



TEST REPORT

TEST OF A NON-CATALYTIC WOOD HEATER FOR EMISSIONS AND EFFICIENCY  
PER EPA METHODS ALT-125, ASTM E2515, ASTM E3053 and CSA B415.1,

Client:

**Spartherm**

Maschweg 38 Melle 49324

Germany

Model Name: Spartherm M 700 insert

Attention: Rafael Sanchez

TESTED BY:

Services Polytests inc.

695-B Gaudette

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

TEST DATES: May 28<sup>th</sup> and 30<sup>th</sup> 2019

REPORT DATE: June 4<sup>th</sup> 2019

Project number: PI-20196-700

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## SUMMARY

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

5.2.2	Tunnel velocity flow measurement .....	12
5.2.3	Pm sampling proportionality (ASTM E2515) .....	12

## List of appendixes

APPENDIX 1: Raw data, forms and results

APPENDIX 2: Proportionality results

APPENDIX 3: Calibration data

APPENDIX 4: Unit pre-burn

APPENDIX 5: Participants

APPENDIX 6: Drawings and specifications

APPENDIX 7: Manual & Label

APPENDIX 8: Photographs of test set up

APPENDIX 9: Test load photographs

APPENDIX 10: Laboratory Operating Procedures

APPENDIX 11: Sample calculations

APPENDIX 12: Volume calculations

APPENDIX 13: Operating instruction

APPENDIX 14: Drawing Air flow pattern

APPENDIX 15: Application for wood stove program

## 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: May 28<sup>th</sup> and 30<sup>th</sup> 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: Spartherm
- Product type: wood heater
- Combustion system: non-catalytic
- Unit tested: Spartherm M 700 insert

#### Particularities

- Same firebox with same flue size and same air combustion control will be used to built an insert, aa free-standing wood stove and a zero-clearance wood fireplace. All three unit share the same design, exact same firebox and control.
- Zero-clearance fireplace: Spartherm M 700 Z/C,
- Free standing stove: Spartherm M 700 Module
- Wood insert: Spartherm M 700 insert

## 1.3 RESULTS

Emission results obtained

- Weighted Average Emissions Rate: 1.14 g/hr
- Weighted Average Overall Efficiency: 66.77 %

Conformity: NSPS Phase 2020

## 1.4 PRETEST INFORMATION

Unit condition: The unit was received by carrier in March 2019 in good condition. The 50hrs of aging was made by Polytests Services.

Set up

- Venting system type: diameter 6-inch steel pipe and insulated chimney
- System height from floor: 15 feet
- Particularities: Optional convection fan can be provided with the heater

## 2 SUMMARY OF TEST RESULTS

### 2.1 MODEL IDENTIFICATION

Model name number	Spartherm M 700 insert
Manufacturer	Spartherm
address	Maschweg 38 Melle 49324 Germany
appliance category	Wood heater
Usable Firebox Volume - ft <sup>3</sup>	1.58
Catalytic/Non-Cat	Non-Cat
convection air fan (no, standard, Optional)	no

### 2.2 LABORATORY INFORMATION

Testing laboratory	Polytests Services inc.
address	695-B Gaudette, St-jean-sur-richelieu, J3B 7S7 Qc, Canada
ISO/ Accreditation info	17025
Dates tested	May 28 <sup>th</sup> and 30 <sup>th</sup> 2019
Test Methods / Standard	ALT-125
Dilution Tunnel Inside diameter - in	8
Filter diameter	47 mm
Filter material	PTFE Pall

### 2.3 TEST CONDITION SUMMARY

Model Name(s) / number(s)	Spartherm M 700 insert		
Usable firebox Volume-ft3	1.58		
Convection Air Fan (No, Standard, Optional)	no		
Test runs #	1,1	1,2	2,1
Date tested	May 28 <sup>th</sup> 2019	May 28 <sup>th</sup> 2019	May 30 <sup>th</sup> 2019
test run category (L, M, H)	H	L	M
average barometric pressure - in Hg	29,85	29,85	29,62
Max observe Ambient temp. °F	81,57	84,17	80,29
Min observe Ambient Temp °F	73,77	74,83	75,74
Max observe Filter temp °F	89,87	86,72	89,41
Run air settings			
Primary (measured up from minimum)	Maximum	minimum	medium
Secondary (measured up from minimum)	maximum	minimum	medium
Convection air setting	Maximum	minimum	medium
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	19	19	19
Number of test fuel pieces	4	5	5
Test fuel Weight			
Kindling - as fired lb.	1,50	NA	NA
Kindling Wt. - as % of test fuel load	9,5%	NA	NA
Kindling Moisture % Db	9,0	NA	NA
Kindling Kg DB	0,62	NA	NA
SU Fuel Wt- as fired lb	4,25	NA	NA
SU Fuel wt. - as % of test fuel load	27,0%	NA	NA
SU Fuel moisture - % DB	20,0	NA	NA
SU fuel- Kg DB	1,61	NA	NA
Test Fuel Load - As Fired lb	15,75	19,16	18,83
Ave. Test Fuel Load MC % DB	21,41	22,35	24,60
Test Fuel Load - kg DB	5,89	7,10	6,86
Test fuel Loading density lb./ft3	9,97	12,13	11,92
Residual SU fuel wt. - as fired lb.	1,8	NA	NA
Residual SU fuel wt.- as % of test fuel load	11,4%	NA	NA
Test run duration - minutes	144	430	337
Test run duration - h	2,40	7,17	5,62
Test fuel load wt at the end of the test - as fired lb	1,5	0	0
total fuel burned kg Db	6,62	7,10	6,86
% test fuel load wt at end of the test	9,5%	0,0%	0,0%

## 2.4 TEST RUN RESULTS SUMMARY

Model name / number	Spartherm M 700 insert		
Usable Firebox volume	1.58		
Convection air Fan (no, Standard, option)	no		
Test runs nu.	1,1	1,2	2,1
Date tested	May 28 <sup>th</sup> 2019	May 28 <sup>th</sup> 2019	May 30 <sup>th</sup> 2019
Test run category	H	L	M
Burn rate - Kg/hr DB	2,46	0,99	1,22
Burn rate as % of low to high Midpoint	NA	40,3%	49,5%
Burn duration - h	2,40	7,17	5,62
Heat output btu/hr	29 452	13 129	16 108
Average Dilution Tunnel Flow Rate - dscfm	319,6	336,6	327,6
Average Sample Flow Rates - dscfm			
Train 1	0,1968	0,1922	0,1890
train 2	0,1924	0,1833	0,1814
Total PM Emissions - g			
Train 1 g	4,90	6,90	5,10
train 2 g	5,02	6,69	4,78
Average	4,96	6,80	4,94
PM emission train precision %	1,17%	1,49%	3,20%
PM emission g/kg	0,75	0,96	0,72
PM emission rate g/h	2,07	0,95	0,88
Total Co Emission g	121,7	960,1	618,2
Co emission Rate g/h	59,4	134,0	110,1
1 <sup>st</sup> hour emission rate g/h	4,1	5,3	3,3
Overall Efficiency - CSA B415,1			
% HHV Basis	59,87%	69,74%	69,76%
% LHV Basis	64,42%	75,04%	75,06%

## 2.5 WEIGHTED AVERAGE SUMMARY

Model name / number	Spartherm M 700 insert		
Usable Firebox volume	1.58		
Convection air Fan (no, Standard, option)	no		
average for each test run category	L	M	H
burn rate kg/h DB	0,99	1,22	2,46
PM Emission rate - g/h	0,95	0,88	2,07
Co emission rate - g/h	133,96	110,06	59,38
Overall Efficiency - CSA B 415,1			
% HHV Basis	69,7%	69,8%	59,9%
% LHV Basis	75,0%	75,1%	64,4%
Heat output - Btu/hr	13129	16108	29452
Category weighting	0,4	0,4	0,2

## 2.6 WEIGHTED AVERAGE FINAL RESULTS

ASTM E 3053 Weighted averages			
PM Emission Rate - g/h	1,14		
CO Emission Rate g/h	109,5		
Overall Efficiency - CSA B415,1			
% HHV Basis	67,77%		
% LHV Basis	72,92%		
Heat output range - Btu/h	13 129	to	29452
Co Arithmetic average g/min	1,69		

## 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	79	83	29,88	29,83	31	29,8	0	0
2	74	82	29,65	29,59	39,3	38,3	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
high Fire test	144	319,60	579,90	28,341	27,703	3,10	3,10
Low fire test	430	336,62	553,41	82,641	78,820	4,10	3,80
medium fire test	337	327,64	554,32	63,697	61,124	3,10	2,80

## 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
high Fire test	1623,91	1661,29	4,90	5,02	1,17%
Low fire test	1751,53	1836,45	6,90	6,69	1,49%
medium fire test	1733,42	1806,39	5,10	4,78	3,20%

## 3 PROCESS DESCRIPTION

### 3.1 DISCUSSION

The heater was received in a good shape by a carrier in March 2019. Pre-burn was done as preliminary testing with cord wood at Polytests facility. The side walls of the combustion chamber are lined with Vermiculite. The damper is located at the back of the firebox controlled by the handle located at the bottom left of the glass door. Post combustion is ensured by the secondary located at the top front of the firebox and tertiary air at the back of the firebox.

### 3.2 UNIT DIMENSIONS

#### Baffle

- Location: between top of combustion chamber and hearth
- Restriction: 1.5 X 21 inches at the front of unit
- Dimensions: covers the hearth area minus the restriction at front
- Material: Vermiculite 1 inch

#### Bricks

- Vermiculite lining bottom, back and side of the firebox.

#### Flue gas exhaust

- Location: top
- Dimensions: 6 in. diameter
- Material: Steel

#### Gasket

- Door: rope fiberglass
- Glass: rope fiberglass

#### Overall unit dimension

- Firebox dimensions: 21 in wide x 8.937 in. deep x 11.875 high at the back and 14.125 at the front
- Usable volume: 1.58 cuft
- Overall dimension: 26.188-inch-wide x 17.375-inch-deep x 22.625-inch-high

#### Convection fan

- none

#### Catalyst

- none

### 3.3 AIR SUPPLY SYSTEM

#### Description

- Primary air: Bottom front of the heater
- Secondary air: sides of the heater Refer appendix 6 for drawing details

#### 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) cm <sup>2</sup>			OUTLET (cm <sup>2</sup> )
Identification	Type	Imin	I <sub>max</sub>	Controlled	
A *	Primary	0	0	Yes	0
B *	Secondary (air wash and front holes)	4.5 (shared with tertiary)	70 (shared with tertiary)	Yes	43 + 4.9
C *	Tertiary (rear wall holes)	4.5 (shared with secondary)	70 (shared with secondary)	Yes	5.9

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

#### Legend

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

Type: Characterization of air intake

Imin: Minimum air intake of a particular air channel

I<sub>max</sub>: 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 May 28<sup>th</sup> 2019. It lasted 144 minutes and a maximum burn rate was obtained at 2.46 kg/hr & emission at 2.1 gr/hr. The air inlet damper was fully open.

#### Run #1.2

This run was performed on May 28<sup>th</sup> 2019 as a continuation of the maximum burn rate (run1.1). It lasted 430 minutes and a Minimum burn rate was obtained at 0.99kg/hr & emission at 0.95 gr/hr. The air inlet damper was at the minimum setting

#### Run #2

This run was performed on May 30<sup>th</sup> 2019. It lasted 337 minutes and a medium burn rate was obtained at 1.22 kg/hr & emission at 0.88 gr/hr. The air inlet damper was at the medium setting.

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

#### Test fuel cribs

- Type of wood: Red Oak, 18 to 28% dry basis moisture content
- Description: for each test, description of the fuel crib is found on the front page of each test run data sheet together with photograph in appendix.

