539,3	539,6	102,65	102,98	0,196	0,183	47	0,2621728
17,728	539,3	539,6	99,62	100,25	0,196	0,184	48	0,2699424
17,642	539,3	539,7	100,06	100,54	0,195	0,184	49	0,2686077
17,743	539,3	539,7	99,85	100,17	0,196	0,184	50	0,2699425
17,507	539,4	539,7	100,84	101,35	0,196	0,184	51	0,2665944
17,579	539,4	539,7	100,53	100,81	0,196	0,183	52	0,267648
17,143	539,4	539,7	103,27	103,40	0,196	0,183	53	0,2608534
17,333	539,4	539,8	102,18	102,54	0,196	0,183	54	0,2636843

17,350	539,4	539,8	102,01	102,45	0,196	0,184	55	0,2639811
17,419	539,4	539,7	101,54	102,08	0,196	0,184	56	0,2649519
17,341	539,4	539,7	102,11	102,57	0,195	0,184	57	0,2637352
17,384	539,4	539,7	101,78	101,93	0,196	0,183	58	0,2645653
17,186	539,4	539,7	102,97	103,01	0,196	0,183	59	0,2616364
17,195	539,4	539,7	102,91	103,34	0,196	0,183	60	0,2616882
17,351	539,4	539,7	102,14	102,67	0,196	0,184	61	0,2638716
17,327	539,4	539,7	102,27	102,40	0,196	0,184	62	0,263594
17,180	539,4	539,7	102,98	103,56	0,196	0,183	63	0,261365
17,168	539,5	539,8	102,92	103,44	0,195	0,184	64	0,2612476
17,388	539,5	539,7	101,68	102,32	0,195	0,184	65	0,2645652
17,272	539,5	539,7	102,76	102,99	0,196	0,184	66	0,2626179
17,403	539,5	539,7	101,98	102,43	0,196	0,184	67	0,2645621
17,297	539,4	539,7	102,29	102,78	0,196	0,184	68	0,2632054
17,171	539,5	539,7	103,04	103,42	0,196	0,184	69	0,261248
17,319	539,5	539,7	102,37	102,89	0,196	0,184	70	0,2633095
17,394	539,5	539,7	101,75	102,32	0,196	0,184	71	0,264715
17,147	539,5	539,7	103,31	103,76	0,196	0,184	72	0,2608531
17,327	539,5	539,7	102,22	102,50	0,196	0,184	73	0,2635946
17,348	539,5	539,7	101,94	102,58	0,196	0,184	74	0,2639803
17,270	539,5	539,7	102,69	103,15	0,196	0,184	75	0,2626198
17,299	539,6	539,7	102,47	102,58	0,196	0,184	76	0,2632041
17,502	539,6	539,7	101,26	101,61	0,196	0,183	77	0,2662797
17,232	539,6	539,7	102,61	103,11	0,196	0,184	78	0,262221
17,387	539,6	539,7	101,84	102,29	0,196	0,184	79	0,2645649
17,346	539,6	539,7	101,99	102,20	0,196	0,183	80	0,2639825
17,312	539,6	539,7	102,08	102,64	0,196	0,183	81	0,2635156
17,189	539,6	539,7	102,77	103,39	0,195	0,184	82	0,2616392
17,340	539,7	539,7	101,92	102,36	0,196	0,184	83	0,2639824
17,381	539,7	539,7	101,84	102,28	0,196	0,184	84	0,2645657
17,227	539,7	539,7	102,72	103,08	0,196	0,184	85	0,2622274
17,180	539,7	539,8	102,89	103,35	0,196	0,184	86	0,2614707
17,149	539,7	539,8	103,02	103,46	0,195	0,183	87	0,2609849
17,340	539,7	539,8	101,97	102,37	0,196	0,183	88	0,2639833
17,280	539,7	539,8	102,18	102,44	0,196	0,183	89	0,2632039
17,132	539,7	539,8	103,09	103,38	0,196	0,183	90	0,2608541
17,491	539,7	539,8	100,96	101,55	0,195	0,183	91	0,2663031
17,332	539,7	539,8	101,87	102,30	0,196	0,184	92	0,2639841
17,330	539,7	539,8	102,27	102,54	0,196	0,183	93	0,2635316
17,699	539,7	539,7	100,12	100,64	0,196	0,184	94	0,2690742
17,808	539,6	539,7	99,59	99,76	0,196	0,184	95	0,2708923
17,601	539,5	539,6	100,21	100,63	0,196	0,183	96	0,268227
17,209	539,4	539,6	102,61	102,96	0,196	0,184	97	0,2621303
17,253	539,4	539,6	102,46	103,16	0,196	0,184	98	0,2625937
17,347	539,4	539,5	101,95	102,25	0,196	0,184	99	0,2639826
17,162	539,4	539,6	103,01	103,24	0,196	0,183	100	0,2612477
17,225	539,4	539,6	102,76	103,03	0,196	0,183	101	0,2622041
17,703	539,5	539,6	99,85	100,38	0,196	0,184	102	0,2694629
17,484	539,5	539,6	101,31	101,50	0,196	0,183	103	0,26592
17,659	539,4	539,5	100,33	100,81	0,196	0,183	104	0,268608
17,531	539,4	539,5	100,84	101,62	0,196	0,184	105	0,2668821
17,653	539,5	539,6	100,49	100,81	0,196	0,184	106	0,2682256
17,245	539,7	539,7	103,33	103,57	0,196	0,183	107	0,2616383
17,391	539,9	539,9	102,34	102,95	0,196	0,183	108	0,2635932
17,412	540,2	540,1	102,49	102,99	0,195	0,183	109	0,2635895
17,429	540,4	540,3	102,52	103,09	0,195	0,183	110	0,2635939
17,315	540,6	540,4	103,01	103,38	0,195	0,183	111	0,2621973
17,462	540,7	540,5	102,07	102,38	0,195	0,183	112	0,2645515
17,394	540,8	540,6	102,40	102,61	0,195	0,183	113	0,2635949
17,525	540,7	540,6	101,47	101,86	0,195	0,183	114	0,2658699
17,411	540,7	540,7	102,17	102,43	0,195	0,183	115	0,2639766
17,338	540,7	540,7	102,31	102,96	0,195	0,183	116	0,2632026

17,624	540,7	540,7	100,46	100,96	0,195	0,183	117	0,2677832
17,800	540,7	540,7	99,54	99,94	0,195	0,183	118	0,2705077
17,256	540,7	540,7	102,62	103,16	0,195	0,183	119	0,2622311
17,396	540,7	540,7	101,80	102,16	0,195	0,183	120	0,2645659
17,376	540,7	540,7	101,55	102,03	0,195	0,183	121	0,264566
17,033	540,7	540,7	104,02	104,30	0,195	0,183	122	0,2589624
17,686	540,7	540,7	100,04	100,46	0,195	0,183	123	0,2689936
17,468	540,7	540,8	101,23	101,68	0,195	0,183	124	0,2656563
17,726	540,7	540,8	99,72	100,26	0,195	0,183	125	0,2697053
17,815	540,7	540,8	99,02	99,58	0,195	0,184	126	0,2712109
17,614	540,7	540,7	100,26	100,59	0,195	0,183	127	0,2682259
16,976	540,6	540,7	103,93	104,35	0,195	0,183	128	0,2584833
17,282	540,6	540,7	101,80	102,45	0,195	0,183	129	0,2633328
17,203	540,6	540,7	102,40	102,73	0,195	0,183	130	0,2622481
17,585	540,6	540,7	100,07	100,24	0,195	0,183	131	0,2682276
17,425	540,6	540,7	100,81	101,32	0,195	0,183	132	0,2659201
17,529	540,6	540,6	100,46	100,92	0,195	0,184	133	0,2672678
17,744	540,5	540,6	99,05	99,44	0,196	0,184	134	0,2708881
17,730	540,5	540,6	98,89	99,29	0,196	0,183	135	0,2708931
17,656	540,5	540,6	99,04	99,57	0,195	0,183	136	0,2699227
17,517	540,5	540,6	100,15	100,28	0,195	0,183	137	0,2677033
17,112	540,5	540,6	102,21	102,63	0,195	0,183	138	0,2616418
17,069	540,4	540,5	102,64	103,08	0,195	0,183	139	0,2608548
17,816	540,3	540,5	98,23	98,45	0,195	0,183	140	0,27247
17,722	540,3	540,5	98,59	99,07	0,195	0,183	141	0,2712671
17,463	540,4	540,5	99,71	100,06	0,195	0,183	142	0,267653
17,791	540,4	540,5	97,85	98,20	0,195	0,183	143	0,2728
17,681	540,3	540,4	98,75	98,82	0,196	0,183	144	0,270817
17,863	540,4	540,4	97,46	97,71	0,196	0,183	145	0,2740755
17,748	540,4	540,4	97,99	98,50	0,196	0,183	146	0,2722163
17,565	540,4	540,4	99,08	99,38	0,196	0,183	147	0,2695627
17,778	540,4	540,4	97,72	98,17	0,196	0,183	148	0,2728458
17,671	540,3	540,4	98,29	98,60	0,195	0,183	149	0,2712517
17,610	540,3	538,1	98,61	99,32	0,196	0,184	150	0,2705133
17,806	540,3	538,2	97,48	98,39	0,196	0,184	151	0,273532
17,657	540,2	538,3	98,25	98,99	0,196	0,184	152	0,2712717
17,330	540,2	538,4	99,93	100,78	0,195	0,184	153	0,2663059
17,057	540,2	538,5	101,45	102,34	0,195	0,184	154	0,2622293
17,828	540,1	538,6	97,08	97,95	0,195	0,184	155	0,2740824
17,523	540,0	538,8	98,79	99,57	0,195	0,184	156	0,269508
17,529	540,0	539,0	98,61	99,00	0,196	0,184	157	0,2699445
17,291	539,8	539,2	99,82	100,49	0,196	0,184	158	0,2663066
17,190	539,7	539,4	100,75	101,33	0,196	0,184	159	0,2645479
17,387	539,7	539,6	99,48	99,91	0,196	0,184	160	0,2676527
17,208	539,7	539,8	100,39	100,75	0,196	0,184	161	0,2649529
17,267	539,6	540,1	100,18	100,37	0,196	0,183	162	0,2658932
17,127	539,6	540,3	101,02	101,29	0,196	0,183	163	0,2635941
17,353	539,6	540,5	99,72	99,85	0,196	0,183	164	0,2672677
17,440	539,6	540,7	99,07	99,26	0,196	0,183	165	0,2686077
17,283	539,5	540,9	99,88	100,38	0,196	0,183	166	0,266304
17,369	539,5	541,1	99,46	99,69	0,196	0,184	167	0,2676688
17,425	539,5	541,3	99,00	99,21	0,196	0,183	168	0,2686065
17,400	539,4	541,5	99,05	99,21	0,196	0,183	169	0,2682631
17,249	539,4	541,7	100,10	100,30	0,196	0,183	170	0,2658702
17,100	539,4	541,9	101,01	101,08	0,196	0,183	171	0,2635973
17,115	539,3	542,0	100,78	100,91	0,196	0,183	172	0,263982
17,390	539,3	542,2	99,10	99,02	0,196	0,183	173	0,268223
17,117	539,3	542,4	100,72	100,85	0,196	0,183	174	0,2640008
17,084	539,3	542,6	100,83	100,76	0,196	0,183	175	0,2635937
17,168	539,3	542,7	100,48	100,12	0,196	0,183	176	0,2649534
17,276	539,2	542,9	99,68	99,24	0,196	0,183	177	0,2667668
17,673	539,1	543,1	97,12	96,95	0,196	0,183	178	0,2731698

17,680	539,1	543,2	97,15	96,98	0,196	0,183	179	0,2731553
17,265	539,1	543,4	99,67	99,31	0,196	0,183	180	0,2666968
17,020	539,0	543,5	100,85	100,82	0,196	0,183	181	0,2632027
17,442	539,0	543,5	98,67	98,59	0,196	0,183	182	0,2695579
17,273	539,0	543,5	99,42	99,60	0,196	0,183	183	0,2668815
17,100	538,9	543,5	100,47	100,65	0,196	0,183	184	0,2641382
17,506	538,9	543,4	98,34	98,27	0,196	0,183	185	0,2705257
17,388	538,9	543,3	98,49	98,68	0,196	0,183	186	0,2689894
17,203	538,9	543,2	99,90	99,95	0,196	0,183	187	0,2659189
17,201	538,9	543,2	99,75	99,63	0,196	0,183	188	0,266198
17,409	538,9	538,1	98,77	99,25	0,196	0,185	189	0,2690648
17,647	538,8	538,2	97,45	98,06	0,196	0,184	190	0,2727796
17,546	538,8	538,3	97,75	98,37	0,196	0,184	191	0,2712699
17,608	538,8	538,4	97,54	98,00	0,196	0,184	192	0,2722149
17,831	538,8	538,5	96,14	96,74	0,196	0,184	193	0,2757722
17,814	538,8	538,6	96,39	96,93	0,196	0,184	194	0,2754023
17,680	538,8	538,8	97,05	97,53	0,196	0,184	195	0,2735259
17,795	538,7	539,0	96,28	96,53	0,196	0,184	196	0,2754553
17,273	538,7	539,2	99,12	99,66	0,196	0,184	197	0,2672661
17,261	538,7	539,4	99,66	99,98	0,196	0,184	198	0,2668818
17,027	538,6	539,6	100,88	101,18	0,196	0,184	199	0,2632027
17,224	538,7	539,8	99,68	99,79	0,196	0,184	200	0,2663627
17,131	538,7	540,1	100,13	100,29	0,196	0,183	201	0,2649539
17,282	538,6	540,3	99,32	99,42	0,196	0,183	202	0,2672656
17,018	538,6	540,5	100,97	100,97	0,196	0,183	203	0,2631972
17,130	538,6	540,7	100,21	100,21	0,196	0,183	204	0,264952
17,107	538,6	540,9	100,30	100,67	0,196	0,183	205	0,2645642
17,193	538,6	541,1	99,78	99,97	0,196	0,184	206	0,2659445
17,277	538,6	541,3	99,38	99,38	0,196	0,183	207	0,2672447
17,041	538,6	541,5	100,57	100,64	0,196	0,183	208	0,263593
17,351	538,5	541,7	98,65	98,86	0,196	0,183	209	0,2685789
17,109	538,5	541,9	100,41	100,40	0,196	0,183	210	0,2645635
17,506	538,5	542,0	97,91	98,02	0,196	0,183	211	0,2708912
17,443	538,4	542,2	98,30	98,05	0,196	0,183	212	0,2699454
17,443	538,4	542,4	98,29	98,20	0,196	0,183	213	0,2700735
17,603	538,4	542,6	97,52	97,22	0,196	0,183	214	0,2723826
17,712	538,4	542,7	96,92	96,52	0,196	0,183	215	0,2740919
17,651	538,3	542,9	97,24	96,71	0,196	0,183	216	0,2731542
17,361	538,3	543,1	98,94	98,50	0,196	0,183	217	0,2686066
17,752	538,3	543,2	96,57	96,28	0,196	0,183	218	0,2747131
17,477	538,3	543,4	98,35	97,71	0,196	0,183	219	0,2705122
17,641	538,3	538,1	97,18	97,58	0,196	0,184	220	0,2731541
17,660	538,3	538,2	96,96	97,59	0,196	0,184	221	0,2735297
17,271	538,3	538,3	99,09	99,46	0,196	0,184	222	0,2676504
17,805	538,3	538,4	96,26	96,56	0,196	0,184	223	0,2757708
17,228	538,3	538,5	99,53	99,80	0,196	0,184	224	0,2668822
17,195	538,2	538,6	99,63	100,05	0,196	0,184	225	0,2663322
17,150	538,2	538,8	99,62	100,09	0,196	0,184	226	0,2659183
17,043	538,2	539,0	100,60	100,66	0,196	0,184	227	0,2639827
17,806	538,2	539,2	96,25	96,50	0,196	0,184	228	0,2757718
17,156	538,2	539,4	99,85	100,09	0,196	0,184	229	0,2659181
17,075	538,2	539,6	100,36	100,41	0,196	0,184	230	0,2645804
17,316	538,2	539,8	98,91	98,93	0,196	0,184	231	0,2682242
17,255	538,2	540,1	99,22	99,28	0,196	0,183	232	0,2672653
17,175	538,2	540,3	99,76	99,77	0,196	0,183	233	0,2659715
17,170	538,1	540,5	99,79	99,80	0,196	0,183	234	0,2659212
17,228	538,1	540,7	99,09	99,05	0,196	0,183	235	0,2672653
17,554	538,1	540,9	97,39	97,58	0,196	0,183	236	0,2722136
17,618	538,2	541,1	96,84	97,10	0,196	0,184	237	0,2731541
17,406	538,2	541,3	98,20	98,13	0,196	0,183	238	0,2699431
17,612	538,2	541,5	96,99	96,86	0,196	0,183	239	0,2731535
17,639	538,2	541,7	96,92	96,90	0,196	0,183	240	0,2735293

17,605	538,1	541,9	97,00	96,91	0,196	0,183	241	0,2731559
17,243	538,1	542,0	98,96	98,90	0,196	0,183	242	0,2676495
17,228	538,0	542,2	99,09	98,80	0,196	0,183	243	0,2672662
17,183	538,0	542,4	99,47	99,39	0,196	0,183	244	0,2664509
17,095	538,0	542,6	100,16	99,78	0,196	0,183	245	0,2649608
17,170	538,0	542,7	99,51	99,12	0,196	0,183	246	0,2663043
16,979	538,0	542,9	100,75	100,19	0,196	0,183	247	0,263205
17,003	538,0	543,1	100,56	100,17	0,196	0,183	248	0,2635939
17,219	538,0	543,2	99,48	98,94	0,196	0,183	249	0,2668819
17,008	538,0	543,4	100,43	100,15	0,196	0,183	250	0,2635925
17,207	538,0	543,5	99,44	99,20	0,196	0,183	251	0,2668001
17,028	537,9	543,5	100,45	100,36	0,196	0,183	252	0,2639802
17,234	537,9	543,5	99,12	99,08	0,196	0,183	253	0,2672659
17,149	537,9	543,5	99,52	99,59	0,196	0,183	254	0,2659168
17,148	537,9	543,4	99,69	99,63	0,196	0,183	255	0,2659183
17,400	537,9	543,3	98,08	98,07	0,196	0,183	256	0,2699136
17,139	537,9	543,2	99,46	99,57	0,196	0,183	257	0,2659187
17,158	537,9	543,2	99,68	99,30	0,196	0,183	258	0,2663021
17,311	537,9	543,2	98,63	98,54	0,196	0,183	259	0,2685686
17,004	537,9	543,2	100,46	100,30	0,196	0,183	260	0,26398
17,146	538,0	543,3	99,76	99,56	0,197	0,183	261	0,2659177
17,795	538,1	543,5	96,34	96,29	0,196	0,183	262	0,2755203
17,516	538,3	543,6	98,13	97,73	0,196	0,183	263	0,2708896
17,212	538,5	543,8	99,97	99,96	0,196	0,183	264	0,265918
17,481	538,7	543,9	98,82	98,32	0,196	0,183	265	0,269767
17,352	538,9	544,1	99,47	99,41	0,196	0,183	266	0,2676302
17,275	539,1	544,3	100,06	99,71	0,196	0,183	267	0,266303
17,090	539,3	544,4	101,28	101,20	0,196	0,183	268	0,2632023
17,288	539,6	544,5	99,97	99,94	0,196	0,183	269	0,2661992
17,342	539,8	544,5	99,76	99,65	0,196	0,183	270	0,2668819
17,339	540,0	544,5	99,73	99,76	0,196	0,183	271	0,2668815
17,637	540,2	544,4	98,05	98,12	0,195	0,183	272	0,2712706
17,587	540,4	544,4	98,56	98,31	0,195	0,183	273	0,2704069
17,625	540,7	544,3	98,35	98,43	0,196	0,183	274	0,2708913
17,952	540,9	544,2	96,55	96,62	0,195	0,183	275	0,275775
17,614	541,1	544,1	98,56	98,76	0,195	0,183	276	0,2705137
17,965	541,3	544,0	96,49	96,70	0,195	0,183	277	0,27579
17,440	541,5	544,0	99,45	99,76	0,195	0,183	278	0,2676525
17,506	541,7	543,9	99,07	99,25	0,195	0,183	279	0,2686093
17,397	541,8	544,0	99,73	100,24	0,195	0,183	280	0,266885
17,367	542,0	544,1	99,96	100,33	0,195	0,183	281	0,2663256
17,495	542,2	544,2	99,38	99,63	0,195	0,183	282	0,2682278
17,408	542,3	542,2	99,87	100,11	0,195	0,183	283	0,2668863
17,446	542,5	542,4	99,88	100,29	0,195	0,183	284	0,2672707
17,465	542,6	542,6	99,34	99,90	0,195	0,183	285	0,2676476
17,836	542,8	542,7	97,62	97,86	0,195	0,183	286	0,2731598
17,696	543,0	542,9	98,33	98,58	0,195	0,183	287	0,2708968
17,698	543,2	543,1	98,41	98,72	0,195	0,183	288	0,2708965
17,677	543,3	543,2	98,32	98,86	0,195	0,183	289	0,270515
17,355	543,4	543,4	99,95	100,34	0,194	0,183	290	0,2660148
17,484	543,5	543,5	98,94	99,50	0,195	0,183	291	0,2685317
17,644	543,5	543,5	97,84	98,47	0,195	0,183	292	0,2712827
17,393	543,4	543,5	99,13	99,70	0,195	0,183	293	0,2676591
17,616	543,3	543,5	97,73	98,30	0,195	0,183	294	0,2712778
17,750	543,2	543,4	96,89	97,46	0,195	0,183	295	0,2735391
17,779	543,1	543,3	96,57	97,17	0,195	0,183	296	0,2741031
17,651	542,9	543,2	97,41	97,85	0,195	0,183	297	0,2722232
17,661	542,9	543,2	97,45	97,81	0,195	0,183	298	0,2722231
17,684	542,9	543,2	97,53	97,92	0,195	0,183	299	0,272309
17,732	543,0	543,2	97,48	97,94	0,195	0,183	300	0,2727884
17,861	543,2	543,3	96,84	97,34	0,195	0,183	301	0,2744762
18,051	543,3	543,5	96,12	96,58	0,195	0,183	302	0,2770836

17,687	543,5	543,6	98,12	98,40	0,195	0,183	303	0,2712802
17,904	543,7	543,8	96,90	97,60	0,195	0,183	304	0,2744791
17,931	543,9	543,9	97,11	97,36	0,195	0,183	305	0,2745701
17,376	544,1	544,1	100,24	100,83	0,195	0,183	306	0,2659205
17,396	544,3	544,3	99,96	100,40	0,195	0,183	307	0,2663151
17,603	544,4	544,4	98,43	99,09	0,195	0,183	308	0,2699531
17,395	544,5	544,5	99,24	99,84	0,194	0,183	309	0,2671586
17,323	544,4	544,5	99,46	99,96	0,194	0,183	310	0,2663177
17,370	544,4	544,5	99,23	99,64	0,195	0,183	311	0,2672775
17,369	544,2	544,4	99,02	99,42	0,195	0,183	312	0,2674373
17,434	544,1	544,4	98,63	98,78	0,195	0,183	313	0,2685945
17,251	544,0	544,3	99,52	99,98	0,195	0,183	314	0,2659218
17,605	543,8	544,2	97,47	97,73	0,195	0,183	315	0,271539
17,511	543,7	544,1	98,15	98,45	0,195	0,183	316	0,2701446
17,908	543,6	544,0	95,67	96,01	0,195	0,183	317	0,2763363
17,737	543,6	544,0	96,81	97,13	0,195	0,183	318	0,2735437
17,877	543,6	543,9	96,25	96,40	0,195	0,183	319	0,275413
17,394	543,7	544,0	99,08	99,57	0,195	0,183	320	0,2677679
17,947	543,8	544,1	96,07	96,59	0,195	0,183	321	0,2759228
17,773	544,0	544,2	97,40	97,86	0,195	0,183	322	0,2727922
17,820	544,2	544,3	97,35	97,87	0,195	0,183	323	0,273277
17,853	544,4	544,5	97,27	97,90	0,195	0,183	324	0,273553
17,697	544,6	544,7	98,37	98,75	0,195	0,183	325	0,2709037
17,567	544,8	544,8	99,15	99,48	0,195	0,183	326	0,2687167
18,052	545,0	545,0	96,53	96,73	0,195	0,182	327	0,2762881
17,799	545,1	545,1	97,42	97,72	0,195	0,182	328	0,2727931
17,408	545,1	545,2	99,29	99,55	0,195	0,182	329	0,2672812
17,179	545,1	545,2	100,34	100,78	0,194	0,182	330	0,2639961
17,473	545,0	545,2	98,61	98,71	0,195	0,182	331	0,2688241
17,425	544,9	545,1	98,53	99,13	0,195	0,182	332	0,2682462
17,416	544,7	545,0	98,71	98,80	0,195	0,182	333	0,2682403
17,740	544,7	545,0	96,79	97,13	0,195	0,182	334	0,2733715
17,576	544,6	544,9	97,42	98,04	0,194	0,183	335	0,2709047
17,595	544,5	544,8	97,47	97,77	0,194	0,183	336	0,271285
17,706	544,3	544,8	96,91	97,08	0,195	0,183	337	0,2731706
17,473	544,3	544,7	98,10	98,52	0,195	0,183	338	0,2696155
17,559	544,2	544,6	97,63	97,99	0,195	0,183	339	0,2709061
17,559	544,2	544,6	98,03	98,24	0,195	0,183	340	0,270526
17,400	544,3	544,6	99,08	99,57	0,195	0,183	341	0,2677164
17,372	544,4	544,7	99,30	99,56	0,195	0,183	342	0,2670621
17,825	544,6	544,8	97,13	97,45	0,195	0,182	343	0,2735436
17,926	544,8	545,0	96,64	97,25	0,195	0,183	344	0,2748553
17,837	545,0	545,1	97,60	97,95	0,195	0,183	345	0,2731561
17,913	545,1	545,2	97,25	97,64	0,195	0,183	346	0,2740314
17,845	545,3	545,4	97,49	97,80	0,195	0,183	347	0,2731709
17,275	545,4	545,5	100,21	100,68	0,195	0,183	348	0,2649673
17,467	545,4	545,6	98,84	99,37	0,194	0,183	349	0,2682336
17,215	545,4	545,6	100,14	100,60	0,194	0,183	350	0,2645816
17,194	545,3	545,6	99,98	100,36	0,194	0,182	351	0,2645813
17,373	545,0	545,4	98,62	98,99	0,194	0,182	352	0,2675864
17,519	544,8	545,2	97,66	98,15	0,194	0,182	353	0,2700093
17,364	544,6	545,1	98,51	98,98	0,194	0,182	354	0,2676746
17,271	544,5	545,0	99,15	99,57	0,194	0,182	355	0,2663205
17,007	544,4	544,9	100,57	101,03	0,194	0,182	356	0,2623284
17,413	544,3	544,8	98,26	98,61	0,194	0,182	357	0,2686386
17,300	544,2	544,8	98,90	99,06	0,194	0,182	358	0,266899
17,424	544,2	544,7	98,40	98,57	0,195	0,182	359	0,2686218
17,183	544,2	544,7	99,94	100,23	0,194	0,182	360	0,2645738
17,468	544,4	544,8	98,53	99,00	0,194	0,182	361	0,2686345
17,474	544,6	544,9	98,86	99,31	0,194	0,182	362	0,2682407
17,410	544,8	545,1	99,46	99,94	0,194	0,182	363	0,2668979
17,275	545,1	545,3	100,30	100,69	0,194	0,182	364	0,2645363

17,208	545,3	545,5	100,98	101,44	0,194	0,182	365	0,2632181
17,629	545,5	545,7	98,47	99,05	0,194	0,182	366	0,2695742
17,992	545,8	545,9	96,40	96,49	0,194	0,182	367	0,2755458
17,933	546,0	546,0	96,09	96,67	0,194	0,182	368	0,2750873
17,873	546,0	546,1	96,26	96,91	0,194	0,182	369	0,2744848
17,794	546,0	546,2	96,82	96,87	0,194	0,182	370	0,2735481
17,905	545,9	546,1	95,95	96,08	0,194	0,182	371	0,2754197
17,810	545,8	546,1	96,20	96,95	0,194	0,182	372	0,2741233
17,883	545,7	546,1	95,98	96,27	0,194	0,182	373	0,2754175
17,459	545,6	546,0	98,19	98,30	0,194	0,182	374	0,2690064
17,578	545,5	545,9	97,29	97,90	0,194	0,182	375	0,2709079
17,339	545,4	545,9	98,72	99,02	0,194	0,182	376	0,2672828
17,511	545,3	545,8	97,66	98,06	0,194	0,182	377	0,2699593
17,475	545,3	545,7	97,92	98,19	0,194	0,182	378	0,2694473
17,559	545,2	545,7	97,37	97,74	0,194	0,182	379	0,2708188
17,352	545,1	545,6	98,51	98,96	0,194	0,182	380	0,2676683
17,437	545,0	545,5	98,03	98,25	0,194	0,182	381	0,2690062
17,373	544,9	545,5	98,36	98,46	0,194	0,182	382	0,268242
17,450	544,6	545,3	97,71	97,97	0,194	0,182	383	0,2696199
17,531	544,4	545,1	97,16	97,37	0,194	0,182	384	0,2709074
17,850	544,3	545,0	95,64	95,94	0,194	0,182	385	0,2757907
17,783	544,2	544,9	96,09	96,55	0,195	0,182	386	0,2744839
17,663	544,3	544,9	97,19	97,46	0,195	0,183	387	0,2722557
17,569	544,4	544,9	97,68	98,19	0,194	0,183	388	0,2705301
17,714	544,6	545,0	97,37	97,74	0,194	0,182	389	0,2722314
17,842	544,8	545,2	96,93	97,37	0,194	0,183	390	0,2738398
17,902	545,0	545,3	96,75	97,02	0,194	0,182	391	0,2744869
17,563	545,3	545,5	98,72	99,10	0,194	0,182	392	0,2690055
17,382	545,5	545,7	99,62	100,06	0,194	0,182	393	0,2663473
17,263	545,7	545,9	99,89	100,41	0,194	0,182	394	0,2649487
17,505	545,8	546,0	98,39	98,65	0,194	0,182	395	0,2690062
17,402	545,8	546,0	98,72	99,22	0,194	0,182	396	0,2676672
17,389	545,8	546,0	98,73	98,98	0,194	0,182	397	0,267667
17,415	545,7	546,0	98,33	98,88	0,194	0,182	398	0,2682218
17,457	545,6	545,9	98,28	98,22	0,194	0,182	399	0,2690064
17,315	545,5	545,9	98,88	99,35	0,194	0,182	400	0,2668993
17,426	545,4	545,8	98,17	98,54	0,194	0,182	401	0,268705
17,414	545,3	545,8	98,25	98,43	0,194	0,182	402	0,2686262
17,297	545,3	545,7	98,84	99,06	0,194	0,182	403	0,2668994
17,493	545,2	545,6	97,70	98,00	0,194	0,182	404	0,2699584
17,848	545,1	545,6	95,61	96,21	0,194	0,182	405	0,2754844
17,339	545,0	545,5	98,44	99,14	0,194	0,183	406	0,2676681
17,072	544,9	545,5	99,99	100,35	0,194	0,183	407	0,2636103
17,221	544,9	545,4	99,18	99,57	0,194	0,182	408	0,2659351
17,320	544,8	545,3	98,60	99,10	0,194	0,183	409	0,2674858
17,365	544,7	545,3	98,36	98,63	0,195	0,183	410	0,2682415
17,538	544,6	545,2	97,51	97,85	0,195	0,183	411	0,2709067
17,275	544,6	545,2	98,81	99,07	0,195	0,183	412	0,266898
17,274	544,5	545,1	98,75	99,21	0,195	0,182	413	0,2668977
17,271	544,5	545,1	98,78	99,09	0,194	0,182	414	0,2668981
17,700	544,4	545,0	96,25	96,86	0,194	0,183	415	0,2735471
17,293	544,4	544,9	98,76	98,92	0,194	0,182	416	0,2671352
17,770	544,4	544,9	96,45	96,85	0,195	0,182	417	0,2740635
17,983	544,5	545,0	95,52	95,97	0,195	0,183	418	0,277089

Average	Average	Average	Proportional Rates Medium/low fire					Average
16,88	Inlet +	Inlet +						0,261
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,29	100,44	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
17,382	533,1	533,5			0,188	0,180	0	0,2616203
17,113	533,6	533,8	100,26	102,50	0,188	0,180	1	0,2616219
17,021	533,9	534,1	100,86	103,32	0,188	0,180	2	0,2600238
17,068	534,2	534,3	100,49	102,84	0,188	0,180	3	0,2608346
17,130	534,4	534,5	99,79	101,90	0,188	0,180	4	0,2622099
17,099	534,7	534,7	99,75	101,81	0,188	0,180	5	0,2619954
17,207	534,9	534,9	98,84	100,99	0,188	0,180	6	0,2639829
17,084	535,1	535,1	99,51	101,70	0,188	0,180	7	0,262212
17,198	535,3	535,3	98,54	100,75	0,188	0,180	8	0,2641173
17,251	535,5	535,5	98,41	100,51	0,188	0,179	9	0,2648829
17,220	535,7	535,7	98,49	100,53	0,188	0,179	10	0,2645484
16,743	535,9	535,9	100,89	103,25	0,188	0,179	11	0,2574724
16,717	535,9	536,0	101,14	103,19	0,188	0,179	12	0,257074
16,964	535,9	536,0	99,37	101,89	0,188	0,179	13	0,2610653
16,752	535,9	536,1	100,72	102,81	0,188	0,180	14	0,2578771
16,901	536,0	536,1	99,98	102,14	0,188	0,179	15	0,2598548
16,939	536,1	536,2	100,10	102,50	0,188	0,179	16	0,2600072
16,983	536,2	536,4	100,11	102,41	0,188	0,179	17	0,2602486
16,762	536,4	536,5	101,84	104,14	0,188	0,179	18	0,256479
17,002	536,6	536,6	100,41	102,75	0,187	0,179	19	0,2598543
16,775	536,7	536,8	101,90	104,08	0,187	0,179	20	0,2563056
16,706	536,9	537,0	102,34	104,76	0,187	0,179	21	0,2551096
16,906	537,1	537,1	101,28	103,62	0,187	0,179	22	0,2578727
16,759	537,4	537,3	102,33	104,74	0,187	0,179	23	0,2554747
17,449	537,6	537,5	98,09	100,50	0,187	0,179	24	0,2658947
17,302	537,8	537,8	98,97	101,37	0,187	0,179	25	0,2635458
17,245	538,1	538,0	99,48	101,74	0,187	0,179	26	0,2626069
17,310	538,3	538,2	98,99	101,33	0,187	0,179	27	0,2635737
17,291	538,5	538,4	99,07	101,57	0,186	0,179	28	0,2631667
17,320	538,7	538,6	98,97	101,33	0,186	0,179	29	0,2635845
17,078	538,9	538,8	100,34	102,96	0,186	0,179	30	0,2598591
16,960	539,1	538,9	100,76	102,95	0,186	0,178	31	0,2584712
17,343	539,1	539,0	98,27	100,68	0,186	0,178	32	0,2645551
17,152	539,1	539,1	99,43	101,53	0,186	0,178	33	0,2616304
17,242	539,0	539,1	98,77	101,01	0,186	0,178	34	0,2632123
17,135	538,9	539,1	99,26	101,62	0,186	0,178	35	0,2615436
17,264	538,9	539,1	98,51	100,86	0,186	0,178	36	0,263587
16,857	538,8	539,1	100,93	103,19	0,186	0,178	37	0,2574752
17,160	538,7	539,0	98,98	101,10	0,186	0,178	38	0,2622182
17,034	538,7	539,0	99,87	102,13	0,186	0,178	39	0,260255
17,225	538,7	539,0	98,69	100,72	0,186	0,178	40	0,2631958
17,392	538,7	539,0	97,42	99,40	0,186	0,178	41	0,2661889
16,926	538,7	539,0	100,21	102,49	0,186	0,178	42	0,2588679
16,734	538,8	539,0	101,69	104,09	0,186	0,178	43	0,2554795
16,943	538,9	539,1	100,42	102,77	0,186	0,178	44	0,258474
16,966	539,1	539,2	100,26	102,52	0,186	0,178	45	0,258872
17,137	539,2	539,3	99,59	101,97	0,186	0,178	46	0,2612394
16,973	539,4	539,5	100,44	102,85	0,186	0,178	47	0,2588729
16,963	539,5	539,6	100,54	102,84	0,186	0,178	48	0,2585109
16,998	539,7	539,8	100,39	102,62	0,186	0,178	49	0,2588724
16,769	539,8	539,9	101,70	104,08	0,186	0,178	50	0,2554819
16,861	539,9	540,0	100,88	103,21	0,186	0,178	51	0,2570819
16,902	539,8	540,0	100,61	102,90	0,186	0,178	52	0,2578789
17,136	539,8	540,0	99,01	101,42	0,186	0,178	53	0,2616332
16,848	539,7	539,9	100,56	102,96	0,186	0,178	54	0,257482
16,907	539,6	539,9	99,96	102,29	0,186	0,178	55	0,2587072
17,379	539,5	539,8	97,33	99,45	0,186	0,178	56	0,2659109
17,130	539,5	539,8	98,43	100,37	0,186	0,178	57	0,2626224
17,084	539,4	539,8	98,61	100,96	0,186	0,178	58	0,2616344
16,836	539,4	539,8	100,25	102,65	0,186	0,178	59	0,2578811
16,790	539,3	539,7	100,36	102,43	0,186	0,178	60	0,2574844
16,824	539,3	539,7	100,23	102,55	0,186	0,178	61	0,2578809
16,973	539,3	539,7	99,50	101,89	0,186	0,178	62	0,2599033
16,978	539,3	539,7	99,22	101,40	0,186	0,178	63	0,2602603
17,159	539,4	539,7	98,29	100,32	0,186	0,178	64	0,2632004
16,981	539,6	539,8	99,46	101,94	0,186	0,178	65	0,2600136