### 3.5 START-UP OPERATION

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

### 3.6 SAMPLING LOCATIONS

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

## APPENDIX 1: Raw data, forms and results

Date: 2019.05.28 Manufacturer: SPAN TECH Model: 700  
 Project #: PI 20146 Run: 1 Tech: MM Reviewer: DP

- kindling 57 LBS START FIRE (1 min in torch)
- close Door immediately
- At 18 LBS insert load High
- close Door immediately
- At 32 LBS stop pump
- At 300 LBS insert load
- close Door immediately
- At 15 min close air fill (Drill bit 5/16)  
MINIMUM setting

TEST LOAD CONFIGURATION

## PRE / POST CHECKS

Date: 2019-05-28      Manufacturer: SPAA-Horn      Model: 700  
 Project #: PT 20196      Run: 1      Tech: MM      Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-1a1	7:00	ok	ok

Pre-Test

Post-Test

**Facility Conditions:**

Air Velocity from less than 2 feet .....

0 (max50 Fpm)	(max50 Fpm)
---------------	-------------

Smoke Capture Check (Tunnel velocity).....

ok	NA
----	----

Picture.....

4 sides ok <del>2019-05-28</del> MM	ok
--	----

**Wood Heater Conditions:**

Date Wood Heater Stack Cleaned.....

2019-05-28
------------

Date Dilution Tunnel Cleaned.....

2019-05-28
------------

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 fire test			Medium low fire test		
	1 <sup>st</sup> hour	Train 1	Train 2	1 <sup>st</sup> hour	Train 1	Train 2
Probe.....	17	34	40	10	19	42
Filter Front.....	200	202	204	206	208	210
Filter Back.....	201	203	205	207	209	211
Filter Thermocouple.....	h	11	12	h	11	12
Filter (80°F ≥ <90°F).....	ok	ok	ok	ok	ok	ok



## SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-28      Manufacturer: SpAthen      Model: 100  
 Project #: PT 20106      Run: 1      Tech: JM      Reviewer: DP

### Leakage Checks Tunnel Samplers

High fire test	System 1 <sup>st</sup> hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Unplugged Flow Rate = .25cfm						
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	935019,22	935845,41	935019,60	935846,10	884029,61	884853,41
Initial 1minute DGM (Liter)	935019,12	935845,31	935019,53	935846,01	884029,51	884853,31
Change © (Liter)	010	010	007	009	010	010
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 1 <sup>st</sup> hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Unplugged Flow Rate = .25cfm						
Vacuum (inches Hg.)	-15	-15	-15	-15	15	-15
Final 1minute DGM (Liter)	935846,66	938274,85	935846,72	938275,26	884854,94	887231,98
Initial 1minute DGM (Liter)	935846,61	938274,70	935846,68	938275,06	884854,91	887231,96
Change © (Liter)	005	015	004	020	003	006
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	ok	ok	ok	ok	ok	ok

**SAMPLING EQUIPMENT CHECK OUT**

 Date: 2019-05-28 Manufacturer: SPAN/TECH Model: 700  
 Project #: PT 20196 Run: 1 Tech: MM Reviewer: DP
**Leakage Checks Flue Gas Sampler**

Plugged Probe	Pre-Test	Post Test
Vacuum (inches Hg.)	-5	-5
Rotameter Reading (mm/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	0/1	0/1

**Leakage Checks Pitot**

Plugged Probe	Pre Test 3 H <sub>2</sub> O static	Pre Test 0.4-0.5 H <sub>2</sub> O velocity	Post Test 3 H <sub>2</sub> O Static	Post Test 0.4-0.5 H <sub>2</sub> O velocity
Vacuum (inches Hg.)	3	.5	3	.6
Check OK (no change after 15 sec.)	0/1	0/1	0/1	0/1

Date: 2019.05.28 Manufacturer: SPARTECH.COM Model: 700  
 Project #: PI 20196 Run: 1 Tech: MM Reviewer: DP

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

**LIMITS OF WEIGHT RANGES**

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

Date: 2019-05-28 Manufacturer: Spartan Model: 700  
 Project #: PT 20196 Run: 1 Tech: MM Reviewer: DF
**FOR TUNNELS < 12 in**

 Barometric pressure ( $P_{bar}$ ) 1012 (KPa.) Static pressure ( $P_q$ ) 0.01 (inches w.c.)  
 Inside diameter: Port A \_\_\_\_\_ Port B \_\_\_\_\_  
 Tunnel cross sectional area: .1963Ft<sup>2</sup>  
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head $\Delta_p$ (inches H <sub>2</sub> O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A - Centroid	3.00	3.50	4	0066	73.82
B - Centroid	3.00	3.50	4	0067	74.24
A-1	0.40	0.50	0.50	0059	73.92
A-2	1.50	1.75	2	0068	74.02
A-3	4.50	5.25	6	<del>0068</del> <sup>0076</sup> <sub>MM</sub>	74.10
A-4	5.60	6.5	7.5	0071	74.10
B-1	0.40	0.50	0.50	0059	74.40
B-2	1.50	1.75	2	0075	74.85
B-3	4.50	5.25	6	0055	75.42
B-4	5.60	6.5	7.5	0052	75.42
				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.

 $\Delta_p$  = manometer reading (inches H<sub>2</sub>O)

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

 $P_s$  = absolute dilution tunnel gas pressure or  $P_{bar} + P_{qg}$ 
 $P_q$  = static pressure in. H<sub>2</sub>O  
 { 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 ( $\Delta_p$ ) measured at each traverse point.

Date: 2019.05.28 Manufacturer: SPARTH CM Model: 700  
 Project #: PI 2019 Run: 1 Tech: MM Reviewer: [Signature]

## Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2971	3000	1009	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO <sub>2</sub>	0	0	1793	1800	978	1000
Tolerance CO <sub>2</sub>		+/- 0.02		+/- 0.5		+/- 0.5
O <sub>2</sub> 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	2979	1002	0	0.02	0.008	0.15	0.007	0.05	✓	
CO <sub>2</sub>	0	1799	985	0	0.02	0.06	0.5	0.07	0.5	✓	

### TEST DATA LOG

Date: 2019-05-28 Manufacturer: SPARthorn Model: 700  
 Project #: PI 20196 Run: 1 Tech: MM Reviewer: SP

#### RAW DRY GAS METER READINGS

		System 1	System 2	Blank
High fire test	Final (Liter)	935844.58	884852.98	850.95
	Initial (Liter)	935029.22	884026.11	815.56
Low medium fire test	Final (Liter)	938273.80	887229.98	956.16
	Initial (Liter)	935849.35	884858.00	850.95

#### AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	101.2	101.0
Dry Bulb (F):	78.90	82.9
Humidity (%):	31	29.8

### FUEL DATA

Date: 2019-05-28 Manufacturer: SPANTHER Model: 700  
 Project #: PI 60196 Run: 1 Tech: MM Reviewer: JP

#### FUEL DESCRIPTION:

Type of wood:

#### KINDLING AND START-UP LOAD

Piece Size		Weight	Meter Moisture Content (% dry)		
X	X 6 in.	1.50 lbs.	9	9	9
X	X 16 in.				
X	X in.				
X	X 6 in.	4.25 lbs.	20	20	20
X	X 16 in.				
X	X in.				
X	X in.				
X	X in.				
X	X in.				

#### HIGHFIRE TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)		
300	200 x 19 in.	2924 lbs.	221	190	193
300	200 x 19 in.	2862 lbs.	190	196	203
300	200 x 19 in.	3012 lbs.	220	260	191
X	X in.				
500	350 x 19 in.	6956 lbs.	196	211	251
X	X in.				
X	X in.				
X	X in.				
X	X in.				

### FUEL DATA

Date: 2019-05-28 Manufacturer: SPARthorn Model: 700  
 Project #: pI 2019b Run: 1 Tech: MM Reviewer: TS

#### FUEL DESCRIPTION:

Type of wood:

#### LOW OR MEDIUM TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)			
375 x 350 x 19 in.	3828 lbs.	22'		22'	193
300 x 325 x 19 in.	4092 lbs.	26'		243	124
350 x 325 x 19 in.	4006 lbs.	24'		216	192
x x in.	lbs.				
200 x 200 x 19 in.	2148 lbs.	126		191	192
350 x 375 x 19 in.	5088 lbs.	279		22'	224
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				
x x in.	lbs.				



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019.05.27      Manufacturer: Spanthelm      Model: 700  
 Project #: PT 20196      Run: 1      Tech: MR      Reviewer: SP

## HIGHFIRE TEST FILTERS

Pre-test Weight Record		SYSTEM 1 - 1 <sup>st</sup> hour						gaskets		SYSTEM 1		Blank
		Probe & Housing Number	Front Filter Number	Back Filter Number	Probe & Housing Number	Front Filter Number	Back Filter Number			Probe & Housing Number	Back Filter Number	
Date	Time	17	200	201	10	34	202	203	28	233		
2019.05.27	17:00	108 9506	00779	00779	34 4390	110 1050	00781	00876	34 5798	00823		
2019.05.28	8:00	108 9506	00779	00788	34 4389	110 1049	00781	00877	34 5797	00824		

Post-test Weight Record		SYSTEM 1 - 1 <sup>st</sup> hour						gaskets		SYSTEM 1		Blank
		Probe & Housing Number	Front Filter Number	Back Filter Number	Probe & Housing Number	Front Filter Number	Back Filter Number			Probe & Housing Number	Back Filter Number	
Date	Time	17	200	201	10	34	202	203	28	233		
2019.05.28	12:00	108 9507	00785	00788	34 4395	110 1052	00805	00877	34 5805	00826		
2019.06.03	8:00	108 9506	00785	00788	34 4389	110 1050	00805	00877	34 5797	00825		
2019.06.05	8:00	108 9506	00785	00788	34 4389	110 1050	00805	00877	34 5797	00825		

Date: 2019.05.27 Model: 702

Manufacturer: SPANTHER

Tech: MM Reviewer: SP

Project #: pt 20196 Run: 1

HIGH FIRE TEST FILTERS				
SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	<u>40</u>	<u>204</u>	<u>205</u>	<u>41</u>
<u>2019.05.27 7:00</u>	<u>110 1108</u>	<u>00880</u>	<u>00781</u>	<u>35 0644</u>
<u>2019.05.27 8:00</u>	<u>110 1108</u>	<u>00881</u>	<u>00781</u>	<u>35 0645</u>

HIGH FIRE TEST FILTERS				
SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	<u>40</u>	<u>204</u>	<u>205</u>	<u>41</u>
<u>2019.05.28 12:00</u>	<u>110 1111</u>	<u>00911</u>	<u>00781</u>	<u>35 0650</u>
<u>2019.06.03 8:00</u>	<u>110 1109</u>	<u>00911</u>	<u>00781</u>	<u>35 0645</u>
<u>2019.06.05 8:00</u>	<u>110 1109</u>	<u>00911</u>	<u>00781</u>	<u>35 0645</u>



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-27      Project #: PI 20196      Run: 1      Manufacturer: SPAN/KORUM      Model: 700  
 Tech: NR      Reviewer: DP

LOW OR MEDIUM TEST FILTERS										
SYSTEM 1 - 1 <sup>st</sup> hour					SYSTEM 1					
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
Date	Time	10	206	207	14	19	208	209	16	300
2019-05-27	17:00	946407	00870	00878	350764	1090919	00876	00884	356342	00779
2019-05-27	18:00	946408	00869	00878	350763	1090918	00877	00884	356343	00775
SYSTEM 1 - 1 <sup>st</sup> hour										
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank	
Date	Time	10	206	207	14	19	208	209	16	300
2019-05-28	9:30	946418	00900	00880	350776	1090919	00889	00886	356355	00778
2019-06-03	8:00	946411	00896	00878	350763	1090918	00887	00885	356343	00777
2019-06-05	8:00	946411	00896	00878	350763	1090918	00887	00885	356343	00777



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019.05.27

Manufacturer: SPANTHER

Model: 700

Project #: PI-Int-8

Tech: \_\_\_\_\_

Run: 1

Reviewer: \_\_\_\_\_

m/pj 20196

LOW OR MEDIUM FIRE TEST FILTERS				
SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	42	210	211	36
2019.05.27 7:00	110 3129	00870	00849	35 4397
2019.05.28 10:00	110 3128	00869	00850	35 4396

LOW OR MEDIUM FIRE TEST FILTERS				
SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	42	210	211	36
2019.05.28 19:00	110 3132	00907	00853	35 4408
2019.06.03 8:00	110 3131	00903	00851	<del>35 4396</del>
2019.06.05 8:00	110 3131	00903	00851	35 4396

35.4396 mm

## Paramètres

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

Code verrouillage: 

SPA
-----

### Description du test

Test standard	EPA
Run #	1
Date	28-05-2019
Technicien	M.M
Project #	PI 20196

### Description de l'unité

Manufacturier	SPARTHERM	
Modèle	700	
Combustion system	Non-Cat	
Appliance type	INSERT	
Firebox volume	1,58	cu ft.
Appliance weight empty	n.a	lbs
Fan (no, Standard, Option)	NO	

### Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	n.a	BTU/h Donnée fournie par le manufacturier
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	Dimensionless
Equipment number (DGM #3):	EM 070	

### 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 20196
Date	28-05-2019
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<sup>3</sup> 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 <sup>3</sup>				
Usable Firebox Volume	1,58	ft <sup>3</sup>				
Total Nom. Load Wt. Target	15,80	lb				
Total Load Wt. Allowable Range	15,00	to	16,60	lb		
Core Target Wt. Allowable Range	7,10	to	10,30	lb		
Remainder Load Wt. Allowable Range	5,50	to	8,70	lb		
					Mid-Point	
Core Load Pc. Wt. Allowable Range	2,40	to	4,00	lb	3,20	
Remainder Load Pc. Wt. Allowable Range	1,60	to	8,70	lb	5,15	
		Pc. #				
Core Load Piece Wt. Actual	1	2,92	lb	In Range		
	2	2,86	lb	In Range		
	3	3,01	lb	In Range		
Core Load Total. Wt. Actual		8,80	lb	In Range		
		Pc. #				
Remainder Load Piece Wt.	1	6,96	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Tot. Wt. Act		6,96	lb	In Range		
Total Load Wt. Actual		15,75	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		100%		In Range	95-105%	
Actual Fuel Load Density		10,0	lb/ft <sup>3</sup>			
<b>Kindling and Start-up Fuel</b>						
Maximum Kindling Wt. (20% of Tot. Load Wt.)		3,15	lb			
Actual Kindling Wt.		1,50	lb	In Range	9,5%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		4,73	lb			
Actual Start-up Fuel Wt.		4,25	lb	In Range	27,0%	
Allowable Residual Start-up Fuel Wt. Range	1,6	to	3,2	lb	Mid-Point	
Actual Residual Start-up Fuel Wt.		1,8	lb	In Range	2,4	
Total Wt. All Fuel Added (wet basis)		21,50	lb			
<b>High Fire Test Run End Point Range</b>						
	Low		High		Mid-Point	
Based on Fuel Load Wt. (w/tares)	1,4	to	1,7	lb	1,6	
Actual Fuel Load Ending Wt.		1,5	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)							
	1	2	3	Ave.		Pc. Wt. Dry Basis	
	22,1	19	19,3	20,1	In Range	2,43	1,10
	19,1	19,6	20,3	19,7	In Range	2,39	1,08
	22	26	19,1	22,4	In Range	2,46	1,12
	19,6	22,1	25,1	22,3	In Range	5,69	2,58
				NA	NA	NA	NA
				NA	NA	NA	NA
Total Load Ave. MC (%-dry basis)				21,4	In Range		
Total Load Ave. MC % (wet basis)				17,6			
Total Test Load Weight (dry basis)						12,98	5,89
<b>Kindling Moisture (%-dry basis)</b>							
	9	9	9	9,0	In Range	1,38	0,62
<b>Start-up Fuel Moisture Readings (%-dry basis)</b>							
	20	20	20	20,0	In Range	3,54	1,61
Total Wt. All Fuel Added (dry basis)						17,89	8,12
Total Wt. All Fuel Burned (dry basis)						14,6	6,6

Load pieces Length in. 19 in.

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

Cordwood Fuel Load Calculators - 12 lb/ft<sup>3</sup> 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 <sup>3</sup> - Low and Medium Fire				
Nominal Required Load Density (wet basis)	12	lb/ft <sup>3</sup>		
Usable Firebox Volume	1.58	ft <sup>3</sup>		
Total Nom. Load Wt. Target	18.96	lb		
Total Load Wt. Allowable Range	18.01	to 19.91	lb	
Core Target Wt. Allowable Range	8.532	to 12.32	lb	
Remainder Load Wt. Allowable Range	6.64	to 10.43	lb	
				Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	2.84	to 4.74	lb	3.79
Remainder Load Pc. Wt. Allowable Range	1.90	to 5.69	lb	3.79
	Pc. #			
Core Load Piece Wt. Actual	1	3.83	lb	In Range
	2	4.09	lb	In Range
	3	4.01	lb	In Range
Core Load Total. Wt. Actual		11.93	lb	In Range
	Pc. #			
Remainder Load Piece Wt.	1	2.15	lb	In Range
(2 or 3 Pcs.)	2	5.09	lb	In Range
	3		lb	NA
Remainder Load Piece Weight Ratio - Small/Large		42%		≤ 67%
Remainder Load Tot. Wt. Act		7.24	lb	In Range
Total Load Wt. Actual		19.16	lb	In Range
Core % of Total Wt.		62%		In Range 45-65%
Remainder % of Total Wt.		38%		In Range 35-55%
Actual Load % of Nominal Target		101%		In Range 95-105%
Actual Fuel Load Density		12.1	lb/ft <sup>3</sup>	
Allowable Charcoal Bed Wt. Range (lb)	2.0	to 3.8	lb	Mid-Point
Actual Charcoal Bed Wt.		3.0	lb	In Range
Actual Fuel Load Ending Wt.			lb	Valid Test ≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		19.2	lb	
Load pieces Length in.		19	in.	

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.			Pc. Wt. Dry Basis			
23.1	22.1	19.3	21.5	In Range	3.15	lb	1.43	kg	
26.1	24.3	19.4	23.3	In Range	3.32	lb	1.51	kg	
24.1	21.6	19.2	21.6	In Range	3.29	lb	1.49	kg	
Total Load Ave. MC % (dry basis)				19.4	In Range	1.80	lb	0.82	kg
Total Load Ave. MC % (wet basis)				24.1	In Range	4.10	lb	1.86	kg
Total Test Load Weight (dry basis)				NA	NA	NA	lb	NA	kg
Total Fuel Weight Burned During Test Run (dry basis)				22.4	In Range	15.66	lb	7.10	kg
				18.3					

For Usable Firebox Volumes above 3.0 ft <sup>3</sup> - Low and Medium Fire				
Nominal Required Load Density (wet basis)	12	lb/ft <sup>3</sup>		
Usable Firebox Volume		ft <sup>3</sup>		
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!		≤ 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 <sup>3</sup>	
Allowable Charcoal Bed Wt. Range (lb)	0.1	to -0.1	lb	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
Total Load Ave. MC % (dry basis)				NA	NA	NA	lb	NA
Total Load Ave. MC % (wet basis)				#DIV/0!	#DIV/0!			
Total Test Load Weight (dry basis)				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!
Total Fuel Weight Burned During Test Run (dry basis)				#DIV/0!	#DIV/0!	#DIV/0!	lb	#DIV/0!

	Start	End
Barometer (kPa):	101,2	101
Barometer (in.Hg):	29,884349	29,82528877
Dry Bulb (F):	78,9	82,9
Humidity (%):	31	29,8
Air velocity (ft/min)	0	0

High fire test				
DGM #1	Final:	33049,040 cuft	Final:	935844,580 Liter
	Initial:	33019,928 cuft	Initial:	935020,220 Liter
DGM #2	Final:	31248,289 cuft	Final:	884852,980 Liter
	Initial:	31219,088 cuft	Initial:	884026,110 Liter
DGM room			Final:	850,950 cuft
			Initial:	815,560 cuft

min or med burnrate				
DGM #1	Final:	33134,827 cuft	Final:	938273,800 Liter
	Initial:	33049,209 cuft	Initial:	935849,350 Liter
DGM #2	Final:	31332,232 cuft	Final:	887229,980 Liter
	Initial:	31248,466 cuft	Initial:	884858,000 Liter
DGM room			Final:	956,160 cuft
			Initial:	850,950 cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	83
Numéro de la ligne dans "Raw data" à partir duquel les données du highfire test commence	100
Numéro de la ligne dans "Raw data" à partir duquel les données du min ou medium fire test commence	237

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

<b>Project nu.</b>	PI 20196
<b>Date</b>	28-05-2019
<b>Technicien</b>	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	34	202	203	28	17	200	201	10	40	204	205	41	233		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	110,1050	0,0781	0,0876	34,5798	108,9506	0,0779	0,0779	34,4390	110,1108	0,0880	0,0781	35,0644	0,0823	2019-05-27	17:00
Before (6)	110,1049	0,0781	0,0877	34,5797	108,9506	0,0779	0,0788	34,4389	110,1108	0,0881	0,0781	35,0645	0,0824	2019-05-28	08:00
After (1)	110,1052	0,0805	0,0877	34,5805	108,9507	0,0785	0,0788	34,4395	110,1111	0,0911	0,0781	35,0650	0,0826	2019-05-28	12:00
After (2)	110,1050	0,0805	0,0877	34,5797	108,9506	0,0785	0,0788	34,4389	110,1109	0,0911	0,0781	35,0645	0,0825	2019-06-03	08:00
After (3)	110,1050	0,0805	0,0877	34,5797	108,9506	0,0785	0,0788	34,4389	110,1109	0,0911	0,0781	35,0645	0,0825	2019-06-05	08:00
After (4)															
After (5)															
After (6)	110,1050	0,0805	0,0877	34,5797	108,9506	0,0785	0,0788	34,4389	110,1109	0,0911	0,0781	35,0645	0,0825	2019-06-05	08:00
Difference	0,0001	0,0024	0,0000	0,0000	0,0000	0,0006	0,0000	0,0000	0,0001	0,0030	0,0000	0,0000	0,0001		
Total (mg)		2,5				3,1				3,1			0,1		
Total ajusté (mg)		<b>2,40</b>				<b>3,00</b>				<b>3,00</b>					

<b>Project nu.</b>	PI 20196
<b>Date</b>	28-05-2019
<b>Technicien</b>	

**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	10	206	207	14	19	208	209	16	42	210	211	36	300		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	94,6407	0,0870	0,0878	35,0764	109,0919	0,0876	0,0884	35,6342	110,3129	0,0870	0,0849	35,4397	0,0774	2019-05-27	17:00
Before (6)	94,6408	0,0869	0,0878	35,0763	109,0918	0,0877	0,0884	35,6343	110,3128	0,0869	0,0850	35,4396	0,0775	2019-05-28	10:00
After (1)	94,6418	0,09	0,088	35,0776	109,0919	0,0889	0,0886	35,6355	110,3132	0,0907	0,0853	35,4408	0,0778	2019-05-28	19:30
After (2)	94,6411	0,0896	0,0878	35,0763	109,0918	0,0887	0,0885	35,6343	110,3131	0,0903	0,0851	35,4396	0,0777	2019-06-03	08:00
After (3)	94,6411	0,0896	0,0878	35,0763	109,0918	0,0887	0,0885	35,6343	110,3131	0,0903	0,0851	35,4396	0,0777	2019-06-05	08:00
After (4)															
After (5)															
After (6)	94,6411	0,0896	0,0878	35,0763	109,0918	0,0887	0,0885	35,6343	110,3131	0,0903	0,0851	35,4396	0,0777	2019-06-05	08:00
Difference	0,0003	0,0027	0,0000	0,0000	0,0000	0,0010	0,0001	0,0000	0,0003	0,0034	0,0001	0,0000	0,0002		
Total (mg)		3				4,1				3,8			0,2		
Total ajusté (mg)		<b>2,80</b>				<b>3,90</b>				<b>3,60</b>					