17,112	539,7	539,9	99,01	101,13	0,186	0,178	66	0,2616343
16,863	539,9	540,0	100,46	102,67	0,186	0,178	67	0,2578832
17,010	540,1	540,2	99,80	101,88	0,186	0,178	68	0,2598633
16,601	540,3	540,3	102,23	104,55	0,186	0,178	69	0,2536687
17,024	540,4	540,5	99,59	101,98	0,186	0,178	70	0,2598645
16,799	540,6	540,7	101,02	103,19	0,186	0,178	71	0,2564587
16,535	540,7	540,8	102,43	104,79	0,186	0,178	72	0,2526574
16,690	540,7	540,8	101,42	103,58	0,186	0,178	73	0,2550798
17,102	540,6	540,8	98,68	101,07	0,186	0,178	74	0,2616366
17,068	540,4	540,7	98,69	100,81	0,186	0,178	75	0,2615142
17,082	540,3	540,7	98,58	100,73	0,186	0,177	76	0,2616361
16,638	540,1	540,6	101,06	103,38	0,186	0,177	77	0,2550644
16,840	540,0	540,5	99,72	101,91	0,186	0,177	78	0,2583402
16,858	539,9	540,4	99,82	101,93	0,186	0,177	79	0,2585015
16,813	539,8	540,4	100,13	102,04	0,186	0,177	80	0,2578827
16,909	539,7	540,3	99,57	101,55	0,186	0,177	81	0,2593429
16,796	539,7	540,3	99,90	102,09	0,186	0,177	82	0,2579053
16,741	539,6	540,2	100,15	102,52	0,186	0,178	83	0,2570872
16,959	539,6	540,2	99,20	100,99	0,186	0,177	84	0,2602609
17,006	539,6	540,1	98,80	101,06	0,186	0,177	85	0,2608502
17,187	539,5	540,1	97,81	99,98	0,186	0,178	86	0,2635924
17,090	539,5	540,1	98,39	100,51	0,186	0,178	87	0,2622246
16,479	539,5	540,1	101,63	103,86	0,186	0,178	88	0,2532671
16,666	539,5	540,0	100,71	102,79	0,186	0,178	89	0,2560819
16,690	539,4	540,0	100,77	102,65	0,186	0,178	90	0,2564865
17,107	539,4	540,0	97,76	100,23	0,186	0,178	91	0,2629658
16,993	539,5	540,0	98,64	100,64	0,186	0,178	92	0,261244
17,043	539,5	540,0	98,73	100,75	0,186	0,178	93	0,2616364
17,002	539,7	540,1	98,81	100,93	0,186	0,178	94	0,2608502
17,071	539,8	540,2	98,25	100,60	0,185	0,177	95	0,2618356
17,045	540,1	540,4	98,82	101,14	0,186	0,178	96	0,2612444
16,956	540,3	540,5	99,25	101,47	0,186	0,178	97	0,2598657
17,075	540,5	540,7	98,66	100,77	0,186	0,177	98	0,2616373
16,886	540,6	540,8	99,22	102,01	0,185	0,178	99	0,258876
16,662	540,6	540,9	100,77	103,05	0,185	0,178	100	0,2554836
16,821	540,6	540,9	99,77	102,07	0,185	0,177	101	0,2580874
16,712	540,5	540,9	100,44	102,68	0,186	0,178	102	0,2564929
16,506	540,5	540,9	101,57	103,61	0,186	0,177	103	0,2536711
17,045	540,4	540,9	98,42	100,51	0,186	0,178	104	0,2618642
16,987	540,3	540,8	98,69	100,93	0,186	0,178	105	0,2608518
16,833	540,3	540,8	99,63	101,83	0,186	0,178	106	0,2584788
16,608	540,2	540,8	100,91	103,31	0,186	0,178	107	0,2550839
16,997	540,2	540,8	98,34	100,49	0,186	0,177	108	0,2612472
16,800	540,2	540,8	99,44	101,50	0,186	0,177	109	0,2584794
16,982	540,2	540,7	98,41	100,75	0,186	0,178	110	0,2612447
17,124	540,1	540,7	97,60	99,69	0,186	0,178	111	0,2635921
17,282	540,1	540,7	96,41	98,40	0,186	0,178	112	0,2663016
16,877	540,1	540,7	98,98	101,07	0,186	0,177	113	0,2598678
16,815	540,1	540,8	99,18	101,51	0,186	0,178	114	0,2588787
16,796	540,1	540,8	99,09	101,25	0,186	0,177	115	0,2587592
17,270	540,1	540,8	96,66	98,65	0,186	0,177	116	0,2659183
16,819	540,1	540,8	99,13	101,40	0,186	0,177	117	0,2589271
16,706	540,1	540,8	99,82	102,14	0,186	0,178	118	0,2570865
16,805	540,1	540,7	99,37	101,47	0,186	0,177	119	0,2586444
16,489	540,0	540,7	101,25	103,74	0,186	0,178	120	0,2536714
16,510	540,0	540,7	101,31	103,45	0,186	0,178	121	0,2540325
16,733	540,0	540,6	100,00	102,31	0,186	0,178	122	0,2574866
17,303	539,9	540,6	96,45	98,77	0,186	0,178	123	0,266305
16,914	539,9	540,6	99,05	100,88	0,186	0,178	124	0,2602705
16,948	539,9	540,6	98,64	100,76	0,186	0,178	125	0,2608735
16,326	539,8	540,6	101,96	104,07	0,186	0,177	126	0,2516423
16,450	539,8	540,5	101,20	103,28	0,186	0,177	127	0,2536732
16,552	539,7	540,5	100,36	102,46	0,186	0,177	128	0,2554238
17,141	539,7	540,5	96,93	99,08	0,186	0,178	129	0,264564
16,469	539,7	540,4	101,08	103,09	0,186	0,178	130	0,2540767
16,753	539,6	540,4	99,15	101,35	0,186	0,178	131	0,2584939
16,439	539,5	540,4	101,32	103,09	0,186	0,177	132	0,2536737
16,753	539,5	540,3	99,23	101,37	0,186	0,177	133	0,2584789
16,742	539,4	540,3	99,32	101,34	0,186	0,178	134	0,2584803
16,734	539,4	540,3	99,33	101,42	0,186	0,178	135	0,2584801
16,677	539,3	540,2	99,50	101,92	0,186	0,178	136	0,2574832
17,141	539,3	540,1	97,10	99,03	0,186	0,178	137	0,2645634
17,123	539,3	540,1	96,89	98,94	0,186	0,178	138	0,2645408

16,845	539,2	540,0	98,44	100,90	0,186	0,178	139	0,2602607
16,466	539,2	540,0	100,65	102,68	0,186	0,178	140	0,2546776
16,736	539,1	540,0	98,91	100,99	0,186	0,178	141	0,258877
16,908	539,1	539,9	97,92	100,04	0,186	0,178	142	0,2616365
16,942	539,1	539,9	97,62	99,81	0,186	0,178	143	0,2622177
17,231	539,0	539,9	95,90	97,88	0,186	0,178	144	0,2668792
16,889	539,0	539,9	97,88	99,87	0,186	0,178	145	0,2616565
17,116	539,1	539,9	96,66	98,80	0,186	0,178	146	0,2648716
16,643	539,2	540,0	99,75	101,75	0,186	0,178	147	0,257087
16,845	539,4	540,1	98,57	100,74	0,186	0,178	148	0,2602766
17,108	539,6	540,3	97,22	99,35	0,186	0,178	149	0,2639795
16,777	539,8	540,4	98,96	101,06	0,186	0,177	150	0,2588764
17,168	539,9	540,5	96,77	98,90	0,186	0,177	151	0,2650486
17,207	540,1	540,7	96,37	98,35	0,186	0,178	152	0,2659174
17,071	540,1	540,8	96,82	99,12	0,186	0,178	153	0,2639801
17,013	540,2	540,8	96,98	99,19	0,186	0,178	154	0,263171
17,000	540,2	540,8	97,29	99,28	0,186	0,177	155	0,2630453
17,164	540,2	540,9	96,16	98,08	0,186	0,177	156	0,2659124
16,560	540,1	540,9	99,86	101,87	0,186	0,178	157	0,2564891
16,654	540,1	540,9	99,10	101,41	0,186	0,178	158	0,2578847
16,683	540,1	540,9	98,88	100,86	0,186	0,178	159	0,2584793
17,215	540,0	540,8	95,83	97,95	0,186	0,178	160	0,2667707
17,376	539,9	540,8	94,86	96,83	0,186	0,178	161	0,2692654
16,860	539,9	540,8	97,94	100,16	0,186	0,178	162	0,2612249
16,865	539,9	540,8	97,70	99,53	0,186	0,178	163	0,2616417
16,782	539,8	540,7	98,10	100,34	0,186	0,178	164	0,2602617
16,571	539,8	540,7	99,17	101,42	0,186	0,178	165	0,2570015
16,601	539,8	540,7	99,11	101,20	0,186	0,178	166	0,2574872
17,018	539,7	540,7	96,50	98,60	0,186	0,177	167	0,2639813
16,896	539,7	540,6	97,13	99,44	0,186	0,178	168	0,2622368
17,044	539,7	540,6	96,41	98,49	0,186	0,178	169	0,2645708
16,608	539,6	540,6	98,87	100,99	0,186	0,178	170	0,257885
16,900	539,6	540,5	97,22	99,55	0,186	0,178	171	0,2621912
16,856	539,7	540,6	97,45	99,63	0,186	0,178	172	0,261666
17,245	539,9	540,7	95,60	97,74	0,186	0,178	173	0,2672652
16,781	540,1	540,8	98,32	100,67	0,186	0,178	174	0,259868
16,933	540,3	541,0	97,65	99,96	0,186	0,178	175	0,261937
16,657	540,5	541,1	99,33	101,38	0,186	0,178	176	0,2575064
16,820	540,7	541,3	98,55	100,79	0,186	0,177	177	0,2598667
16,683	540,9	541,5	99,29	101,68	0,186	0,178	178	0,2575059
17,020	541,1	541,7	97,46	99,46	0,185	0,177	179	0,2626177
16,961	541,4	541,9	97,91	99,79	0,185	0,177	180	0,2616402
16,632	541,6	542,1	99,88	101,98	0,186	0,177	181	0,2564916
16,887	541,8	542,3	98,35	100,73	0,185	0,177	182	0,2602878
16,780	542,0	542,5	99,03	101,62	0,185	0,178	183	0,2584827
17,192	542,2	542,6	96,78	99,03	0,185	0,177	184	0,2647359
17,338	542,3	542,8	96,04	98,21	0,185	0,177	185	0,2669608
16,956	542,5	543,0	98,36	100,61	0,185	0,177	186	0,2608556
16,913	542,7	543,2	98,49	100,61	0,185	0,177	187	0,2602661
17,019	542,8	543,4	98,14	100,31	0,185	0,177	188	0,2616461
17,168	543,0	543,5	97,22	99,46	0,185	0,177	189	0,263985
17,201	543,2	543,7	96,73	98,84	0,185	0,177	190	0,2649563
17,044	543,3	543,8	97,40	99,45	0,185	0,177	191	0,2628878
17,049	543,3	543,8	97,12	99,42	0,185	0,177	192	0,2631545
17,037	543,2	543,8	96,91	99,35	0,185	0,177	193	0,2632089
16,832	543,1	543,8	98,18	100,33	0,185	0,177	194	0,2602657
16,529	543,0	543,8	99,99	101,94	0,186	0,177	195	0,2556294
16,553	542,9	543,7	99,52	101,92	0,185	0,177	196	0,2561002
16,636	542,8	543,6	99,17	101,40	0,185	0,177	197	0,257494
16,543	542,7	543,6	99,39	101,98	0,185	0,178	198	0,2561755
16,627	542,6	543,5	99,17	101,19	0,185	0,177	199	0,2574937
16,647	542,6	543,5	99,00	101,04	0,186	0,177	200	0,2578927
16,939	542,6	543,5	97,46	99,40	0,186	0,177	201	0,2622324
16,870	542,6	543,5	97,98	100,27	0,186	0,177	202	0,2608589
16,758	542,8	543,6	98,92	100,95	0,186	0,177	203	0,2588852
16,751	542,9	543,7	99,12	101,34	0,186	0,177	204	0,258489
16,945	543,1	543,8	98,22	99,99	0,186	0,177	205	0,2612036
17,087	543,3	543,9	97,61	99,64	0,186	0,177	206	0,2632105
16,903	543,4	544,1	98,58	100,57	0,186	0,177	207	0,2602699
16,949	543,6	544,3	98,24	100,67	0,185	0,177	208	0,2608602
17,259	543,8	544,4	96,41	98,55	0,185	0,177	209	0,2659274
16,914	543,9	544,5	98,24	100,18	0,186	0,177	210	0,2608608
16,777	543,9	544,5	98,86	101,00	0,186	0,177	211	0,258886

16,671	543,9	544,5	99,33	101,45	0,186	0,177	212	0,2574958
16,885	543,8	544,5	98,06	100,19	0,186	0,177	213	0,2608611
17,059	543,7	544,4	96,91	99,16	0,186	0,177	214	0,2636014
16,922	543,6	544,4	97,79	99,86	0,186	0,177	215	0,2616477
17,116	543,6	544,4	96,74	98,69	0,186	0,177	216	0,2645741
16,742	543,5	544,3	98,81	100,69	0,186	0,177	217	0,2588879
16,673	543,4	544,2	99,16	101,09	0,186	0,177	218	0,2578819
16,701	543,3	544,2	98,88	100,89	0,186	0,177	219	0,25849
16,792	543,3	544,2	98,24	100,62	0,186	0,178	220	0,2598766
16,878	543,2	544,1	97,81	100,01	0,186	0,178	221	0,2611487
16,919	543,2	544,1	97,83	99,70	0,186	0,177	222	0,2616467
16,883	543,1	544,0	97,78	99,76	0,186	0,177	223	0,2612547
17,236	543,1	544,0	95,86	97,76	0,186	0,177	224	0,2668914
16,878	543,1	544,0	97,68	99,90	0,186	0,177	225	0,261274
17,075	543,1	544,0	96,91	99,00	0,186	0,177	226	0,2640392
17,003	543,3	544,1	97,49	99,68	0,186	0,178	227	0,262626
16,925	543,4	544,2	97,88	100,16	0,186	0,177	228	0,2612554
16,917	543,6	544,4	98,17	100,37	0,185	0,177	229	0,2608324
16,710	543,8	544,5	99,60	101,73	0,185	0,177	230	0,2574969
16,660	544,0	544,7	99,91	102,12	0,185	0,177	231	0,2564986
16,630	544,2	544,8	100,05	102,40	0,185	0,177	232	0,2560975
16,726	544,3	545,0	99,36	101,37	0,185	0,177	233	0,2578945
16,777	544,4	545,1	98,75	100,81	0,185	0,177	234	0,2588882
16,896	544,4	545,1	97,86	100,23	0,185	0,177	235	0,2609529
16,577	544,4	545,1	99,75	101,72	0,185	0,177	236	0,2560996
16,821	544,3	545,1	98,13	100,25	0,185	0,177	237	0,25999
16,528	544,2	545,0	99,96	101,94	0,185	0,177	238	0,2555912
16,735	544,1	545,0	98,51	100,71	0,185	0,177	239	0,2588885
16,612	544,1	545,0	99,31	101,33	0,185	0,177	240	0,2570985
16,877	544,0	544,9	97,72	99,80	0,186	0,177	241	0,2612654
16,567	544,0	544,9	99,57	101,72	0,186	0,177	242	0,2564529
17,087	543,9	544,8	96,40	98,43	0,186	0,177	243	0,2645745
16,803	543,9	544,8	98,07	100,26	0,186	0,177	244	0,2602727
16,831	543,9	544,8	97,74	99,84	0,186	0,177	245	0,2608515
16,555	543,8	544,7	99,44	101,70	0,186	0,177	246	0,2564965
16,793	543,8	544,7	98,06	100,32	0,186	0,178	247	0,2602723
16,786	543,7	544,7	98,04	100,27	0,186	0,178	248	0,2602719
16,701	543,7	544,6	98,66	100,89	0,186	0,178	249	0,2588885
16,938	543,6	544,6	97,17	99,24	0,186	0,178	250	0,2626244
16,936	543,6	544,5	97,11	99,40	0,186	0,178	251	0,2626279
17,059	543,6	544,5	96,28	98,58	0,186	0,178	252	0,2645596
16,755	543,5	544,5	98,15	100,22	0,186	0,178	253	0,2598768
16,686	543,5	544,4	98,51	100,39	0,186	0,177	254	0,2588881
16,659	543,4	544,4	98,66	100,85	0,186	0,177	255	0,258491
16,741	543,4	544,4	98,11	100,37	0,186	0,178	256	0,2598647
16,587	543,4	544,3	99,04	101,33	0,186	0,178	257	0,2574969
16,585	543,3	544,3	98,94	101,23	0,186	0,178	258	0,2574118
16,630	543,4	544,3	99,07	101,14	0,186	0,178	259	0,2578996
16,719	543,5	544,4	98,85	100,98	0,186	0,178	260	0,2588878
16,689	543,7	544,5	99,03	101,00	0,186	0,177	261	0,2581419
16,665	543,9	544,6	99,55	101,47	0,186	0,177	262	0,2574967
17,137	544,0	544,8	96,76	98,87	0,186	0,177	263	0,2645764
16,927	544,2	544,9	97,76	99,83	0,186	0,177	264	0,2616492
17,183	544,3	545,0	95,92	98,06	0,186	0,177	265	0,2659045
16,611	544,3	545,0	99,29	101,43	0,185	0,177	266	0,2570987
16,892	544,3	545,0	97,46	99,54	0,186	0,177	267	0,261649
17,009	544,2	545,0	96,57	98,67	0,185	0,177	268	0,2636056
16,935	544,1	545,0	96,91	99,14	0,185	0,177	269	0,2626282
16,781	544,0	544,9	97,91	100,01	0,186	0,177	270	0,2602738
17,248	544,0	544,8	95,17	97,39	0,186	0,178	271	0,2676606
17,324	543,9	544,8	94,89	96,75	0,186	0,177	272	0,268825
16,805	543,8	544,7	97,71	99,79	0,186	0,177	273	0,2608639
16,916	543,7	544,7	96,99	98,92	0,186	0,177	274	0,2626283
16,734	543,7	544,6	97,84	100,17	0,186	0,177	275	0,2599367
16,582	543,6	544,6	99,02	101,01	0,186	0,178	276	0,2574969
16,610	543,6	544,5	98,83	100,78	0,186	0,177	277	0,2578952
16,601	543,5	544,5	98,79	101,07	0,186	0,177	278	0,2577183
16,753	543,5	544,4	97,93	99,81	0,186	0,177	279	0,2602697
16,664	543,5	544,4	98,48	100,28	0,186	0,177	280	0,258888
16,823	543,4	544,4	97,57	99,55	0,186	0,177	281	0,2612962
16,844	543,3	544,3	97,42	99,55	0,186	0,178	282	0,2616485
16,846	543,3	544,3	97,33	99,35	0,186	0,178	283	0,2616476
16,757	543,3	544,2	97,93	100,05	0,186	0,177	284	0,2602713

16,520	543,2	544,2	99,53	101,49	0,186	0,178	285	0,2564987
16,728	543,2	544,1	98,08	100,09	0,186	0,178	286	0,2598833
16,749	543,1	544,1	97,83	99,93	0,186	0,178	287	0,2602728
17,247	543,0	544,0	95,17	97,31	0,186	0,178	288	0,2679622
17,225	543,1	544,0	95,30	97,09	0,186	0,178	289	0,2676606
16,576	543,1	544,0	99,03	101,28	0,186	0,178	290	0,2572885
16,635	543,2	544,0	99,03	101,01	0,186	0,178	291	0,2579114
16,631	543,3	544,1	99,12	101,37	0,186	0,177	292	0,2575272
16,617	543,4	544,2	99,41	101,70	0,186	0,178	293	0,257096
16,527	543,6	544,3	100,07	102,65	0,186	0,178	294	0,2554961
16,618	543,7	544,4	99,48	101,62	0,186	0,178	295	0,2570096
16,450	543,8	544,5	100,23	102,29	0,186	0,177	296	0,2546881
16,621	543,8	544,5	99,24	101,19	0,186	0,177	297	0,2575049
16,621	543,8	544,5	99,11	101,29	0,186	0,177	298	0,2576174
16,447	543,7	544,4	99,88	102,14	0,186	0,178	299	0,2550942
16,501	543,6	544,4	99,52	101,82	0,186	0,178	300	0,256097
16,437	543,5	544,3	99,90	102,19	0,186	0,178	301	0,2550802
17,041	543,4	544,3	96,26	98,32	0,186	0,178	302	0,2645784
16,971	543,3	544,2	96,64	98,66	0,186	0,177	303	0,2636023
16,946	543,2	544,1	96,92	99,09	0,186	0,178	304	0,2632493
17,179	543,1	544,0	95,46	97,50	0,186	0,178	305	0,2669057
16,790	543,0	543,9	97,87	99,94	0,186	0,178	306	0,2608632
16,786	542,9	543,8	97,89	99,79	0,186	0,178	307	0,260861
16,751	542,9	543,7	98,08	100,05	0,186	0,178	308	0,2602701
16,549	542,8	543,7	99,16	101,21	0,186	0,178	309	0,257129
17,138	542,8	543,6	95,78	97,82	0,186	0,178	310	0,2663133
16,417	542,7	543,6	100,08	102,13	0,186	0,178	311	0,2550941
16,643	542,7	543,5	98,44	100,67	0,186	0,178	312	0,2585946
16,508	542,6	543,5	99,47	101,68	0,186	0,178	313	0,2564975
16,593	542,6	543,5	98,92	101,01	0,186	0,178	314	0,257892
16,631	542,5	543,4	98,63	100,71	0,186	0,178	315	0,2584895
16,569	542,4	543,4	99,11	101,12	0,186	0,178	316	0,2575266
16,710	542,4	543,3	98,10	100,36	0,186	0,178	317	0,2598764
16,653	542,4	543,3	98,36	100,71	0,186	0,178	318	0,2588857
16,744	542,5	543,3	98,31	100,32	0,186	0,178	319	0,2598745
16,703	542,6	543,4	98,88	100,86	0,186	0,178	320	0,2588862
16,805	542,7	543,5	98,15	100,39	0,186	0,178	321	0,2602691
16,797	542,9	543,6	98,61	100,58	0,186	0,178	322	0,259875
16,830	543,1	543,7	98,37	100,72	0,186	0,178	323	0,2602673
16,703	543,2	543,8	98,97	101,01	0,186	0,178	324	0,2584879
16,929	543,3	543,9	97,41	99,63	0,186	0,178	325	0,2622333
16,794	543,3	543,9	98,17	100,15	0,186	0,178	326	0,2602685
16,538	543,3	543,9	99,48	101,72	0,186	0,178	327	0,2564967
16,701	543,2	543,9	98,47	100,66	0,186	0,178	328	0,2591066
17,013	543,2	543,9	96,53	98,63	0,186	0,178	329	0,2639852
17,069	543,1	543,8	96,32	98,26	0,186	0,177	330	0,2649606
17,190	543,0	543,7	95,73	97,58	0,186	0,178	331	0,2668905
16,946	542,9	543,7	96,89	98,89	0,186	0,178	332	0,2632107
17,123	542,8	543,6	95,97	98,13	0,186	0,178	333	0,2659275
16,844	542,7	543,5	97,51	99,49	0,186	0,178	334	0,2616462
16,967	542,7	543,4	96,87	98,62	0,186	0,178	335	0,2636005
17,188	542,6	543,4	95,50	97,54	0,186	0,178	336	0,2670728
16,958	542,5	543,3	96,83	98,87	0,186	0,178	337	0,2636044
16,835	542,4	543,2	97,49	99,68	0,186	0,178	338	0,2616456
16,647	542,4	543,2	98,50	100,71	0,186	0,178	339	0,2587439
16,808	542,3	543,1	97,59	99,65	0,186	0,178	340	0,2612527
16,627	542,2	543,0	98,64	100,92	0,186	0,178	341	0,25849
16,776	542,2	543,0	97,76	100,02	0,186	0,178	342	0,2608435
16,586	542,1	542,9	98,92	101,10	0,186	0,178	343	0,2578927
16,714	542,0	542,8	98,21	100,34	0,186	0,178	344	0,2598745
16,615	542,0	542,8	98,73	100,83	0,186	0,178	345	0,2584888
16,533	542,0	542,8	99,48	101,59	0,186	0,178	346	0,256862
16,766	542,1	542,8	98,22	100,20	0,186	0,178	347	0,2602682
16,701	542,2	542,9	98,80	101,04	0,186	0,178	348	0,2588854
16,592	542,4	543,0	99,72	101,95	0,186	0,178	349	0,2569677
16,622	542,6	543,1	99,72	101,78	0,186	0,178	350	0,2570955
16,627	542,7	543,3	99,65	102,20	0,186	0,178	351	0,257095
17,015	542,9	543,4	97,16	99,07	0,186	0,178	352	0,2633915
16,797	542,9	543,4	98,16	100,34	0,186	0,178	353	0,2602704
17,027	542,9	543,5	96,78	98,73	0,186	0,178	354	0,2639889
17,078	542,9	543,5	96,39	98,57	0,186	0,178	355	0,2649591
17,071	542,8	543,5	96,37	98,40	0,186	0,178	356	0,2649494
17,125	542,8	543,4	95,95	98,02	0,186	0,178	357	0,2658787

16,945	542,7	543,4	96,99	99,14	0,186	0,178	358	0,2632111
16,666	542,6	543,3	98,61	100,73	0,186	0,178	359	0,2588848
16,549	542,5	543,3	99,41	101,45	0,186	0,178	360	0,2570828
16,599	542,4	543,2	98,94	101,11	0,186	0,178	361	0,2578912
16,658	542,3	543,1	98,64	100,61	0,186	0,178	362	0,2588859
16,592	542,2	543,0	98,85	101,08	0,186	0,178	363	0,2578936
16,539	542,2	542,9	99,29	101,25	0,186	0,178	364	0,2570946
16,563	542,1	542,9	99,13	101,08	0,186	0,178	365	0,2574941
16,789	542,0	542,8	97,79	99,65	0,186	0,178	366	0,2610594
16,532	541,9	542,7	99,28	101,13	0,186	0,178	367	0,2570934
16,802	541,9	542,6	97,66	99,72	0,186	0,178	368	0,2612522
16,694	541,8	542,6	98,31	100,49	0,186	0,178	369	0,2596355
16,616	541,8	542,5	98,76	100,60	0,186	0,178	370	0,2584871
17,029	541,8	542,5	96,14	98,37	0,186	0,178	371	0,2649582
16,941	541,8	542,5	96,91	99,35	0,186	0,178	372	0,263209
16,907	541,9	542,5	97,48	99,50	0,186	0,178	373	0,2623266
16,940	542,0	542,6	97,29	99,65	0,186	0,178	374	0,2626209
16,955	542,2	542,7	97,39	99,63	0,186	0,178	375	0,2626232
16,968	542,3	542,8	97,48	99,93	0,186	0,178	376	0,2625129
17,288	542,4	542,9	95,99	98,04	0,186	0,178	377	0,2672721
17,028	542,6	543,1	97,14	99,37	0,186	0,178	378	0,2635991
16,891	542,7	543,2	97,53	99,72	0,186	0,178	379	0,2617551
17,084	542,7	543,2	96,40	98,64	0,186	0,178	380	0,2649329
16,962	542,6	543,2	97,03	98,95	0,186	0,178	381	0,263205
16,984	542,6	543,2	96,81	98,99	0,186	0,178	382	0,2636002
16,675	542,5	543,1	98,62	100,83	0,186	0,178	383	0,2588853
17,123	542,4	543,1	95,99	98,10	0,186	0,178	384	0,2659245
16,756	542,3	543,0	98,19	100,30	0,186	0,178	385	0,2602663
16,600	542,2	543,0	98,90	101,13	0,186	0,178	386	0,2578907
16,419	542,1	542,9	100,01	102,10	0,186	0,178	387	0,2551239
16,632	542,1	542,8	98,73	100,75	0,186	0,178	388	0,2584875
16,476	542,0	542,7	99,69	101,89	0,186	0,178	389	0,2560947
16,653	541,9	542,7	98,50	100,66	0,186	0,178	390	0,2588843
16,562	541,8	542,6	99,00	101,46	0,186	0,178	391	0,2574932
16,711	541,8	542,5	98,14	100,39	0,186	0,178	392	0,2598731
16,458	541,7	542,5	99,68	101,91	0,186	0,178	393	0,2560528
16,942	541,6	542,4	96,64	99,01	0,186	0,178	394	0,2635981
16,705	541,6	542,3	98,20	100,28	0,186	0,178	395	0,259874
17,140	541,6	542,3	95,72	97,71	0,187	0,178	396	0,2667764
16,994	541,6	542,3	96,73	98,68	0,187	0,178	397	0,2641577
17,004	541,7	542,3	96,79	98,88	0,186	0,178	398	0,2639875
16,975	541,8	542,4	97,37	99,37	0,186	0,178	399	0,2632088
16,950	541,9	542,5	97,43	99,63	0,186	0,178	400	0,2626236
16,795	542,1	542,6	98,65	100,94	0,186	0,178	401	0,2598738
16,913	542,2	542,7	97,81	100,08	0,186	0,178	402	0,2616443
16,881	542,4	542,9	98,08	100,37	0,186	0,178	403	0,2612527
16,796	542,5	543,0	98,42	100,57	0,186	0,178	404	0,2602778
16,762	542,6	543,0	98,40	100,47	0,186	0,178	405	0,2598743
17,017	542,5	543,0	96,78	98,99	0,186	0,178	406	0,263988
17,035	542,5	543,0	96,58	98,62	0,186	0,178	407	0,2643888
16,851	542,4	543,0	97,59	99,85	0,186	0,178	408	0,2616419
16,906	542,4	543,0	97,24	99,16	0,186	0,178	409	0,262624
17,143	542,3	542,9	95,97	97,97	0,186	0,178	410	0,2663212
17,173	542,2	542,9	95,82	97,73	0,187	0,178	411	0,2668637
17,111	542,1	542,8	96,04	97,96	0,187	0,178	412	0,2659253
17,256	542,0	542,7	95,22	97,21	0,186	0,178	413	0,2682306
17,251	541,9	542,6	95,15	97,02	0,186	0,178	414	0,2682322
16,825	541,8	542,6	97,46	99,75	0,186	0,178	415	0,261646
17,010	541,7	542,5	96,31	98,67	0,186	0,178	416	0,2645703
16,945	541,7	542,4	96,67	98,87	0,186	0,178	417	0,2636033
17,148	541,6	542,3	95,56	97,82	0,186	0,178	418	0,2668244
16,944	541,5	542,3	96,69	98,80	0,186	0,178	419	0,2635976
16,997	541,5	542,2	96,43	98,62	0,186	0,178	420	0,2645704
16,819	541,4	542,1	97,27	99,57	0,186	0,178	421	0,2618809
17,265	541,5	542,1	94,94	97,07	0,186	0,178	422	0,2686101
16,842	541,5	542,2	97,68	99,77	0,186	0,178	423	0,2616436
16,690	541,7	542,3	98,89	101,02	0,186	0,178	424	0,2589133
16,674	541,8	542,3	98,95	101,23	0,186	0,178	425	0,258478
16,956	541,9	542,4	97,66	99,68	0,186	0,178	426	0,2626225
16,974	542,1	542,6	97,53	100,05	0,186	0,178	427	0,2626228
16,929	542,2	542,7	97,90	100,01	0,186	0,178	428	0,2619023
16,801	542,4	542,8	98,32	100,41	0,186	0,178	429	0,2602697
16,786	542,4	542,9	98,34	100,23	0,186	0,178	430	0,2602684

16,776	542,4	542,9	98,11	100,22	0,186	0,178	431	0,2602678
16,804	542,4	542,9	97,79	100,10	0,186	0,178	432	0,2608557
16,946	542,3	542,9	96,90	99,04	0,186	0,178	433	0,2632086
17,226	542,2	542,8	95,35	97,39	0,186	0,178	434	0,2676636
16,982	542,1	542,8	96,61	98,88	0,186	0,178	435	0,2639384
16,869	542,0	542,7	97,34	99,45	0,186	0,178	436	0,2622317
17,038	542,0	542,7	96,31	98,29	0,186	0,178	437	0,2649579
16,922	541,9	542,6	96,98	99,12	0,186	0,178	438	0,2632133
16,936	541,8	542,5	96,79	99,01	0,186	0,178	439	0,263548
16,966	541,7	542,5	96,55	98,75	0,186	0,178	440	0,2639892
16,813	541,6	542,4	97,51	99,56	0,186	0,178	441	0,2616438
16,896	541,5	542,3	97,10	99,22	0,187	0,178	442	0,2629654
16,849	541,5	542,2	97,38	99,22	0,187	0,178	443	0,2622313
16,631	541,4	542,2	98,50	100,99	0,187	0,178	444	0,258883
16,718	541,4	542,1	97,76	100,04	0,186	0,178	445	0,2602634
16,803	541,3	542,1	97,54	99,64	0,186	0,178	446	0,2616437
16,565	541,3	542,1	98,94	101,22	0,187	0,178	447	0,2578885
16,764	541,4	542,1	98,04	100,14	0,187	0,178	448	0,2606106
16,616	541,5	542,1	99,03	101,33	0,186	0,178	449	0,257972
16,866	541,6	542,2	97,83	100,11	0,186	0,178	450	0,2616424
16,882	541,7	542,2	97,81	100,01	0,186	0,178	451	0,2616419
17,199	541,8	542,4	96,13	98,29	0,186	0,178	452	0,2663086
17,126	542,0	542,5	96,81	99,11	0,186	0,178	453	0,2649573
17,027	542,1	542,6	97,25	99,28	0,186	0,178	454	0,2635977
16,999	542,2	542,7	97,13	99,36	0,186	0,178	455	0,2635124
16,623	542,3	542,7	99,06	101,24	0,186	0,178	456	0,2578956
16,829	542,3	542,8	97,79	100,18	0,186	0,178	457	0,2612515
16,818	542,2	542,7	97,94	99,85	0,186	0,178	458	0,2612516
17,113	542,2	542,7	96,01	97,95	0,186	0,178	459	0,2659215
16,866	542,1	542,7	97,35	99,19	0,186	0,178	460	0,2622327
16,888	542,0	542,7	97,11	99,32	0,186	0,178	461	0,2626229
17,044	541,9	542,6	96,17	98,25	0,186	0,178	462	0,2651306
16,730	541,9	542,6	98,05	99,87	0,186	0,178	463	0,2602699
16,917	541,8	542,5	97,00	99,17	0,187	0,178	464	0,2632083
17,110	541,7	542,5	95,83	97,70	0,187	0,178	465	0,2662583
17,023	541,7	542,4	96,32	98,25	0,187	0,178	466	0,2649594
17,022	541,6	542,4	96,17	98,27	0,186	0,178	467	0,2649574
16,840	541,5	542,3	97,24	99,29	0,186	0,178	468	0,2622321
16,997	541,5	542,2	96,31	98,52	0,186	0,178	469	0,2646754
16,840	541,4	542,2	97,34	99,14	0,187	0,178	470	0,2622311
16,863	541,4	542,1	97,17	99,12	0,187	0,178	471	0,2626251
17,134	541,3	542,1	95,56	97,70	0,187	0,178	472	0,2668874
17,185	541,4	542,1	95,41	97,34	0,187	0,178	473	0,2676253
16,825	541,4	542,1	97,49	99,53	0,187	0,178	474	0,261644
16,849	541,5	542,2	97,77	99,67	0,186	0,178	475	0,2616432
17,040	541,6	542,2	96,78	98,86	0,186	0,178	476	0,2643916
16,920	541,8	542,3	97,70	99,88	0,186	0,178	477	0,2622322
17,410	542,0	542,5	94,92	97,10	0,186	0,178	478	0,2695664
17,027	542,1	542,6	97,15	99,55	0,186	0,178	479	0,2635132
17,035	542,3	542,7	96,94	99,27	0,186	0,178	480	0,2638741
17,292	542,4	542,8	95,27	97,78	0,186	0,178	481	0,2682273
17,191	542,4	542,9	95,63	98,04	0,186	0,179	482	0,266888
16,944	542,4	542,9	96,94	98,92	0,186	0,178	483	0,2631947
16,961	542,4	542,9	96,94	98,92	0,186	0,178	484	0,2636044
16,890	542,3	542,9	97,17	99,36	0,186	0,178	485	0,2626241
17,203	542,2	542,8	95,20	97,19	0,186	0,178	486	0,2675839
17,119	542,1	542,8	95,74	97,92	0,186	0,178	487	0,266312
17,150	542,1	542,7	95,44	97,58	0,186	0,178	488	0,2668886
16,997	542,0	542,7	96,29	98,39	0,186	0,178	489	0,2645717
16,449	541,9	542,6	99,48	101,50	0,186	0,178	490	0,2560937
16,509	541,8	542,6	99,19	101,36	0,186	0,178	491	0,2570937
16,558	541,8	542,5	98,74	100,92	0,186	0,178	492	0,2578922
16,683	541,7	542,4	98,08	100,25	0,186	0,178	493	0,2598733
16,744	541,6	542,4	97,59	99,76	0,186	0,178	494	0,2608575
16,936	541,6	542,3	96,57	98,48	0,186	0,178	495	0,2639875
16,933	541,5	542,2	96,62	98,77	0,187	0,178	496	0,2639882
17,144	541,3	542,1	95,43	97,28	0,187	0,178	497	0,2673262

APPENDIX 13: Operating instruction

<u>High Fire with a Cold Start</u>

To start the fire from a "cold" stove:

1. Cut and split 12 kindling pieces 16 inches long. Half of them should be approximately ¾ inch square, the rest ½ inch square. Cut and split 4 kindling pieces 12 inches long, about ½ inch square. The kindling should be very dry and weigh approximately 3.5lbs
2. Cut and split 8 start-up fuel pieces 16 inches long and 1 ½ inches square. Cut and split 4 start-up fuel pieces 12 inches long, two 1 ½ inches square and two that are ¾ inches square. These can be split from larger fuel pieces that are in the range of 19-25% moisture (Dry-basis). The total weight of the start-up fuel should be approximately 6.5 lbs.
3. Arrange the start-up fuel pieces in a grid on the bottom of the firebox with short pieces side to side and long pieces running front to back. First on the bottom the larger 12 inch pieces side to side about 10 inches apart. Next place the 4 larger 16 inch pieces front to back on top of the 12 inch pieces. Next the 2 remaining cross pieces and the 4 remaining long pieces on top.
4. Next arrange the kindling pieces in a similar grid pattern with the larger pieces first followed by the smallest. See Photos


Kindling


Start up fuel


Kindling on top, start up fuel on bottom, stacked in fire box

5. Make sure the air control is fully open to the right.
6. Using a propane torch, light the top front of the kindling grid. The torch should be operated for 60 seconds.
7. Close the door until it hits the latch. This will leave the door in a slightly open position.
8. After one minute, close the door fully and secure the door latch.
9. Make sure the air control is still in the maximum open position.