<b>Project nu.</b>	PI 20196
<b>Date</b>	28-05-2019
<b>Technicien</b>	















368.0	605.0	0,7	1,3	5,5	176,7	82,0	91,4	174,1	211,4	137,7	141,4	138,2	0,19	86,96	85,40	82,81	0,18	86,67	85,67	82,61	0,07	0,03
369.0	606.0	0,7	1,3	5,5	176,3	81,8	90,8	174,0	211,2	137,5	141,3	138,2	0,19	86,78	85,37	82,82	0,18	86,59	85,65	82,65	0,07	0,03
370.0	607.0	0,7	1,3	5,5	176,4	82,2	90,6	173,7	211,6	137,6	141,4	138,3	0,19	86,66	85,37	82,88	0,18	86,52	85,64	82,73	0,07	0,03
371.0	608.0	0,6	1,3	5,5	176,6	82,2	90,4	173,8	211,7	137,4	141,5	138,3	0,19	86,63	85,36	82,92	0,18	86,52	85,65	82,79	0,07	0,03
372.0	609.0	0,6	1,3	5,5	176,5	82,3	90,2	173,8	211,8	137,3	141,2	138,2	0,19	86,63	85,39	82,97	0,18	86,53	85,65	82,84	0,06	0,03
373.0	610.0	0,6	1,3	5,5	176,6	82,1	90,2	173,7	211,9	137,2	141,0	138,1	0,19	86,58	85,39	83,01	0,18	86,50	85,67	82,91	0,07	0,03
374.0	611.0	0,6	1,3	5,5	176,7	82,0	89,7	173,8	211,9	137,3	140,8	138,1	0,19	86,49	85,34	83,04	0,18	86,42	85,64	82,95	0,07	0,03
375.0	612.0	0,6	1,3	5,5	176,7	81,9	89,5	173,6	212,1	137,4	140,7	138,1	0,19	86,37	85,31	83,07	0,18	86,34	85,62	82,99	0,07	0,03
376.0	613.0	0,6	1,3	5,5	176,6	81,8	89,3	173,5	212,3	137,2	140,7	138,1	0,19	86,26	85,29	83,05	0,18	86,24	85,60	83,02	0,07	0,03
377.0	614.0	0,6	1,3	5,5	176,6	81,8	89,0	173,4	212,3	137,3	140,6	138,0	0,19	86,16	85,26	83,08	0,18	86,18	85,58	83,05	0,07	0,03
378.0	615.0	0,5	1,3	5,5	176,9	81,7	88,9	173,3	212,5	137,1	140,4	138,0	0,19	86,03	85,25	83,09	0,18	86,09	85,56	83,07	0,07	0,03
379.0	616.0	0,6	1,3	5,6	177,1	81,7	88,8	173,3	212,6	137,0	140,3	137,9	0,19	85,92	85,21	83,07	0,18	86,01	85,54	83,08	0,07	0,03
380.0	617.0	0,6	1,3	5,6	177,0	81,6	88,6	173,2	212,6	137,1	140,2	137,9	0,19	85,85	85,18	83,08	0,18	85,94	85,52	83,11	0,07	0,03
381.0	618.0	0,6	1,3	5,6	177,1	81,6	88,4	173,1	212,8	136,9	140,1	137,9	0,19	85,73	85,16	83,07	0,18	85,86	85,51	83,09	0,07	0,03
382.0	619.0	0,5	1,3	5,6	177,2	81,5	88,4	173,0	212,9	136,9	140,0	137,8	0,19	85,65	85,10	83,07	0,18	85,77	85,49	83,10	0,07	0,03
383.0	620.0	0,5	1,3	5,6	177,1	81,5	88,3	172,8	213,0	136,7	139,9	137,8	0,19	85,55	85,08	83,04	0,18	85,68	85,48	83,09	0,07	0,03
384.0	621.0	0,5	1,3	5,6	177,0	81,4	88,2	172,7	213,1	136,7	139,7	137,7	0,19	85,48	85,04	83,03	0,18	85,59	85,44	83,09	0,07	0,03
385.0	622.0	0,5	1,3	5,6	176,7	81,6	88,3	172,8	213,3	136,7	139,7	137,8	0,19	85,44	85,04	83,02	0,18	85,53	85,42	83,08	0,07	0,03
386.0	623.0	0,5	1,2	5,6	177,4	81,8	88,1	172,8	213,3	136,7	139,8	137,9	0,19	85,42	85,01	83,02	0,18	85,53	85,39	83,10	0,07	0,03
387.0	624.0	0,5	1,2	5,6	177,5	82,0	89,3	172,7	213,4	136,8	140,1	137,9	0,19	85,54	85,02	83,07	0,18	85,60	85,42	83,13	0,07	0,03
388.0	625.0	0,5	1,2	5,6	177,6	82,1	91,7	172,8	213,5	136,6	139,9	137,7	0,19	85,72	85,09	83,11	0,18	85,73	85,45	83,14	0,07	0,03
389.0	626.0	0,4	1,2	5,6	177,4	82,3	93,3	173,1	213,4	136,5	139,8	137,7	0,19	85,95	85,17	83,20	0,18	85,91	85,53	83,18	0,07	0,03
390.0	627.0	0,4	1,2	5,6	177,0	82,4	94,3	173,4	213,6	136,8	139,6	137,7	0,19	86,17	85,25	83,26	0,18	86,05	85,59	83,23	0,07	0,03
391.0	628.0	0,4	1,2	5,6	176,6	82,5	95,5	173,6	213,7	136,6	139,6	137,7	0,19	86,43	85,37	83,32	0,18	86,27	85,71	83,27	0,06	0,03
392.0	629.0	0,4	1,2	5,7	176,4	82,6	96,6	173,8	213,9	136,8	139,6	137,7	0,19	86,67	85,49	83,39	0,18	86,48	85,81	83,32	0,06	0,03
393.0	630.0	0,4	1,3	5,8	176,6	82,6	95,7	173,9	214,0	137,0	139,6	137,8	0,19	86,91	85,62	83,46	0,18	86,72	85,96	83,36	0,07	0,03
394.0	631.0	0,4	1,3	5,8	176,6	82,7	94,6	173,9	214,3	137,0	139,6	137,7	0,19	87,01	85,70	83,51	0,18	86,82	86,02	83,40	0,07	0,03
395.0	632.0	0,4	1,3	5,8	177,2	82,7	93,3	173,9	214,7	136,9	139,5	137,6	0,19	87,04	85,73	83,57	0,18	86,86	86,06	83,45	0,07	0,03
396.0	633.0	0,4	1,3	5,8	177,4	82,5	92,4	173,8	215,0	136,9	139,5	137,7	0,19	86,97	85,76	83,55	0,18	86,84	86,08	83,46	0,07	0,03
397.0	634.0	0,4	1,3	5,8	177,5	82,5	91,7	173,7	215,3	136,9	139,5	137,7	0,19	86,89	85,76	83,59	0,18	86,80	86,09	83,51	0,07	0,03
398.0	635.0	0,3	1,2	5,8	177,9	82,4	91,1	173,8	215,5	136,8	139,4	137,6	0,19	86,76	85,75	83,60	0,18	86,73	86,10	83,51	0,07	0,03
399.0	636.0	0,3	1,2	5,7	177,8	82,5	90,8	173,7	215,7	137,0	139,4	137,8	0,19	86,60	85,74	83,61	0,18	86,63	86,08	83,54	0,07	0,03
400.0	637.0	0,3	1,2	5,8	178,7	82,6	90,6	173,7	216,0	137,0	139,5	137,9	0,19	86,54	85,72	83,63	0,18	86,62	86,09	83,57	0,07	0,03
401.0	638.0	0,3	1,2	5,9	178,8	82,5	90,4	173,7	216,0	136,7	139,3	137,8	0,19	86,53	85,74	83,65	0,18	86,62	86,08	83,61	0,07	0,03
402.0	639.0	0,3	1,3	5,9	179,0	82,4	90,2	174,1	216,2	136,8	139,3	137,8	0,19	86,53	85,74	83,65	0,18	86,60	86,12	83,61	0,07	0,03
403.0	640.0	0,3	1,3	5,9	179,2	82,2	89,9	174,1	216,4	136,9	139,3	137,8	0,19	86,46	85,72	83,66	0,18	86,53	86,12	83,65	0,07	0,03
404.0	641.0	0,3	1,3	5,9	179,4	82,2	89,6	174,1	216,8	136,8	139,2	137,8	0,19	86,34	85,69	83,64	0,18	86,47	86,10	83,66	0,06	0,03
405.0	642.0	0,3	1,2	5,9	179,5	82,0	89,4	174,0	216,9	136,8	139,2	137,9	0,19	86,24	85,68	83,64	0,18	86,39	86,06	83,66	0,07	0,03
406.0	643.0	0,3	1,2	5,9	180,0	82,0	89,1	174,2	217,1	136,7	139,1	137,8	0,19	86,11	85,62	83,63	0,18	86,31	86,04	83,67	0,07	0,03
407.0	644.0	0,3	1,2	5,9	180,2	82,0	88,9	174,3	217,3	136,7	139,0	137,8	0,19	86,00	85,60	83,60	0,18	86,22	86,01	83,63	0,07	0,03
408.0	645.0	0,2	1,2	5,9	180,4	81,8	88,9	174,4	217,3	136,6	139,1	137,8	0,19	85,91	85,58	83,59	0,18	86,16	86,02	83,63	0,07	0,03
409.0	646.0	0,2	1,2	5,9	180,9	81,7	88,7	174,4	217,4	136,6	139,0	137,8	0,19	85,81	85,56	83,55	0,18	86,08	85,97	83,63	0,07	0,03
410.0	647.0	0,2	1,2	5,9	180,9	81,7	88,6	174,6	217,6	136,6	139,1	137,8	0,19	85,72	85,51	83,52	0,18	86,02	85,97	83,61	0,07	0,03
411.0	648.0	0,2	1,2	5,9	181,4	81,7	88,4	174,6	217,6	136,7	139,0	137,8	0,19	85,62	85,47	83,48	0,18	85,92	85,93	83,60	0,06	0,03
412.0	649.0	0,2	1,2	5,9	181,3	81,6	88,5	174,9	217,9	136,7	139,0	137,8	0,19	85,54	85,45	83,49	0,18	85,85	85,93	83,59	0,07	0,03
413.0	650.0	0,2	1,2	5,9	181,4	81,6	88,3	175,1	218,0	136,7	139,0	137,8	0,19	85,46	85,42	83,46	0,18	85,76	85,88	83,57	0,07	0,03
414.0	651.0	0,2	1,2	5,2	181,1	81,5	88,2	175,2	218,4	136,6	138,9	137,8	0,19	85,38	85,37	83,42	0,18	85,69	85,86	83,55	0,07	0,03
415.0	652.0	0,1	1,2	5,1	180,8	81,9	88,3	175,4	218,5	136,7	139,0	138,0	0,19	85,31	85,33	83,42	0,18	85,62	85,85	83,52	0,07	0,03
416.0	653.0	0,2	1,1	5,1	180,4	82,0	88,4	175,4	218,8	136,7	138,8	137,9	0,19	85,34	85,35	83,40	0,18	85,63	85,83	83,54	0,06	0,03
417.0	654.0	0,1	1,1	5,1	180,4	81,7	88,4	175,6	218,7	136,6	138,7	137,9	0,19	85,38	85,34	83,40	0,18	85,64	85,83	83,53	0,07	0,03
418.0	655.0	0,2	1,1	5,1	180,1	81,7	88,3	175,6	219,2	136,5	138,7	137,9	0,19	85,37	85,33	83,39	0,18	85,57	85,81	83,48	0,07	0,03
419.0	656.0	0,1	1,1	5,1	179,8	81,6	88,1	175,7	219,4	136,8	138,7	137,9	0,19	85,33	85,29	83,34	0,18	85,52	85,80	83,49	0,06	0,03
420.0	657.0	0,1	1,0	5,0	179,3	81,4	88,1	175,5	219,6	136,6	138,6	137,8	0,19	85,23	85,29	83,32	0,18	85,47	85,79	83,47	0,07	0,03
421.0	658.0	0,1	1,0	5,0	179,5	81,8	88,3	175,4	219,7	136,8	138,8	137,9	0,19	85,17	85,26	83,32	0,18	85,41	85,77	83,46	0,06	0,03
422.0	659.0	0,1	1,0	5,0	179,2	82,0	89,5	175,3	219,9	136,7	138,7	137,8	0,19	85,27	85,27	83,32	0,18	85,48	85,77	83,45	0,07	0,03
423.0																						

Manufacturer: SPARTHERM  
 Model: 700

Run: 1  
 Project #: PI 20196  
 Test Duration: 430 min

	HHV	LHV
Eff	59,87%	64,42%
Comb Eff	98,99%	98,99%
HT Eff	60,48%	65,08%
Output	31 048	kJ/h
Burn Rate	2,57	kg/h
Grams CO	122	g
Input	51 859	kJ/h
MC wet	17,63	

Note: In the "Input data", "Calc. % O<sub>2</sub>", "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<sub>2</sub>  
 CO<sub>2-ut</sub> 19,86  
 F<sub>o</sub>  
 1,048

	Air Fuel Ratio (A/F)
Overall Heating Efficiency:	59,87%
Combustion Efficiency:	98,99%
Heat Transfer Efficiency:	60,48%

Dry Molecular Weight (M <sub>d</sub> )	29,56
Dry Moles Exhaust Gas (N <sub>g</sub> )	559,18
Air Fuel Ratio (A/F)	16,02

Heat Output:	29 452 Btu/h	31 048 kJ/h
Heat Input:	49 194 Btu/h	51 859 kJ/h
Burn Duration:	2,05 h	
Burn Rate:	5,66 lb/h	2,566 kg/h
Stack Temp:	554,3 Deg. F	290,2 Deg. C

Manufacturer: SPARTHERM  
 Model: 700

Run: 1  
 Project #: PI 20196  
 Test Duration: 430 min

	HHV	LHV
Eff	69,74%	75,04%
Comb Eff	90,38%	90,38%
HT Eff	77,17%	83,03%
Output	13 840	kJ/h
Burn Rate	0,98	kg/h
Grams CO	960	g
Input	19 845	kJ/h
MC wet	18,27	

Note: In the "Input data", "Calc. % O<sub>2</sub>", "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<sub>2</sub>  
 CO<sub>2-ut</sub> 19,86  
 F<sub>o</sub>  
 1,050

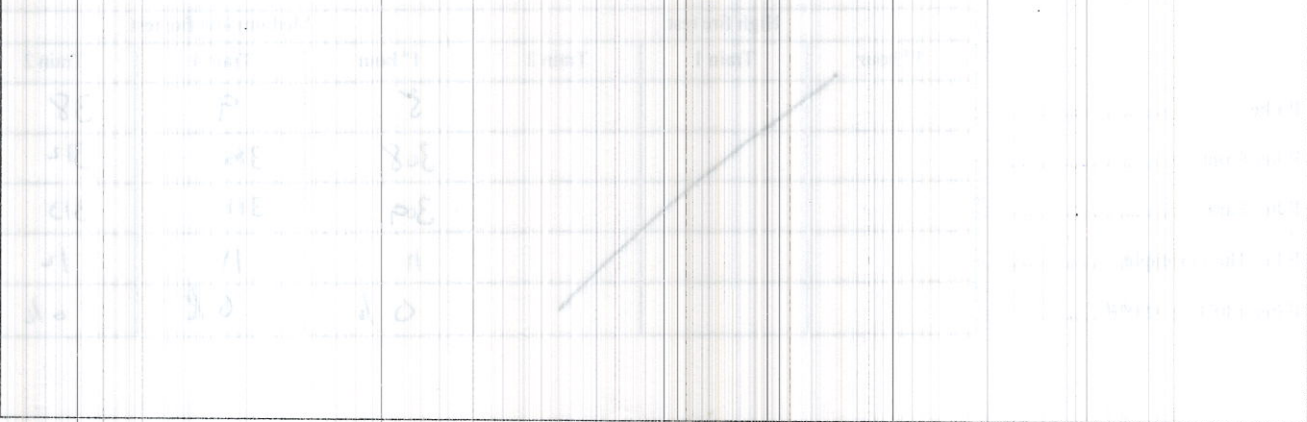
	Air Fuel Ratio (A/F)
Overall Heating Efficiency: 69,74%	Dry Molecular Weight (M <sub>d</sub> ) 29,72
Combustion Efficiency: 90,38%	Dry Moles Exhaust Gas (N <sub>g</sub> ): 412,16
Heat Transfer Efficiency: 77,17%	Air Fuel Ratio (A/F) 11,74

Heat Output:	13 129 Btu/h	13 840 kJ/h
Heat Input:	18 825 Btu/h	19 845 kJ/h
Burn Duration:	7,17 h	
Burn Rate:	2,16 lb/h	0,982 kg/h
Stack Temp:	261,9 Deg. F	127,7 Deg. C

Date: 2019-05-30 Manufacturer: SPANTHERM Model: 700  
 Project #: PI 20196 Run: 2 Tech: MM Reviewer: [Signature]

- 576 lbs stand F.A.G (1 min torque)
- close Door immediately
- At 186 lbs insert load (High)
- close Door immediately
- At 291 lbs insert load
- After 2 min close Door
- At 15 min close air inlet (7/16 Drill Bit)
- Medium setting

TEST LOAD CONFIGURATION



**PRE / POST CHECKS**

Date: 2019.05.30 Manufacturer: SPAAtherm Model: 700  
 Project #: PT 20196 Run: 2 Tech: MM Reviewer: JS

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-19A	7:00	OK	OK

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.....

2019-05-30 <sup>MR</sup>
--------------------------

Date Dilution Tunnel Cleaned.....

2019-05-28
------------

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 fire test			Medium low fire test		
	1 <sup>st</sup> hour	Train 1	Train 2	1 <sup>st</sup> hour	Train 1	Train 2
Probe.....				5	9	38
Filter Front.....				308	310	312
Filter Back.....				309	311	313
Filter Thermocouple.....				11	11	12
Filter (80°F ≥ <90°F).....				OK	OK	OK

## SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-30      Manufacturer: SPARTHERM      Model: 700  
 Project #: PI 201ab      Run: 2      Tech: M, M      Reviewer: DP

### Leakage Checks Tunnel Samplers

<del>High fire test</del> Low <u>mm</u> fire test	System 1 <sup>st</sup> hour		System 1		System 2	
	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Unplugged Flow Rate = .25cfm						
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	938286.58	940208.50	938286.80	940208.62	887244.32	889121.08
Initial 1minute DGM (Liter)	938286.44	940208.48	938286.75	940208.60	887244.30	889121.05
Change © (Liter)	0.14	0.02	0.05	0.02	0.02	0.03
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 1 <sup>st</sup> 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.)						
Final 1minute DGM (Liter)						
Initial 1minute DGM (Liter)						
Change © (Liter)						
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 ( 0.56)						
Check OK						



# SAMPLING EQUIPMENT CHECK OUT

Date: 2019.05.30 Manufacturer: SpAtherm Model: 700  
 Project #: PI 20196 Run: 2 Tech: h/h 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	0/0	0/0

## 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.)	0/0	0/0	0/0	0/0

Date: 2019-05-30 Manufacturer: SPANTHERM Model: 700  
 Project #: PI 20196 Run: 2 Tech: MM Reviewer: JP

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

**LIMITS OF WEIGHT RANGES**

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



Date: 2019.05.30 Manufacturer: SPANTHERM Model: 700  
 Project #: PT 20196 Run: 2 Tech: MM Reviewer: DP

FOR TUNNELS &lt; 12 in

 Barometric pressure ( $P_{bar}$ ) 102.6 (KPa.) Static pressure ( $P_q$ ) 0.20 (inches w.c.)  
 Inside diameter: Port A \_\_\_\_\_ Port B \_\_\_\_\_  
 Tunnel cross sectional area: .1963Ft<sup>2</sup>  
 Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head $\Delta_p$ (inches H <sub>2</sub> O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0.065	69.98
B - Centroid	3.00	3.50	4	0.064	69.69
A-1	0.40	0.50	0.50	0.053	69.93
A-2	1.50	1.75	2	0.063	69.79
A-3	4.50	5.25	6	0.074	69.81
A-4	5.60	6.5	7.5	0.068	69.71
B-1	0.40	0.50	0.50	0.053	69.41
B-2	1.50	1.75	2	0.071	69.41
B-3	4.50	5.25	6	0.054	69.26
B-4	5.60	6.5	7.5	0.053	69.21
				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.

 $\Delta_p$  = manometer reading (inches H<sub>2</sub>O)

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

 $P_s$  = absolute dilution tunnel gas pressure or  $P_{bar} + P_{qg}$ 
 $P_q$  = static pressure in. H<sub>2</sub>O  
 { 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 ( $\Delta_p$ ) measured at each traverse point.

Date: 2019-05-30 Manufacturer: SPARTHERM Model: 700  
 Project #: PI 20196 Run: 2 Tech: MM Reviewer: SP

**Pre-Test (Adjust and Record)**

	ZERO		SPAN		CAL. (Record Only)	
	Actual	Should Be	Actual	Should Be	Actual	Should Be
CO	0	0	2990	3000	0996	1000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO <sub>2</sub>	0	0	1781	1800	978	1000
Tolerance CO <sub>2</sub>		+/- 0.02		+/- 0.5		+/- 0.5
O <sub>2</sub> informative CSA B415 calculated value	na	na	na	na	na	na

**Post Test (Record Only)**

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0	2981	1000	0	0.02	0.009	0.15	0.004	0.05	✓	
CO <sub>2</sub>	0	1786	978	0	0.02	0.05	0.5	0	0.5	✓	

**TEST DATA LOG**

Date: 2019-05-30 Manufacturer: SPATHERM Model: 700  
 Project #: PI 20196 Run: 2 Tech: MM Reviewer: DE

**RAW DRY GAS METER READINGS**

		System 1	System 2	Blank
High fire test	Final (Liter)		↘	
	Initial (Liter)			
Low medium fire test	Final (Liter)	940 207 58	889 120 12	039 10
	Initial (Liter)	938 287 25	887 245 49	956 62

**AMBIENT CONDITIONS**

	Before	After
Barometer (kPa):	100.4	100.2
Dry Bulb (F):	74.4	81.6
Humidity (%):	39.3	38.3

### FUEL DATA

Date: 2019-05-30 Manufacturer: Spartan Model: 700  
 Project #: PI 20196 Run: 2 Tech: mm Reviewer: DP

### FUEL DESCRIPTION:

Type of wood:

### KINDLING AND START-UP LOAD

Piece Size		Weight	Meter Moisture Content (% dry)			
x	x 6 in.	4.25 lbs.	20		20	20
x	x 16 in.					
x	x in.					
x	x 6 in.	1.50 lbs.	9		9	9
x	x 16 in.					
x	x in.					
x	x in.					
x	x in.					
x	x in.					