Adding the High Fire fuel load:

1. When the kindling and start up fuel have burned down by approximately 2/3, rake remaining coals and fuel pieces forward until they are equally distributed and level.
2. Place your largest piece in the center with the two smaller pieces on the either side packed tightly together making sure there is space on both sides of the load for good air flow. Place the remaining pieces on top.

Low Fire Fueling and Operation (loading on coals after High Fire operation):

1. At the end of the high fire, rake the remaining coals forward until they are equally distributed and level
2. Place your largest piece in the center with two smaller pieces on either side packed tightly together making sure there is space in both sides of the load for good airflow. Place the remaining pieces on top.
3. Immediately close the door and open the air control to max (fully to the right)
4. After one minute set the air control to the center position until the fire is well established on the top of the wood. Gradually reduce the air setting over a period of up to 15 minutes until the handle is all the way to the left.

Medium Fire Fueling and Operation (loading on coals after High Fire operation):

1. At the end of the high fire rake the remaining coals forward until they are equally distributed and level.
2. Place your largest piece in the center of the firebox with two smaller pieces on either side, packed tightly together making sure there is space on both sides of the load for good air flow, place the remaining pieces on top.
3. Immediately close the load door and open the air control to max (all the way to the right).
4. After 1 minute set the control to the medium air flow position, the center of its range (the middle).

Blower Settings for all tests

High Fire Cold Start:	Blower on HIGH in automatic on mode
Medium Fire:	Blower on LOW in automatic on mode
Low Fire:	Blower on LOW in automatic on mode

Trescal

4407 rue Charleroi, Montréal-Nord (Québec) H1H 1T6 Canada
TEL.: (514) 329-3242 / 1 888 774-6665
FAX : (514) 329-3750
info.canada@trescal.com

Certificat d'Étalonnage / Certificate of Calibration

CLIENT :
SERVICES POLYTESTS INC.
695-B GAUDETTE
ST-JEAN-SUR-RICHELIEU, QUEBEC

Description: VÉRIFICATEUR D'HUMIDITÉ / MOISTURE METER
Fabricant/ Manufacturer: DELMHORST
Modèle/ Model : MCS-1 REFERENCE STANDARD
No série / Serial no : N/A
 # Inventaire / Asset # : **EM-191**

CERTIFICAT No / Certificate No: **254067**

PROCÉDURE / Procedure :
TRESCAL - DELMHORST_MCS-1 REFERENCE STANDARD

aaaa - mm - jj
Date étalonnage/ Calibration Performed : **2018-12-19**

Echéance/ Due Date : **2019-12-19**

Type de résultat / *Results type* : **As-Found = As-Left**

Résultats d'essais / *Test results* : **Conforme / In Tolerance**

Conditions de mesure / Measurement conditions

TEMPÉRATURE / Temp. : **23.2°C**

HUMIDITÉ / Humidity : **28% RH**

Usage restreint/ *Restricted use* : ☐

Réparation effectuée / *Repair performed* : ☐

Ajustement effectué / *Adjustment performed* : ☐

ÉTALONS UTILISÉS/ Standards Used:

Identification	Manuf.	Model	Description	Ser. #	Etalonné/ Cal.	Echéance/ Due
PR0661	FLUKE	8508A	REFERENCE MULTIMETER	389272208	2018-07-27	2019-07-27

Les spécifications mentionnées comme limites de tolérances d'essai sont celles établies par le manufacturier, sauf indication contraire.
Test tolerance limits are based on manufacturers specifications unless stated otherwise.

NOTES :

2019. 01. 07

Technicien : Technician

V. KOSTADINOV

Le système qualité de la société est conforme aux exigences de la norme ISO 17025 et les étalons utilisés pour le processus d'étalonnage sont retraçables au SI par l'entreprise du CNRC et/ou du NIST.
Our quality system complies with the requirements of ISO 17025 and the standards used for the calibration are traceable to SI through NRC and/or NIST.

ACCREDITATION 17025 ISO/IEC

LE DROIT D'AUTEUR DE CE CERTIFICAT APPARTIENT À TRESCAL / PRIMO INSTRUMENT INC.CE CERTIFICAT NE PEUT ÊTRE REPRODUIT AUTREMENT QU'EN ENTIER ET AVEC LE CONSENTEMENT PRÉALABLE ÉCRIT DU GROUPE TRESCAL.
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CALIBRATION SOLUTIONS TO IMPROVE YOUR PERFORMANCE
Réf : Primo.056M 2016-10-04 Rev. 7.1
LA MÉTROLOGIE AU SERVICE DE VOTRE PERFORMANCE
www.trescal.com

Trescal

Certificat d'Étalonnage
Certificate of Calibration

	254067
CLIENT / Customer :	SERVICES POLYTESTS INC.
DESCRIPTION / Description :	VÉRIFICATEUR D'HUMIDITÉ / MOISTURE METER
MANUFACTURIER / Manufacturer :	DELMHORST
MODÈLE / Model :	MCS-1 REFERENCE STANDARD

DESCRIPTION Description		LIMITES Limits	LECTURES Readings	LIMITES Limits
DOUGLAS-FIR @ 80°F				**Déviation**
	Nominal			***Mohms***
12 %	120 MOhms		115.1	4.9
22 %	1.10 MOhms		1.099	0.001

S:\CERTIFICAT\MANUFACTURIER\DELMHORST\MCS-1 REFERENCE STANDARD

FORME : REV. 2011-12-13

ACCREDITATION 17025 ISO/IEC

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LA MÉTROLOGIE AU SERVICE DE VOTRE PERFORMANCE

www.trescal.com

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-006 06/03/19

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

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

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

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Setra	**No. du certificat d'étalonnage:**	2019001131
No. Série:	2784759	**Dernière date d'étalonnage:**	27-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	27-Feb-20

Commentaire:

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0000 "H2O	0.000 "H2O	0.000 "H2O	0.000 "H2O	0.000 "H2O	0.25 "H2O	Vérification indicateur
0.2500 "H2O	0.250 "H2O	0.249 "H2O	-0.001 "H2O	0.249 "H2O	0.25 "H2O	Vérification indicateur
0.5000 "H2O	0.500 "H2O	0.500 "H2O	0.000 "H2O	0.500 "H2O	0.25 "H2O	Vérification indicateur
0.7500 "H2O	0.750 "H2O	0.750 "H2O	0.000 "H2O	0.750 "H2O	0.25 "H2O	Vérification indicateur
1.0000 "H2O	1.000 "H2O	0.998 "H2O	-0.002 "H2O	0.998 "H2O	0.25 "H2O	Vérification indicateur
0.0000 "H2O	0.0000 V.DC.	0.0003 V.DC.	+0.0003 V.DC.	0.0003 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.2500 "H2O	2.5000 V.DC.	2.4714 V.DC.	-0.0286 V.DC.	2.4714 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.5000 "H2O	5.0000 V.DC.	5.0177 V.DC.	0.0177 V.DC.	5.0177 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.7500 "H2O	7.5000 V.DC.	7.5058 V.DC.	0.0058 V.DC.	7.5058 V.DC.	0.5 V.DC.	Vérification sortie analogique
1.0000 "H2O	10.0000 V.DC.	9.9982 V.DC.	-0.0018 V.DC.	9.9982 V.DC.	0.5 V.DC.	Vérification sortie analogique

Conditions Environnementales: Température: 19 °C Humidité 20 %RH

Type d'Étalonnage:

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

2019.03-19

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

Martin Langlais - Technicien

5F09106

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DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

CLAS
NRC CNRC
CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

Client :	Polytests	**No. du Certificat :**	**152-4BB901-181**
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	**Date d'étalonnage :**	09-01-2018

Technicien:
Simeonidis, Georgios

David Llorens

David Llorens, Responsable Qualité

DESCRIPTION DU SERVICE:

Description des masses :	ASTM E617	**Date d'approbation :**	09-01-2018
Classe de précision :	ASTM 6	**Date prochain étalonnage :**	09-01-2023
Densité :	$7.95 g/cm^3$	**Accrédtation CCN n. :**	668
Identification (si unique) :	EM-090	**Certification CLAS n. :**	2010-01

Condition d'essai :	Temp °C:	21.17	Pression kPa:	101.475	Humidité:	48.665

NOTES:

Pour l'étalonnage des masses, nous utilisons la procédure "Comparaison individuelle" PDL-09-MG-001 et la procédure "Détermination des incertitudes" PDL-09-MG-002. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.

REMARQUES:

11 JANV. 2018

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Client :	Polytests	**No. du Certificat :**	**152-4BB901-181**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	St-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Classe d'exactitude :**	ASTM 6
		Date d'étalonnage :	09-01-2018
Masse :	2 kg	**Date du prochain étalonnage :**	09-01-2023

RÉSULTAT DE L'ÉTALONNAGE, MASSE CONVENTIONNELLE:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle	Masse conventionnelle après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
2 kg		EM-090	2.0001538 kg		200 mg	2.0 mg

S.P.

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CERTIFICAT D'ÉTALONNAGE

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Client :	Polytests	**No. du Certificat :**	**152-4BB901-181**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	St-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Classe d'exactitude :**	ASTM 6
		Date d'étalonnage :	09-01-2018
Masse :	2 kg	**Date du prochain étalonnage :**	09-01-2023

RÉSULTAT DE L'ÉTALONNAGE DES POIDS, CORRECTIONS:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle Correction	Masse conventionnelle Correction après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
2 kg		EM-090	153.8 mg		200 mg	2.0 mg

CERTIFICAT D'ÉTALONNAGE

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BALANCES UTILISÉES

Pour l'étalonnage manuel :

> 5 kg à 25 kg :	Mettler Toledo XP32003L, SNR 1123271214, max. 32100 g, d = 0.005 g
> 1 kg à 5 kg	Mettler Toledo PR5003, SNR 1115311634, max. 5100 g, d = 0.001 g
> 300 g à 2 kg :	Mettler Toledo XP2004S, SNR B131185222, max. 2100 g, d = 0.1 mg
> 100 g à 200 g :	Mettler Toledo AT201 SNR BA1115230146, max. 205 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1127063924, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1121103055, max. 5.1 g, d = 0.1 µg

Pour l'étalonnage automatisé :

> 200 g à 1 kg :	Mettler Toledo AX1005 SNR 1127063210, max. 1109 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1120143015, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1125140561, max. 5.1 g, d = 0.1 µg

Les balances sont vérifiées selon notre procédure de contrôle périodique PDL-11-MG-001.

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

1. *L'incertitude associée à l'opération de pesage.*
2. *L'incertitude associée à la densité de l'air.*
3. *L'incertitude associée à l'étalon utilisé.*
4. *L'incertitude associée à la densité de la masse à être étalonnée.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de k = 2. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

D.P.

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CERTIFICAT D'ÉTALONNAGE

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RÉFÉRENCES UTILISÉES

Poids	No de série	Fabricant	Date d'étalonnage	Date due
20kg	69976	Troemner	30-05-2017	30-05-2018
5kg	129099	Mettler Toledo	02-09-2017	02-09-2018
5kg	96-0888-50-3	Denver Instrument Company	02-09-2017	02-09-2018
2kg	129098	Mettler Toledo	02-09-2017	02-09-2018
2kg	96-0888-50-3	Denver Instrument Company	02-09-2017	02-09-2018
300g	96-0888-50-2	Denver Instrument Company	02-09-2017	02-09-2018
1kg - 1mg	MT-01	Mettler Toledo	02-09-2017	02-09-2018

ÉTALONS CERTFIÉS PAR LE CNRC(**Référence NRC MS-2016-0021**)

Poids	No de série	Fabricant	Date d'étalonnage	Date due
100g	95170	Mettler Toledo	17-10-2016	17-10-2018
10kg	129100	Mettler Toledo	17-10-2016	17-10-2018
1kg	95171	Mettler Toledo	17-10-2016	17-10-2018

RÉFÉRENCES DE LA STATION ROBOTISÉE

Poids	No de série	Fabricant	Date d'étalonnage	Date due
1kg - 1mg	DK000A132	Laboratoire Dispersion	01-08-2017	01-08-2018

DP

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ACCREDITATION ISO 17025
CNN Portée Numéro 668

CERTIFICAT D'ÉTALONNAGE

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Client :	Polytests	**No. du Certificat :**	**142-508805-181-2130**
Adresse :	695 B rue Gaudette Saint-Jean-sur-Richelieu, QC J3B7S7	**Date d'étalonnage :**	28-05-2018

Technicien:
Gatto, Angelo

David Llorens

David Llorens, Responsable Qualité

DESCRIPTION DU SERVICE:

Modèle de Balance :	PA214	**Méthode :**	ISO 17025
Manufacturier :	Ohaus	**Date d'approbation :**	29-05-2018
Numéro de Série :	8331230529	**Date prochain étalonnage :**	28-05-2019
Numéro d'identification :	EM-232	**accréditation CCN n. :**	668
Capacité :	210g	**Certification CLAS n. :**	2010-01
Résolution:	0.0001g		

Condition d'essai :	Temp °C:	19	Pression kPa:	101.5	Humidité %:	62

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

CETTE BALANCE RENCONTRE LES SPÉCIFICATIONS SUIVANTES:

Type de test :	Manufacturier
Excentricité:	☑ Oui ☐ Non
Linéarité:	☑ Oui ☐ Non
Sensibilité:	☑ Oui ☐ Non
Répétabilité:	☑ Oui ☐ Non

NOTES:

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

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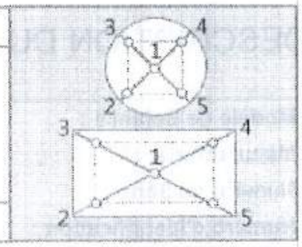
Client :	Polytests	**No. du Certificat :**	**142-508805-181-2130**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	Saint-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Modèle de Balance :**	PA214
		Date d'étalonnage :	28-05-2018
Méthode :	ISO 17025	**Date du prochain étalonnage :**	28-05-2019

TEST D'EXCENTRICITÉ:

Poids Test: 50 g Tolérance 0.0003 g
(Note: Le Poids Test est taré au centre du plateau de pesée)

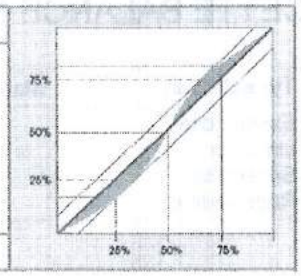
Position	Avant Ajustement	Après Ajustement
1: Centre:	0.0000 g	---
2: Avant Gauche:	0.0001 g	---
3: Arrière Gauche:	0.0000 g	---
4: Arrière Droit:	0.0000 g	---
5: Avant Droit:	0.0000 g	---
Résultats	0.0001 g	---
STATUT	**CONFORME**	**N/A**



TEST DE LINÉARITÉ:

Méthode: Substitution Plage: 210 g Poids Test: 50 g Tolérance: 0.0002 g

Pré-Charge	Avant Ajustement	Après Ajustement
0.0000 g	50.0001 g	---
50.0000 g	50.0001 g	---
100.0000 g	50.0000 g	---
150.0000 g	50.0001 g	---
---	---	---
---	---	---
---	---	---
Résultats	**0.00005 g**	---
STATUT	**CONFORME**	**N/A**



TEST DE SENSIBILITÉ:

Valeur de masse conventionnelle: 200.0002 g Tolérance: 0.0004 g Résultats: 0.00% < 0.10%

	Avant Ajustement	Après Ajustement
Lecture:	200.0002 g	---
Résultats:	**0.0000 g**	---
STATUT	**CONFORME**	**N/A**

$$S = \frac{\Delta W}{\Delta m}$$

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CERTIFICAT D'ÉTALONNAGE

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Client :	Polytests	**No. du Certificat :**	**142-508805-181-2130**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	Saint-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Modèle de Balance :**	PA214
		Date d'étalonnage :	28-05-2018
Méthode :	ISO 17025	**Date du prochain étalonnage :**	28-05-2019

TEST DE RÉPÉTABILITÉ:

AVANT AJUSTEMENT:

Charge Utilisée:
100.0000 g

Tolérance:
0.00010 g

Résolution d'affichage:
0.0001 g

Moyenne:
100.00019 g

Écart-type:
0.00003 g

#	Vide	Chargé	Différence
1	0.0000 g	100.0002 g	100.0002 g
2	0.0000 g	100.0001 g	100.0001 g
3	0.0000 g	100.0002 g	100.0002 g
4	0.0000 g	100.0002 g	100.0002 g
5	0.0000 g	100.0002 g	100.0002 g
6	0.0000 g	100.0002 g	100.0002 g
7	0.0000 g	100.0002 g	100.0002 g
8	0.0000 g	100.0002 g	100.0002 g
9	0.0000 g	100.0002 g	100.0002 g
10	0.0000 g	100.0002 g	100.0002 g

Statut : CONFORME

APRÈS AJUSTEMENT:

Charge Utilisée:

Tolérance:
0.00010 g

Résolution d'affichage:
0.0001 g

Moyenne:

Écart-type:

#	Vide	Chargé	Différence
1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---
6	---	---	---
7	---	---	---
8	---	---	---
9	---	---	---
10	---	---	---

Statut : N/A

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CERTIFICAT D'ÉTALONNAGE

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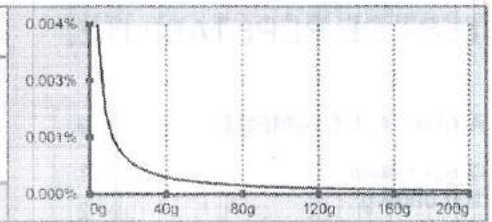
INCERTITUDE AVANT AJUSTEMENT :

$$Uc = \sqrt{\left(u_{(cr)}^2 + s_p^2 + u_{(l)}^2 + u_{(dr)}^2 + u_{(s)}^2\right)}$$

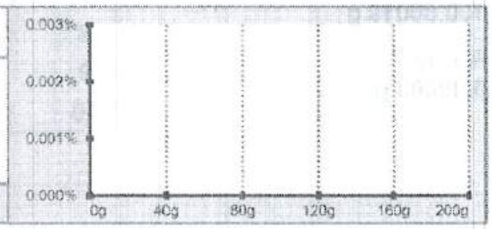
u(cr) = Incertitude reliée à l'étalon utilisé
Sp = Incertitude de l'écart-type
u(l) = Incertitude associée à la linéarité
u(dr) = Incertitude associée à résolution si Sp = 0
u(s) = Incertitude liée à la sensibilité (span)

Valeur	Incertitude	Incertitude (%)
12.5000 g	0.00016 g	0.001285 %
25.0000 g	0.00016 g	0.000643 %
50.0000 g	0.00016 g	0.000324 %
100.0000 g	0.00017 g	0.000165 %
200.0000 g	0.00021 g	0.000104 %



INCERTITUDE APRÈS AJUSTEMENT :

Valeur	Incertitude	Incertitude (%)
---	---	---
---	---	---
---	---	---
---	---	---



NOTES :

De ces valeurs d'incertitudes, seule la valeur surlignée est calculée selon ISO17025:2005, les autres étant estimées jusqu'au résultat de l'incertitude minimale. Dans le calcul de cette l'incertitude, l'écart-type utilisé est de 0,577d (où d est la précision d'affichage de la balance) lorsque cet écart-type est plus inférieur à 0,577d.

CERTIFICAT D'ÉTALONNAGE

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RÉFÉRENCE

ENSEMBLE DE RÉFÉRENCE:

Référence	No de série	Fabricant	Date d'étalonnage
1mg-5kg	DK000A175	Dispersion	29-09-2017

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

1. *L'incertitude associée à l'opération de pesage.*
2. *L'incertitude associée à l'écart-type.*
3. *L'incertitude associée à l'étalon utilisé.*
4. *L'incertitude associée à la résolution de l'appareil.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de k = 2. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

REMARQUES:

18 MAI 2018

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-249 06/03/19

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

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

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Indicateur	**Type d'entrée:**	Pression
Manufacturier:	Dwyer	**Type de sortie:**	Voltage
No. Model:	MS-321-LCD	**Type de mesure:**	Pression
No. Série:	N/A	**Gamme:**	0 à 0.10 "H2O
Emplacement:	Banc de test	**No. Machine:**	N/A

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Setra	**No. du certificat d'étalonnage:**	2019001131
No. Série:	2784759	**Dernière date d'étalonnage:**	27-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	27-Feb-20

Commentaire:

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0000 "H2O	0.0000 "H2O	-0.0002 "H2O	-0.0002 "H2O	0.0002 "H2O	0.25 "H2O	Vérification indicateur
0.0250 "H2O	0.0250 "H2O	0.0242 "H2O	-0.0008 "H2O	0.0242 "H2O	0.25 "H2O	Vérification indicateur
0.0500 "H2O	0.0500 "H2O	0.0491 "H2O	-0.0009 "H2O	0.0491 "H2O	0.25 "H2O	Vérification indicateur
0.0750 "H2O	0.0750 "H2O	0.0740 "H2O	-0.0010 "H2O	0.0740 "H2O	0.25 "H2O	Vérification indicateur
0.1000 "H2O	0.1000 "H2O	0.0981 "H2O	-0.0019 "H2O	0.0981 "H2O	0.25 "H2O	Vérification indicateur
0.0000 "H2O	0.0000 V.DC.	0.0006 V.DC.	+0.0006 V.DC.	0.0006 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.0250 "H2O	2.5000 V.DC.	2.4262 V.DC.	-0.0738 V.DC.	2.4262 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.0500 "H2O	5.0000 V.DC.	4.8990 V.DC.	-0.1010 V.DC.	4.8990 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.0750 "H2O	7.5000 V.DC.	7.4021 V.DC.	-0.0979 V.DC.	7.4021 V.DC.	0.5 V.DC.	Vérification sortie analogique
0.1000 "H2O	10.0000 V.DC.	9.8114 V.DC.	-0.1886 V.DC.	9.8114 V.DC.	0.5 V.DC.	Vérification sortie analogique

Conditions Environnementales: Température: 19 °C Humidité: 16 %RH

Type d'Étalonnage:

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

2019-03-19

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

Martin Langlais - Technicien

5F09106

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Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB
LAB Accrédité CCN
N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-126 06/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+\- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	**Type d'entrée:**	Pression
Manufacturier:	Dwyer	**Type de sortie:**	Digitale
No. Model:	DPG200	**Type de mesure:**	Pression
No. Série:	N.A.	**Gamme:**	0-28"Hg
Emplacement:	N.A.	**No. Machine:**	N.A.

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	**No. du certificat d'étalonnage:**	2019000879
No. Série:	7798010	**Dernière date d'étalonnage:**	7-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	7-Feb-20
Commentaire:			

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Crystal XP2i	**No. du certificat d'étalonnage:**	2018004512
No. Série:	258139	**Dernière date d'étalonnage:**	9-Jul-18
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	9-Jul-19
Commentaire:			

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	1 "Hg	Vérification indicateur
-7.50 "Hg	-7.50 "Hg	-7.61 "Hg	-0.11 "Hg	-7.61 "Hg	1 "Hg	Vérification indicateur
-15.00 "Hg	-15.00 "Hg	-15.25 "Hg	-0.25 "Hg	-15.25 "Hg	1 "Hg	Vérification indicateur
-22.50 "Hg	-22.50 "Hg	-22.88 "Hg	-0.38 "Hg	-22.88 "Hg	1 "Hg	Vérification indicateur
-28.00 "Hg	-28.00 "Hg	-28.48 "Hg	-0.48 "Hg	-28.48 "Hg	1 "Hg	Vérification indicateur
0.00 "Hg	10.0000 V.DC.	10.0625 V.DC.	+0.0625 V.DC.	10.0625 V.DC.	0.5 V.DC.	Vérification sortie analogique
-7.50 "Hg	8.0000 V.DC.	8.0413 V.DC.	+0.0413 V.DC.	8.0413 V.DC.	0.5 V.DC.	Vérification sortie analogique
-15.00 "Hg	6.0000 V.DC.	6.0055 V.DC.	+0.0055 V.DC.	6.0055 V.DC.	0.5 V.DC.	Vérification sortie analogique
-22.50 "Hg	4.0000 V.DC.	3.9621 V.DC.	-0.0379 V.DC.	3.9621 V.DC.	0.5 V.DC.	Vérification sortie analogique
-28.00 "Hg	2.5333 V.DC.	2.4497 V.DC.	-0.0836 V.DC.	2.4497 V.DC.	0.5 V.DC.	Vérification sortie analogique

Conditions Environnementales: Température: 19 °C Humidité: 16 %RH

Type d'Étalonnage:

5F09106

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

Instrumentation
Saint•Laurent Inc.
Accrédité ISO 17025

CLAS NRC-CNRC CLAS 2010-02

SCC Accredited LAB
LAB Accrédité CCN
N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-126 06/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+\- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	**Type d'entrée:**	Pression
Manufacturier:	Dwyer	**Type de sortie:**	Digitale
No. Model:	DPG200	**Type de mesure:**	Pression
No. Série:	N.A.	**Gamme:**	0-28"Hg
Emplacement:	N.A.	**No. Machine:**	N.A.

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

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

Martin Langlais - Technicien

2019. 03. 19

5F09106

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-127 06/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+\- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	**Type d'entrée:**	Pression
Manufacturier:	Dwyer	**Type de sortie:**	Digitale
No. Model:	DPG200	**Type de mesure:**	Pression
No. Série:	N.A.	**Gamme:**	0-28"Hg
Emplacement:	N.A.	**No. Machine:**	N.A.

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	**No. du certificat d'étalonnage:**	2019000879
No. Série:	7798010	**Dernière date d'étalonnage:**	7-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	7-Feb-20
Commentaire:			

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Crystal XP2i	**No. du certificat d'étalonnage:**	2018004512
No. Série:	258139	**Dernière date d'étalonnage:**	9-Jul-18
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	9-Jul-19
Commentaire:			

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	0.00 "Hg	1 "Hg	Vérification indicateur
-7.50 "Hg	-7.50 "Hg	-7.49 "Hg	+0.01 "Hg	-7.49 "Hg	1 "Hg	Vérification indicateur
-15.00 "Hg	-15.00 "Hg	-14.84 "Hg	+0.16 "Hg	-14.84 "Hg	1 "Hg	Vérification indicateur
-22.50 "Hg	-22.50 "Hg	-22.57 "Hg	-0.07 "Hg	-22.57 "Hg	1 "Hg	Vérification indicateur
-28.00 "Hg	-28.00 "Hg	-27.86 "Hg	+0.14 "Hg	-27.86 "Hg	1 "Hg	Vérification indicateur
0.00 "Hg	10.0000 V.DC.	10.0152 V.DC.	+0.0152 V.DC.	10.0152 V.DC.	0.5 V.DC.	Vérification sortie analogique
-7.50 "Hg	8.0000 V.DC.	8.0359 V.DC.	+0.0359 V.DC.	8.0359 V.DC.	0.5 V.DC.	Vérification sortie analogique
-15.00 "Hg	6.0000 V.DC.	6.0757 V.DC.	+0.0757 V.DC.	6.0757 V.DC.	0.5 V.DC.	Vérification sortie analogique
-22.50 "Hg	4.0000 V.DC.	3.9980 V.DC.	-0.0020 V.DC.	3.9980 V.DC.	0.5 V.DC.	Vérification sortie analogique
-28.00 "Hg	2.5333 V.DC.	2.5845 V.DC.	+0.0512 V.DC.	2.5845 V.DC.	0.5 V.DC.	Vérification sortie analogique

Conditions Environnementales: Température: 19 °C Humidité: 16 %RH

Type d'Étalonnage:

2019-03-19

5F09106

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

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

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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Tél: (450) 473-6169
Fax: (450) 473-5207
Email: inst.st-laurent@videotron.ca

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-127 06/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	4IN9106
Précision requise:	+\- 1"Hg
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Manomètre	**Type d'entrée:**	Pression
Manufacturier:	Dwyer	**Type de sortie:**	Digitale
No. Model:	DPG200	**Type de mesure:**	Pression
No. Série:	N.A.	**Gamme:**	0-28"Hg
Emplacement:	N.A.	**No. Machine:**	N.A.

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

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

Martin Langlais - Technicien

5F09106

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DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

CLAS
NRC CNRC
CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

Client :	Polytests	**No. du Certificat :**	**152-4BB901-182**
Adresse :	695 B rue Gaudette St-Jean-sur-Richelieu, QC J3B7S7	**Date d'étalonnage :**	09-01-2018

Technicien:
Simeonidis, Georgios

David Llorens

David Llorens, Responsable Qualité

DESCRIPTION DU SERVICE:

Description des masses :	ASTM E617	**Date d'approbation :**	09-01-2018
Classe de précision :	ASTM 1	**Date prochain étalonnage :**	09-01-2023
Densité :	7.95g/cm³	**Accrédtation CCN n. :**	668
Identification (si unique) :	(items multiples)	**Certification CLAS n. :**	2010-01

Condition d'essai :	Temp °C:	21.265	Pression kPa:	101.565	Humidité:	49.58

NOTES:

Pour l'étalonnage des masses, nous utilisons la procédure "Comparaison individuelle" PDL-09-MG-001 et la procédure "Détermination des incertitudes" PDL-09-MG-002. Le droit d'auteur du présent certificat appartient au laboratoire délivreur et doit être reproduit intégralement, à moins d'une autorisation écrite du laboratoire délivreur.

REMARQUES:

11 JANV. 2018

DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

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CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

Client :	Polytests	**No. du Certificat :**	**152-4BB901-182**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	St-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Classe d'exactitude :**	ASTM 1
		Date d'étalonnage :	09-01-2018
Masse :	100 mg - 200 g	**Date du prochain étalonnage :**	09-01-2023

RÉSULTAT DE L'ÉTALONNAGE, MASSE CONVENTIONNELLE:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle	Masse conventionnelle après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
100 mg	1000014200	EM-128	99.9993 mg		0.010 mg	0.002 mg
200 g	1000026013	EM-129	199.99962 g		0.50 mg	0.10 mg

D.P.

DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

CLAS
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CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

Client :	Polytests	**No. du Certificat :**	**152-4BB901-182**
Adresse :	695 B rue Gaudette	**Accrédtation CCN n. :**	668
	St-Jean-sur-Richelieu, QC	**Certification CLAS n. :**	2010-01
	J3B7S7	**Classe d'exactitude :**	ASTM 1
		Date d'étalonnage :	09-01-2018
Masse :	100 mg - 200 g	**Date du prochain étalonnage :**	09-01-2023

RÉSULTAT DE L'ÉTALONNAGE DES POIDS, CORRECTIONS:

Valeur Nominale	No de série	No d'inventaire	Masse conventionnelle Correction	Masse conventionnelle Correction après ajustement	Tolérance ± (mg)	Incertitudes ± (mg)
100 mg	1000014200	EM-128	-0.0007 mg		0.010 mg	0.002 mg
200 g	1000026013	EM-129	-0.38 mg		0.50 mg	0.10 mg

D.P.

DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

CLAS
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CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

BALANCES UTILISÉES

Pour l'étalonnage manuel :

> 5 kg à 25 kg :	Mettler Toledo XP32003L, SNR 1123271214, max. 32100 g, d = 0.005 g
> 1 kg à 5 kg	Mettler Toledo PR5003, SNR 1115311634, max. 5100 g, d = 0.001 g
> 300 g à 2 kg :	Mettler Toledo XP2004S, SNR B131185222, max. 2100 g, d = 0.1 mg
> 100 g à 200 g :	Mettler Toledo AT201 SNR BA1115230146, max. 205 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1127063924, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1121103055, max. 5.1 g, d = 0.1 µg

Pour l'étalonnage automatisé :

> 200 g à 1 kg :	Mettler Toledo AX1005 SNR 1127063210, max. 1109 g, d = 0.01 mg
> 5 g à 100 g :	Mettler Toledo AX106 SNR 1120143015, max. 111 g, d = 1 µg
1 mg à 5 g :	Mettler UMX5, SNR 1125140561, max. 5.1 g, d = 0.1 µg

Les balances sont vérifiées selon notre procédure de contrôle périodique PDL-11-MG-001.

INCERTITUDES:

Les incertitudes que nous retrouvons comprennent :

1. *L'incertitude associée à l'opération de pesage.*
2. *L'incertitude associée à la densité de l'air.*
3. *L'incertitude associée à l'étalon utilisé.*
4. *L'incertitude associée à la densité de la masse à être étalonnée.*

L'incertitude de l'opération de pesage comprend la reproductibilité à long terme.

Les incertitudes précisées dans ce rapport sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95 %, obtenu en multipliant ensemble l'incertitude-type composée par un facteur de couverture de k = 2. Pour de plus amples renseignements, veuillez consulter la publication GUM (Guide pour l'expression de l'incertitude de mesure, édition de 1995).

TRAÇABILITÉ

Le Service d'évaluation de laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et a certifié des capacités d'étalonnage spécifiques de ce laboratoire et leur traçabilité à des étalons nationaux de mesure reconnus et au Système international d'unités (SI). Ce certificat d'étalonnage est émis conformément aux conditions de certification accordées par CLAS et aux conditions d'accréditation accordées par le Conseil canadien des normes (CCN). Le CLAS pas plus que le CCN ne peut garantir l'exactitude des étalonnages individuels effectués par des laboratoires accrédités.

B.P.

DISPERSION
Laboratoire • Laboratory DIVISION • TRANSCAT CANADA

CLAS
NRC CNRC
CLAS 2010-01

CERTIFICAT D'ÉTALONNAGE

9900 Chemin de la Côte-de-Liesse, Lachine, QC H8T 1A1
www.dispersion.ca 1.866.390.5066

RÉFÉRENCES UTILISÉES

Poids	No de série	Fabricant	Date d'étalonnage	Date due
20kg	69976	Troemner	30-05-2017	30-05-2018
5kg	129099	Mettler Toledo	02-09-2017	02-09-2018
5kg	96-0888-50-3	Denver Instrument Company	02-09-2017	02-09-2018
2kg	129098	Mettler Toledo	02-09-2017	02-09-2018
2kg	96-0888-50-3	Denver Instrument Company	02-09-2017	02-09-2018
300g	96-0888-50-2	Denver Instrument Company	02-09-2017	02-09-2018
1kg - 1mg	MT-01	Mettler Toledo	02-09-2017	02-09-2018

ÉTALONS CERTFIÉS PAR LE CNRC(**Référence NRC MS-2016-0021**)

Poids	No de série	Fabricant	Date d'étalonnage	Date due
100g	95170	Mettler Toledo	17-10-2016	17-10-2018
10kg	129100	Mettler Toledo	17-10-2016	17-10-2018
1kg	95171	Mettler Toledo	17-10-2016	17-10-2018

RÉFÉRENCES DE LA STATION ROBOTISÉE

Poids	No de série	Fabricant	Date d'étalonnage	Date due
1kg - 1mg	DK000A132	Laboratoire Dispersion	01-08-2017	01-08-2018

D.P.

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-001 06/03/19

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

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

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

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	**No. du certificat d'étalonnage:**	2019000879
No. Série:	7798010	**Dernière date d'étalonnage:**	7-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	7-Feb-20

Commentaire:

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
0.0 °C	0.0 °C	0.0 °C	0.0 °C	0.0 °C	1.0 °C	T1 typeJ
125.0 °C	125.0 °C	125.1 °C	+0.1 °C	125.1 °C	1.0 °C	T1 typeJ
250.0 °C	250.0 °C	250.1 °C	+0.1 °C	250.1 °C	1.0 °C	T1 typeJ
375.0 °C	375.0 °C	375.1 °C	+0.1 °C	375.1 °C	1.0 °C	T1 typeJ
500.0 °C	500.0 °C	500.1 °C	+0.1 °C	500.1 °C	1.0 °C	T1 typeJ
0.0 °C	0.0 °C	0.2 °C	+0.2 °C	0.2 °C	1.0 °C	T2 typeJ
125.0 °C	125.0 °C	125.1 °C	+0.1 °C	125.1 °C	1.0 °C	T2 typeJ
250.0 °C	250.0 °C	250.1 °C	+0.1 °C	250.1 °C	1.0 °C	T2 typeJ
375.0 °C	375.0 °C	375.1 °C	+0.1 °C	375.1 °C	1.0 °C	T2 typeJ
500.0 °C	500.0 °C	500.1 °C	+0.1 °C	500.1 °C	1.0 °C	T2 typeJ
0.0 °C	0.0 °C	0.2 °C	+0.2 °C	0.2 °C	1.0 °C	T1 typeK
125.0 °C	125.0 °C	125.2 °C	+0.2 °C	125.2 °C	1.0 °C	T1 typeK
250.0 °C	250.0 °C	250.1 °C	+0.1 °C	250.1 °C	1.0 °C	T1 typeK
375.0 °C	375.0 °C	375.2 °C	+0.2 °C	375.2 °C	1.0 °C	T1 typeK
500.0 °C	500.0 °C	500.1 °C	+0.1 °C	500.1 °C	1.0 °C	T1 typeK
0.0 °C	0.0 °C	0.2 °C	+0.2 °C	0.2 °C	1.0 °C	T2 typeK
125.0 °C	125.0 °C	125.2 °C	+0.2 °C	125.2 °C	1.0 °C	T2 typeK
250.0 °C	250.0 °C	250.2 °C	+0.2 °C	250.2 °C	1.0 °C	T2 typeK
375.0 °C	375.0 °C	375.2 °C	+0.2 °C	375.2 °C	1.0 °C	T2 typeK
500.0 °C	500.0 °C	500.2 °C	+0.2 °C	500.2 °C	1.0 °C	T2 typeK

Conditions Environnementales: Température: 19 °C Humidité: 16 %RH

Type d'Étalonnage:

5F09101

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB
LAB Accrédité CCN
N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-001 06/03/19

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

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

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

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

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

Martin Langlais - Technicien

2019-03-19

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Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-015 05/03/19

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

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

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	**Type d'entrée:**	Temp
Manufacturier:	Keithley	**Type de sortie:**	Digitale
No. Model:	7700	**Type de mesure:**	Température
No. Série:	1213648	**Gamme:**	Divers
Emplacement:	N/A	**No. Machine:**	N.A.

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	**No. du certificat d'étalonnage:**	2019000879
No. Série:	7798010	**Dernière date d'étalonnage:**	7-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	7-Feb-20

Commentaire:

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
-190.0 °C	-190.0 °C	-190.7 °C	-0.7 °C	-190.7 °C	1.0 °C	Input#1TypeK
0.0 °C	0.0 °C	-0.3 °C	-0.3 °C	-0.3 °C	1.0 °C	Input#1TypeK
750.0 °C	750.0 °C	749.8 °C	-0.2 °C	749.8 °C	1.0 °C	Input#1TypeK
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#2 TypeK
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#3 TypeK
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#4 TypeK
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#5TypeK
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#6TypeK
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#7TypeK
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#8TypeK
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#9TypeK
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#10TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#11TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#12TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#13 TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#14TypeJ
100.0 °C	100.0 °C	100.0 °C	0.0 °C	100.0 °C	1.0 °C	Input#15 TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#16TypeJ
100.0 °C	100.0 °C	100.0 °C	0.0 °C	100.0 °C	1.0 °C	Input#17TypeJ
100.0 °C	100.0 °C	99.9 °C	-0.1 °C	99.9 °C	1.0 °C	Input#18TypeJ
100.0 °C	100.0 °C	100.0 °C	0.0 °C	100.0 °C	1.0 °C	Input#19TypeJ
100.0 °C	100.0 °C	100.1 °C	+0.1 °C	100.1 °C	1.0 °C	Input#20TypeJ
12.000 mA	12.000 mA	12.003 mA	+0.003 mA	12.003 mA	1.00 mA	Input#21
12.000 mA	12.000 mA	12.003 mA	+0.003 mA	12.003 mA	1.00 mA	Input#22

Conditions Environnementales: Température: 19 °C Humidité: 20 %RH

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Instrumentation
Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC·CNRC
CLAS 2010-02

SCC Accredited LAB
LAB Accrédité CCN
N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-015 05/03/19

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

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

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	**Type d'entrée:**	Temp
Manufacturier:	Keithley	**Type de sortie:**	Digitale
No. Model:	7700	**Type de mesure:**	Température
No. Série:	1213648	**Gamme:**	Divers
Emplacement:	N/A	**No. Machine:**	N.A.

Type d'Étalonnage: Test avec EM-147

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	5 Mars 2019
Date du prochain Étalonnage:	5 Mars 2020
Date d'émission du certificat:	5 Mars 2019

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

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

Martin Langlais - Technicien

2019-03-09

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POLYCONTROLS

INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9786

Date d'étalonnage : 2018-11-12
Date d'émission du certificat : 2018-11-12

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Débitmètre volumétrique American Meter Company DTM-200A S/N : 99A274209

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
	Lectures Initiales = Lectures finales, aucun ajustement
Résultats	Lectures finales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

B Poirier

Métrologiste

Responsable du laboratoire

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Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018-11-22

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02 — Conseil canadien des normes, Laboratoire accrédité, Portée d'accréditation 655 — ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9786

Numéro de série:	99A274209	Station de mesure:	3
Date d'étalonnage:	2018-11-12	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-130		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2403	1500237464	2019-04-26
DHI molbloc (100 slpm)	2E2-S	380	1500241926	2019-07-19
DHI molbox1	Molbox1	755	1500237197	2019-04-25
RTD Mist	M22	2208102	2018002234	2019-04-11
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	0-200 ACFH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance ±1 %O.R.	

Condition d'étalonnage

Gaz	Air
Température ambiante	21.5 °C
Pression ambiante	1026.07 mbar
Orientation	Verticale
Élastomère	Viton
Valve	Viton

Lectures finales

Débit du test ACFH	Instrument en test ft^3	Valeurs mesurées Pression PSIA	Valeurs mesurées Température °C	Valeurs mesurées Référence ft^3	Référence calculée ft^3	Erreur calculée ft^3	Tolérance acceptable ft^3	TUR
39.5798	6.610	14.8845	21.17	6.674	6.590	0.020	0.066	2.97
70.0656	11.700	14.9044	21.05	11.845	11.677	0.023	0.117	>4
164.1928	27.340	15.0230	20.96	27.959	27.336	0.004	0.273	>4

Bernard Poirier
Métrologiste

B Poirier
Signature

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC-CNRC CLAS 2009-02

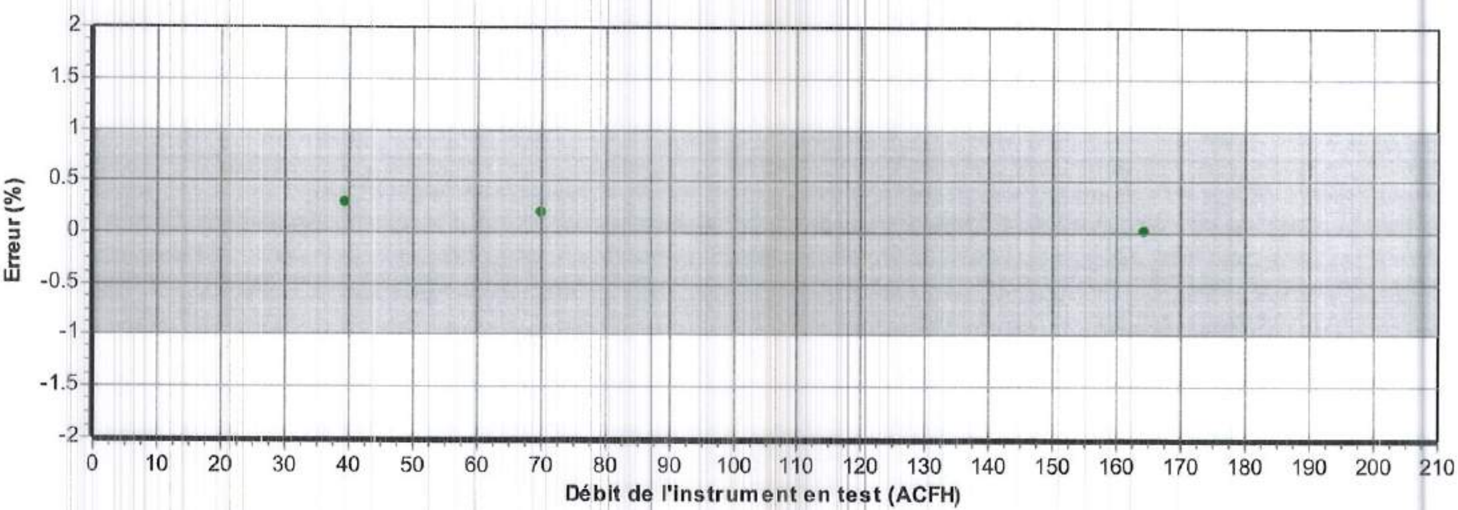
Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9786

Numéro de série:	99A274209	Station de mesure:	3
Date d'étalonnage:	2018-11-12	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-130		

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Bernard Poirier
Métrologiste

B Poirier
Signature

Instrumentation Saint-Laurent inc.
Accrédité ISO 17025

CLAS NRC-CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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Tél: (450) 473-6169
Fax: (450) 473-5207
Email: inst.st-laurent@videotron.ca

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-136 09/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	ISL-004
Précision requise:	+\-2°C +\-3%RH
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Hygromètre	**Type d'entrée:**	Temp/%RH
Manufacturier:	Fluke	**Type de sortie:**	Digitale
No. Model:	971	**Type de mesure:**	Temp/humidité
No. Série:	10610850	**Gamme:**	5-95%RH -20a60°C
Emplacement:	N.A.	**No. Machine:**	N.A.

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Vaisala HMI14/HMP46	**No. du certificat d'étalonnage:**	2018002178
No. Série:	T1450150/T1940011	**Dernière date d'étalonnage:**	10-Apr-18
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	10-Apr-19
Commentaire:			

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
25.0 °C	25.0 °C	25.2 °C	+0.2 °C	25.2 °C	1.0 °C	
40.0 °C	40.0 °C	40.2 °C	+0.2 °C	40.2 °C	1.0 °C	
28.0 %RH	28.2 %RH	29.0 %RH	+0.8 %RH	29.0 %RH	-- %RH	
48.0 %RH	48.1 %RH	49.3 %RH	+1.2 %RH	49.3 %RH	-- %RH	
75.0 %RH	74.7 %RH	74.0 %RH	-0.7 %RH	74.0 %RH	-- %RH	

Conditions Environnementales: Température: 22 °C Humidité: 45 %RH

Type d'Étalonnage:

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	9 Mars 2019
Date du prochain Étalonnage:	9 Mars 2020
Date d'émission du certificat:	9 Mars 2019

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

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

Martin Langlais - Technicien

2019. 03. 19

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CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 69804

Customer Information

Customer: Services Polytests, Inc.

Address : 695-B Gaudette
St-Jean-sur-richelieu
J3B 7S7

Customer PO #: 100476

Calibration Procedure Information

Procedure ID: GTP AIRVEL | Revision #: 6 | Revision Date: 1/6/2013

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10086	Furness Controls	FC0332	DP Transmitter	6/6/2019
10100	Graftel	n/a	Temperature	10/29/2019
10171	Furness	FC0332-2W	0 - .4" H2O	11/10/2018
10187	Vaisala	PTB210	Barometric Pressure Gauge	11/22/2018
10157	HOBO	UX100-011	RH/Temp logger	11/10/2018

Sensor Information

Manufacturer: Omega
Description: Anemometer
Method Used: Pitot Tube

Model #: HHF143
Rated Accuracy: ± See Attachment
Accuracy Specified By: Omega

Instrument ID#: EM153
Range: 40 to 7800 fpm
Condition: Functional

Serial #: 1015949

Comments: Calibration Date: 08/16/2018 | Note: Limited calibration range = 40 to 5000 fpm
Calibration Due: 08/16/2019

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

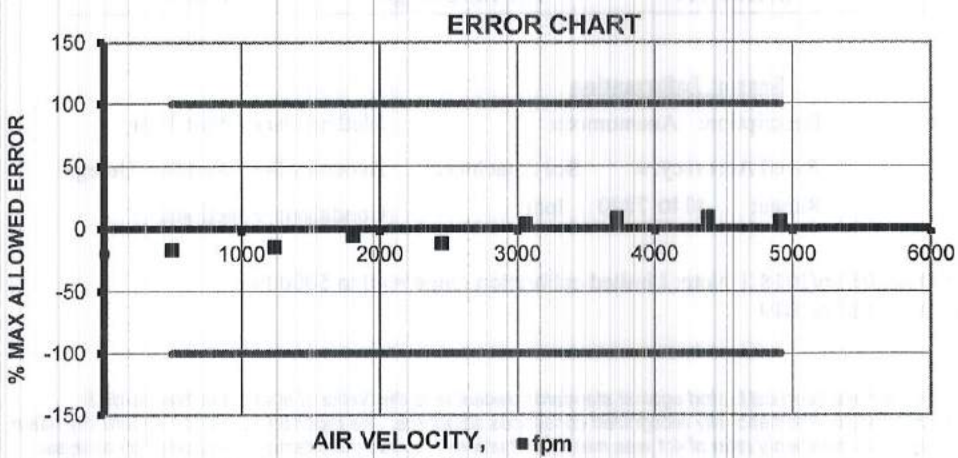
Performed By: [signature] Date: 8/16/2018

Philip Davis
Calibration Technician

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

ATTACHMENT TO CALIBRATION CERTIFICATE 69804
AS FOUND/AS LEFT DATA

Reading From Standard,	Lower Limit of Meter Reading,	Measured Reading From Meter,	Upper Limit of Meter Reading,	Error,	Measurement Uncertainty,	STATUS
		Actual Air Velocity				
fpm	fpm	fpm	fpm	fpm	fpm	
494	488	493	500	-1	2.47	Pass
1238	1225	1236	1251	-2	6.19	Pass
1805	1786	1804	1824	-1	9.03	Pass
2448	2423	2445	2473	-3	12.24	Pass
3063	3031	3064	3095	1	15.32	Pass
3724	3686	3727	3762	3	18.62	Pass
4388	4343	4392	4433	4	21.94	Pass
4911	4861	4914	4961	3	24.56	Pass



INSTRUMENT SPECIFICATIONS		
Test Fluid	Air	
Lower Range	40	fpm
Upper Range	7800	fpm
Rated Accuracy	1%Rding +1 digit	
LABORATORY AMBIENT CONDITIONS		
Pressure	14.36	psia
Humidity	56.22	% RH
Temperature	74.51	F

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

NIST Traceable Calibration Data Sheet

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

www.graftel.com

2018.08.27

Instrumentation Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC-CNRC CLAS 2010-02

SCC Accredited LAB / LAB Accrédité CCN N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-154 05/03/19

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

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

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	**Type d'entrée:**	Temp
Manufacturier:	Keithley	**Type de sortie:**	Digitale
No. Model:	7700	**Type de mesure:**	Température
No. Série:	1306774	**Gamme:**	Divers
Emplacement:	N/A	**No. Machine:**	N.A.

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Fluke 744	**No. du certificat d'étalonnage:**	2019000879
No. Série:	7798010	**Dernière date d'étalonnage:**	7-Feb-19
Certificat fait par:	Alpha Controls	**Prochaine date d'étalonnage:**	7-Feb-20
Commentaire:			

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage	Incertitude Élargie	Commentaire
-17.000 mV	-17.000 mV	-17.011 mV	-0.011 mV	-17.011 mV	0.1 mV	Input#1
0.000 mV	0.000 mV	0.055 mV	+0.055 mV	0.055 mV	0.1 mV	Input#1
20.000 mV	20.000 mV	19.931 mV	-0.069 mV	19.931 mV	0.1 mV	Input#1
30.000 mV	30.000 mV	30.006 mV	+0.006 mV	30.006 mV	0.1 mV	Input#2
Input#3 Non-Conforme						
5.000 V.DC.	5.000 V.DC.	4.999 V.DC.	-0.001 V.DC.	4.999 V.DC.	0.1 V.DC.	Input#4
30.000 mV	30.000 mV	29.990 mV	-0.010 mV	29.990 mV	0.1 mV	Input#5
30.000 mV	30.000 mV	30.031 mV	+0.031 mV	30.031 mV	0.1 mV	Input#6
100.00 Ohms	100.00 Ohms	99.99 Ohms	-0.01 Ohms	99.99 Ohms	1.0 Ohms	Input#7
100.00 Ohms	100.00 Ohms	99.98 Ohms	-0.02 Ohms	99.98 Ohms	1.0 Ohms	Input#8
100.00 Ohms	100.00 Ohms	100.02 Ohms	+0.02 Ohms	100.02 Ohms	1.0 Ohms	Input#9
100.00 Ohms	100.00 Ohms	99.98 Ohms	-0.02 Ohms	99.98 Ohms	1.0 Ohms	Input#10
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#11TypeT
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#12TypeT
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#13 TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#14TypeJ
100.0 °C	100.0 °C	99.8 °C	-0.2 °C	99.8 °C	1.0 °C	Input#15 TypeJ
100.0 °C	100.0 °C	99.7 °C	-0.3 °C	99.7 °C	1.0 °C	Input#16TypeJ
100.00 Ohms	100.00 Ohms	99.98 Ohms	-0.02 Ohms	99.98 Ohms	1.0 Ohms	Input#17
100.00 Ohms	100.00 Ohms	99.99 Ohms	-0.01 Ohms	99.99 Ohms	1.0 Ohms	Input#18
100.00 Ohms	100.00 Ohms	99.99 Ohms	-0.01 Ohms	99.99 Ohms	1.0 Ohms	Input#19
100.00 Ohms	100.00 Ohms	99.96 Ohms	-0.04 Ohms	99.96 Ohms	1.0 Ohms	Input#20
12.000 mA	12.000 mA	12.003 mA	+0.003 mA	12.003 mA	1.00 mA	Input#21
12.000 mA	12.000 mA	12.003 mA	+0.003 mA	12.003 mA	1.00 mA	Input#22

Conditions Environnementales: Température: 19 °C Humidité: 20 %RH

5F09101

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

Instrumentation
Saint•Laurent inc.
Accrédité ISO 17025

CLAS NRC-CNRC
CLAS 2010-02

SCC Accredited LAB
LAB Accrédité CCN
N°669

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-154 05/03/19

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

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

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Enregistreur	**Type d'entrée:**	Temp
Manufacturier:	Keithley	**Type de sortie:**	Digitale
No. Model:	7700	**Type de mesure:**	Température
No. Série:	1306774	**Gamme:**	Divers
Emplacement:	N/A	**No. Machine:**	N.A.

Type d'Étalonnage: Test avec EM-147

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

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	5 Mars 2019
Date du prochain Étalonnage:	5 Mars 2020
Date d'émission du certificat:	5 Mars 2019

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

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

Martin Langlais - Technicien

2019.03.19

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

4407 rue Charleroi, Montréal-Nord (Québec) H1H 1T6 Canada
TEL.: (514) 329-3242 / 1 888 774-6665
FAX: (514) 329-3750
info.canada@trescal.com

Certificat d'Étalonnage / Certificate of Calibration

CLIENT :
SERVICES POLYTESTS INC.
695-B GAUDETTE
ST-JEAN-SUR-RICHELIEU, QUEBEC

Description: CHRONOMÈTRE / STOPWATCH TIMER
Fabricant/ Manufacturer: EXTECH
Modèle/ Model : 365510
No série / Serial no : 131636
 # Inventaire / Asset # : **EM-175**

CERTIFICAT No / Certificate No: **254068**

PROCÉDURE / Procedure :
TRESCAL - EXTECH_365510

Date étalonnage/ Calibration Performed : **2018-12-20**

Echéance/ Due Date : **2019-12-20**

Type de résultat / *Results type* : **As-Found = As-Left**
Résultats d'essais / *Test results* : **Conforme / In Tolerance**

Conditions de mesure / Measurement conditions

TEMPÉRATURE / Temp. : **22°C**
HUMIDITÉ / Humidity : **23% RH**

Usage restreint/ *Restricted use* : ☐
Réparation effectuée / *Repair performed* : ☐
Ajustement effectué / *Adjustment performed* : ☐

ÉTALONS UTILISÉS/ Standards Used:

Identification	Manuf.	Model	Description	Ser. #	Etalonné/ Cal.	Echéance/ Due
PR0313	H-P	53132A	UNIVERSAL COUNTER	3546A03142	2018-07-03	2019-07-03
PR0392	AGILENT	33250A	FUNCTION/ARBITRARY WAVEFORM GENERATOR	MY40008014	2017-06-19	2019-06-19

Les spécifications mentionnées comme limites de tolérances d'essai sont celles établies par le manufacturier, sauf indication contraire.
Test tolerance limits are based on manufacturers specifications unless stated otherwise.

NOTES :

2019.01.07

Technicien : Technician
Y. MEFTAH

Le système qualité de la société est conforme aux exigences de la norme **ISO 17025** et les étalons utilisés pour le processus d'étalonnage sont retraçables au SI par l'entremise du CNRC et/ou du NIST.
*Our quality system complies with the requirements of **ISO 17025** and the standards used for the calibration are traceable to SI through NRC and/or NIST.*

LE DROIT D'AUTEUR DE CE CERTIFICAT APPARTIENT À TRESCAL / PRIMO INSTRUMENT INC.CE CERTIFICAT NE PEUT ÊTRE REPRODUIT AUTREMENT QU'EN ENTIER ET AVEC LE CONSENTEMENT PRÉALABLE ÉCRIT DU GROUPE TRESCAL.
TRESCAL / PRIMO INSTRUMENT INC. OWN COPYRIGHT OF THIS CERTIFICATE THE CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN CONSENT OF THE TRESCAL GROUP.

ACCREDITATION 17025 ISO/IEC

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LA MÉTROLOGIE AU SERVICE DE VOTRE PERFORMANCE
www.trescal.com

Trescal

Certificat d'Étalonnage
Certificate of Calibration

	254068
CLIENT / Customer :	SERVICES POLYTESTS INC.
DESCRIPTION / Description :	CHRONOMÈTRE / STOPWATCH TIMER
MANUFACTURIER / Manufacturer :	EXTECH
MODÈLE / Model :	365510

DESCRIPTION Description	LIMITES Limits	LECTURES Readings	LIMITES Limits
	Min		Max
Temps écoulé, chronomètre sous test / Elapsed time on test stopwatch		**Comptes / Counts** Chronomètre/timer 162060	
(Δt) Deviation (1/100sec): 2.00			
Deviation Par jour/ Per day (%): 0.0012 %	*** Secondes**	Deviation 24hrs	*** Secondes**
Deviation Par jour/ Per day (sec): **1.07 sec**	-3.00	**1.07**	3.00

Minutes	Seconds	1/100 sec
27	0	60

Total au compteur / Reference timer: 162058.0 comptes/counts

* Tolérances basées sur une déviation maximale de 3 sec/jour
* Tolerances based on a 3 sec/day maximum deviation

Incertitude/ Uncertainty: ±37 ms

Lorsque fournies dans le rapport, les incertitudes de mesure sont des incertitudes élargies représentant un niveau de confiance d'approximativement 95% , obtenu en multipliant l'incertitude-type composée par un facteur de couverture de k=2.

When supplied in the report, the measurement uncertainties are expanded uncertainties representing a confidence level of approximately 95% , obtain by multiplying the combined standard uncertainty by a coverage factor of k=2.

ACCREDITATION 17025 ISO/IEC

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9799

Date d'étalonnage : 2018-11-14
Date d'émission du certificat : 2018-11-14

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDa-2c S/N : 23544

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
Résultats	Lectures initiales hors tolérance
	Lectures finales dans les tolérances
Remarques	Valeur de l'instrument corrigée = Lecture de l'indicateur de l'instrument * 0.98 K facteur
	Fréquence d'étalonnage aux 12 mois

Carl Trein-Dansean
Métrologiste

Responsable du laboratoire

©2012 Polycontrols • Le présent document ne peut être reproduit, sinon en entier, que par l'approbation écrite des laboratoires d'étalonnage de la compagnie Polycontrols inc. 3650 boul. Matte (Local A-1), Brossard (Québec), Canada, J4Y 2Z2
Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018. 11. 22

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02 — Conseil canadien des normes Laboratoire accrédité Portée d'accréditation 655 — ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Instrument de mesure de référence utilisé pour l'étalonnage initial

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications initiales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	10-2000 ALH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %O.R.

Condition d'étalonnage

Gaz	Air
Température ambiante	21 °C
Pression ambiante	1009.77 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	

Lectures initiales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
364.6385	61.8500	14.6522	21.55	60.4150	60.6869	1.1631	1.2137	>4
612.3148	104.0800	14.6557	21.47	101.7210	102.1249	1.9551	2.0425	>4
1628.8459	276.5500	14.6757	21.45	269.8463	270.5303	6.0197	5.4106	>4

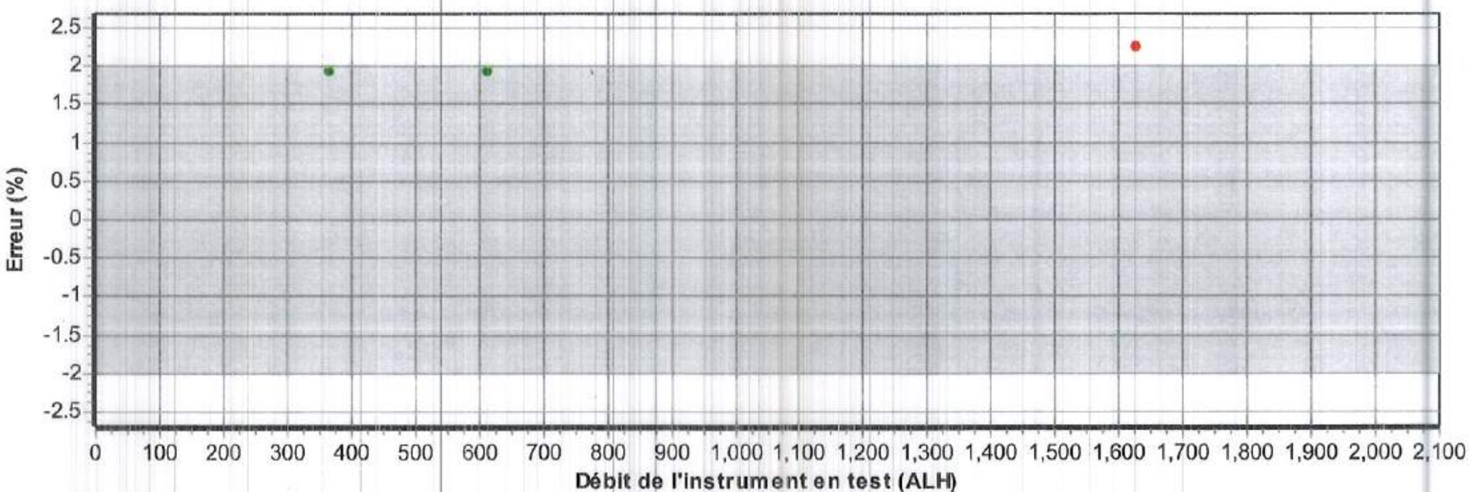
Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Résultats initiaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

POLYCONTROLS

INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	10-2000 ALH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %O.R.

Condition d'étalonnage

Gaz	Air
Température ambiante	21.5 °C
Pression ambiante	1025.86 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
352.3959	58.5060	14.8906	21.27	59.3386	58.5953	-0.0893	1.1719	>4
614.6929	102.2940	14.9046	21.20	103.7453	102.3248	-0.0308	2.0465	>4
1597.3393	265.5408	14.9230	21.23	270.0182	266.0123	-0.4715	5.3202	>4

Fc. : 1.01007684

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

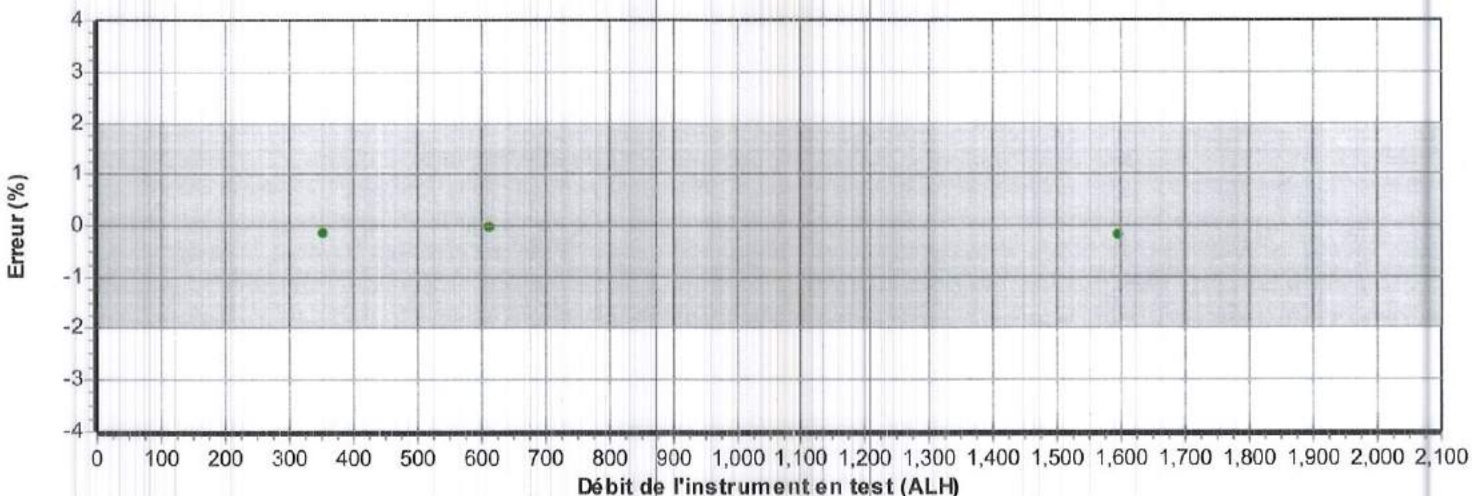
POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC·CNRC CLAS 2009-02 — Conseil canadien des normes, Laboratoire accrédité, Portée d'accréditation 655 — ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC-CNRC
CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9801

Date d'étalonnage : 2018-11-14
Date d'émission du certificat : 2018-11-14

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDa-2c S/N : 23543

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Lectures Initiales = Lectures finales, aucun ajustement Étalonnage de l'instrument
Résultats	Lectures initiales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

Carl Terrier-Dansereau
Métrologiste

Responsable du laboratoire

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Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018.11.22

POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC-CNRC CLAS 2009-02 | Conseil canadien des normes Laboratoire accrédité Portée d'accréditation 655 | ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9801

Numéro de série:	23543	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-179		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil		Condition d'étalonnage	
Gaz	Air	Gaz	Air
Température d'opération		Température ambiante	21.5 °C
Pression à l'entrée		Pression ambiante	1027.25 mbar
Pression à la sortie		Orientation	Horizontale
Température de référence		Élastomère	Viton
Pression de référence		Valve	
Étendue d'échelle	10-2000 ALH		
Signaux Entrée/Sortie	-		
Alimentation			
Tolérance ±2 %O.R.			

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
350.3144	59.1000	14.9078	21.31	59.1513	58.3496	0.7504	1.1670	>4
598.7895	101.1200	14.9160	21.26	101.1058	99.6653	1.4547	1.9933	>4
1605.3452	269.5100	14.9364	21.25	271.3957	267.1497	2.3603	5.3430	>4

Fe : 0,98730288

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

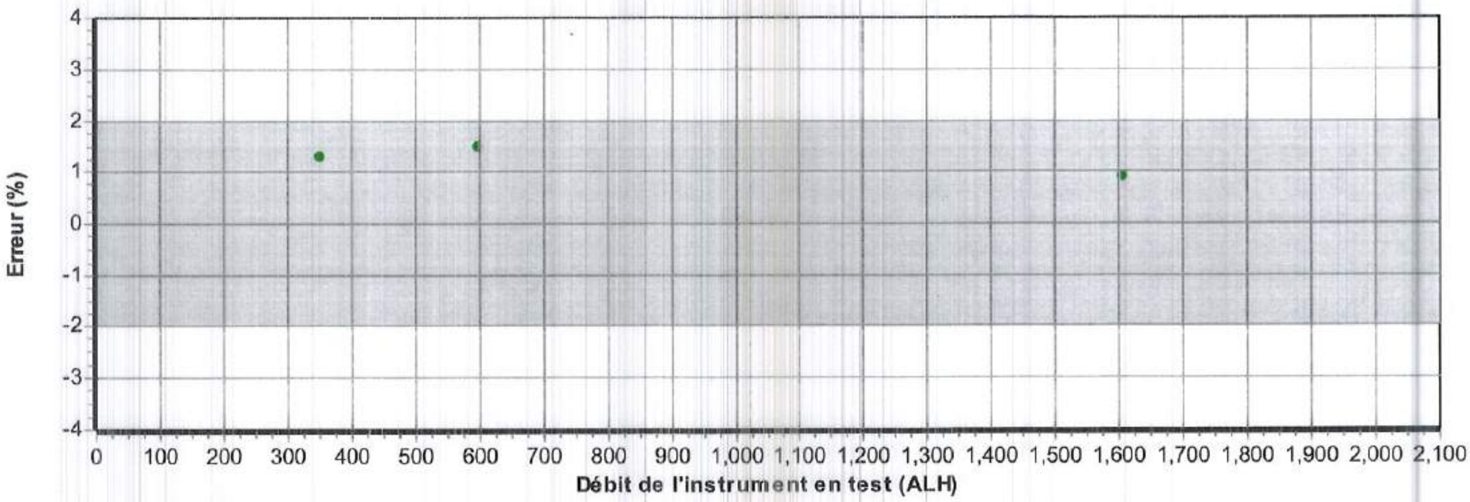
POLYCONTROLS
INTEGRATION • CALIBRATION • INSTRUMENTATION

CLAS NRC-CNRC CLAS 2009-02 | Conseil canadien des normes Laboratoire accrédité Portée d'accréditation 655 | ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9801

Numéro de série:	23543	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-179		

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Carl Tessier Dansereau
Métrologiste

Signature

Instrumentation Saint•Laurent inc.

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

CERTIFICAT D'ÉTALONNAGE

No.Certificat: CE-EM-224 06/03/19

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

SPÉCIFICATION DE CALIBRATION	
Procédure de service:	ISL-022
Précision requise:	+/- 1/32"
Fréquence d'étalonnage: (jours)	365

SPÉCIFICATION DE L'INSTRUMENT			
Type d'instrument:	Ruban à mesurer	**Type d'entrée:**	Mesure
Manufacturier:	Stanley	**Type de sortie:**	N/A
No. Model:	Leverlock 12'	**Type de mesure:**	Inch
No. Série:	N/A	**Gamme:**	0 à 12'
Emplacement:	Portable	**No. Machine:**	N/A

SPÉCIFICATION DE L'ÉTALON			
Étalon Utilisé:	Tape Mesure	**No. du certificat d'étalonnage:**	TA-47525320
No. Série:	17413592	**Dernière date d'étalonnage:**	23-Oct-17
Certificat fait par:	Starrett	**Prochaine date d'étalonnage:**	23-Oct-19
Commentaire:			

RÉSULTAT D'ÉTALONNAGE

Entrée Source	Valeur Donnée	Valeur Actuelle	Erreur de Déviation	Valeur après Étalonnage		Commentaire
1.00 "	1.00 "	1.00 "	0.00 "	1.00 "		
36.00 "	36.00 "	36.00 "	0.00 "	36.00 "		
72.00 "	72.00 "	72.00 "	0.00 "	72.00 "		
108.00 "	108.00 "	108.00 "	0.00 "	108.00 "		
132.00 "	132.00 "	132.00 "	0.00 "	132.00 "		

Conditions Environnementales: Température: 19 °C Humidité: 16 %RH

Commentaire:

Instrumentation St-Laurent Inc. Certifie que l'instrument ci-haut, rencontre ou excède les spécifications établies par le fabriquant. Les étalons utilisés pour effectuer l'étalonnage est retraçable au CNRC et/ou au NIST.