### HIGHFIRE TEST LOAD

Piece Size		Weight	Meter Moisture Content (% dry)			
300	x 2.25 x 19 in.	3018 lbs.	191		193	196
300	x 2.50 x 19 in.	3238 lbs.	193		190	192
250	x 2.50 x 19 in.	2636 lbs.	192		196	199
x	x in.					
4250	x 3.75 x 19 in.	713 lbs.	279		243	190
x	x in.					
x	x in.					
x	x in.					
x	x in.					

## FUEL DATA

Date: 2019-05-30 Manufacturer: SPARTHERM Model: 700  
 Project #: PI 20196 Run: 2 Tech: M M Reviewer: [Signature]

### FUEL DESCRIPTION:

Type of wood:

### LOW OR MEDIUM TEST LOAD

Piece Size			Weight		Meter Moisture Content (% dry)			
300	x 300	x in.	3798	lbs.	192		193	192
300	x 2.75	x in.	3806	lbs.	194		194	192
350	x 4.25	x in.	4030	lbs.	196		192	192
	x	x in.		lbs.				
200	x 200	x in.	2152	lbs.	200		192	191
400	x 3.50	x in.	5046	lbs.	191		193	191
	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.				



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: \_\_\_\_\_ Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

Project #: \_\_\_\_\_ Run: \_\_\_\_\_ Tech: \_\_\_\_\_ Reviewer: \_\_\_\_\_

HIGHFIRE TEST FILTERS									
SYSTEM 1 - 1 <sup>st</sup> hour					SYSTEM 1				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time								

HIGHFIRE TEST FILTERS									
SYSTEM 1 - 1 <sup>st</sup> hour					SYSTEM 1				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
Date	Time								



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: \_\_\_\_\_ Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

Project #: \_\_\_\_\_ Run: \_\_\_\_\_ Tech: \_\_\_\_\_ Reviewer: \_\_\_\_\_

HIGH FIRE TEST FILTERS				
SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time			

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



# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-29 Project #: PT 20196 Run: 6 Manufacturer: SPANTHER Model: 700  
 Tech: J.M. Reviewer: NO

LOW OR MEDIUM TEST FILTERS											
SYSTEM 1 - 1 <sup>st</sup> hour					SYSTEM 1						
Pre-test Weight Record	Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
			5	308	309	1	9	310	311	9	314
	2019.05.29	17:10	615038	00806	00805	35,3299	614471	00874	00804	34,9495	00779
	2019.05.30	8:00	615038	00806	00805	35,3298	614472	00874	00804	34,9494	00780
SYSTEM 1 - 1 <sup>st</sup> hour											
Post-test Weight Record	Date	Time	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blank
			5	308	309	1	9	310	311	9	314
	2019.05.30	16:45	615043	00823	00806	35,3309	614473	00885	00805	34,9511	00782
	2019.06.03	8:00	615040	00822	00806	35,3298	614472	00885	00805	34,9494	00782
	2019.06.05	8:00	615040	00822	00806	35,3298	614472	00885	00805	34,9494	00782





# DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019.05.29 Model: 700

Manufacturer: SP. A. The firm

Project #: PI 2019.6 Run: 2 Tech: MM Reviewer: DS

LOW OR MEDIUM FIRE TEST FILTERS				
SYSTEM 2				
Pre-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	<u>38</u>	<u>312</u>	<u>313</u>	<u>42</u>
<u>2019.05.29 17:30</u>	<u>110 4344</u>	<u>00806</u>	<u>00780</u>	<u>35 5180</u>
<u>2019.05.30 8:10</u>	<u>110 4350</u>	<u>00807</u>	<u>00781</u>	<u>35 5181</u>

LOW OR MEDIUM FIRE TEST FILTERS				
SYSTEM 2				
Post-test Weight Record	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
	<u>38</u>	<u>312</u>	<u>313</u>	<u>42</u>
<u>2019.05.30 16:45</u>	<u>110 4354</u>	<u>00835</u>	<u>00782</u>	<u>35 5191</u>
<u>2019.06.03 8:00</u>	<u>110 4352</u>	<u>00832</u>	<u>00782</u>	<u>35 5181</u>
<u>2019.06.05 8:10</u>	<u>110 4352</u>	<u>00832</u>	<u>00782</u>	<u>35 5181</u>

## Paramètres

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

Code verrouillage:

### Description du test

Test standard	EPA
Run #	2
Date	30-05-2019
Technicien	M.M
Project #	PI 20196

### Description de l'unité

Manufacturier	SPARTHERM	
Modèle	700	
Combustion system	Non-Cat	
Appliance type	INSERT	
Firebox volume	1,58	cu ft.
Appliance weight empty	n.a	lbs
Fan (no, Standard, Option)	NO	

### Paramètres du test

Logging time	1	min
Manufacturer's rated heat output	n.a	BTU/h Donnée fournie par le manufacturier
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	Dimensionless
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 20196
Date	30-05-2019
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<sup>3</sup> 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 <sup>3</sup>				
Usable Firebox Volume	1,58	ft <sup>3</sup>				
Total Nom. Load Wt. Target	15,80	lb				
Total Load Wt. Allowable Range	15,00	to	16,60	lb		
Core Target Wt. Allowable Range	7,10	to	10,30	lb		
Remainder Load Wt. Allowable Range	5,50	to	8,70	lb		
					Mid-Point	
Core Load Pc. Wt. Allowable Range	2,40	to	4,00	lb	3,20	
Remainder Load Pc. Wt. Allowable Range	1,60	to	8,70	lb	5,15	
		Pc. #				
Core Load Piece Wt. Actual		1	3,02	lb	In Range	
		2	3,24	lb	In Range	
		3	2,64	lb	In Range	
Core Load Total. Wt. Actual			8,89	lb	In Range	
		Pc. #				
Remainder Load Piece Wt.		1	7,13	lb	In Range	
(1 to 3 Pcs.)		2		lb	NA	
		3		lb	NA	
Remainder Load Tot. Wt. Act			7,13	lb	In Range	
Total Load Wt. Actual			16,02	lb	In Range	
Core % of Total Wt.			55%		In Range	45-65%
Remainder % of Total Wt.			45%		In Range	35-55%
Actual Load % of Nominal Target			101%		In Range	95-105%
Actual Fuel Load Density			10,1	lb/ft <sup>3</sup>		
<b>Kindling and Start-up Fuel</b>						
Maximum Kindling Wt. (20% of Tot. Load Wt.)			3,20	lb		
Actual Kindling Wt.			1,50	lb	In Range	9,4%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)			4,81	lb		
Actual Start-up Fuel Wt.			4,25	lb	In Range	26,5%
Allowable Residual Start-up Fuel Wt. Range	1,6	to	3,2	lb		Mid-Point
Actual Residual Start-up Fuel Wt.			1,8	lb	In Range	2,4
Total Wt. All Fuel Added (wet basis)			21,77	lb		
<b>High Fire Test Run End Point Range</b>						
	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1,4	to	1,8	lb		1,6
Actual Fuel Load Ending Wt.			1,5	lb	In Range	

Fuel Piece Moisture Reading (%-dry basis)							
	1	2	3	Ave.		Pc. Wt. Dry Basis	
	19,1	19,3	19,6	19,3	In Range	2,53	1,15
	19,3	19	19,2	19,2	In Range	2,72	1,23
	19,2	19,6	19,9	19,6	In Range	2,20	1,00
	27,9	14,3	19	20,4	In Range	5,92	2,69
				NA	NA	NA	NA
				NA	NA	NA	NA
Total Load Ave. MC (%-dry basis)				19,8	In Range		
Total Load Ave. MC % (wet basis)				16,5			
Total Test Load Weight (dry basis)						13,37	6,07
<b>Kindling Moisture (%-dry basis)</b>							
	9	9	9	9,0	In Range	1,38	0,62
<b>Start-up Fuel Moisture Readings (%-dry basis)</b>							
	20	20	20	20,0	In Range	3,54	1,61
Total Wt. All Fuel Added (dry basis)						18,29	8,30
Total Wt. All Fuel Burned (dry basis)						15,0	6,8

Load pieces Length in. 19 in.

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

Cordwood Fuel Load Calculators - 12 lb/ft<sup>3</sup> Nominal Load Density  
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For Usable Firebox Volumes up to 3.0 ft <sup>3</sup> - Low and Medium Fire				
Nominal Required Load Density (wet basis)	12	lb/ft <sup>3</sup>		
Usable Firebox Volume	1.58	ft <sup>3</sup>		
Total Nom. Load Wt. Target	18.96	lb		
Total Load Wt. Allowable Range	18.01	to 19.91	lb	
Core Target Wt. Allowable Range	8.532	to 12.32	lb	
Remainder Load Wt. Allowable Range	6.64	to 10.43	lb	
				Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	2.84	to 4.74	lb	3.79
Remainder Load Pc. Wt. Allowable Range	1.90	to 5.69	lb	3.79
	Pc. #			
Core Load Piece Wt. Actual	1	3.80	lb	In Range
	2	3.81	lb	In Range
	3	4.03	lb	In Range
Core Load Total. Wt. Actual		11.63	lb	In Range
	Pc. #			
Remainder Load Piece Wt.	1	2.15	lb	In Range
(2 or 3 Pcs.)	2	5.05	lb	In Range
	3		lb	NA
Remainder Load Piece Weight Ratio - Small/Large		43%		In Range ≤ 67%
Remainder Load Tot. Wt. Act		7.20	lb	In Range
Total Load Wt. Actual		18.83	lb	In Range
Core % of Total Wt.		62%		In Range 45-65%
Remainder % of Total Wt.		38%		In Range 35-55%
Actual Load % of Nominal Target		99%		In Range 95-105%
Actual Fuel Load Density		11.9	lb/ft <sup>3</sup>	
Allowable Charcoal Bed Wt. Range (lb)	1.9	to 3.7		Mid-Point
Actual Charcoal Bed Wt.		3.0	lb	In Range 2.8
Actual Fuel Load Ending Wt.			lb	Valid Test ≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		18.8	lb	
Load pieces Length in.		19	in.	