DATE D'ÉTALONNAGE / ÉMISSION DU CERTIFICAT	
Date d'Étalonnage:	6 Mars 2019
Date du prochain Étalonnage:	6 Mars 2020
Date d'émission du certificat:	6 Mars 2019

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

Martin Langlais - Technicien

2019-03-19

Le droit d'auteur du présent certificat appartient à Inst. St-Laurent Inc et doit être reproduit intégralement, à moins d'une autorisation écrite de Inst. St-Laurent Inc.

Rapport d'étalonnage No. CA0124-510-092818
Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, Ohio 43240
1-800-METTLER

METTLER TOLEDO

ISO 9001 Registered

ANSI/NCSL Z540-1 Accrédité

ACCREDITED

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

Certificat d'étalonnage

Client

Société :	Services Polytests		
Adresse :	695-B Rue Gaudette		
Ville :	Saint-Jean-Sur-Richelieu	*État/Province :*	Quebec
Code postal :	J3B 7S7	Astea Customer ID:	301288671

Instrument

Constructeur :	RICE LAKE	*Modèle de terminal :*	N/A
Modèle :	em257	*# série du terminal:*	N/A
No de série :	C66221	*# série de l'imprimant*	N/A
Capacité :	1000 kg		N/A
Résolution :	0.05 kg	*Nbre de Divisions:*	20000
Classe :	III	*Procédure utilisée :*	NIST Handbook 44
No./ID d'inventaire:	EM256		

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

Date de calibrage :	28-Sep-2018	*Date, prochaine Cal.*	30-Sep-2019
Signataire autorisé (A2LA) :	Pier-Hugues Riopel	*Signature:*	ELECTRONIC SIGNATURE

Étalons de travail

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

Jeu de poids no :	*Traçabilité NIST No.:*	*Classe ASTM/OIML*	*Date d'étalonnage :*	*Date proch. étalonnage*
160941929	4350-8126171	Temperature Kit	18-Nov-2016	18-Nov-2018
42273	M17-0562	M1	23-Jan-2018	23-Jan-2019
T101-T150 (20kg)	1412537	M1	19-Apr-2018	19-Apr-2019

2018-10-02

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METTLER TOLEDO

Résultats de mesure

La température : 22 °C

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

Test de variation

1	2
4	3

Poids Appliqués	Position	Avant Réglage Valeur lue
1: 200 kg	*Position 1*	200.00 kg
2: 200 kg	*Position 2*	200.00 kg
3: 200 kg	*Position 3*	199.95 kg
4: 200 kg	*Position 4*	199.95 kg
Erreur maximum :		0.05 kg
Max Erreur Admissible :		0.15 kg

Linéarité

	Avant réglage					
	Poids Appliqués	*Valeur lue*	*Erreur*		*Erreur admissible*	*Dans la Tolérance*
Zero 1	0.00 kg	0.00 kg	0.00 kg	0 d	1 d	YES
2	0.50 kg	0.50 kg	0.00 kg	0 d	1 d	YES
3	2.00 kg	2.00 kg	0.00 kg	0 d	1 d	YES
4	10.00 kg	9.95 kg	-0.05 kg	1 d	1 d	YES
Max 5	100.00 kg	100.00 kg	0.00 kg	0 d	2 d	YES

☐ Méthode de substitution utilisée

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

☐ OUI ☑ NON

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Répétabilité

Poids appliqués : 2.00 kg

	Chargé	Vide	Différence
1	2.00 kg	0.00 kg	2 kg
2	2.00 kg	0.00 kg	2 kg
3	2.00 kg	0.00 kg	2 kg
	Erreur maximale :	0.00 kg	0.0 d
	Tolérance :	0.05 kg	1 d

Incertitude

Mesure de l'incertitude = 0.029 kg

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

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Certificat de Pesée Minimale

Incertitude de mesure élargie

U = Uo
Ur1 = 0.03 kg

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

Poids Net Affiché	*Incertitude de mesure élargie*	
1 kg	0.03 kg	2.90000 %
10 kg	0.03 kg	0.29000 %
100 kg	0.03 kg	0.02900 %
500 kg	0.03 kg	0.00580 %
1000 kg	0.03 kg	0.00290 %

Explication sur le tableau de pesée minimale

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

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

	Facteur de Sécurité FS			
Erreur Relative Requise	*1x* *FS = 1*	*2x* *FS = 2*	*3x* *FS = 3*	*5x* *FS = 5*
0.1 %	29.00 kg	58.00 kg	87.00 kg	145.00 kg
0.2 %	14.50 kg	29.00 kg	43.50 kg	72.50 kg
0.5 %	5.80 kg	11.60 kg	17.40 kg	29.00 kg
1 %	2.90 kg	5.80 kg	8.70 kg	14.50 kg
2 %	1.45 kg	2.90 kg	4.35 kg	7.25 kg
5 %	0.58 kg	1.16 kg	1.74 kg	2.90 kg

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

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

Remarques

None.

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22 Albiston Way
Auburn, ME 04210
800-292-6218
207-777-6218
Fax 207-777-6215
www.specair.com

Date: 08/14/2017

Certificate of Analysis

Customer:
VAC OXY

Results are reported in mole percent, unless otherwise indicated. Mixes are prepared via partial pressure methods, or gravimetrically, using high load high sensitivity electronic scales. Prior to use, scales are verified for accuracy using applicable NIST traceable weights; analyses are calibrated against reference materials traceable to NIST weights and/or NIST gas reference materials.

Cylinder Serial #: 809277 **Cylinder Size:** K **CGA Connection:** 350 **Fill Pressure:** 1450 PSI

Analysis: Certified Standard **Lot #:** 4722621

Component(s):	Requested Concentration(s):	Actual Concentration(s):
Carbon Monoxide	3%	3.0%
Carbon Dioxide	18%	18.0%
Oxygen	2%	2.0%
Nitrogen	BALANCE	BALANCE

Expiration Date: 08/2020

Approved By:

Tom Bosse

EM-275

5-sept 2017

The information contained herein has been prepared at your request by qualified experts. While we believe that the information is accurate within the limits of the analytical methods employed, and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability arising out of the use of the information contained herein exceed the fee established for providing such information.

22 Albiston Way
Auburn, ME 04210
800-292-6218
207-777-6218
Fax 207-777-6215
www.specair.com

Date: 08/14/2017

Certificate of Analysis

Customer:
VAC OXY

Results are reported in mole percent, unless otherwise indicated. Mixes are prepared via partial pressure methods, or gravimetrically, using high load high sensitivity electronic scales. Prior to use, scales are verified for accuracy using applicable NIST traceable weights; analyses are calibrated against reference materials traceable to NIST weights and/or NIST gas reference materials.

Cylinder Serial #: K3886 **Cylinder Size:** K **CGA Connection:** 590 **Fill Pressure:** 1450 PSI

Analysis: Certified Standard **Lot #:** 4722622

Component(s):	Requested Concentration(s):	Actual Concentration(s):
Carbon Monoxide	1%	1.0%
Carbon Dioxide	10%	10.0%
Oxygen	10%	10.0%
Nitrogen	BALANCE	BALANCE

Expiration Date: 08/2020

Approved By:

Tom Bosse

5 sept 2017
EM. 276

The information contained herein has been prepared at your request by qualified experts. While we believe that the information is accurate within the limits of the analytical methods employed, and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability arising out of the use of the information contained herein exceed the fee established for providing such information.

Model / Modéle:

JØTUL F 45 V2

Serial No./ Nu. de Série:

[redacted]

Mfg. Date /
Date de Fabrication:

2019	2020	2021	2022
JAN	FEB	MAR	APR
MAY	JUN	JUL	AUG
SEP	OCT	NOV	DEC

JØTUL®

Listed Solid Fuel Room Heater for use in the United States and Canada.

Refer to the Intertek Directory of Building Products (https://bpdirectory.intertek.com) for detailed information.

Voir verso pour le français.

DO NOT REMOVE THIS PLATE.

C US

Intertek

W/N: 22047

Certified to:
UL 1482-2011, UL 737-2011, ULC-S627-2000, ULC-S628-93, ASTM E2515-2011, ASTM E3053-2017

Intertek Testing Laboratories Inc. Middleton, WI U.S.A.

U.S. ENVIRONMENTAL PROTECTION AGENCY - CERTIFIED TO COMPLY WITH 2020 PARTICULATE EMISSIONS STANDARDS USING CORD WOOD.

CERTIFIED EMISSIONS VALUE 1.75 G/Hr.
EPA TEST METHODS ALT-125, ASTM E2515-11, AND ASTM E3053-17 (CORD WOOD.)

This wood heater requires periodic inspection and repair for proper operation. See the owner's manual for specific maintenance information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the manual.

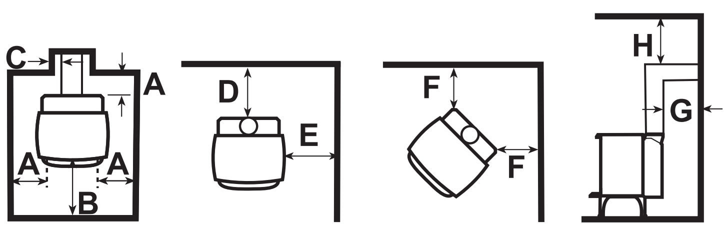
- For use with solid wood fuel only.
- Always contact your local building or fire officials about restrictions and installation inspections in your area.
- Approved for use in mobile homes.
- Do not connect this appliance to a chimney flue serving another appliance.
- Install and use only in accordance with Jøtul Installation and Operating Instructions manual.
- This heater must be installed on the legs provided. The space beneath the stove may not be obstructed.
- Do not use a grate or elevate the fire - build wood fire directly on fire chamber floor.
- Risk of smoke or flame spillage - operate stove only with door fully closed or open with optional fire screen in place.
- The chimney connector must be 24 gauge black steel, 6" in diameter or listed, double-wall pipe.
- DO NOT OVER-FIRE. If the heater or chimney connector glows, you are over-firing.
- Use only a lined masonry or listed, type HT factory-built chimney.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote build-up may occur rapidly.
- When passing the chimney or chimney connector through a combustible wall, always consult the Installation and Operation Manual, NFPA 211 or CAN/CSA-B365 and your local codes.
- Replace glass only with ceramic glass supplied by the manufacturer or distributor of this product.
- Approved for use with Jøtul Forced-air Blower #156431. Input Rating 115 VAC, 60 Hz, MAX. 40W.

FLOOR PROTECTION:
This stove must be placed on a noncombustible floor protector that extends:
A) From the sides of the door opening and rear of the stove:
8 in. (205 mm) in both U.S. & CAN.
B) From the front of the door opening:
16 in. - U.S.
18 in. (460 mm) - CAN.
C) Beyond the sides of a horizontal chimney connector:
2 in. (50 mm) in both U.S. & CAN.

SEE INSTALLATION MANUAL FOR DETAILS AND OTHER OPTIONS.

MINIMUM CLEARANCES - FROM STOVE TO COMBUSTIBLES, without heat shields or wall protection:
D: 16 in. / 406 mm
E: 15 in. / 381 mm
F: 11 in. / 280 mm

MINIMUM CLEARANCES - FROM CHIMNEY CONNECTOR TO UNPROTECTED COMBUSTIBLES:
G: 16 in. / 406 mm, horizontally
H: 18 in. / 460 mm, vertically

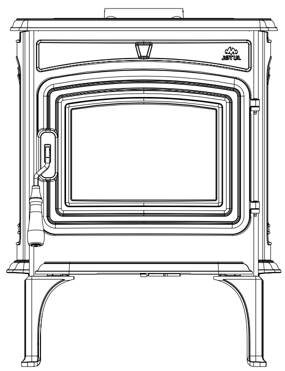


CAUTION:

HOT WHILE IN OPERATION. DO NOT TOUCH.
KEEP CHILDREN, CLOTHING, AND FURNITURE AWAY.
CONTACT MAY CAUSE SEVERE SKIN BURNS -
SEE NAMEPLATE AND INSTRUCTION MANUAL.

226600

Jøtul F 45 V2 Greenville
Wood Stove



Jøtul F 45 V2 Greenville

Installation and Operating Instructions

- **The Jøtul F 45 V2 Greenville non-catalytic stove is listed to burn solid wood only. Do not burn any other fuels.**
- **Read this entire manual before you install and use this appliance.**
- **Save these instructions for future reference and make them available to anyone using or servicing the fireplace insert.**
- **This wood heater requires periodic inspection and repair for proper operation. See this manual for specific maintenance information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in this owner's manual.**

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

JØTUL

Table of Contents

Jøtul F 45 V2 Greenville Accessories

Stove Gloves, pair - #157363
Flame-retardant, full length, Black.

Spark Screen - #157638
Enjoy the warmth of open door fire-viewing with use of this custom fit spark screen.

Stove-Top Thermometer - #5002
We recommend the use of a magnetic stove-top thermometer to monitor the surface temperature of the stove.

The optimum surface temperature range for the most efficient performance is between 400° F - 700° F (205° C - 316° C).

Outside Air Kit - #157637
This kit includes a plenum assembly which attaches to the stove bottom. It permits connection of duct work from an outside source directly to the air intake of the stove. A direct outside air connection is required for mobile home installations.

Mobile Home Floor Bracket Kit - #157321|
This kit includes two brackets used to fulfill the mobile home requirement that the stove be secured directly to the floor.

Blower Kit - #156431
This kit includes components for mounting a thermostatically controlled 120 cfm blower to the back of the stove to enhance heat convection into the living area.

Short Leg Kit - #157636
This kit includes four, 4 1/4” (108 mm) steel legs which allow stove installation into a fireplace opening height as low as 26 1/4”. ***Approved only for code-approved, masonry fireplace hearth mount installation.***

Standards

The Jøtul F 45 V2 Greenville non-catalytic heater has been tested and listed to:
U.S: ANSI/UL 1482-2011 and ANSI/UL 737-2011
Canada: CAN/ULC-S627-00 and ULC-S628–93

Certified Safety Tests performed by:
ITS, Intertek Testing Services
Middleton, WI

Manufactured by:
Jøtul North America
55 Hutcherson Drive
Gorham, Maine 04038-2644

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

Combustion Specifications

Jøtul F 45 V2 Greenville

Heat Output Range:[1] 16,748 to 58,657 BTU/hr.
Heating Capacity:[2] Up to 1,500 sq. ft.
Maximum Burn Time:[2] Up to 8 hours
EPA Efficiency:[3] **HHV:** 71.15% **LHV:** 76.55%
CO Emissions:[4] 1.48 g/min
Pariculate Emissions:[5] 1.75 g/hr - Cordwood
Fuel: Up to 18” Logs (457 mm) Front to Back

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

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

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

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

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

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

5. ***Particulate Emissions*** rate is obtained using EPA Test Methods:
ALT-125 (Cordwood Fuel)
ASTM E2515-11
ASTM E3053-17

Check Building Codes

When installing, operating and maintaining your Jøtul F 45 V2 Greenville woodstove, follow the guidelines presented in these instructions, and make them available to anyone using or servicing the stove.

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

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

In Canada, the guideline is established by the CSA Standard, CAN/CSA-B365-M93, *Installation Code for Solid-Fuel-Burning Appliances and Equipment*.

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

The Jøtul 45 Greenville is approved for use in mobile homes. Install in accordance with 24 CFR, Part 3280 (HUD). Follow the instructions in this manual.

NATIONAL FIREPLACE INSTITUTE
NFI CERTIFIED
www.nficertified.org

We suggest that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training
www.wettinc.ca

Safety Notices

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

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

Installation Tools Required, but not limited to:

- Measuring Tape
- Phillips screwdriver
- 10 mm open-end or socket wrench
- Work Gloves
- Safety Glasses
- 4 mm hex key

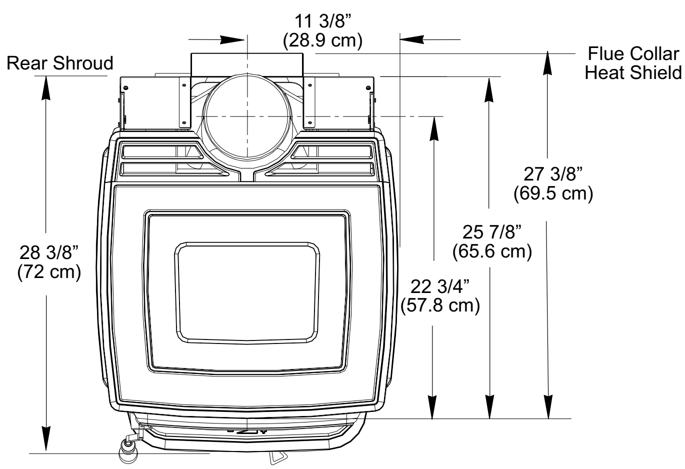
PLEASE NOTE:

IT IS NORMAL FOR SMOKE AND ODOR TO OCCUR DURING THE INITIAL STAGES OF OPERATION, DEPENDING UPON TEMPERATURES GENERATED OVER TIME. THIS "CURING" CONDITION CAN BE ALLEVIATED BY PROMOTING FRESH AIR CIRCULATION WITHIN THE IMMEDIATE VICINITY OF THE APPLIANCE.

1.0 Installation

If this solid fuel room heater is not properly installed, a house fire may result. For your safety, follow the installation directions. Contact the local building or fire officials about restrictions and installation inspection requirements in your area.

Your local officials have final authority in determining if a proposed installation is acceptable. Any requirement by the local authority having jurisdiction that is not specifically addressed in this manual, defaults to NFPA 211, and local codes in the U.S. or in Canada, CAN/CSA-B365-M and local codes.



1.1 Unpack the Stove

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

Contents:

- Flue Collar Heat Shield
- Miscellaneous Hardware

NOTE: The integral Rear Shroud acts as a heat shield. There is no accessory rear heat shield.

1.2 Bottom Heat Shield

The installed bottom heat shield is an integral part of the stove and must be used to protect any floor that is not composed of poured concrete on earth. Remove it only to install the optional Outside Air manifold and then reinstall it according to the instructions in Sect. 7.2, page 22.

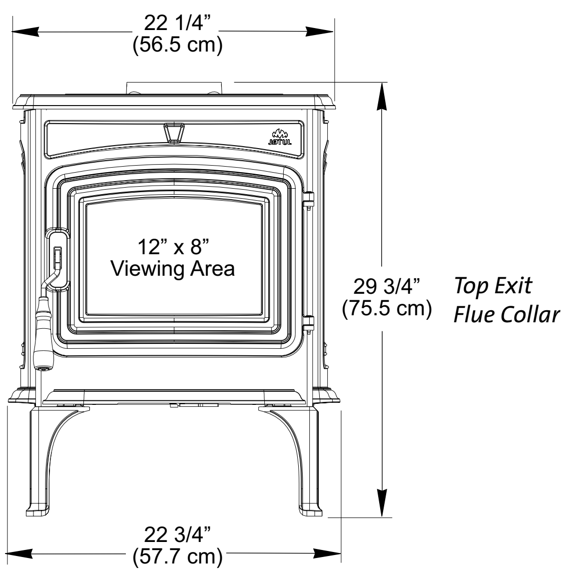
1.3 Short Leg Installation

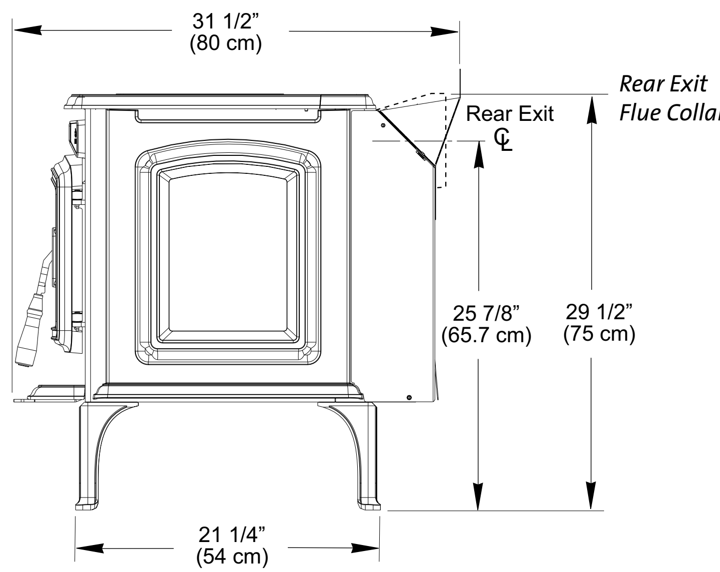
NOTE ! Install the optional Outside Air Kit and Blower Kit BEFORE the short legs. Follow the instructions provided with those kits.

1.4 Leg Levellers

Two M8 x 40 mm leg leveller screws are included in the hardware bag. **Install the in the appropriate legs BEFORE locating the stove in the final position.** See fig. 27, page 24.

Use Short Leg Kit #157636 to reduce stove height by 3 1/4". Hearthmount installation only.





1.5 Flue Collar Orientation

The Flue Collar is oriented in the Top Exit position. To change orientation to Rear Exit:

1. Remove the Rear Shroud from the stove with removal of the four sheet metal screws at the top and bottom of the shroud sides.
2. Twist and remove the perforated cut-out section from the top edge of the rear shroud.
3. Use a 10 mm socket wrench to remove the two M6 nuts and bolts that attach the flue collar to the stove. Orient the flue collar to the rear and use the same nuts and bolts to re-attach it to the stove.
4. Reattach the shroud to the back of the stove using the sheet metal screws previously removed.

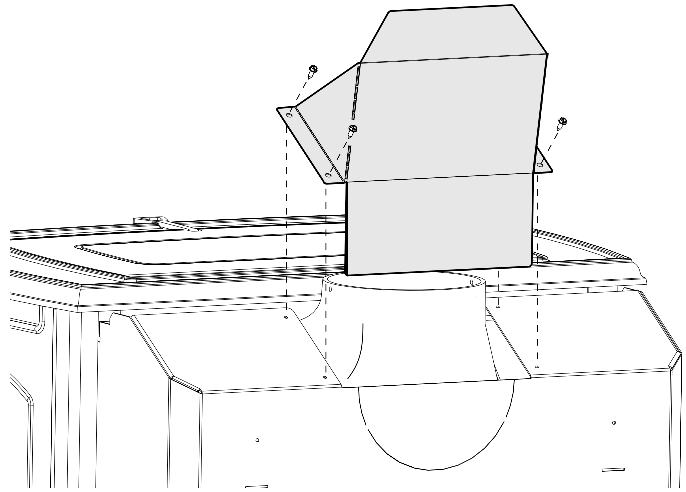


Figure 2. Flue Collar heat shield attachment.

1.6 Flue Collar Heat Shield

Not applicable for rear exit configuration.

1. Fold the heat shield on the perforations to conform to the shape as illustrated in fig.2.
2. Secure it to the rear stove shroud using the four #8 x 12 sheet metal screws from the hardware bag.

1.7 Chimney Connector

Use 6" single wall or listed 6" double-wall stovepipe to connect the stove to the chimney. Single wall stovepipe must be black steel or stainless steel and have a minimum thickness of 24 gauge. Do not use aluminum or galvanized steel pipe for chimney connection - these materials are not suitable for use with solid fuel.

Follow these guidelines:

- Do not use chimney connector as a chimney. It is intended only as a connection device.
- Each connector section must be oriented with the male (crimped) end pointing toward the stove. See fig. 3.
- Secure all connector joints with three sheet metal screws. The connection to the stove flue collar uses the two M6x 16 mm self-tapping screws provided.
- For the best performance, the chimney connector should be as short and direct as possible, including no more than two 90° elbows.
- **The maximum vertical run of single wall stovepipe should not exceed 10 ft. (305 cm).**
- **The maximum horizontal run should not exceed 3 ft. (92 cm) with a 1/4" rise per foot.** Under no circumstance should horizontal pipe be installed slanting down toward the chimney.

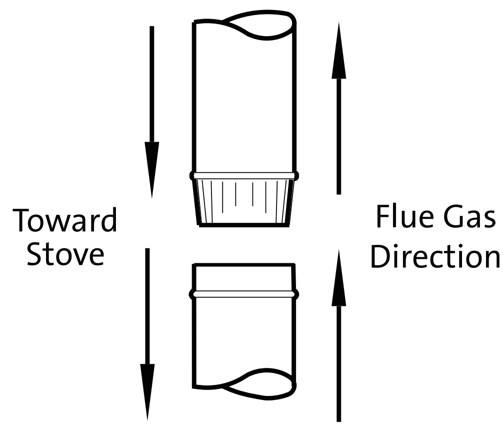


Figure 3. Chimney connector orientation.

- No part of the chimney connector may pass through an attic or roof space, closet or other concealed space, or through a floor or ceiling. All sections of the chimney connectors must be accessible for cleaning. Where passage through a wall or partition of combustible construction is desired, the installation must conform with NFPA 211 or CAN/CSA-B365, and is also addressed in this manual.
- **Do not connect this stove to a chimney flue serving another appliance.**

2.0 Chimney Requirements

There are two types of approved chimneys:

1. A code-approved masonry chimney with a ceramic tile or listed steel flue liner.
2. A prefabricated chimney complying with the requirements for Type HT (2100°F) chimneys per UL 103 or ULC S629.

Use of an existing chimney requires that the entire system pass a UL 1482 Level II inspection by a qualified solid fuel technician or building official.

The chimney size should not be less than the cross-sectional area of the flue collar, and not more than three times greater than the cross-sectional area of the flue collar. If the chimney flue is outdoors, its cross-sectional area may not exceed two times greater than the stove flue collar. See also Sect. 3.2.

When selecting a chimney type and the location for the chimney in the house, keep this in mind: **It is the chimney that makes the stove work - not the stove that makes the chimney work.** This is because a chimney actually creates a suction, called "draft" which pulls air through the stove.

Several factors affect draft: chimney height, cross-sectional area (size), and temperature of the chimney, as well as the proximity of surrounding trees or buildings.

A short exterior masonry chimney will give the poorest performance because it will be difficult to warm the flue and sustain the temperatures necessary to maintain draft strength. In extremely cold climates, it may be necessary to reline the chimney or extend the height to help establish draft.

A tall, interior masonry chimney is easier to keep warm and will perform the well under a variety of weather and environmental conditions.

The following guidelines give the necessary chimney requirements based on the national code (ANSI-NFPA 211 for the US. And CSA CAN-B365 for Canada). However, many local codes differ from the national code to take into account climate, altitude, or other factors. Your local building inspector is the final approving authority. Consult them prior to installation.

Do not connect the stove to any air distribution duct or system.

2.1 Masonry Chimneys

Follow these guidelines when installing the Jøtul F 45 V2 into a masonry chimney:

- The masonry chimney must have a fireclay liner or equivalent, with a minimum thickness of 5/8" (14 mm) and must be installed with refractory mortar. There must be at least 1/2" (12.7 mm) air space between the flue liner and chimney wall.
- The fireclay flue liner must have a nominal size of 8" X 8" (20 cm x 20 cm), and should not be larger than 8"X 12" (20 cm x 30 cm). A round fireclay liner must have a minimum inside diameter of 6" (15 cm) and maximum inside diameter of 8" (20 cm).
  A larger chimney should be relined with an appropriate code approved liner.
- Brick or modular block must be a minimum of 4" (10 cm) nominal thickness. Stone construction must be at least 12" (30 cm) thick.
- A newly-built chimney must conform to local codes, or, in their absence, must comply with national regulations.
- An existing chimney must be inspected by a professional, licensed chimney sweep, fire official, or code officer to ensure that the chimney is in proper working order. Any repairs must be completed before installing the stove.
- No other appliance may be vented into the same flue.
- An airtight clean-out door should be located at the base of the chimney.

2.2 Prefabricated Chimneys

A prefabricated metal chimney must be tested and listed for use with solid fuel burning appliances. High Temperature (HT) Chimney Standard UL 103 for the U.S. and High Temperature Standard ULC S-629 for Canada.

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

2.3 Chimney Height

The chimney must be at least 3 feet (92 cm) higher than the highest point where it passes through the roof and at least 2 feet (61 cm) higher than the highest part of the roof or structure that is within 10 feet (3.05 m) of the chimney, measured horizontally. See fig. 4.

Chimneys shorter than 14 feet (4.27 m) may not provide adequate draft. Inadequate draft can result in smoke spillage when loading the stove, or when the door is open. Poor draft can also cause back puffing (ignition of gas build-up inside the firebox) and sluggish performance. The minimum height does not, in itself, guarantee proper chimney performance. Optimum draft force should be in the .05 - .10 in. w.c. range measured by a Magnahelic gauge. Draft at .07 w.c. is ideal.

Excessive chimney height can promote over-strong draft resulting in high stove temperatures and short burn times. Excessive draft can be corrected by installing a butterfly damper. Your Jøtul dealer is an expert resource to consult regarding draft issues or other performance-related questions.

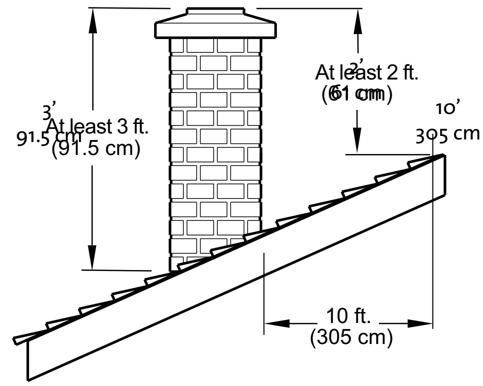


Figure 4. Chimney Height Requirement.

2.4 Wall Pass-Throughs

Note: In addition to the methods described here, any listed, prefabricated wall pass-through components available from chimney manufacurers may be used.

In the U.S.

The National Fire Protection Association's publication, NFPA 211, *Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances* permits four methods for passing through a combustible wall. Before proceeding with any method be sure to consult with your local building officials to discuss any local code requirements.

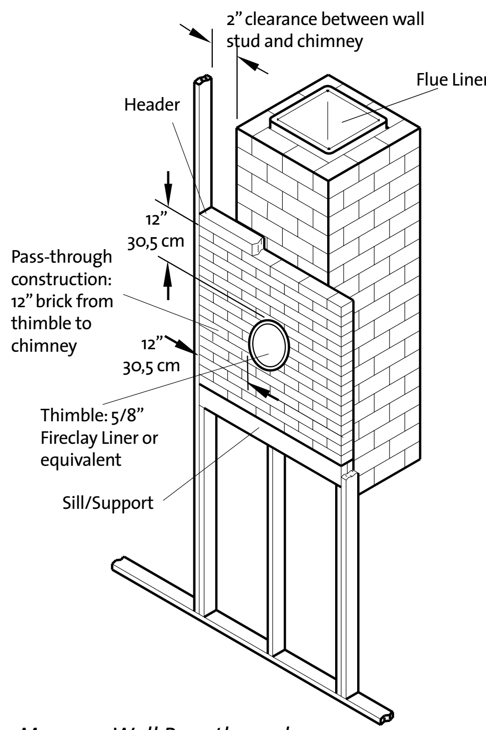


Figure 5. Masonry Wall Pass-through.

Common Method:

See fig. 5. Remove all combustible materials from the pass-through area (around the chimney connector), a minimum 12" (30.5 cm). A 6" (15.2 cm) diameter connector will require a 31" x 31" (78.7 x 78.7 cm) square opening.

The opening must be filled with at least 12" (30.5 cm) of brick around a fireclay liner. The liner must be ASTM C35 or equivalent, having a minimum wall thickness of 5/8" (16 mm).

The Pass-through must be at least 18" (45.7 cm) from combustible ceiling materials.

It will be necessary to cut wall studs, install headers, and construct a sill frame to maintain the proper dimensions and to support the weight of the brick.

The bricks must be solid brick with a minimum of 3 inches thick (nominal 4"/ 102 mm).

Refractory mortar must be used at the junction of the chimney and the pass-through liner. The pass-through liner must not penetrate the chimney liner beyond the inner surface of the chimney liner. Use extreme care when constructing the hole in the chimney liner as the tiles can shatter easily.

In Canada

The installation must conform to CAN/CSA-B365, Installation Code for Solid Fuel Burning Appliances and Equipment. Before proceeding be sure to consult your local building inspector.

Common Method:

This method requires the removal of all combustible materials from at least 18" (45.7 cm) around the chimney connector's proposed location. A 6" round liner requires a minimum opening 43" x 43" (109.2 x 109.2) square.

Locate the pass-through at least 18" from combustible ceiling materials.

The space that is cleared of combustible materials must remain empty. Sheet metal panels can be used to cover the area. However, when using a panel on both sides of the wall, each cover must be installed on noncombustible spacers at least 1" from the wall. If one panel of sheet metal is to be used it may be installed flush to the wall.

See section 5.3.1 and 5.3.2 of CAN/CSA - B365-M91. Consult your local building inspector, authorized Jøtul Dealer, NFPA 211 in the U.S. or CAN/CSA-B635 in Canada for other approved wall pass-through methods.

3.0 Connecting to the Chimney

3.1 Masonry Chimney

When installing a Jøtul F 45 V2into a masonry chimney through a "thimble" (the opening through the chimney wall to the flue), the thimble must consist of ceramic tile or steel and be securely cemented in place.

The chimney connector/stove pipe must slide completely inside the thimble to the inner surface or the flue liner. It may be necessary to make use of a thimble sleeve (a pipe with a slightly larger diameter than standard stove pipe). See **fig. 6.**

The connector pipe or thimble sleeve must not protrude into the flue liner or otherwise restrict draft.

Use refractory cement to seal the seam between the chimney connector, sleeve, and thimble.

Do not connect this stove to a chimney flue servicing another appliance of any kind.

3.2 Hearthmount into a Masonry Fireplace

The Jøtul F 45V2 on standard legs may be installed into a masonry fireplace with a minimum opening height of 29 1/2" (75 cm).

Use Short Leg Kit 137636 to install into a fireplace with a minimum opening height of 26 1/4" (667 mm). ***Short legs are approved only for use on a code-approved, masonry fireplace hearth.***

Building code requires that the fireplace damper plate be removed or securely fixed in the open position.
A connector pipe must then extend from the stove's flue exit through the damper area of the fireplace and into the chimney tile liner. See **fig. 7**. In any case, we recommend that a full liner be installed through any masonry chimney to ensure good performance.

The cross-sectional area of the flue of a chimney with no walls exposed to the outside below the roofline may be no more than three times the cross-sectional area of the stove flue collar.

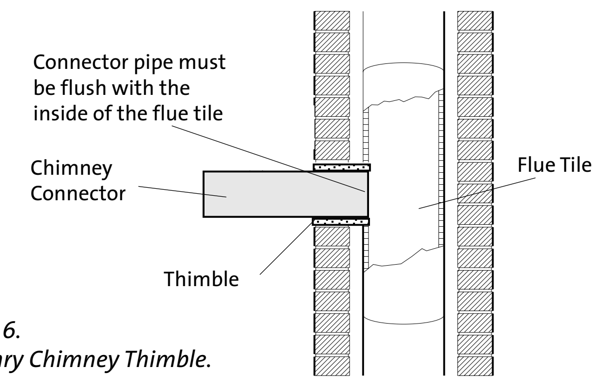


Figure 6.
Masonry Chimney Thimble.

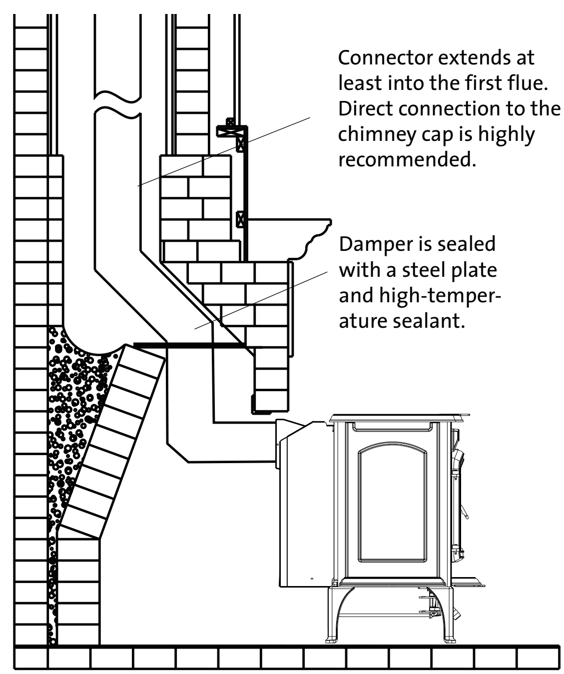


Figure 7. Hearthmount Installation.

The cross-sectional area of the flue of a chimney with one or more walls exposed to the outside below the roofline may be no more than two times the cross-sectional area of the stove flue collar.

If the chimney liner is too large to accommodate the stove, an approved relining system must be installed to resize the flue.

A new sheet metal damper block-off plate must be installed around the connector pipe at the damper frame and sealed with the proper sealant (usually High-Temp Silicone).

3.3 Prefabricated Chimneys

When connecting the Jøtul F 45 V2 to a prefabricated metal chimney always follow the pipe manufacturer's instructions and be sure to use the all components that are required. This usually includes a "smoke pipe adapter" that is secured to the bottom section of the metal chimney and allows the chimney pipe to be secured to it with two sheet metal screws. See fig. 8.

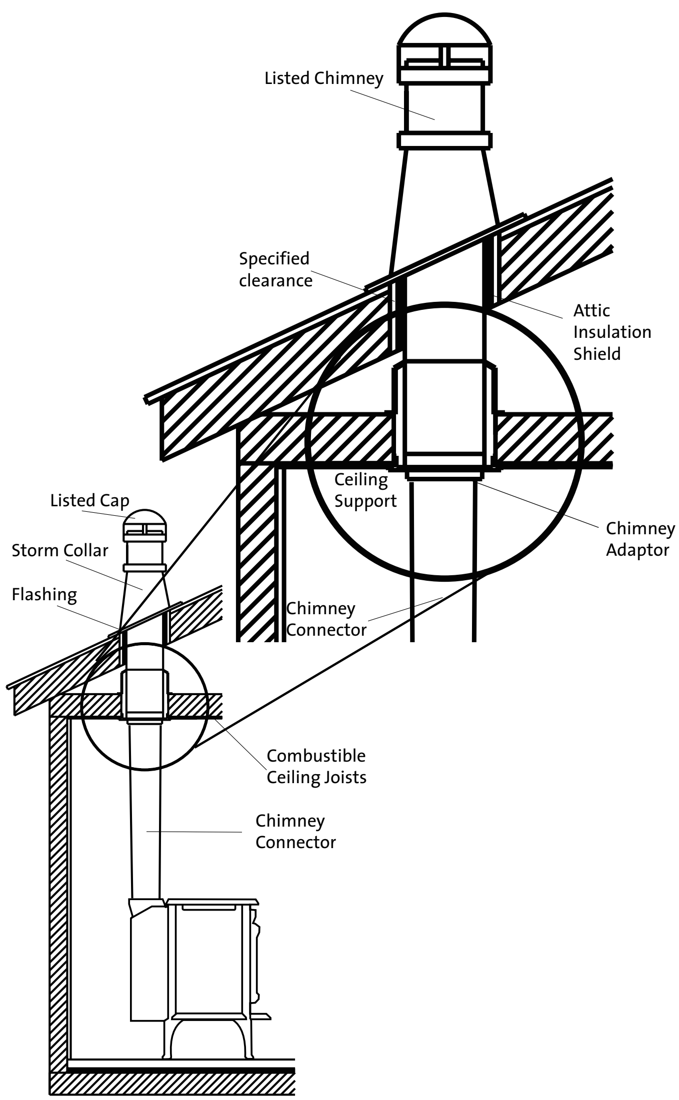


Figure 8. Prefabricated Listed Type HT Chimney.

3.4 Mobile Home Installation

The Jøtul F 45 V2 is approved for installation in manufactured mobile homes provided the following requirements are met:

1. All chimney components, including chimney sections, supports, spark arrestor, etc., shall comply with the Standard for Factory-built Chimneys for Residential Type and Building Heating Appliances, UL 103 and/or CAN/ULC-S629 Standard for 650°C Factory-built Chimneys.

2. The chimney shall be attached directly to the stove and extend at least 3 ft. (0.9m) above the roof. Termination must be at least 2 ft. (0.6m) above the hightest elevation of any part of the mobile home within 10 ft. (3m).

3. In order to allow for transportation of the mobile home, the chimney termination shall be readily removed at or below an elevation of 13.5 ft. (4.1 m) above ground level and reinstalled without use of special tools or instructions.

4. A spark arrester must be installed at the termination. The net free area of the arrester above the chimney outlet must not be less than four times the net area of the chimney outlet, and the vertical height of the arrester must not be less than one-half the diameter of the chimney flue. Openings shall not permit the passage of a sphere having a diameter larger than 1/2" (12.7 mm), and shall permit the passage of a sphere having a diameter of 3/8" (9.6 mm).

5. Direct connection of the stove to an outside air source is required. Use Outside Air Kit 157440. Do not substitute any other connection method or device. See Appendix, Section 7.0. Duct termination must not be installed at a level that is higher than the air inlet located at the bottom of the stove.

6. The stove must be secured to the mobile home floor. Use Floor Bracket Kit 157321.

7. When the chimney exits the mobile home at a location other than through the roof, and exits at a point 7 ft. (2.1 m) or less above the ground level, a guard or other method of enclosing the chimney, must be provided at the point of exit for a height up to 7 ft. Openings of this chimney guard shall not permit penetration of a 3/4 in. (19.1 mm) diameter rod, or contact with the chimney by a 1/2 inch (12.7 mm) diameter rod inserted through the opening a distance of 4 inches (102 mm).

8. Provision must be made for electrical grounding of the chimney, chimney connector, and stove in accordance with local building codes.

WARNING: Do not install this appliance in a sleeping room.

CAUTION: The structural integrity of the mobile home floor, walls, and ceiling/roof must be maintained.

4.0 Clearance to Combustibles

4.1 Floor Protection

The Bottom Heat Shield provided with the stove must be installed unless the stove is installed on concrete poured on earth**.** See instructions in the Appendix on page 26.

The Jøtul F 45 V2 also requires one of the following forms of hearth protection if not installed directly on concrete poured on earth:

1) Any UL/ULC Type I, Type II, or Warnock Hersey Listed hearth board.

2) Any noncombustible material.

IN THE U.S: **Floor protection must extend forward from the door opening at least 16 in. and 8 in. from the sides of the door opening.** Protection must also extend 2 in. from the rear and 2" to the sides under any horizontal chimney connector. This will result in a minimum floor protector measuring 27" wide x 44" deep. See fig 9.

IN CANADA: **Floor protection must extend 18" from the front of the stove and 8 in. (460mm) from the sides *and rear*.** It must also extend 2 in. (51 mm) under any horizontal chimney connector. This results in a floor protector dimension of 39 in. x 52 in. (99 cm x 52 cm) See fig.10.

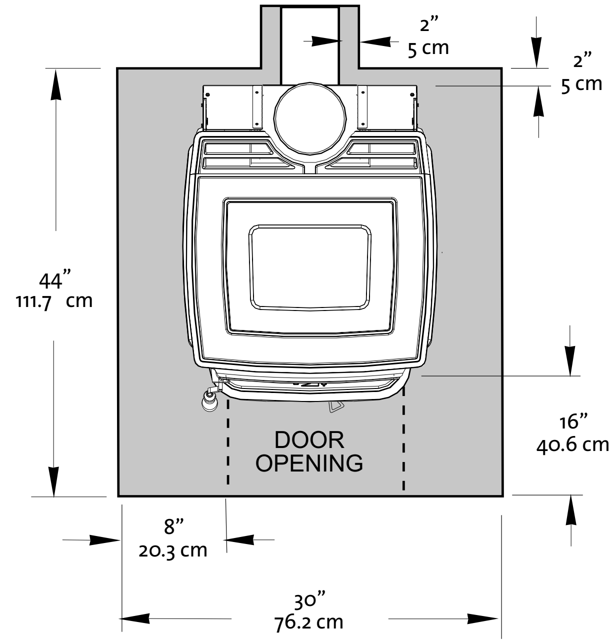


Figure 9. Floor Protection minimum dimensions, U.S.

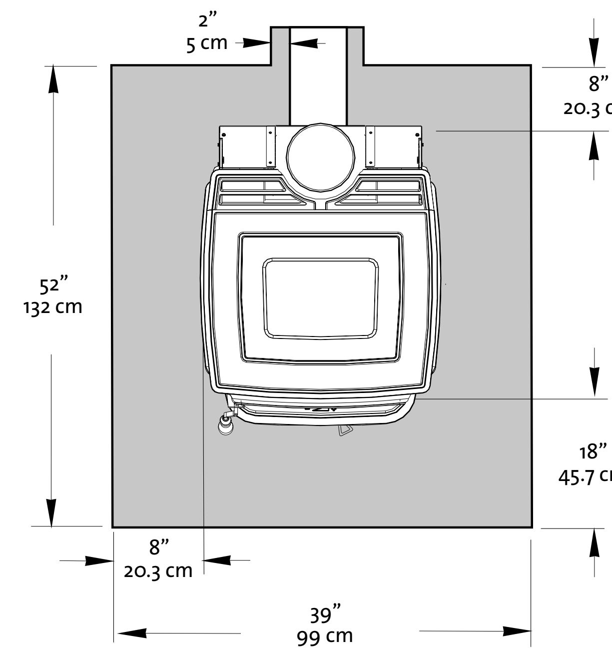


Figure 10. Floor Protection minimum dimensions, Canada.

4.2 Clearances to Walls and Ceilings

The clearances listed and diagramed in this manual have been tested to UL and ULC standards and are the minimum clearances to combustible materials specifically established for the Jøtul F 45 V2.

A combustible surface is anything that can burn (i.e. sheet rock, wall paper, wood, fabrics etc.). These surfaces are not limited to those that are visible and also include materials that are behind noncombustible materials. If you are not sure of the combustible nature of a material, consult your local fire officials.

Remember: "Fire Resistant" materials are considered combustible; they are difficult to ignite, but will burn. Also "Fire-rated" sheet rock is also considered combustible.

Contact your local building officials about restrictions and installation requirements in your area.

See pages 12-13 for clearance requirements and diagrams.

4.3 Using Shields to Reduce Clearances

Double Wall Connector: Listed double wall pipe is an acceptable alternative to connector pipe heat shields.

Wall-Mounted Protection: When reducing clearances through the use of wall-mounted protection:

In the U.S. refer to NFPA 211, *Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances*, for acceptable materials, proper sizing and construction guidelines.

In Canada, refer to CAN/CSA-B365, *Installation Code for Solid-Fuel Burning Appliances and Equipment,* also for acceptable materials, proper sizing and construction guidelines.

Notice: Many manufacturers have developed woodstove accessories that permit clearance reduction. Use only those accessories that have been tested by an independent laboratory and carry the laboratory's testing mark. Be sure to follow all of the manufacturer's instructions.

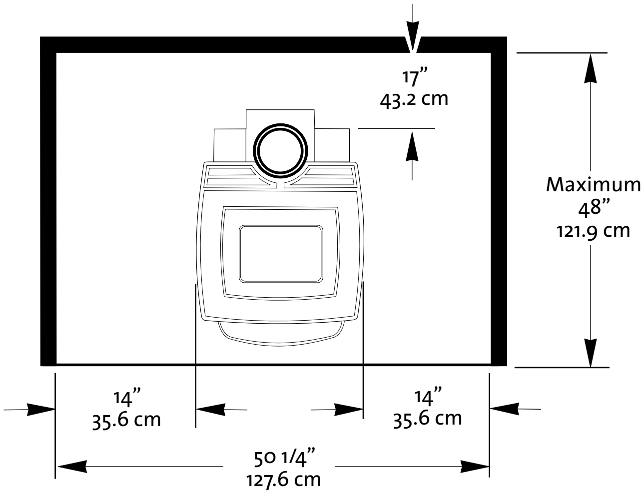


Figure 11. Alcove Clearances.

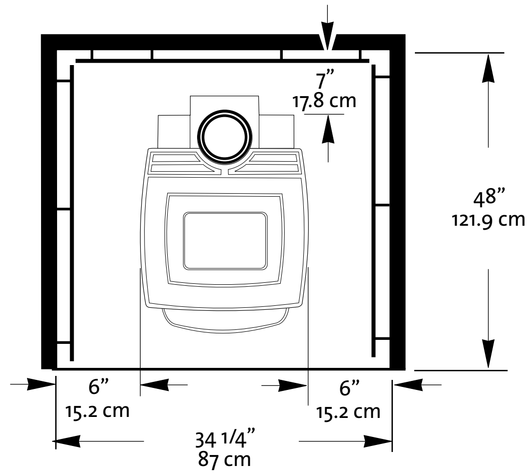


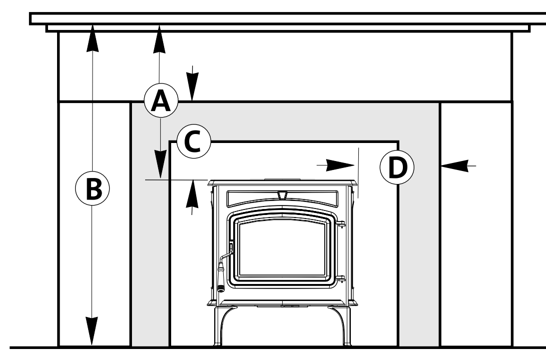
Figure 12. Alcove with Wall Protection.

4.4 Alcove Installation

The Jøtul F 45 V2 can be installed in an alcove as diagrammed in **figs. 11.**-12.

1. **Only double-wall chimney connector may be used.**
2. Wall and ceiling protection, if used, must extend over the entire area.
3. Alcove floor protection must consist of a Type I or Type II, UL/ULC 1618 or WHI listed hearth pad or a non-combustible material.
4. **Minimum Alcove Ceiling Height from Floor:**
   Unprotected Surface - 72” (183 cm)
   Protected Surface - 65” (165 cm)

The Short Leg option is not approved for use in Alcove installations.



A: Unit to Mantel (12 in. deep) - 20 in. / 88.9 cm
B: Floor to Mantel - 49.75 in. / 126.4 cm
C: Stove to 1 in. Top Trim - 16 in. / 78.7 cm
D: Stove to 1 in. Side Trim - 8 in. / 35.6 cm
☐ Non-combustible Material

Figure 13. Mantel and Trim Clearances.

4.5 Clearances to Fireplace Mantels and Surrounding Trim

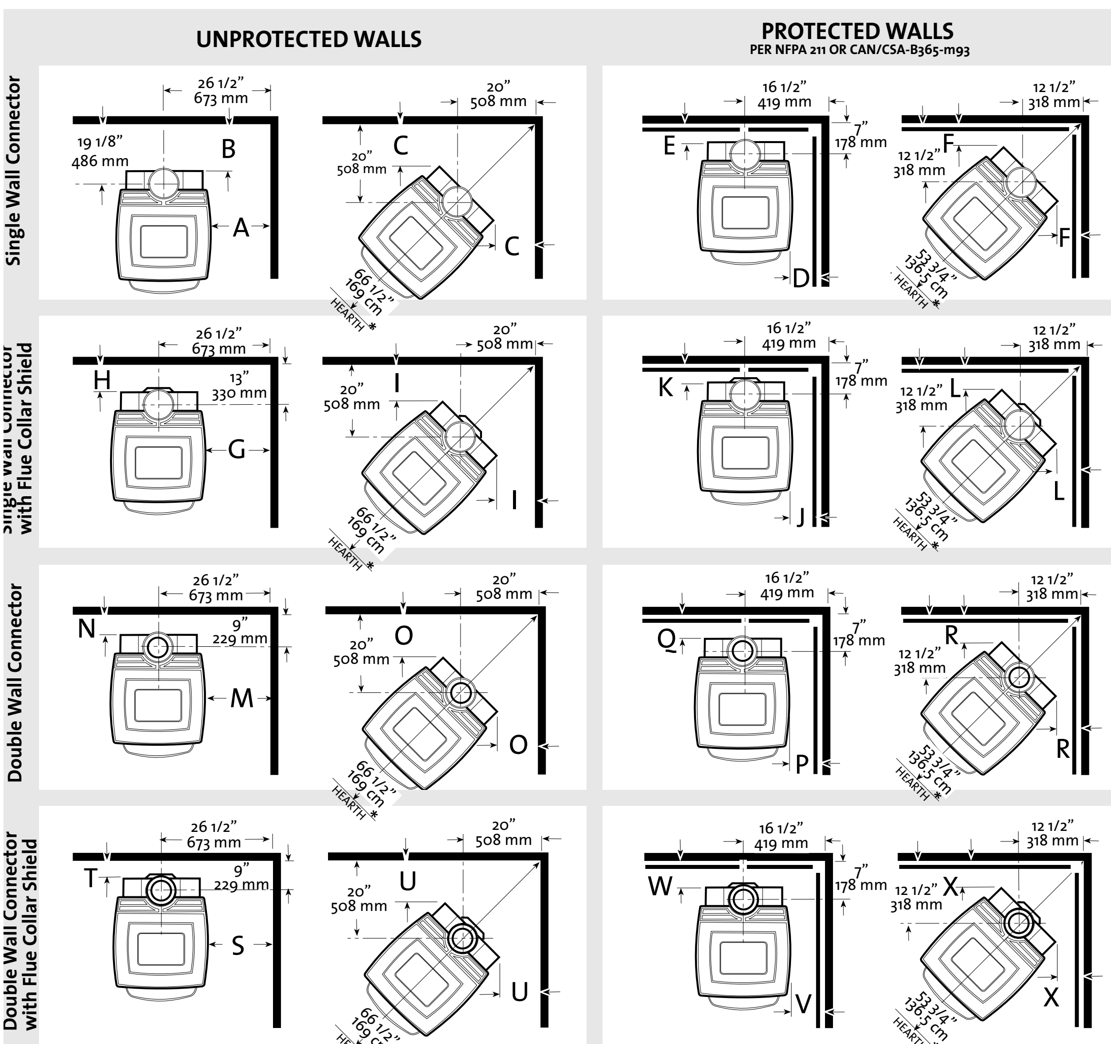
See fig. 13 and the Clearance Chart on page 13 for approved clearances to combustible materials that may be part of fireplace construction.

Mantel and Trim clearances may be reduced by 50% with use of shielding constructed in accordance with NFPA 211 specifications.

4.6 Jøtul F 45 V2 Greenville Clearance Specifications

	UNPROTECTED WALLS			PROTECTED WALLS PER NFPA211 OR CAN/CSA -B365-M93		
	SIDE	REAR	CORNER	SIDE	REAR	CORNER
Single Wall Connector	A 15" / 381 mm	B 16" / 406 mm	C 11" / 280 mm	D 5" / 127 mm	E 4" / 102 mm	F 3.5" / 89 mm
Single Wall Connector w/ Flue Collar Heat Shield	G 15" / 381 mm	H 10" / 254 mm	I 11" / 280 mm	J 5" / 127 mm	K 4" / 102 mm	L 3.5" / 89 mm
Double Wall Connector	M 15" / 381 mm	N 6" / 152 mm	O 11" / 280 mm	P 5" / 127 mm	Q 4" / 102 mm	R 3.5" / 89 mm
Double Wall Connector w/ Flue Collar Heat Shield	S 15" / 381 mm	T 6" / 152 mm	U 11" / 280 mm	V 5" / 127 mm	W 4" / 102 mm	X 3.5" / 89 mm
Alcove w/ Double-Wall Connector	A 14" / 356 mm	B 17" / 432 mm	N/A	D 6" / 152 mm	E 7" / 178 mm	N/A

Figure 14. Clearance Diagrams. All specifications applicable to both top and rear exit configurations.



*For Canada, add 2" (51 mm) to corner hearth extension dimensions.

5.0 Operation

Please read the following section before building the first fire in your new Jøtul F 45 V2.

5.1 Combustion Efficiency

The Jøtul F 45 V2 has an EPA tested High Heating Value (HHV) efficiency rate of 71.15. There are aspects of efficiency, however, that you should be aware of in order to get the most from your stove.

Operation habits and fuel moisture can have a significant effect on efficiency. Poorly seasoned wood having a higher than optimum moisture content, can reduce the amount of energy transferred tothe living area as a result of the energy expended to evaporate the excess fuel moisture in order for the wood to burn. Operational aspects, such as not building a robust kindling fire to readily ignite the larger fuel pieces, can result in an inefficient smoldering fire. Additionally, most modern wood heaters' optimum performance and efficiency are at the medium to medium -to-low burn rates.

The location of the stove can have a significant effect on heating efficiency, primarily in regard to distribution of the heat. For example, a wood heater centrally located in the residence in an open living area will likely provide better circulation of heat than will a stove located in a room adjacent to the larger living area.

5.2 Minimize Carbon Monoxide Emissions

Testing the F 45 V2 to CSA B414.1-10 resulted in a carbon monoxide emission rate of 1.48 grams per minute. Most means of combustion produce CO, including wood fires. Maintaining a well-established fire and avoiding operation that produces a smoldering, smoky fire, will greatly reduce CO levels.

It is highly recommended that a CO monitor (detector) be installed in the same room as the stove. The monitor, however, should be located as far away as possible from the stove to avoid alert soundings when adding fuel to the fire.

5.3 Wood Fuel and Performance

The F 45 V2 is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air-dried, seasoned hardwoods, as opposed to softwoods, green or freshly cut hardwoods. Wood that has been air-dried for a period of 6 to 14 months will provide the cleanest, most efficient heat. Wood seasoned more than 2 years will burn too quickly to take advantage of the stove's low end efficiency strength.

A seasoned log will have check marks on the ends and be lighter than an unseasoned log which will show little or no check marks.

We recommend using a moisture meter to determine the moisture content of your wood. For purposes of home heating, your fuel should have a moisture content between 12 - 20%. Wood with higher moisture content will burn, however, very inefficiently. Most of its heat value will be lost to driving water out of the wood. Worse, that moisture will condense as creosote in the relatively cool chimney flue, increasing the potential for a chimney fire. Use of unseasoned wood defeats the purpose of any modern wood-burning stove.

DO NOT BURN:

- Coal;
- Garbage;
- Synthetic fuel or logs;
- Material containg rubber, including tires;
- Material containing plastics;
- Waste petroleum products, asphalt products, paints, paint thinners or solvents;
- Materials containing asbestos;
- Construction or demolitioin debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Salt water driftwood or other previously salt-water; saturated materials;
- Unseasoned wood; or
- Paper products, cardboard, plywood, or particle board.

(The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax or similar substances for the purpose of starting a fire.)

The burning of any of these materials can result in the release of toxic fumes, or render the heater ineffective and cause smoke. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen-up" the fire. Always keep such liquids away from the heater at all times.

WARNING

ALWAYS WEAR STOVE GLOVES WHILE TENDING THE FIRE.

NEVER ALLOW THE FIRE TO REST DIRECTLY ON THE GLASS. KEEP THE LOGS SPACED AT LEAST ONE INCH FROM THE GLASS TO ALLOW FOR PROPER AIR FLOW WITHIN THE STOVE. AVOID STRIKING THE GLASS WITH LOGS.

OPERATE THIS STOVE ONLY WITH THE FRONT DOOR FULLY CLOSED OR FULLY OPEN WITH THE OPTIONAL SPARK SCREEN IN PLACE. OPERATION WITH THE DOOR PARTIALLY OPEN MAY RESULT IN OVER-FIRING. IF THE DOOR IS LEFT PARTIALLY OPEN, GAS AND FLAME MAY BE DRAWN OUT OF THE STOVE CREATING SAFETY RISKS FROM BOTH FIRE AND SMOKE.

5.4 How your Jøtul F 45 V2 works

When used with dry wood and a well-drafting chimney system, modern non-catalytic wood stoves burn fuel efficiently by the precise control and delivery of primary and secondary air to the fire.

Primary Air is drawn into a front inlet in the stove bottom and directed through a regulator shutter under the front door before entering the lower fire chamber. Additional primary air is directed to the top of the load door to act as an air wash to help prevent extreme soot build-up on the glass panel. The amount of primary air available to the fire determines the intensity of heat output and rate of fuel combustion; the greater the amount of air, the greater the heat output, the faster the wood burns. The primary air setting also determines the effectiveness of the air wash over the glass; the higher the setting, the cleaner the glass.

Additional air is separately directed into the top of the fire chamber to support combustion of exhaust gasses before passing out of the stove. This unregulated ***Secondary Air*** enters through an inlet in the rear of the stove bottom and is heated as it passes through the rear of the stove into a two-tiered manifold at the top of the firechamber. Additional secondary air is directed through a stainless steel baffle plate.

Volatile gases, released unburned from the fuel bed, rise to the baffle where they are turbulently mixed with the hot, fresh oxygen. Secondary combustion then occurs before the gases pass into the heat exchange chamber. The action of secondary combustion can be readily seen through the viewing glass as slow, rolling flames suspended over the main fuel bed and smaller jets of flame extending from the baffle manifold ports. At the same time, no smoke will be observed exiting the chimney. This is evidence that the stove is operating at the so-called "sweet-spot" wherein optimum efficiency and lowest particulate emissions are realized. See fig. 15.

Use a Stove-top Thermometer

Determining the primary air setting for the best overall performance for your particular needs and installation will be established over time and experience. Each installation has unique characteristics that will affect stove performance. You should use a stove-top thermometer to monitor the status of the fire. Place the thermometer on the stove top, centered two one side or the other. Generally speaking, once the stove temperature has reached 400°F - 600°F (204°C -316°C), the air control may be set in a mid-range position to allow adequate oxygen to support efficient combustion throughout the burn cycle.

Beside using a thermometer, you can also monitor stove performance through the window. Peak combustion efficiency occurs when exhaust gas is burned at the baffle in the top of the firebox. This is apparent as rolling yellow-orange flames appearing at the secondary air ports in the underside of the baffle plate and forward tube. At this stage, little or no smoke will be visible exiting the chimney.

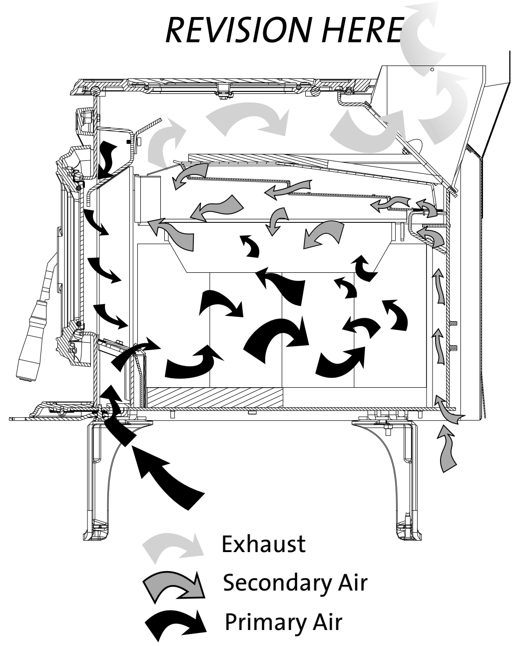


Figure 15. Combustion air paths

5.5 Air Control / Blower Settings

Use the following guide for best performance.

Burn Rate	Air Control Setting	Blower Speed
Low	Fully Closed	Low / On auto
Medium	1/8" Open	Low / On auto
High	Fully Open	High / On auto

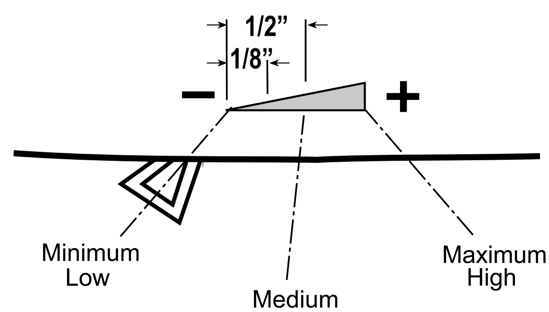


Figure 16. Air Control Settings

5.6 Controlling the Fire

Combustion intensity is controlled by the position of an air shutter located under the front door. You adjust its position using the handle located under the ash lip. Slide the handle to the left to decrease air to the fire. Sliding it to the right increases air delivery and consequently, fire intensity. See fig. 16. The shutter regulates and directs primary air to the front of the burn chamber. Push it to the right to allow maximum air to support combustion. It should be fully open when first starting or rekindling a fire, or when greater heat output is desired.

5.7 Break-In Procedure

Although your Jøtul F 45 V2 is constructed of welded, 3/16" steel plate, it also incorporates cast iron components. This material requires the stove to be"broken-in" gradually so that heat expansion does not occur too quickly and cause damage. The following steps describe the proper break-in procedure for your stove. Use a magnetic stove-top thermometer to monitor stove temperature, placed directly on the cook plate.

Set the Primary Air Shutter fully open, all the way to the right.

1. Light a small fire of newspaper and kindling at the front of the stove. Gradually add small pieces of wood, but only allow the stove to reach a maximum surface temperature of 200°F (93° C). Continue burning at this low rate for approximately 1 hour.
2. Allow the stove to cool to room temperature.
3. Light a second fire, allowing the stove to reach a maximum temperature of 300°F (149°C) for 1 hour.
4. Cool the stove to room temperature.
5. Light a third fire and gradually allow the stove to reach a surface temperature of 400°F (204°C)
6. Cool the stove to room temperature. This completes the "break-in" procedure.

Note: If the temperature exceeds the limit during any break-in fire, move the Air Shutter all the way to the left to shut off the air supply completely. It is normal that the stovetop temperature will continue to climb until the fuel burns down somewhat. Once the fire is out and the stove has cooled to room temperature, continue the break-in procedure. Never attempt to reduce the temperature by removing burning logs from the fire.

Break-in Odors: It is normal for a newly-painted stove to emit odor and smoke during the first few fires, and these may set off smoke alarms. This condition is caused by curing of the high temperature paint and will diminish with each subsequent fire. It is advisable to open windows or doors to provide plenty of fresh air and cross-ventilation during the break-in period.

WARNING:

NEVER OVER-FIRE THE STOVE. IF ANY PART OF THE STOVE OR CHIMNEY GLOWS, YOU ARE OVER-FIRING. A HOUSE FIRE OR SERIOUS DAMAGE TO THE STOVE OR CHIMNEY COULD RESULT. IF THIS CONDITION OCCURS, IMMEDIATELY CLOSE THE AIR CONTROL.

ATTEMPTS TO ACHIEVE HEAT OUTPUT RATES THAT EXCEED HEATER DESIGN SPECIFICATIONS CAN RESULT IN PERMANENT DAMAGE TO THE HEATER.

5.8 Starting and Maintaining a Fire

Burn only solid wood directly on the bottom of the stove firechamber. Do not elevate the fire in any way.

Traditional Fire Building

1. With the primary air control lever in the full open position *(to the right)*, start with several sheets of crumbled newspaper placed directly on the grate. On top of the newspaper, place several pieces of small dry kindling (approx. 1" in diameter) with two to three larger logs (approx. 3" to 5" in diameter) on top.
2. Light the fire and close the door, slowly building the fire by adding larger and larger logs. Be sure to follow the break-in procedure before creating a hot fire that might damage the stove.
3. Once the stove has reached a surface temperature range of between 400° and 600°, (204°C -316°C), adjust the primary air control lever as necessary to generate the heat output and burn time desired.

Top-Down Fire Building - See fig. 17.

Many people find this method to be superior to the traditional method.

1. With the primary air control lever in the full open position *(to the right)*, place two short 1/4-split logs on the firebox floor, perpendicular to the rear wall, about 6 inches apart.
2. Place kindling across the base logs.
3. Place one or two smaller logs on top of the kindling.
4. Place newspaper between the two bottom logs under the kindling. Light the news paper and close the door. Continue to add kindling and small logs as necessary to build the fire. Keep the air control fully open until the fire is well-established.

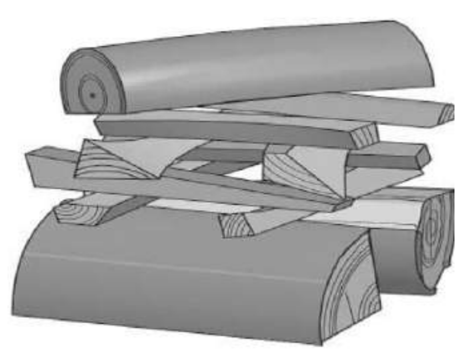


Figure 17. Top-down fire starting structure.

5.9 Adding Fuel

Follow this procedure when reloading the stove while it is still hot and a bed of hot embers remains:

- Always wear gloves when tending to the stove.

- Adjust the Primary Air Shutter Lever to the fully open position - all the way to the right. Wait a few seconds to re-establish strong draft before opening the load door. This will allow fresh air to flush the firebox and prevent smoke escaping when the door is opened.
- Open the door slightly, and hesitate a moment to allow exhaust purge, then open the door fully.
- Use a stove tool or poker to evenly distribute coals and embers around the firebox.
- Load the fuel, usually with smaller logs first.
- Close the door, being sure to latch the door tightly.
- Wait 5 – 10 minutes to re-establish the fire before setting the air controls for the desired heat output and burn time. (If there is at least a 2" thick ember bed when reloading, it may be possible to close the door and immediately adjust the air control setting).
- Set the Air Shutter for the desired heat output.

5.10 Open Door Fire-viewing

Warning: This stove should be operated with the door either fully open with optional Spark Screen in place or with the door fully closed. If the door is left partly open, there is risk of overfiring. Also, gas and flame may be drawn out of the fireplace stove opening, creating risks from both fire and smoke.

Be aware that, when operating with the door open, there exists the possibility of carbon monoxide generation by charcoal, Good draft is essential to minimize the potential for CO to be introduced into the living space. Be sure adequate fresh air and ventilation are available to the stove when using the spark screen.

5.11 Creosote Formation and the Need for Removal

When wood is burned slowly, it produces tar and other vapors that combine with moisture to form creosote. Creosote vapors condense in the relatively cool chimney flue, and creosote residue accumulates on the flue lining. When ignited, this creosote fuels an extremely hot fire.

The chimney connector and chimney flue should be inspected at least every other month during the heating season to determine if creosote buildup has occurred. If creosote has accumulated, it should be removed to reduce the chance of a chimney fire.

In the event that creosote ignites in the flue, the resulting fire is often accompanied by a roaring noise and crackling sound as flakes of burning creosote break loose. If you suspect you are having a chimney fire, immediately close the air controls and make sure the door is closed securely. Call the fire department and have everyone leave the house.

Do not attempt to extinguish the fire. Opening the door will only supply additional oxygen and intensify the fire. When the fire in the flue has subsided, resist the temptation to open the door to check on the fire. The fire may have suffocated, but could re-ignite with a supply of fresh air. After a chimney fire, do not use the stove until the chimney connector and flue have been cleaned and inspected to ensure no damage has been sustained.

See Section 6.6 of this manual regarding chimney cleaning.

5.12 Ash Removal

Remove ashes whenever accumulation nears the primary air port located inside the firechamber just under the door opening.

Always wear safety gloves when handling the ashes.

Ashes should only be placed in a metal container equipped with a tight sealing lid. The container should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are to be disposed of by burial in soil or otherwise locally dispersed, they should be kept in the closed container until all cinders have thoroughly cooled.

6.0 Maintenance

6.1 Door Latch Adjustment

Over time, as the door gasket becomes compressed, it may be necessary to adjust the door latch in order to maintain the integrity of the door seal. To check the seal o f the front door, close and latch the door on a dollar bill and slowly try to pull the bill free. You should feel resistance as you pull. If it can be easily removed, the seal is too loose. Follow this procedure to tighten the latch mechanism.

Tools Required:
- 4 mm hex key

1. Remove the two socket head screws and latch keeper from the stove. See fig. 18.
2. Remove one of the shim plates from the latch cavity and re-install the latch keeper. Retain the shim plate(s) removed for future use.
3. Test the seal integrity using the dollar bill.

The door gasket will compress over time. When the latch can no longer be tightend by shim removal, install a new gasket and replace the shim plates.

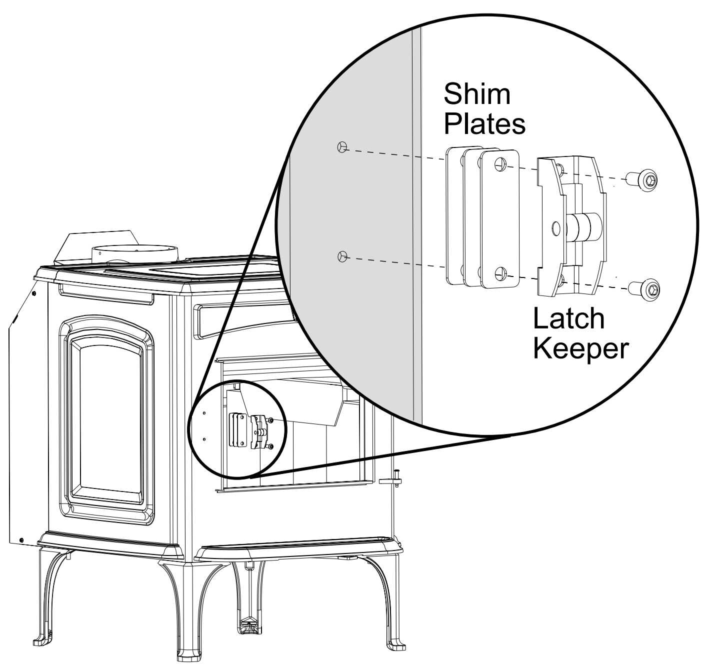


Figure 18. Latch adjustment.

6.2 Glass Care

Cleaning

On occasion it will be necessary to clean the carbon deposits and fly ash off of the glass. If these deposits are allowed to remain on the glass for an extended period of time, the surface may become etched and cloudy. Any creosote that might develop on the glass will burn off during the next hot fire.