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Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.			Pc. Wt. Dry Basis		
25	25	24	24.7	In Range	3.05	lb	1.38	kg
25	24	25	24.7	In Range	3.05	lb	1.38	kg
25	25	24	24.7	In Range	3.23	lb	1.47	kg
20	24	26	23.3	In Range	1.74	lb	0.79	kg
25	25	25	25.0	In Range	4.04	lb	1.83	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			24.6	In Range				
Total Load Ave. MC % (wet basis)			19.7					
Total Test Load Weight (dry basis)					15.11	lb	6.86	kg
Total Fuel Weight Burned During Test Run (dry basis)					15.1	lb	6.86	kg

For Usable Firebox Volumes above 3.0 ft <sup>3</sup> - Low and Medium Fire				
Nominal Required Load Density (wet basis)	12	lb/ft <sup>3</sup>		
Usable Firebox Volume		ft <sup>3</sup>		
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!		≤ 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 <sup>3</sup>	
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
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			#DIV/0!	#DIV/0!				
Total Load Ave. MC % (wet basis)			#DIV/0!	#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):	100,4	100,2
Barometer (in.Hg):	29,648109	29,58904886
Dry Bulb (F):	74,4	81,6
Humidity (%):	39,3	38,3
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:	33203,118	cuft	Final:	940207,580	Liter
	Initial:	33135,302	cuft	Initial:	938287,250	Liter
DGM #2	Final:	31398,981	cuft	Final:	889120,120	Liter
	Initial:	31332,779	cuft	Initial:	887245,490	Liter
DGM room				Final:	1039,620	cuft
				Initial:	956,620	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	198
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	198

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

<b>Project nu.</b>	PI 20196
<b>Date</b>	30-05-2019
<b>Technicien</b>	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	5	308	309	1	9	310	311	9	38	312	313	42	314		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,5038	0,0806	0,0805	35,3299	61,4471	0,0874	0,0804	34,9495	110,4349	0,0806	0,0780	35,5180	0,0779	2019-05-29	17:00
Before (6)	61,5038	0,0806	0,0805	35,3298	61,4472	0,0874	0,0804	34,9494	110,4350	0,0807	0,0781	35,5181	0,0780	2019-05-30	08:00
After (1)	61,5043	0,0823	0,0806	35,3309	61,4473	0,0885	0,0805	34,9511	110,4354	0,0835	0,0782	35,5191	0,0782	2019-05-30	16:45
After (2)	61,5040	0,0822	0,0806	35,3298	61,4472	0,0885	0,0805	34,9494	110,4352	0,0832	0,0782	35,5181	0,0782	2019-06-03	08:00
After (3)	61,5040	0,0822	0,0806	35,3298	61,4472	0,0885	0,0805	34,9494	110,4352	0,0832	0,0782	35,5181	0,0782	2019-06-05	08:00
After (4)															
After (5)															
After (6)	61,5040	0,0822	0,0806	35,3298	61,4472	0,0885	0,0805	34,9494	110,4352	0,0832	0,0782	35,5181	0,0782	2019-06-05	08:00
Difference	0,0002	0,0016	0,0001	0,0000	0,0000	0,0011	0,0001	0,0000	0,0002	0,0025	0,0001	0,0000	0,0002		
Total (mg)		1,9				3,1				2,8			0,2		
Total ajusté (mg)		<b>1,70</b>				<b>2,90</b>				<b>2,60</b>					

<b>Project nu.</b>	PI 20196
<b>Date</b>	30-05-2019
<b>Technicien</b>	M.M

* Elapsed		* Weight	* CO	* CO <sub>2</sub>	*1 Fuel	*2 Room	*3 Tunnel	*4 Unit	*5 Unit	*6 Unit	*7 Unit	*8 Unit	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2	Tunnel Velo	Flue draft	
Time	Raw data row	Remaining			Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp	Pressure	Pressure	
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	°F	°F	°F	cuft/min	°F	°F	°F	in wc	in wc	
0.00	198.00	18.6	0.2	4.9	415.5	76.0	129.0	243.2	236.4	193.3	188.8	198.6	0.19	78.77	78.43	87.08	0.18	79.20	78.76		84.52	0.06	0.06
1.0	199.0	18.3	0.2	2.1	532.9	76.2	138.1	241.5	235.4	193.6	188.9	200.7	0.19	78.98	78.44	87.07	0.18	79.30	78.76		85.54	0.06	0.08
2.0	200.0	18.1	0.3	6.8	580.3	75.7	124.8	241.3	234.2	192.3	187.4	202.2	0.19	79.11	78.41	86.88	0.18	79.37	78.77		85.56	0.06	0.09
3.0	201.0	17.9	0.4	8.7	640.1	76.1	126.8	242.3	235.7	190.2	185.4	202.0	0.19	79.20	78.41	86.72	0.18	79.45	78.75		85.66	0.06	0.09
4.0	202.0	17.6	0.3	10.7	659.9	75.9	127.7	246.0	236.1	188.7	184.2	202.3	0.19	79.27	78.40	86.52	0.18	79.52	78.77		85.91	0.06	0.09
5.0	203.0	17.3	0.2	11.5	671.1	76.3	128.3	252.5	236.5	186.7	183.6	202.4	0.19	79.37	78.43	86.45	0.18	79.61	78.79		86.16	0.06	0.09
6.0	204.0	17.0	0.2	11.8	675.9	76.1	128.3	261.1	236.3	186.5	183.0	203.1	0.19	79.47	78.44	86.41	0.18	79.69	78.83		86.43	0.06	0.09
7.0	205.0	16.8	0.2	11.5	680.6	76.5	129.1	271.4	236.7	185.9	182.3	204.0	0.19	79.60	78.47	86.41	0.18	79.79	78.83		86.78	0.06	0.09
8.0	206.0	16.6	0.2	11.5	690.7	76.6	129.0	282.7	237.4	186.1	183.1	204.2	0.19	79.68	78.51	86.42	0.18	79.89	78.94		87.08	0.06	0.09
9.0	207.0	16.3	0.2	11.9	707.4	76.6	131.2	295.6	237.5	186.0	184.2	204.6	0.19	79.79	78.54	86.45	0.18	79.98	78.96		87.46	0.06	0.10
10.0	208.0	16.0	0.2	12.3	727.5	76.4	132.8	309.2	238.4	185.7	185.5	204.4	0.19	79.88	78.55	86.55	0.18	80.09	79.02		87.88	0.06	0.10
11.0	209.0	15.8	0.2	12.8	743.1	76.5	133.4	323.2	238.6	185.5	187.2	204.0	0.19	79.93	78.59	86.62	0.18	80.17	79.08		88.24	0.06	0.10
12.0	210.0	15.5	0.2	13.0	752.5	76.6	134.8	337.9	238.8	185.6	189.0	203.3	0.19	80.06	78.64	86.68	0.18	80.29	79.13		88.60	0.06	0.10
13.0	211.0	15.3	0.2	13.3	756.4	76.7	135.5	353.8	240.3	186.5	191.2	203.6	0.19	80.13	78.71	86.80	0.18	80.35	79.16		89.00	0.06	0.10
14.0	212.0	15.0	0.2	13.3	762.5	76.9	136.3	369.7	241.0	186.9	193.7	202.8	0.19	80.29	78.79	86.96	0.18	80.48	79.26		89.41	0.06	0.10
15.0	213.0	14.8	0.2	13.4	657.1	76.8	121.0	384.3	244.3	188.1	195.7	202.8	0.18	80.40	78.84	86.98	0.18	80.56	79.30		89.37	0.06	0.09
16.0	214.0	14.6	0.5	15.5	596.8	76.9	113.6	397.5	244.7	189.6	198.3	203.1	0.19	80.49	78.88	86.93	0.18	80.66	79.37		89.13	0.06	0.09
17.0	215.0	14.5	1.3	14.3	562.9	77.0	110.6	409.3	245.7	190.6	200.4	202.7	0.19	80.59	78.94	86.95	0.18	80.70	79.43		88.99	0.06	0.09
18.0	216.0	14.3	0.9	13.3	544.0	77.1	108.4	418.4	246.7	191.4	202.1	202.2	0.19	80.72	78.98	86.98	0.18	80.79	79.48		88.93	0.07	0.08
19.0	217.0	14.2	0.9	13.4	531.7	77.2	106.8	424.2	247.8	192.0	203.1	201.8	0.19	80.78	79.02	87.00	0.18	80.84	79.51		88.90	0.07	0.08
20.0	218.0	14.0	1.1	13.6	524.1	77.2	106.5	429.3	249.0	192.9	204.0	201.1	0.19	80.84	79.08	87.01	0.18	80.86	79.57		88.83	0.07	0.08
21.0	219.0	13.9	1.3	13.8	518.8	77.3	106.3	432.3	250.2	193.7	204.3	200.8	0.19	80.85	79.12	87.04	0.18	80.87	79.58		88.81	0.06	0.08
22.0	220.0	13.7	1.6	13.8	509.5	77.3	106.0	436.0	251.2	193.9	204.3	201.1	0.19	80.88	79.16	87.07	0.18	80.89	79.65		88.79	0.06	0.08
23.0	221.0	13.6	1.6	13.9	510.9	77.1	105.0	434.0	252.3	194.3	204.7	199.2	0.19	80.91	79.18	87.01	0.18	80.96	79.67		88.75	0.06	0.08
24.0	222.0	13.4	1.8	13.9	508.4	77.2	105.0	434.7	253.2	195.1	204.0	198.4	0.19	80.94	79.26	86.99	0.18	81.01	79.71		88.68	0.06	0.08
25.0	223.0	13.2	2.0	14.0	507.0	77.2	105.3	435.8	254.2	195.5	203.9	197.7	0.19	80.99	79.27	87.00	0.18	81.03	79.77		88.64	0.06	0.08
26.0	224.0	13.0	2.1	14.1	506.3	77.3	104.9	436.7	254.7	196.0	203.6	197.0	0.19	81.02	79.31	87.00	0.18	81.09	79.82		88.59	0.06	0.08
27.0	225.0	12.9	2.2	14.2	505.7	77.3	104.7	436.7	255.4	196.4	203.3	196.2	0.19	81.07	79.36	87.00	0.18	81.10	79.86		88.56	0.06	0.08
28.0	226.0	12.7	2.4	14.2	505.7	77.4	104.9	437.3	256.0	196.7	203.4	195.4	0.19	81.12	79.39	86.99	0.18	81.14	79.89		88.54	0.06	0.08
29.0	227.0	12.6	2.5	14.3	507.3	77.5	104.8	437.5	256.5	197.1	203.2	194.8	0.19	81.17	79.43	86.94	0.18	81.20	79.92		88.50	0.06	0.08
30.0	228.0	12.4	2.6	14.6	508.3	77.5	104.8	438.1	256.9	197.4	202.7	193.8	0.18	81.22	79.48	86.92	0.18	81.26	79.96		88.49	0.06	0.08
31.0	229.0	12.2	2.8	14.8	508.8	77.5	105.1	438.5	257.0	197.6	202.7	193.0	0.19	81.30	79.54	86.85	0.18	81.33	80.02		88.45	0.06	0.08
32.0	230.0	12.0	3.2	14.7	509.5	77.3	104.7	438.7	257.2	197.3	202.8	192.3	0.19	81.39	79.59	86.84	0.18	81.40	80.08		88.39	0.06	0.08
33.0	231.0	11.8	3.2	14.9	509.6	77.5	103.9	439.9	257.1	197.4	203.4	190.8	0.19	81.41	79.63	86.78	0.18	81.45	80.14		88.28	0.06	0.08
34.0	232.0	11.7	2.7	14.9	509.6	77.6	104.1	440.7	257.1	197.7	203.3	190.4	0.19	81.49	79.69	86.69	0.18	81.52	80.18		88.24	0.06	0.08
35.0	233.0	11.5	2.4	14.7	507.4	77.7	103.7	442.2	257.4	197.7	203.9	189.0	0.19	81.58	79.75	86.65	0.18	81.59	80.23		88.21	0.06	0.08
36.0	234.0	11.4	2.2	14.8	507.3	77.8	104.1	443.3	257.1	198.3	203.6	188.5	0.19	81.68	79.80	86.60	0.18	81.68	80.30		88.17	0.06	0.08
37.0	235.0	11.2	2.2	14.8	508.8	77.8	104.5	445.0	257.1	198.6	203.3	187.9	0.19	81.77	79.86	86.51	0.18	81.76	80.39		88.12	0.06	0.08
38.0	236.0	11.1	2.3	15.0	509.3	77.8	104.2	445.9	256.8	198.8	203.6	187.2	0.19	81.87	79.91	86.50	0.18	81.85	80.41		88.16	0.06	0.08
39.0	237.0	10.9	2.3	15.1	509.9	78.1	104.7	447.0	256.6	199.1	203.4	186.5	0.19	81.99	79.97	86.43	0.18	81.92	80.46		88.14	0.06	0.08
40.0	238.0	10.7	2.1	15.2	512.0	78.1	104.8	448.5	256.5	199.4	203.7	186.0	0.19	82.07	80.03	86.39	0.18	82.01	80.51		88.15	0.06	0.08
41.0	239.0	10.6	1.7	15.4	514.7	78.1	104.7	450.1	256.3	199.6	204.0	185.0	0.19	82.10	80.08	86.40	0.18	82.06	80.55		88.09	0.06	0.08
42.0	240.0	10.4	1.5	15.5	512.4	78.0	104.4	451.4	256.3	199.8	204.2	184.2	0.19	82.11	80.11	86.36	0.18	82.13	80.62		88.02	0.06	0.08
43.0	241.0	10.3	1.4	15.3	507.6	78.0	104.4	453.0	256.3	200.2	204.3	183.3	0.19	82.15	80.16	86.30	0.18	82.15	80.67		87.94	0.06	0.08
44.0	242.0	10.1	1.0	15.0	504.3	78.1	103.9	453.6	256.0	200.6	204.5	182.7	0.19	82.24	80.20	86.26	0.18	82.25	80.74		87.88	0.06	0.08
45.0	243.0	10.0	0.8	14.7	499.9	78.1	103.6	454.4	256.3	201.4	205.1	182.2	0.18	82.30	80.26	86.23	0.18	82.31	80.80		87.90	0.06	0.08
46.0	244.0	9.9	0.7	14.5	496.6	78.2	103.7	455.0	256.1	201.8	205.5	181.6	0.19	82.38	80.33	86.25	0.18	82.38	80.84		87.88	0.06	0.08
47.0	245.0	9.7	0.6	14.5	493.5	78.2	102.7	454.4	256.5	201.8	206.1	180.3	0.19	82.44	80.36	86.25	0.18	82.43	80.89		87.80	0.07	0.08
48.0	246.0	9.6	0.6	14.5	492.3	78.3	103.2	453.6	256.4	202.0	206.3	179.7	0.19	82.51	80.45	86.41	0.18	82.46	80.95		87.73	0.06	0.08
49.0	247.0	9.5	0.7	14.6	490.8	78.3	102.8	452.9	256.4	202.6	206.3	179.5	0.19	82.52	80.51	86.41	0.18	82.48	80.99		87.78	0.06	0.08
50.0	248.0	9.3	0.7	14.6	490.9	77.9	102.9	451.5	255.9	202.5	206.7	179.4	0.18	82.50	80.52	87.12	0.18	82.51	81.03		87.75	0.06	0.08
51.0	249.0	9.2	0.7	14.7	491.																		