Follow this glass cleaning procedure:

1. Glass must be completely cool.
2. Only use only those cleaning products specifically formulated to clean solid fuel appliance glass and follow the manufacturer's instructions. **Use of abrasive compounds or solutions will damage the glass.**
3. Rinse and dry glass completely before burning the stove. Polish with a piece of newspaper.

Caution! Always operate the door slowly and carefully to avoid cracking or breaking the glass. Never use the door to push wood into the firebox. If the glass becomes cracked or broken follow the replacement procedure in Section 6.4.

Never operate the stove with a cracked or broken glass panel.

Important: Replace glass only with ceramic glass panel PN 224923 specifically designed for the Jøtul F 45, available from your local Jøtul dealer. Do not substitute any other glass.

6.3 General Care

Regular maintenance will ensure excellent performance and prolong the life of your stove. The following procedures do not take long and are generally inexpensive. When performed consistently, they will lengthen the life of your stove and in turn, provide many years of service.

- Regularly empty the stove of all soot and ashes. Only use a vacuum for this job if the vacuum is specifically designed to handle ashes. **CAUTION: Ashes can contain live embers. Be certain the ash bed contains no live embers before using a vacuum.**
- Inspect the stove: Using a strong light inspect the stove inside and out for cracks or leaks.
- Replace any broken bricks. See fig. 26, page 24. DO NOT OPERATE THE STOVE WITH BROKEN OR MISSING BRICKS.

6.4 Gasket Replacement

Tools needed:

- needle nose pliers
- wire brush
- 4mm hex key
- gasket cement

1. Use the pliers to remove the small C-clips from the door hinge pins. Remove the door from the stove and place it face down on a protected surface.
2. Use the hex key to remove the warning label plate from the back of the door.
3. Use pliers to remove the old gasket and adhesive from the door.
4. Thoroughly clean the channel with a wire brush.
5. Apply a small bead of gasket cement to the channel as shown in fig. 19. DO NOT APPLY CEMENT TO THE GLASS CLIPS OR THE CLIP LANDING AREAS.
6. Starting at the center of the gasket length and the top center of the channel, gently press each gasket half into the channel. Do not stretch the gasket. Wrap the ends at the center of the bottom as shown in fig. 19.
7. Replace the Warning Plate.
8. Replace the door. Close and latch the door and then reopen. Wipe away any excess cement that may have squeezed out from around the gasket.
9. Replace the c-clips onto the hinge pins.

Description	Part Number
1. Door Gasket	223858
2. Glass Gasket	200024
3. Screw, M6x10 Button Hd.	117978
4. Glass Clip Ass'y. - 5"	157651
5. Glass Panel	224158
6. Warning Plate	225093

6.5 Glass Replacement

Tools needed:

- 4mm hex key

1. Lift the door gasket over the glass clips enough to expose the clip button head screws. See fig. 20. Use the 4mm hex key to loosen the glass clips just enough to remove the glass panel. It is not necessary to completely remove the clips from the door.

   If replacing the glass gasket, follow steps 3-5 in section 6.4.
2. Position the new glass panel and tighten the glass clips just snug. Avoid overtightening or placing uneven pressure on the glass.
3. Reposition the door gasket over the glass clips.

Figure 20. Loosen the glass clips.

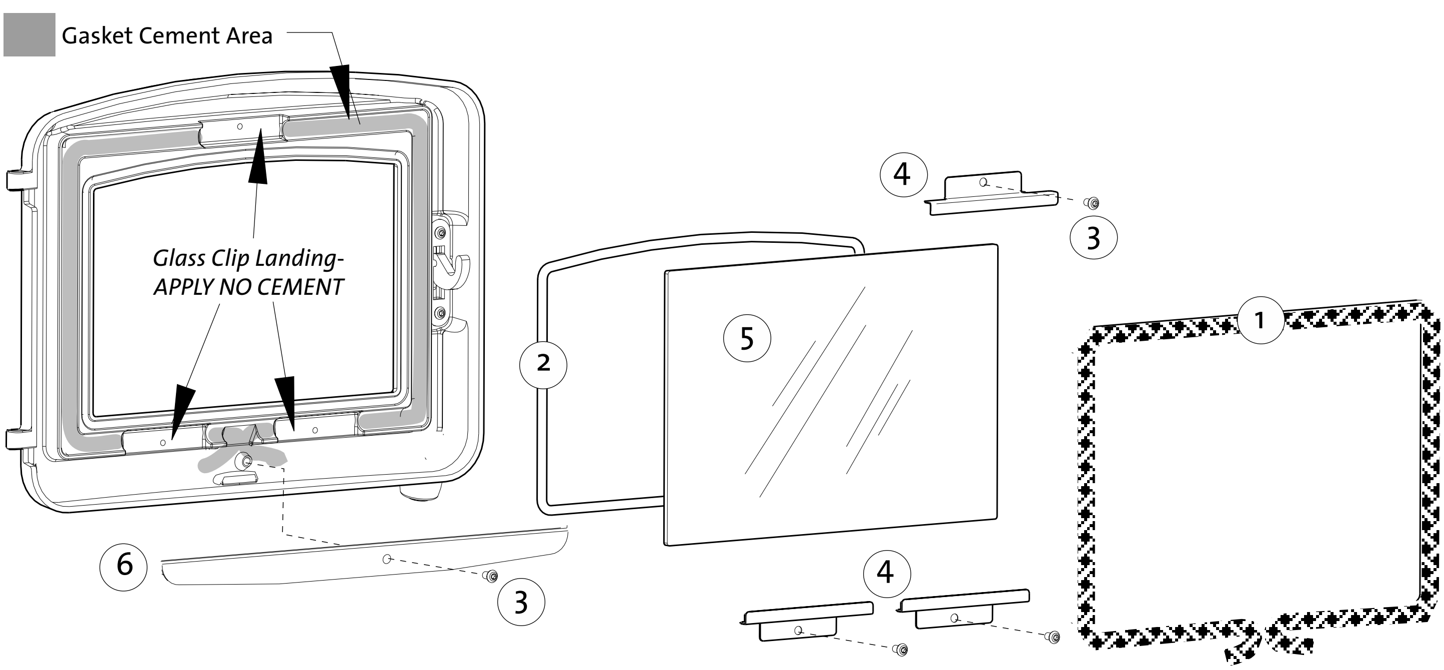


Figure 19. Glass and Gasket Replacement

6.6 Chimney System

The Jøtul F 45 V2 is designed to burn cleanly and efficiently when used according to the guidelines in this manual. In order to maintain proper performance, you should inspect the chimney and chimney connector at the beginning of each heating season and then every other month during the heating season. Clean the chimney whenever creosote and fly ash accumulation exceeds 1/4 inch in any part of the system.

Chimney brushes are available from your local Jøtul dealer or hardware supply store. Your dealer can also refer you to a reputable, professional chimney sweep who will have all the equipment to ensure a complete and proper job.

WARNING: FAILURE TO KEEP THE CHIMNEY CONNECTOR AND FLUE FREE OF CREOSOTE BUILD-UP CAN RESULT IN A CHIMNEY FIRE.

6.7 Replace Firebricks

DO NOT OPERATE THE STOVE WITH BROKEN OR MISSING BRICKS.

See fig. 28, page 25 and the parts listing on page 26 for the configuration and part number of any firebricks that require replacement. Order bricks through your local Jøtul Authorized Dealer.

7.0 Appendix

7.1 Optional Blower 156431

Tools Required

- 10 mm wrench or socket driver
- pliers
- 1/4" socket driver or flat head screwdriver
- 4 mm hex key
- work gloves

CAUTION:
Avoid injury- always wear work gloves when handling sheet metal parts. Read through these instructions to familiarize yourself with these parts before beginning the installation.

- **115 VAC, 60 HTZ, Max. 40 Watts**
- **This blower must be electrically grounded in accordance with local codes or, in the absence of local codes, with the current ANSI/NFPA 70, National Electrical Code or CSA C22.1-Canadian Electrical Code.**
- **This unit is supplied with a three-prong (grounding) plug for protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. DO NOT CUT OR REMOVE THE GROUNDING PRONG FROM THE PLUG.**
- **Do not connect to power supply until all electical connections have been made.**
- **Always disconnect the power supply when performing any service.**

Installation

Install the blower kit before moving the stove into its final position. If the stove is already installed, you may need to pull it out to install this blower.

For Freestanding stove installations, where access to the back of the stove is unrestricted, the Control Box may be mounted to either corner of the rear shroud.

For Alcove or Hearthmount installations into fireplaces, the Switch Box must be mounted under the stove, attached to the stove using the left front leg stud. Determine the location most appropriate to your needs and follow the installation steps outlined below.

1. Remove the Rear Shroud:
   Use the 1/4" socket driver to remove the four sheet metal screws from the bottom and top of each side of the Rear Shroud. See fig. 22, A. Keep all shroud fasteners for reassembly.

2. **Attach the Air Deflector to Rear Shroud: See figs. 21 and 23 /#3.** Use pliers to bend the deflector tabs at the perforation lines as shown. Attach the deflector to the interior side of the rear shroud using two #8 X 12 sheet metal screws from the exterior side.

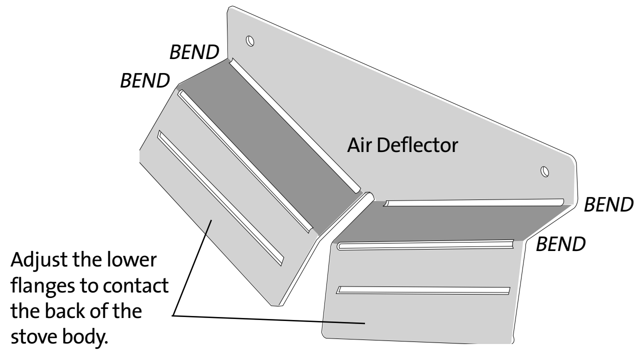
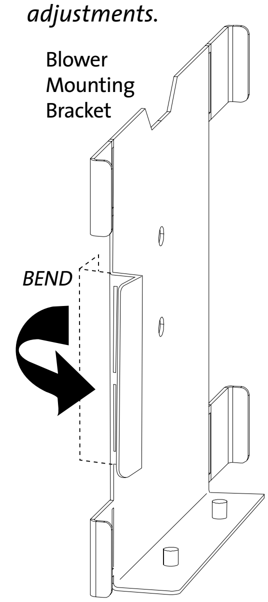


Figure 21. Air Deflector orientation.

3. **Attach the Blower Mounting Bracket**.
   Use pliers to bend back the long, vertical flange to allow the bracket to fit flush against the back of the stove. (Fig.21 and 23/#2) to the two center studs on the back of the stove, oriented as shown. Secure with two M6 flange nuts.

Figure 22. Blower Bracket adjustments.



4. **Attach the Blower to the Mounting Bracket** using the two wing nuts (Fig. 23/#9).

5. **Attach the Snapstat Bracket** to the lower stud on the back of the stove, oriented as shown in fig. 23 /#7.
   Slide the **small Snapstat *(#6, marked F110-20)*** all the way into the bracket slot between the stove and the bracket. Connect either snapstat lead to either snapstat terminal.

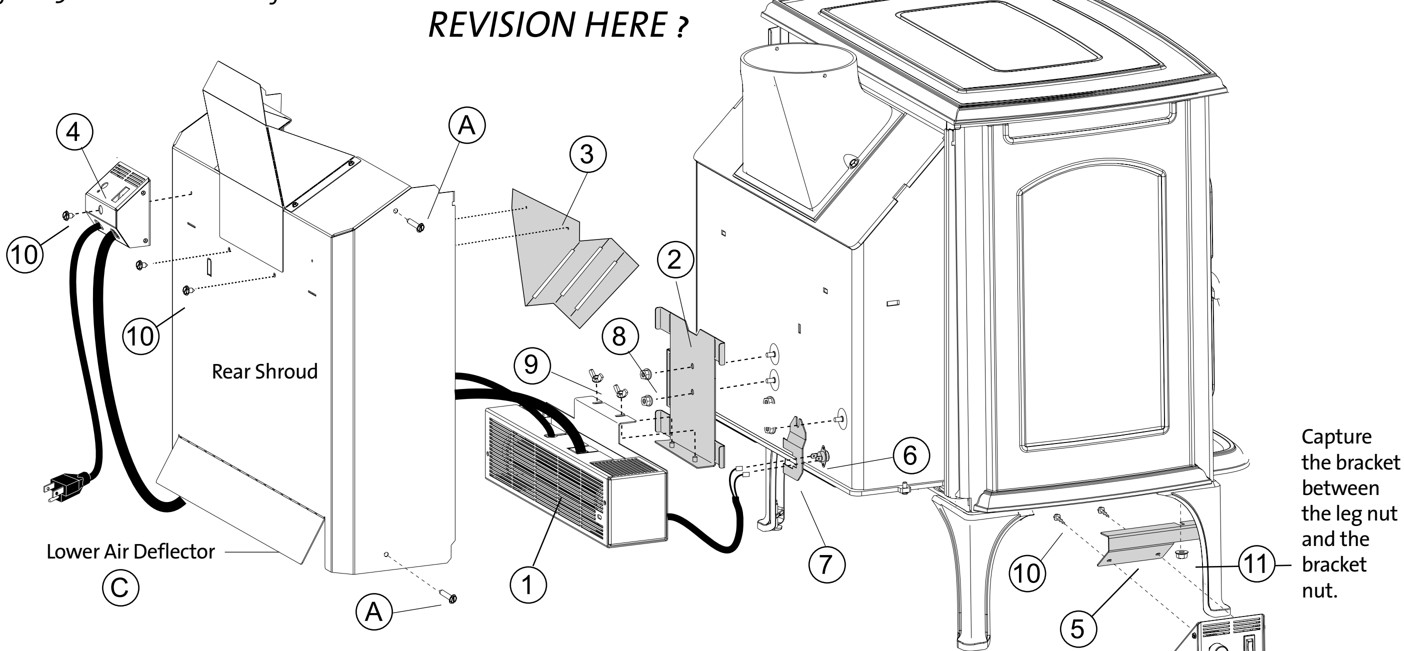
6. **Install the Control Box, fig. 23 /#4:**
   The Control Box may be mounted to the side of the stove closest to the nearest electrical outlet.

   Freestanding Installation- Accessible from the rear.
   Attach the control box to either side of the rear shroud using a 1/4" socket driver and one #8 x 12 sheet metal screw (#10) as shown in fig. 21.

   Alcove or Hearthmount Installation - Accessible from the side.
   Attach the Control Box Mounting Bracket (#5) to the back of the Control Box (#4) using two #8 x 12 sheet metal screws (#10).

   Install the M8 hex nut (#11) on the left front leg stud and engage the slotted Mounting Bracket/Control Box assembly between that nut and the leg nut. See fig. 23.

Figure 23. Blower Parts Identification



1. Blower Assembly
2. Blower Mounting Bracket
3. Air Deflector
4. Control Box Assembly
5. Control Box Bracket
6. Snapstat
7. Snapstat Bracket
8. M6 Flange Hex Nut (3)
9. M6 Wingnut (2)
10. #8 x 1/2" sheet metal screws (9)
11. M8 Flange Hex Nut (1)

7. Bend back the Lower Air Deflector panel (C, fig.23) on the rear shroud. Reinstall the shroud by reversing the procedure in Step 1. Engage the shroud with the upper hex nuts on the back of the stove and then reinstall the socket head screws (A) at the bottom of each side.

8. Route the power cord to the nearest electrical outlet.

Operation

The blower is controlled by the heat-activated snapstat that will only function when the control switch is set in AUTO. After the fire is established, the snapstat will react to the heat and activate the blower. Fan speed may be manually adjusted with the rheostat knob. The blower will shut off automatically as the stove cools down. If automatic blower circulation is not desired, place the blower control switch in the MANUAL position.

Maintenance

Disconnect the blower from its power source before cleaning or servicing.

Regular cleaning will help ensure you obtain maximum life from the blower. Use a vacuum with a soft brush attachment to clean the blower fans and motor housing at least monthly, or more frequently if there are pets in the home. Keep the area under the stove free of dust and debris.

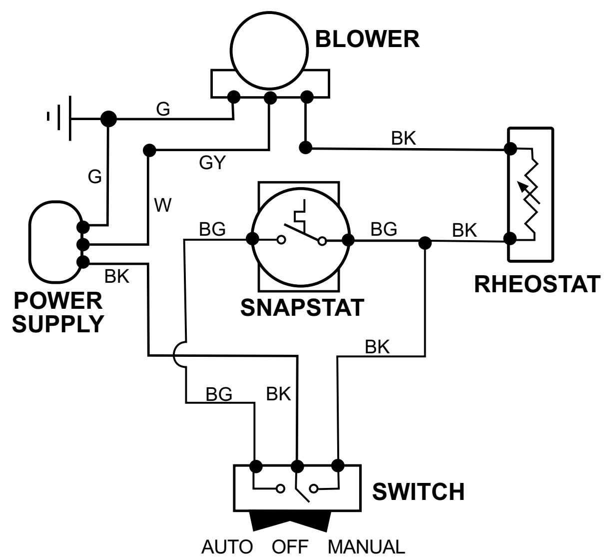


Figure 24.
Blower Wiring diagram.

7.2 Outside Air Kit 157637

REVISION HERE ?

Contents:
- Outside Air Manifold

Tools Required:
- 10 mm and 1/4" socket drivers
- safety glasses
- work gloves

You will need to acquire the following additional components available at any hardware supplier
- Exterior Air Inlet Cover
- 4" Aluminum Duct
- Rodent Screen
- 4" Duct Clamps, 2

The exterior air inlet should not be installed at a level higher than the stove bottom.

1. **Remove Bottom Heat Shield:** Use the 10 mm socket driver or wrench to remove the four nuts and the Bottom Heat Shield from the studs in the stove bottom as shown in fig. 25. Also remove the four remaining spacer nuts from the studs.
2. **Attach the Outside Air Manifold** directly to the stove bottom using four of the nuts previously removed.
3. Use pliers to remove the air inlet cut-out from the bottom heat shield.
4. Attach the bottom heat shield to the outside air manifold using four sheet metal screws from the Outside Air Kit.

   If the bottom heat shield will not be used, install the sheet metal screws supplied with the outside air kit to plug the associated holes in the manifold.

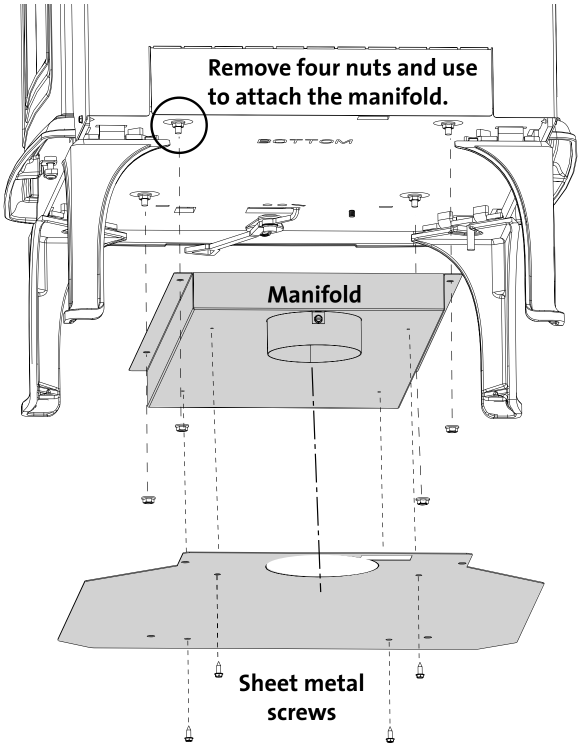


Figure 25. Outside Air Adaptor installation.

7.3 Short Leg Kit 157636

Approved for use only in fireplace hearth mount (existing masonry fireplace) installations.

Contents:

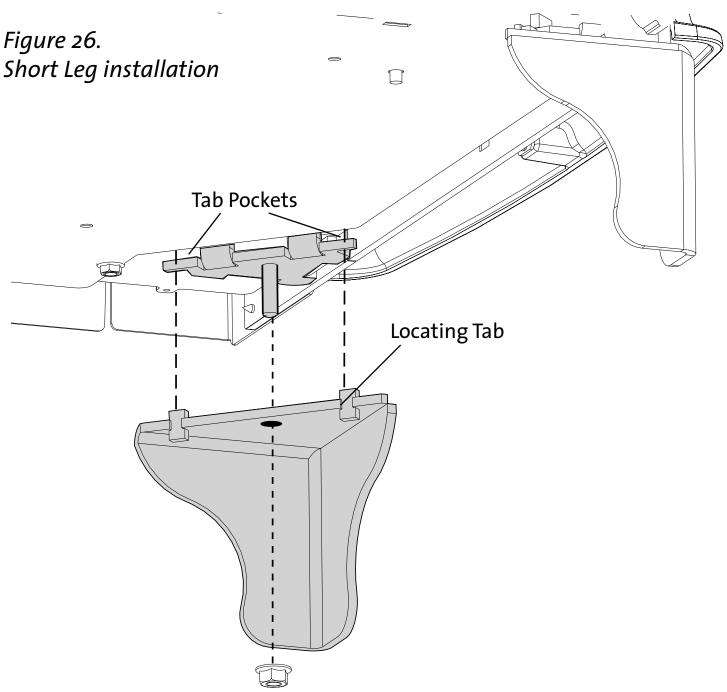
4 1/4" Steel Legs, (4)

Tools Required:
- 13 mm wrench or socket/ratchet
- work gloves

DO NOT LIFT THE STOVE UP BY THE ASH LIP.

1. Have an assistant tilt the stove up on one side enough to remove the cast iron legs. Fully remove the nuts from the leg studs.
2. Engage the steel leg with the mounting stud. Be certain the two locating tabs on each leg seat with the corner pockets in the stove bottom. Tighten the nuts and carefully set the stove back down.

Figure 26.
Short Leg installation



7.4 Mobile Home Floor Bracket Kit 157321

Contents: Floor Brackets , (2)

Fastener Required: 3/8" dia. lag screw

1. Determine the final location of the stove and use the leveller screws to plumb and level the stove.
2. Mount the floor brackets over the leveller screws at rear and front locations at opposite corners and secure each to the floor using a 3/8" dia. lag screw of appropriate length, (not supplied).

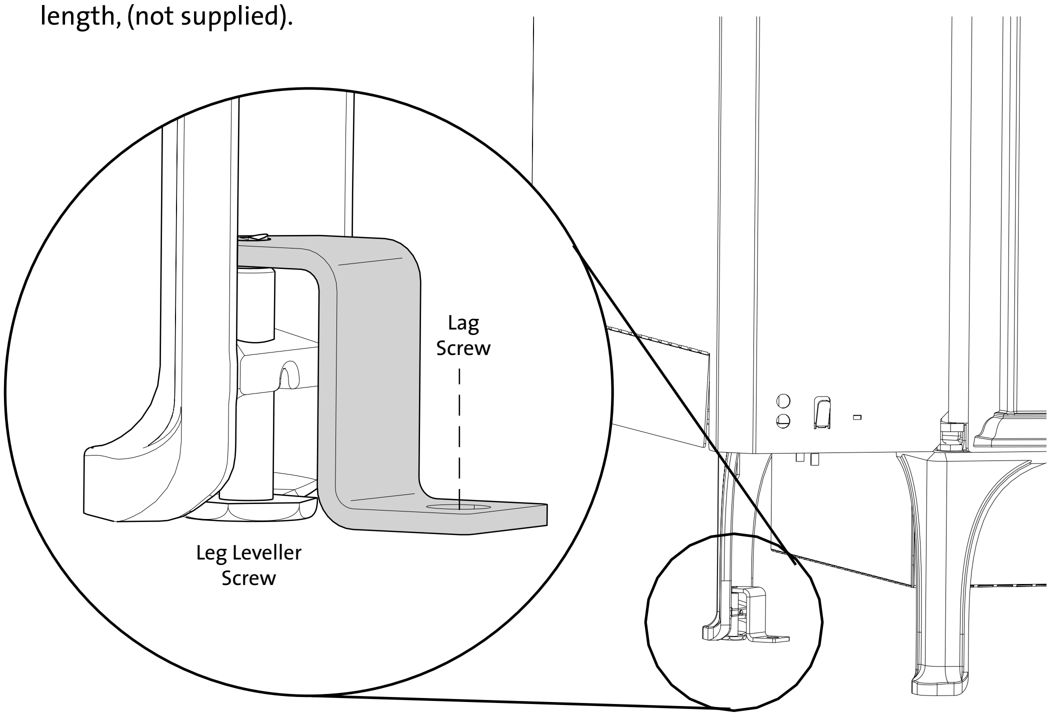


Figure 27. Floor Bracket Detail

8.0 Jøtul F 45 V2 Greenville Illustrated Parts

Only use replacement parts provided through your authorized Jøtul dealer.

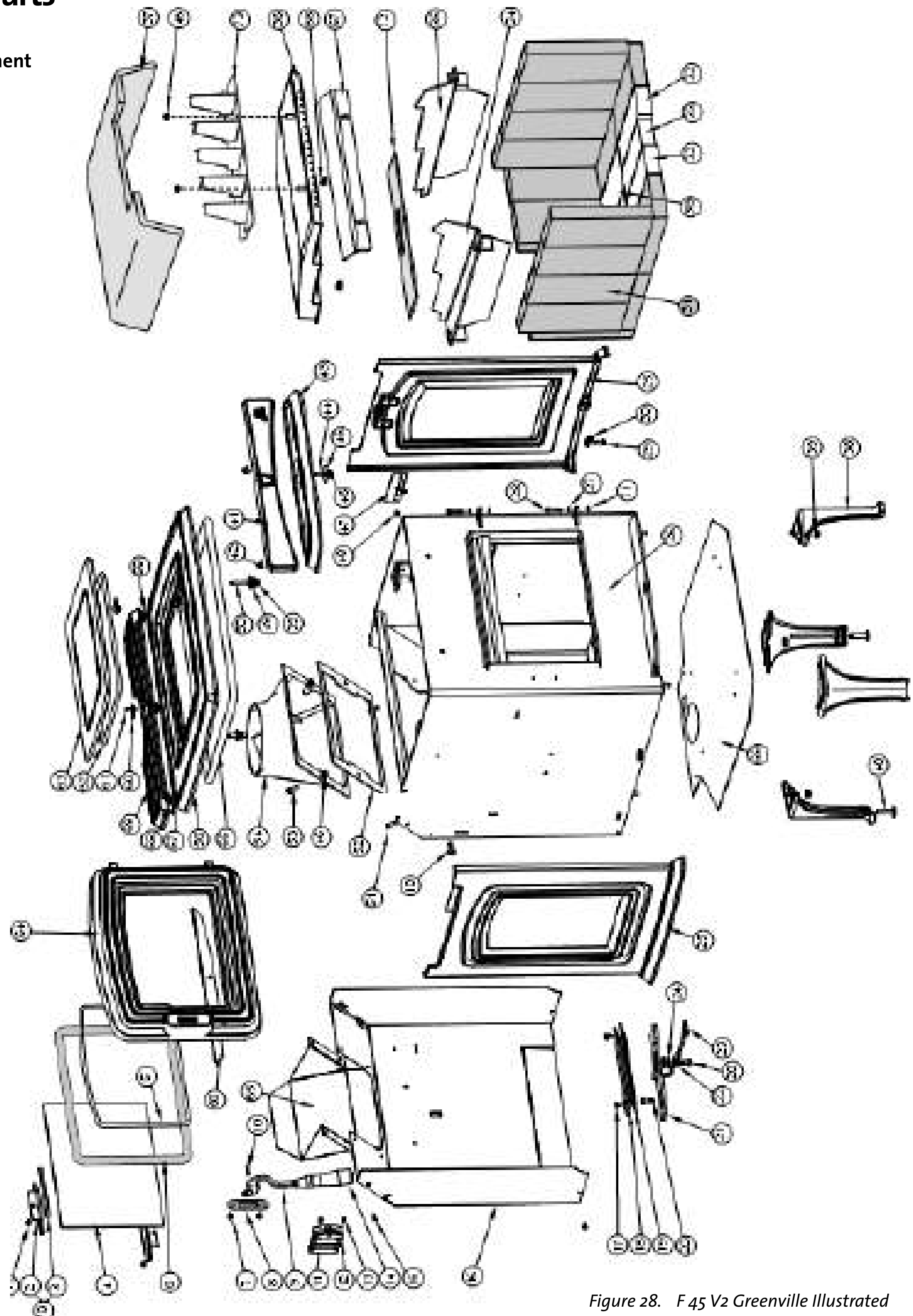


Figure 28. F 45 V2 Greenville Illustrated Parts

8.1 Jøtul F 45 V2 Greenville Part List

No.	Description	Part Number
1.	Screw, Button Head Socket - M6 x 10 Blk	117978
2.	Glass Clip, 3 ” (three)	157352
3.	Gasket, SA Flat	127215
4.	Door Glass, Ceramic	224923
5.	Gasket, MD .625 Ø Fiberglass Rope	223858
6.	Gasket, LD .250 Ø Fiberglass Rope	200024
7.	Screw, Button Head Socket M6 x 10 mm Blk	117978
8.	Retainer, Front Door Catch	224159
9.	Latch, Front Door	224979
10.	Roll Pin, Slotted 5mm x 24, steel	118215
11.	Shim, Door Catch	224734
12.	Door Catch	22473392
13.	Screw, Button Head Socket, M6 x 14 mm, Blk	118215
14.	Door Tool (Fall-away Handle)	157635
15.	Screw, HWH SMA 8 x 1/2 SL Blk Oxide	117917
16.	Rear Shroud, F 45 V2	22491892
17.	Bolt, Hex Cap M6 x 10 Ser. Flange Hd	9962
18.	Inspection Cover, F 45	224924
19.	Gasket, Inspection Cover	224355
20.	Screw, Shoulder M6 x 10, 8mm dia. x 10 mm, Hex	117912
21.	Air Valve Weldment	223729
22.	Disk Spring	118249
23.	Air Valve Handle Assembly, Nickel	157391
24.	Fender Washer, 8mm, Zinc	117949
25.	Side Convection Panel Assembly	157643
26.	Firebox Assembly	224752
27.	Shim Washer	117588
28.	Hinge Pin, New Style - Nickel	125960
29.	Screw, Button Head Socket, M6 x 14 mm, Blk	118215
30.	Bottom Bracket, Cast Convection Panel	224197
31.	Refractory Brick, 4.50” x 9” x 1.25” (16)	129082
31a.	Refractory Brick, 4.50” x 8.50” x 1.25” (2, center-rear)	2211751
32.	Refractory Brick, 3” x 9” x 1.25” (2)	220518
33.	Refractory Brick, 8.5” x 3” x 1.25” (1)	221752
34.	Left Support	224919
35.	Right Support	224920
36.	Baffle Weldment	224921
37.	Blanket, Ceramic Fiber	226599
38.	Leg, Steel Stoves, Matte Black	157346
39.	Nut, M8, Surrated Flange	117881
40.	Leveler Screw, M8x40 mm, (2)	118047
41.	Cast Eyebrow, Matte Black	157644
42.	Bolt, Hex Hd Serrated Flange, M6 x 16 mm, Blk	99625
43.	Ash Lip, Matte Black	157645
44.	Screw, Socket Set, M6 x 16 mm	118031
45.	Fender Washer, .250 x 1.50 dia.	118029
46.	Nut, M6 Serrated Flange, plain	117968
47.	Bracket, Top, Cast Convection Panel	226582
48.	Screw, Button Head Socket, M6 x 6 mm Blk	118170
49.	Fender Washer, 8mm - Zinc	117949
50.	Set Screw, M8 x 40 mm, Hex Socket	118245
51.	Screw, M6 x 20 Socket Button Hd (Baffle Retainer)	118097
52.	Gasket, Flue Collar	224350
53.	Bolt, Hex Hd, Serrated Flange, M6 x 20 mm	117117
54.	Smoke Outlet, Matte Black	10332692
55.	Gasket, MD .625 Ø Fiberglass Rope	223858
56.	Top Plate, Front - Matte Black	157655
57.	Screw, M8 x 8 mm Socket Button Hd	118241
58.	Fender Washer, 8 mm - Zinc	117949
59.	Top Plate, Rear - Matte Black	157646
60.	Side Clip	120120
61.	Bolt, Hex Hd Serrated Flange, M6 x 16 mm	99625
62.	Gasket, LD 250 Fiberglass Rope	200024
63.	Top Cover - Matte Black	157647
64.	Front Door - Matte Black	157648
65.	Flue Collar Heat Shield	22505392
66.	Safety Warning Plate	225093
67.	Exhaust Deflector	224922
68.	Screw, Shoulder, M6 x 1.0	118244
69.	Bottom Heat Shield	225066
70.	Glass Clip w/ gasket - 3”	157642
71.	Hinge Pin Retainer Clip	118261
72.	Rear Secondary Baffle Gasket	225021
73	Turbulator	226597

10.0 Jøtul F 45 V2 Greenville Warranty

Effective January 1, 2013

This warranty policy applies to wood-burning products identified by Jøtul trade names, as set forth below.

A. LIMITED LIFETIME WARRANTY, parts only:
Jøtul North America Inc. (JØTUL) warrants, to the original retail purchaser, that those baffle and air manifold components of the Jøtul or Scan Stove or Fireplace Insert specified above will be free of defects in material and workmanship for the life of the product. This warranty is subject to the terms, exclusions and limitations set forth below.

B. LIMITED FIVE YEAR WARRANTY - Cast Iron and Steel Components:
JØTUL warrants, to the original retail purchaser, that those components of the Jøtul or Scan Stove or Fireplace Insert specified above will be free of defects in material and workmanship for a period of five (5) years from the date of purchase. This warranty is subject to the terms, exclusions and limitations set forth below.

C. LIMITED TWO YEAR WARRANTY - Enamel Finish:
JØTUL warrants, to the original retail purchaser, the enamel finish on cast iron components of the Jøtul Stove or Fireplace Insert specified above against peeling or fading for a period of two (2) years from the date of purchase. This warranty is subject to the terms, exclusions and limitations set forth below.

D. LIMITED ONE YEAR WARRANTY - Electrical Components (blowers, thermostatic switches):
JØTUL warrants, to the original retail purchaser, that those components of the Jøtul or Scan Stove or Fireplace Insert specified above will be free of defects in material and workmanship for a period of one (1) year from the date of purchase. This warranty is subject to the terms, exclusions, and limitations set forth below:

JØTUL will repair or replace at its option, any of the above components determined by JØTUL to be covered by this warranty. You must, at your own expense, arrange to deliver or ship the component to an authorized Jøtul dealer and arrange for pickup or delivery of the component after repairs have been made. If, upon inspection, JØTUL determines that the component is covered by this warranty, the repair or replacement will be made as set forth above. This warranty is not transferable and is extended only to, and is solely for the benefit of, the original retail purchaser of the Jøtul Stove or Fireplace Insert. This paragraph sets forth the sole remedy available under this warranty in the event of any defect in the Jøtul Stove or Fireplace Insert.
The warranty period for any replaced component will be the remaining unexpired portion of the warranty period for the original component.
Please retain your dated sales receipt in your records as proof of purchase.

EXCLUSIONS AND LIMITATIONS

NOTICE: This warranty is void if installation or service is performed by someone other than an authorized installer or service agency, or if installation is not in conformance with the installation and operating instructions contained in this owners manual or local and/or national fire and building regulations. A listing of local authorized installers, service agencies and gas suppliers can be obtained from the National Fireplace Institute at http://www.nficertified.org/.

This warranty does not cover the following:

1) Repair or replacement of parts that are subject to normal wear and tear during the warranty period or to parts that may require replacement in connection with normal maintenance. These parts include paint, gaskets, burn plates, firebricks, fire grates, ceramic insulation blankets or glass (glass is only warranted against thermal breakage).
2) Damage due to incorrect installations not in conformance with the installation instructions contained in this owners manual or local and/or national fire and building regulations.
3) Damage, including damage to enamel surfaces, caused by improper operation, over-firing, and/or misuse. Improper operation, such as burning the stove with the ash door open, can damage the stove. Over-firing occurs when any part of the stove glows red. Over-firing can also be identified by warped plates, rust-colored cast iron, paint pigment that has turned dusty white, or bubbling, cracking and discoloration of the enamel finish. Misuse includes, without limitation, use that is not in conformance with the operating instructions contained in this owners manual.
4) Damage due to, or repair of, rust. Use of stove-top steamers may cause rust.
5) Damage due to service performed by an installer or service agency, unless otherwise agreed to in writing by JØTUL.
6) Damage caused by unauthorized modification, use or repair.
7) Costs incurred by travel time and/or loss of service.
8) Labor or other costs associated with the repair of components beyond the warranty period.
9) Damage incurred while the Jøtul Stove or Fireplace Insert is in transit.

IN NO EVENT SHALL JØTUL, ITS PARENT COMPANY, SHAREHOLDERS, AFFILIATES, OFFICERS, EMPLOYEES, AGENTS OR REPRESENTATIVES BE LIABLE OR RESPONSIBLE TO YOU FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR OTHER SIMILAR DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR DAMAGES TO A STRUCTURE OR ITS CONTENTS, ARISING UNDER ANY THEORY OF LAW WHATSOEVER. ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WRITTEN WARRANTY. EXCEPT AS EXPRESSLY SET FORTH HEREIN, JØTUL MAKES NO ORAL, WRITTEN OR OTHER WARRANTY WITH RESPECT TO JØTUL OR SCAN STOVES OR FIREPLACES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on the length of implied warranties. Therefore, the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

JØTUL reserves the right to discontinue, modify or change the materials used to produce the Jøtul Stove or Fireplace. JØTUL shall have the right to replace any defective component with substitute components determined by JØTUL to be of substantially equal quality and price.

The dollar value of JØTULs liability for breach of this warranty shall be limited exclusively to the cost of furnishing a replacement component. JØTUL shall not in any event be liable for the cost of labor expended by others in connection with any defective component. Any costs or expenses beyond those expressly assumed by JØTUL under the terms of this warranty shall be the sole responsibility of the owner(s) of the Jøtul Stove or Fireplace Insert.

No dealer, distributor, or other person is authorized to modify, augment, or extend this limited warranty on behalf of JØTUL. NO MODIFICATION OR CHANGE TO THIS WARRANTY WILL BE EFFECTIVE UNLESS IT IS MADE IN A WRITTEN DOCUMENT MANUALLY SIGNED BY AN AUTHORIZED OFFICER OF JØTUL.

An authorized installer may have been provided with certain information related particularly to the Jøtul Stove or Fireplace Insert; however, no authorized installer or other person who may service the appliance is an agent of JØTUL. No inference should be made that JØTUL has tested, certified, or otherwise pronounced any person as qualified to install or service the appliance. JØTUL shall not be liable or otherwise responsible for any error or omission by a person installing or servicing a Jøtul Stove or Fireplace Insert.

If you believe your Jøtul or Fireplace Insert is defective, you should contact your nearest authorized Jøtul dealer, who will process a warranty claim. IN ORDER TO QUALIFY FOR WARRANTY COVERAGE, JØTUL MUST RECEIVE NOTICE OF A POSSIBLE DEFECT WITHIN SIXTY (60) DAYS OF THE DATE THE DEFECT IS FIRST DISCOVERED, OR REASONABLY COULD HAVE BEEN DISCOVERED.

This warranty is given by Jøtul North America, Inc.,
55 Hutcherson Drive, Gorham, Maine 04038 USA

139967
May, 2019

Quality

We appreciate your trust in welcoming our product into your home and invite your comment and appraisal of our efforts to provide you with the finest in home hearth products.

Jøtul pursues a policy of continuous product development. Products supplied may therefore differ in specification, colour and type of accessories from those illustrated and described in this manual.

Jøtul North America Inc.
P.O. Box 1157
55 Hutcherson Drive
Gorham, Maine 04038
USA

Jøtul AS
P.O. Box 1411
N-1602 Fredrikstad,
Norway

www.jotul.us

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Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9786

Date d'étalonnage : 2018-11-12
Date d'émission du certificat : 2018-11-12

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Débitmètre volumétrique American Meter Company DTM-200A S/N : 99A274209

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
	Lectures Initiales = Lectures finales, aucun ajustement
Résultats	Lectures finales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

B Poirier
Métrologiste

Responsable du laboratoire

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Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018-11-22

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Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9786

Numéro de série:	99A274209	Station de mesure:	3
Date d'étalonnage:	2018-11-12	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-130		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2403	1500237464	2019-04-26
DHI molbloc (100 slpm)	2E2-S	380	1500241926	2019-07-19
DHI molbox1	Molbox1	755	1500237197	2019-04-25
RTD Mist	M22	2208102	2018002234	2019-04-11
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	0-200 ACFH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance ±1 %O.R.	

Condition d'étalonnage

Gaz	Air
Température ambiante	21.5 °C
Pression ambiante	1026.07 mbar
Orientation	Verticale
Élastomère	Viton
Valve	Viton

Lectures finales

Débit du test ACFH	Instrument en test ft^3	Valeurs mesurées Pression PSIA	Température °C	Référence ft^3	Référence calculée ft^3	Erreur calculée ft^3	Tolérance acceptable ft^3	TUR
39.5798	6.610	14.8845	21.17	6.674	6.590	0.020	0.066	2.97
70.0656	11.700	14.9044	21.05	11.845	11.677	0.023	0.117	>4
164.1928	27.340	15.0230	20.96	27.959	27.336	0.004	0.273	>4

Bernard Poirier
Métrologiste

B Poirier
Signature

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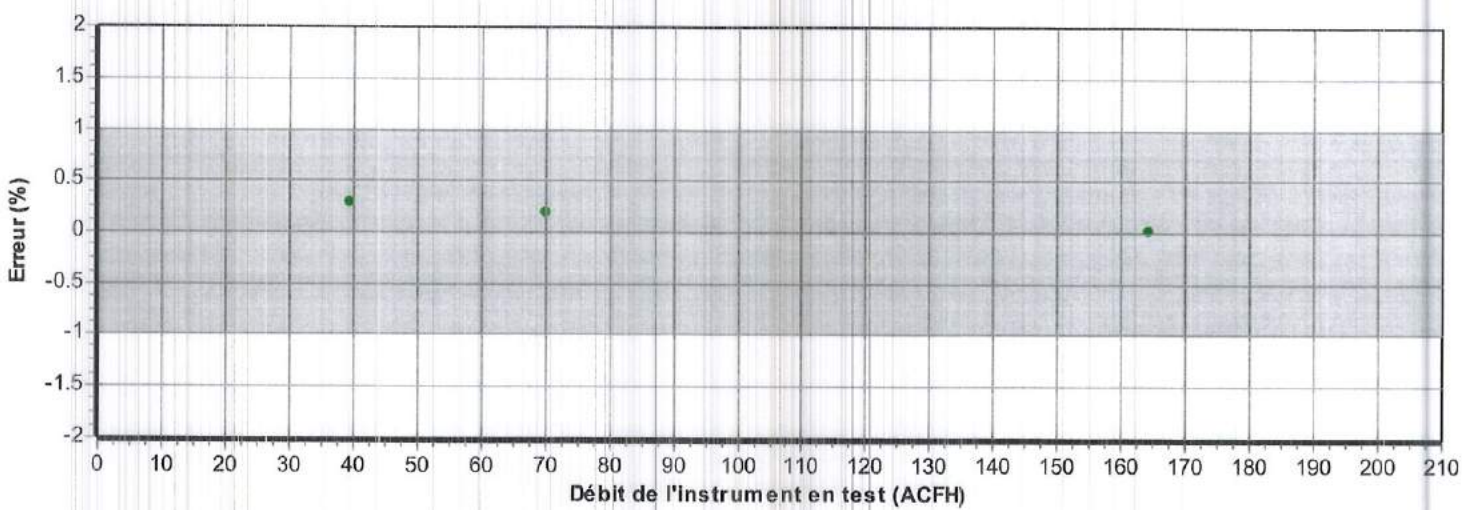
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9786

Numéro de série:	99A274209	Station de mesure:	3
Date d'étalonnage:	2018-11-12	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-130		

Résultats finaux



- La mesure (et son incertitude) se situe dans les tolérances
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Bernard Poirier
Métrologiste

Signature

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Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9799

Date d'étalonnage : 2018-11-14
Date d'émission du certificat : 2018-11-14

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDa-2c S/N : 23544

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
Résultats	Lectures initiales hors tolérance
	Lectures finales dans les tolérances
Remarques	Valeur de l'instrument corrigée = Lecture de l'indicateur de l'instrument * 0.98 K facteur
	Fréquence d'étalonnage aux 12 mois

Cal Tuin Dansan
Métrologiste

Responsable du laboratoire

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Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018. 11. 22

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ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Instrument de mesure de référence utilisé pour l'étalonnage initial

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications initiales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	10-2000 ALH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %O.R.

Condition d'étalonnage

Gaz	Air
Température ambiante	21 °C
Pression ambiante	1009.77 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	

Lectures initiales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
364.6385	61.8500	14.6522	21.55	60.4150	60.6869	1.1631	1.2137	>4
612.3148	104.0800	14.6557	21.47	101.7210	102.1249	1.9551	2.0425	>4
1628.8459	276.5500	14.6757	21.45	269.8463	270.5303	6.0197	5.4106	>4

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

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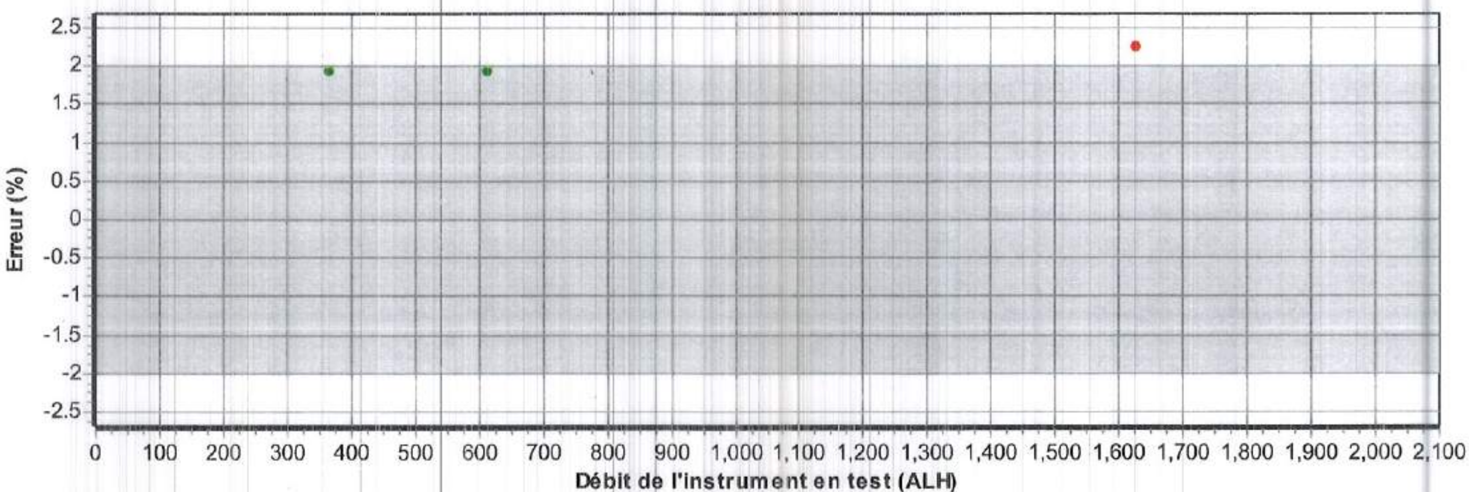
Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Résultats initiaux



- ● La mesure (et son incertitude) se situe dans les tolérances
- ● La mesure (et son incertitude) se situe hors tolérance
- ○ La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

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Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	10-2000 ALH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %O.R.

Condition d'étalonnage

Gaz	Air
Température ambiante	21.5 °C
Pression ambiante	1025.86 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
352.3959	58.5060	14.8906	21.27	59.3386	58.5953	-0.0893	1.1719	>4
614.6929	102.2940	14.9046	21.20	103.7453	102.3248	-0.0308	2.0465	>4
1597.3393	265.5408	14.9230	21.23	270.0182	266.0123	-0.4715	5.3202	>4

Fc. : 1.01007684

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

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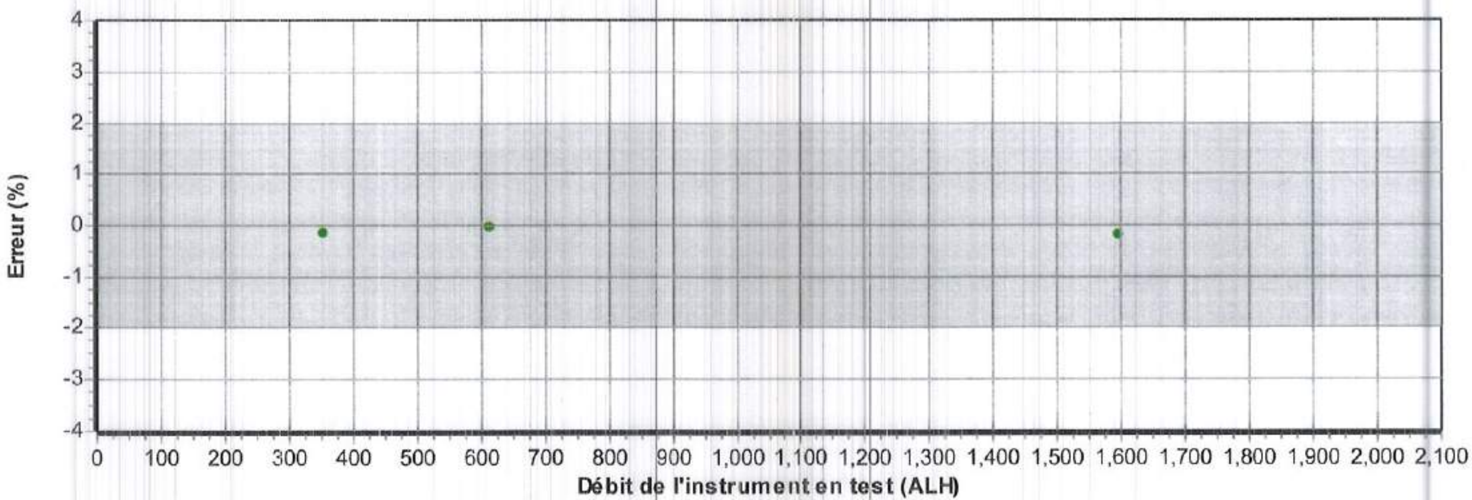
Laboratoire accrédité
Portée d'accréditation 655

ISO/IEC 17025-2005 CERTIFICATION

Certificat d'étalonnage # 9799

Numéro de série:	23544	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-178		

Résultats finaux



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Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

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Laboratoire accrédité
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ISO/IEC 17025-2005 CERTIFICATION

CERTIFICAT D'ÉTALONNAGE # 9801

Date d'étalonnage : 2018-11-14
Date d'émission du certificat : 2018-11-14

Services Polytests
695 B Gaudette street
St-Jean-sur-Richelieu, Québec, Canada
J3B 7S7

Étalonnage d'un
Shinigawa DCDa-2c S/N : 23543

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2005, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, AINSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement $k = 2$, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Lectures Initiales = Lectures finales, aucun ajustement Étalonnage de l'instrument
Résultats	Lectures initiales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

Carl Ternier-Dansereau
Métrologiste

Responsable du laboratoire

©2012 Polycontrols • Le présent document ne peut être reproduit, sinon en entier, que par l'approbation écrite des laboratoires d'étalonnage de la compagnie Polycontrols inc. 3650 boul. Matte (Local A-1), Brossard (Québec), Canada, J4Y 2Z2
Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

2018.11.22

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Certificat d'étalonnage # 9801

Numéro de série:	23543	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-179		

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500231794	2019-01-19
DHI molbox1+	Molbox1+	2089	1500241952	2019-07-24
RTD Mist	Mist	L00295	2017007605	2018-12-07
Module 44.5 PSI avec Baro 163671	Module 30	160659	2018002180	2019-04-12

Spécifications finales de l'appareil		Condition d'étalonnage	
Gaz	Air	Gaz	Air
Température d'opération		Température ambiante	21.5 °C
Pression à l'entrée		Pression ambiante	1027.25 mbar
Pression à la sortie		Orientation	Horizontale
Température de référence		Élastomère	Viton
Pression de référence		Valve	
Étendue d'échelle	10-2000 ALH		
Signaux Entrée/Sortie	-		
Alimentation			
Tolérance ±2 %O.R.			

Lectures finales

Débit du test ALH	Instrument en test L	Valeurs mesurées Pression PSIA	Température °C	Référence L	Référence calculée L	Erreur calculée L	Tolérance acceptable L	TUR
350.3144	59.1000	14.9078	21.31	59.1513	58.3496	0.7504	1.1670	>4
598.7895	101.1200	14.9160	21.26	101.1058	99.6653	1.4547	1.9933	>4
1605.3452	269.5100	14.9364	21.25	271.3957	267.1497	2.3603	5.3430	>4

Fe : 0,98730288

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

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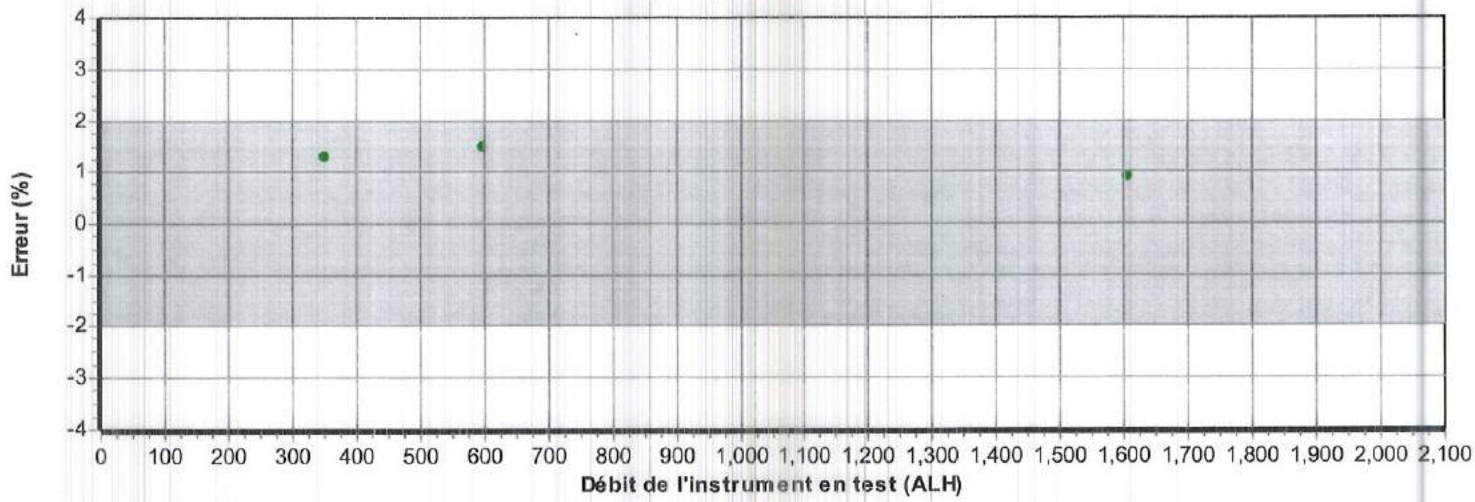
Certificat d'étalonnage # 9801

Numéro de série:	23543	Station de mesure:	4
Date d'étalonnage:	2018-11-14	Procédure:	POS-CAL-005
Identification de l'instrument:	EM-179		

Résultats finaux



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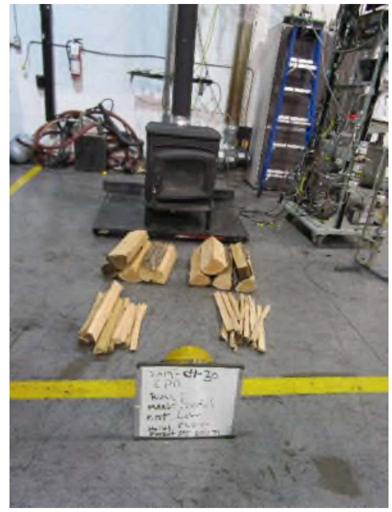
- La mesure (et son incertitude) se situe hors tolérance
- La mesure (et son incertitude) ne rencontre pas la marge de sécurité tel que spécifié dans le document G-8 de l'ILAC

Carl Tessier Dansereau
Métrologiste

Carl Tessier-Dansereau
Signature

Run 1.1



Run 1.2

	5 
	

POLYTESTS

TESTING THROUGH YOUR REALITY

Run 2.1

Dragonfyre LLC

64 West Shore Drive, South Hero, VT 05486 • 802-343-4116 • derik.dragonfyre@gmail.com

April 24, 2019

Mr. Roger Purinton
Jøtul North America
55 Hutcherson Drive
Gorham, ME 04038-2644

Dear Roger,

This letter provides the necessary documentation for the pre-conditioning of the F45 test stove that has been sent to Polytests Services, Inc. for EPA certification testing in beginning April 29, 2019. We have followed the requirements of Section 8.1 in ASTM E3053. Although no minimum flue gas temperature is specified in ASTM E3053, we used a 200°F cut-off temperature measured 7.5 feet from the floor for determining hours of operation. Using this criterion, we accumulated 56 hours of operation at a medium air setting over five separate operating cycles. 351 pounds of hardwood cordwood were consumed during the pre-conditioning.

There are three attachments included with this letter. The handwritten data sheet documents fuel additions, fuel moisture and flue gas temperature at loading/reloading points. The table includes flue gas temperature data extracted from our data logger and showing date and time as well as accumulated hours. The chart is a visual representation of the data.

By my signature below, we attest that this information is in compliance with EPA and ASTM requirements for pre-conditioning of the referenced test stove model.

Derik K. Andors
Dragonfyre LLC

Attachments (3)

Stove Model JØTUL F.45

Pre-conditioning Log

2019 Date	Time	Fuel Wt. Added (lb)	Flue Gas Temp (°F)	# of Pcs. Added	Pc. 1 %DB	Pc. 2 %DB	Pc. 3 %DB	Pc. 4 %DB	Pc. 5 %DB
3/22	0830	10.5	65	K+SU					
	0930	23.0	628	5	20	18	18	19	20
	1056	27.2	362	5	21	20	22	21	20
3/29	1123	7.0	62	K+SU					
	1128	15.8	223	5	20	19	18	19	21
	1330	17.7	331	4	21	20	22	20	
	1550	18.1	398	4	20	22	20	20	
	1730	6.3	472	2	21	23			
4/1	1340	10.0	62	K+SU					
	1418	23.5	443	5	21	20	21	19	21
	1551	20.5	400	4	19	18	19	19	
	2021	20.9	219	4	18	18	19	19	
4/3	1020	8.1	62	K+SU					
	1037	24.2	541	5	19	18	20	19	19
	1241	22.9	399	5	20	19	19	20	19
	1500	23.1	320	6	19	20	19	20	18
	1610	13.1	562	4	19	20	19	19	
	2104	12.9	236	4	20	19	18	19	
4/5	0918	9.4	69	K+SU					
	0948	22.7	530	5	19	20	19	20	19
	1105	14.4	509	4	19	19	18	18	

Dragonfyre LLC

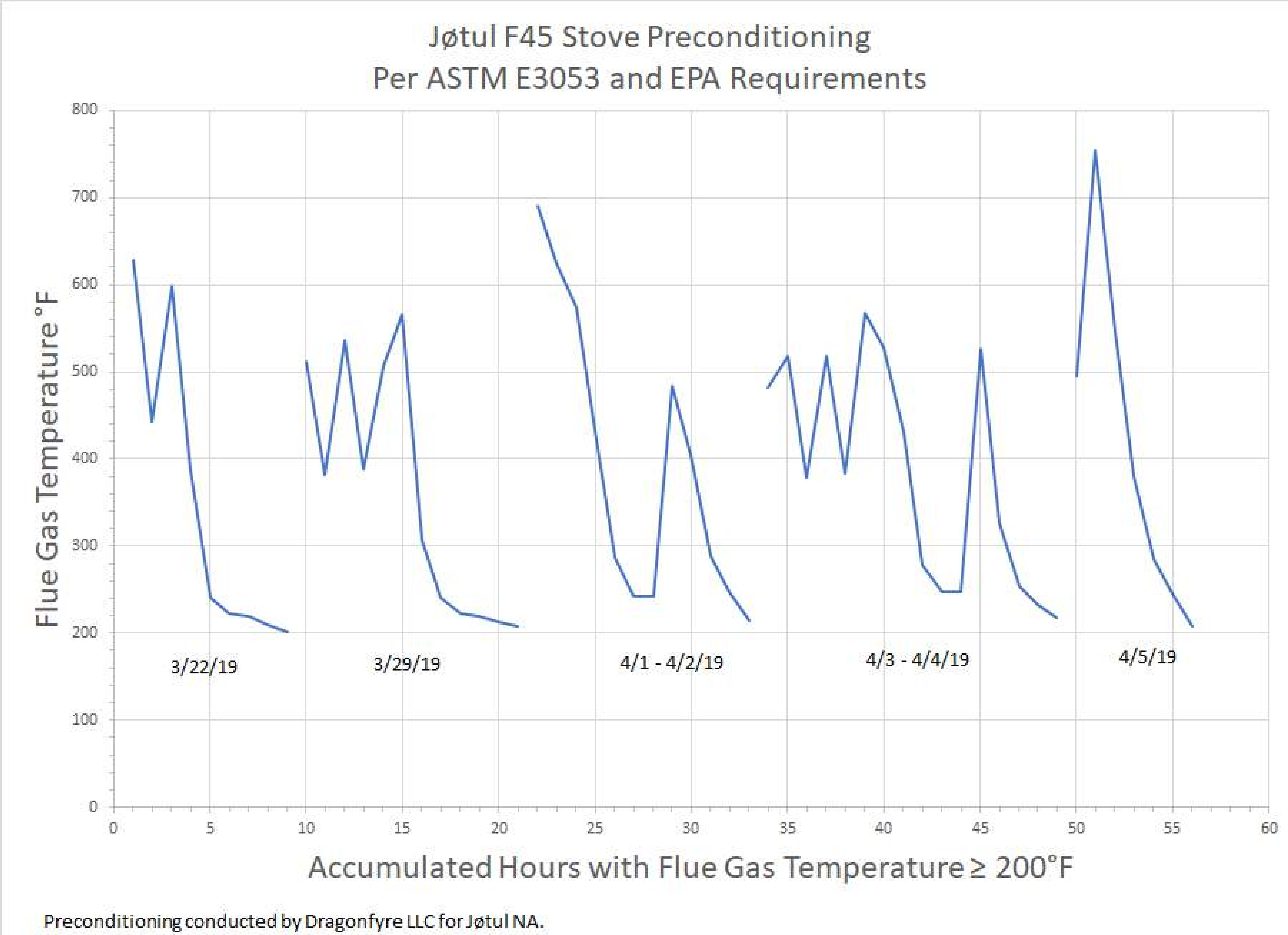
[signature]

Attachment 1

Jøtul F45 Preconditioning Data (extracted from datalogger)
Dragonfyre LLLC

Date mm/dd/yy	Time hh/mm/ss	Accumulated Hours	Flue Gas Temp °F	Date mm/dd/yy	Time hh/mm/ss	Accumulated Hours	Flue Gas Temp °F
03/22/19	9:30:40	1	628	04/01/19	21:25:35	29	483
	10:30:40	2	443		22:25:35	30	405
	11:30:40	3	599		23:25:35	31	288
	12:30:40	4	387	04/02/19	0:25:35	32	247
	13:30:40	5	240		1:25:35	33	215
	14:30:40	6	222	04/03/19	10:47:57	34	483
	15:30:40	7	219		11:47:57	35	518
	16:30:40	8	210		12:47:57	36	378
	17:30:40	9	201		13:47:57	37	518
03/29/19	12:22:39	10	512		14:47:57	38	384
	13:22:39	11	382		15:47:57	39	568
	14:22:39	12	537		16:47:57	40	528
	15:22:39	13	388		17:47:57	41	431
	16:22:39	14	507		18:47:57	42	279
	17:22:39	15	566		19:47:57	43	248
	18:22:39	16	306		20:47:57	44	248
	19:22:39	17	240		21:47:57	45	526
	20:22:39	18	223		22:47:57	46	326
	21:22:39	19	219		23:47:57	47	253
	22:22:39	20	212	04/04/19	0:47:57	48	233
	23:22:39	21	207		1:47:57	49	218
04/01/19	14:25:35	22	690	04/05/19	9:37:52	50	494
	15:25:35	23	625		10:37:52	51	754
	16:25:35	24	574		11:37:52	52	547
	17:25:35	25	432		12:37:52	53	380
	18:25:35	26	286		13:37:52	54	284
	19:25:35	27	242		14:37:52	55	245
	20:25:35	28	243		15:37:52	56	208

Attachment 2



Attachment 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

FEB 2 8 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Justin White
Hearthstone QHPP, Inc.
#17 Stafford Ave.
Morrisville, VT 05661

Dear Mr. White,

I am writing in response to your letter dated January 12, 2018, regarding wood heaters manufactured by Hearthstone QHPP, Inc. (Hearthstone). This response, dated February 28, 2018, supercedes our previous response (dated February 26, 2018) to correct an inaccuracy regarding required changes to ASTM E3053-17.

You are requesting to use an alternative test method, using cord wood, as referenced in section 60.532(c) of 40 CFR part 60, Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA) to meet the 2020 cord wood alternative compliance option. The 2020 cord wood alternative compliance option states that each affected wood heater manufactured or sold at retail for use in the United States on or after May 15, 2020, must not discharge into the atmosphere any gases that contain particulate matter in excess of 2.5 g/hr. Compliance must be determined by a cord wood test method approved by the Administrator along with the procedures in 40 CFR 60.534. You have requested approval to use the procedures and specifications found in ASTM Method E3053-17, a cord wood test method titled, "Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel," in conjunction with ASTM E2515-11 and Canadian Standards Administration (CSA) Method CSA-B415.1-10, which are specified in 40 CFR 60.534.

We understand that Hearthstone is also requesting that the alternative method proposed above be approved to apply broadly to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA, from the approval date of this request until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, providing all requirements of section 60.533 of Subpart AAA are met.

With the caveats set forth below, we approve your alternative test method request for certifying wood heaters using ASTM E3053-17 in conjunction with section 60.534 of Subpart AAA to meet the 2020 cord wood compliance option until such time that Subpart AAA is revised or replaced to require a different cord wood certification method. We also approve application of this alternative method to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA.

As required in Subpart AAA, section 60.354(d), you or your approved test laboratory must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run. Also, as required by Subpart AAA, section 60.534(e), you must have your approved laboratory measure the efficiency, heat output, and carbon monoxide emissions of the tested wood heater using CSA-B415.1-10. For measurement of particulate matter emission concentrations, ASTM 2515-11 must be used.

The following change to ASTM E3053-17 must be followed:

1. Coal bed conditions prior to loading test fuel. The coal bed shall be a level plane without valleys or ridges for all test runs in the high, low, and medium burn rate categories.

The following changes to ASTM E2515-11 must be followed:

1. The filter temperature must be maintained between 80 and 90 degrees F during testing.

2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.

3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 47 mm, 90 mm, 100 mm, or 110 mm in diameter.

4. Only one point is allowed outside the +/- 10 percent proportionality range per test run.

A copy of this letter must be included in each certification test report where this alternative test method is utilized.

It is reasonable that this alternative test method approval be broadly applicable to all wood heaters subject to the requirements of 40 CFR part 60, Subpart AAA. For this reason, we will post this letter as ALT-125 on our website at *http://www3.epa.gov/ttn/emc/approalt.html* for use by other interested parties. As noted earlier in this letter, this alternative method approval is valid until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, and at such time, this alternative will be reconsidered and possibly withdrawn.

If you have additional questions regarding this approval, please contact Michael Toney of my staff at 919-541-5247 or toney.mike@epa.gov.

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Amanda Aldridge, EPA/OAQPS/OID
Adam Baumgart-Getz, EPA/OAQPS/OID
Rafael Sanchez, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to 40 CFR PART 60 Subparts AAA AND QQQQ, Sections 60.533 and 60.5475. This document may be revised periodically without public notice. If you have additional questions, please contact Rafael Sanchez at 202-564-7028 or via email at sanchez.rafael@epa.gov.

- **The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov.**
- **This notice must be received by the EPA at least 30 days before the start of testing.**

GENERAL INFORMATION

Manufacturer's Name: Jøtul North America

Appliance Type (Circle One):	Adjustable Burn Rate Wood Heater	Pellet Stove	Single Burn Rate Heater	Hydronic Heater	Forced Air Furnace	Other:
Hydronic Heater Type (Circle One):	Traditional	Full Storage	Partial Storage	Indoor/Outdoor	Other:	
Forced-Air Furnace Type (Circle One):	Small (less than 65,000 BTU/hr heat output)		Large (greater than 65,000 BTU/hr heat output)		Other:	
Fuel Type:	Crib	Pellet	Cordwood	Other:		

Model Name and Number: F 45 V2

Catalyst: Yes______ No__X___

Mailing Address: Jøtul North America

Street Address: 55 Hutcherson Drive

City: Gorham	**State:** Maine	**ZIP Code:** 04038
Phone: 207-591-6601	**Fax:** 207-591-6606	**Web Site:** Jotul.com/us/home

Address of Manufacturing Facility: Same address as above

City:	**State**	**ZIP Code:**

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES

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- **This notice must be received by the EPA at least 30 days before the start of testing.**

EPA APPROVED TEST LABORATORY		
Name and Title of Authorized Representative: Danick Power, Vice President Operations		
Company: Polytests Services Inc.		
Phone: 450-741-3636	**E-mail:** dpower@polytests.com	**Fax:**
City: St-Jean-sur-Richelieu	**Province & Country:** Quebec, Canada	**ZIP Code:** J3B 727
EPA APPROVED THIRD-PARTY CERTIFIER		
Name and Title of Authorized Representative: **Charles Meyers – Certification Manager**		
Company: Intertek		
Phone: 312-906-7783	**E-mail:** charles.meyers@intertek.co m	**Fax:**
City: Arlington Heights	**State:** IL	**ZIP Code:** 60005
COMPLIANCE TEST INFORMATION		
Test Method(s): ALT-125, ASTM E2515-11, ASTM E3053-17, CSA B415.1-10		
Date(s) of Proposed Test: April 29 – May 3, 2019		

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
30-DAY NOTIFICATION FORM
PURSUANT TO 40 CFR PART 60 SUBPARTS AAA AND QQQQ
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to 40 CFR PART 60 Subparts AAA AND QQQQ, Sections 60.533 and 60.5475. This document may be revised periodically without public notice. If you have additional questions, please contact Rafael Sanchez at 202-564-7028 or via email at sanchez.rafael@epa.gov.

- **The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov.**
- **This notice must be received by the EPA at least 30 days before the start of testing.**

Testing Location:
Polytests Services Inc.
695 B rue Gaudette
St-Jean-sur-Richelieu
Quebec, Canada J3B 727

RogerW. Purinton, Research & Development Manager

Print Name and Title of Authorized Official

Roger W Purinton

Signature

March 26, 2019

Date

Remarks: REVISED TO INCLUDE ALT-125 METHOD

v1

Certificate of Conformity

Emissions – Adjustable burn rate wood burning heater

EPA 40 CFR Part, Subpart AAA, EPA Method ALT-125, ASTM E2515-2011, ASTM E3053-2017, CSA B415.1-2010

Certificate number: WHI19 – 20548602

This is a certificate of conformity to certify that the bearer has successfully completed the requirements of the above scheme which include the testing of products, the initial assessment, and are subject to continuing annual assessments of their compliance and testing of samples of products taken from production (as applicable to the scheme) and has been registered within the scheme for the products detailed.

Organization:

Company Name: Jotul North America, Inc.
Address: 55 Hutcherson Drive
City, State: Gorham, ME
Zip Code: 04038
Country: USA

Product: Model F45 V2
Maximum Output: 58,657 Btu/hour
Weighted Average Emissions Rate: 1.75 g/hr
Weighted Average Efficiency: 71.15%
Test Fuel Type: Cordwood
Compliance: Certified to comply with 2020 particulate emissions standard.
Report Number: PI-20194

Certification body: Intertek Testing Services NA, Inc.
Initial registration: May 29, 2019
Date of expiry: NA
Issue status: 1

Name	Signature	Date
Charles Meyers Certification Manager		5/29/19

Registered address:
Intertek Testing Services NA, Inc. 545 E. Algonquin Rd. Arlington Heights, IL 60005 USA

www.intertek.com

The certificate and schedule are held in force by regular annual surveillance visits by Intertek Testing Services NA, Inc. and the reader or user should contact Intertek to validate its status. This certificate remains the property of Intertek Testing Services NA, Inc. and must be returned to them on demand. This Certificate is for the exclusive use of Intertek's Client and is provided pursuant to the Certification agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this certificate. Only the Client is authorized to permit copying or distribution of this certificate and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the agreement. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.

Intertek Testing Services NA, Inc.
8431 Murphy Drive
Middleton, WI 53562

Tel +1-608-836-4400

www.intertek.com

Issue Date: May 29, 2019

Jotul North America, Inc.
55 Hutcherson Drive
Gorham, ME 04038

Subject: Approval of Third-Party test report PI-20194.

Memo to file

U.S. EPA emissions testing for Jotul North America, Inc. for ASTM E3053 completed by Services Polytest, Inc. 695 B Gaudette Street, St. Jean-Sur-Richelieu, Quebec, J3B 7S7, Canada on April 30th and May 1st, 2019 model F45 V2 Solid Fuel Room Heater. Test report is identified under PI-20194. Services Polytest, Inc is a Recognized Testing Laboratory (RTL) under assessment report No. 103431418MTL-001.

Intertek Testing Services NA, Inc. will be the Third-Party Certifier for this product based on the test results generated by Services Polytest, Inc. and report No. PI-20194.

INTERTEK TESTING SERVICES NA, INC.

Reported by:

Brian Ziegler
Technical Team Leader - Hearth

Intertek Intertek Intertek

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