89.0	287.0	4,5	0,4	11,0	420,2	79,3	98,4	419,5	255,7	213,9	223,1	167,1	0,19	83,22	81,96	85,31	0,18	83,45	82,56	87,51	0,06	0,07
90.0	288.0	4,5	0,4	10,8	414,6	79,3	98,8	415,3	255,7	214,6	222,7	167,3	0,19	83,22	81,96	85,25	0,18	83,42	82,58	87,50	0,06	0,07
91.0	289.0	4,4	0,5	10,8	411,7	79,3	98,7	411,3	255,8	214,6	223,4	167,3	0,18	83,20	81,98	85,22	0,18	83,41	82,59	87,42	0,06	0,07
92.0	290.0	4,4	0,5	10,8	410,3	79,4	98,1	408,1	256,1	214,9	223,0	167,2	0,18	83,23	82,01	85,18	0,18	83,43	82,62	87,38	0,06	0,07
93.0	291.0	4,3	0,5	10,8	407,7	79,3	97,9	404,5	256,3	213,9	222,7	166,9	0,19	83,20	82,02	85,16	0,18	83,42	82,62	87,30	0,06	0,07
94.0	292.0	4,2	0,5	10,9	404,4	79,4	98,2	400,2	256,1	214,0	221,9	167,1	0,19	83,17	82,02	85,12	0,18	83,41	82,65	87,29	0,06	0,07
95.0	293.0	4,2	0,5	10,9	402,1	79,3	97,9	396,5	256,3	213,6	222,0	167,0	0,19	83,17	82,06	85,10	0,18	83,37	82,66	87,22	0,06	0,07
96.0	294.0	4,1	0,5	10,9	401,2	79,3	97,6	393,2	256,2	213,7	221,8	167,1	0,19	83,17	82,06	85,06	0,18	83,38	82,67	87,13	0,06	0,07
97.0	295.0	4,0	0,5	10,9	399,5	79,4	97,7	389,8	256,0	213,5	221,5	167,2	0,19	83,16	82,07	85,02	0,18	83,40	82,69	87,09	0,06	0,07
98.0	296.0	4,0	0,5	10,8	398,8	79,4	97,1	387,0	256,2	213,1	221,4	167,3	0,18	83,15	82,08	85,00	0,18	83,38	82,70	87,04	0,06	0,07
99.0	297.0	3,9	0,5	10,8	396,9	79,3	97,1	384,2	255,8	212,5	221,4	167,5	0,18	83,14	82,10	84,95	0,18	83,40	82,69	86,97	0,06	0,07
100.0	298.0	3,8	0,5	10,7	395,0	79,3	97,0	381,8	256,1	211,8	221,0	167,5	0,19	83,11	82,10	84,91	0,18	83,35	82,72	86,94	0,06	0,07
101.0	299.0	3,8	0,5	10,5	392,9	79,3	97,0	379,0	256,1	211,2	220,4	167,6	0,18	83,10	82,12	84,87	0,18	83,33	82,74	86,90	0,06	0,07
102.0	300.0	3,7	0,5	10,3	390,8	79,0	96,5	377,1	256,0	211,3	220,6	167,6	0,18	83,09	82,15	84,85	0,18	83,35	82,74	86,82	0,06	0,07
103.0	301.0	3,7	0,4	10,2	388,3	79,3	96,5	373,9	255,7	211,0	219,9	168,2	0,19	83,08	82,16	84,79	0,18	83,33	82,77	86,75	0,06	0,07
104.0	302.0	3,6	0,4	10,0	385,4	79,2	95,9	371,9	256,1	210,6	220,0	167,8	0,18	83,08	82,18	84,73	0,18	83,33	82,79	86,69	0,06	0,07
105.0	303.0	3,6	0,4	9,9	382,6	79,3	96,1	369,3	256,3	210,2	219,5	167,9	0,18	83,05	82,18	84,71	0,18	83,34	82,82	86,63	0,06	0,07
106.0	304.0	3,6	0,4	9,8	381,0	79,4	96,2	366,9	256,2	209,7	219,4	168,2	0,19	83,01	82,18	84,66	0,18	83,31	82,83	86,55	0,06	0,07
107.0	305.0	3,5	0,3	9,7	378,9	79,2	95,4	364,1	255,9	209,5	219,2	168,4	0,19	83,00	82,18	84,60	0,18	83,29	82,83	86,47	0,06	0,07
108.0	306.0	3,5	0,3	9,7	375,9	79,2	95,5	361,4	256,0	208,6	219,7	168,3	0,19	82,99	82,22	84,57	0,18	83,33	82,83	86,35	0,06	0,07
109.0	307.0	3,5	0,3	9,7	373,3	79,1	95,4	359,0	256,2	207,8	219,0	168,5	0,19	82,92	82,21	84,56	0,18	83,26	82,85	86,33	0,06	0,07
110.0	308.0	3,4	0,3	9,6	370,3	79,3	95,3	357,0	256,4	207,2	218,5	168,6	0,19	82,90	82,22	84,53	0,18	83,21	82,83	86,29	0,06	0,07
111.0	309.0	3,4	0,2	9,3	365,7	79,1	94,9	354,0	256,0	207,6	218,6	169,3	0,18	82,90	82,25	84,49	0,18	83,20	82,85	86,25	0,06	0,06
112.0	310.0	3,4	0,2	8,6	359,6	79,3	94,5	351,2	255,6	206,6	218,4	169,4	0,19	82,92	82,25	84,44	0,18	83,22	82,86	86,19	0,06	0,06
113.0	311.0	3,3	0,2	8,1	357,7	79,3	94,3	347,9	255,4	205,4	217,9	169,4	0,19	82,91	82,25	84,40	0,18	83,23	82,86	86,14	0,06	0,06
114.0	312.0	3,3	0,2	7,9	348,6	79,2	94,1	344,9	255,4	205,0	217,0	169,6	0,19	82,89	82,26	84,35	0,18	83,21	82,88	86,05	0,06	0,07
115.0	313.0	3,3	0,2	7,9	344,0	79,1	94,1	341,6	255,9	203,8	216,7	169,5	0,18	82,84	82,26	84,30	0,18	83,17	82,89	85,98	0,06	0,06
116.0	314.0	3,3	0,3	7,9	340,4	79,2	94,0	337,1	255,8	203,4	215,8	169,8	0,19	82,79	82,25	84,27	0,18	83,12	82,89	85,93	0,06	0,06
117.0	315.0	3,2	0,3	7,8	336,9	79,3	93,6	333,6	256,3	202,2	215,3	170,0	0,19	82,79	82,25	84,21	0,18	83,10	82,89	85,87	0,06	0,06
118.0	316.0	3,2	0,3	7,7	333,0	79,2	93,6	330,1	256,5	201,6	214,4	170,1	0,18	82,78	82,26	84,20	0,18	83,08	82,88	85,81	0,06	0,06
119.0	317.0	3,2	0,3	7,5	328,9	79,3	93,4	325,9	256,5	201,4	214,0	170,4	0,19	82,76	82,26	84,14	0,18	83,05	82,88	85,74	0,06	0,06
120.0	318.0	3,2	0,3	7,4	325,8	79,3	92,8	322,1	256,2	200,8	213,5	170,8	0,19	82,76	82,26	84,12	0,18	83,04	82,88	85,64	0,06	0,06
121.0	319.0	3,2	0,4	7,4	321,2	79,2	92,9	318,3	256,4	200,4	212,3	171,2	0,19	82,74	82,28	84,04	0,18	83,00	82,87	85,55	0,06	0,06
122.0	320.0	3,1	0,5	7,2	316,2	79,3	92,9	314,7	256,3	199,8	212,0	171,4	0,19	82,73	82,26	84,01	0,18	83,00	82,86	85,49	0,06	0,06
123.0	321.0	3,1	0,5	7,2	315,3	79,3	92,5	310,8	256,4	199,6	211,2	171,7	0,19	82,70	82,26	83,97	0,18	82,97	82,87	85,43	0,06	0,06
124.0	322.0	3,1	0,6	7,2	311,8	79,3	92,3	307,2	256,0	198,8	210,4	172,0	0,19	82,67	82,26	83,95	0,18	82,94	82,87	85,39	0,06	0,06
125.0	323.0	3,1	0,6	7,2	308,6	79,3	92,1	303,9	256,1	198,1	209,6	172,2	0,19	82,65	82,27	83,90	0,18	82,92	82,84	85,29	0,06	0,05
126.0	324.0	3,0	0,6	7,2	306,2	79,3	91,7	300,1	255,8	197,5	208,9	172,4	0,18	82,63	82,26	83,85	0,18	82,88	82,83	85,23	0,06	0,05
127.0	325.0	3,0	0,6	7,2	303,7	79,3	91,4	296,7	255,6	196,8	207,9	172,7	0,19	82,61	82,25	83,82	0,18	82,85	82,82	85,15	0,06	0,05
128.0	326.0	3,0	0,6	7,2	301,0	79,4	91,6	293,1	255,6	196,4	207,1	172,9	0,19	82,60	82,25	83,79	0,18	82,83	82,83	85,07	0,06	0,05
129.0	327.0	3,0	0,6	7,2	299,2	79,3	91,4	290,2	255,4	195,3	206,3	173,1	0,19	82,62	82,27	83,74	0,18	82,86	82,82	85,01	0,06	0,05
130.0	328.0	3,0	0,6	7,2	296,4	79,3	91,4	286,8	255,3	194,5	205,1	173,3	0,19	82,63	82,26	83,73	0,18	82,85	82,83	84,95	0,06	0,05
131.0	329.0	3,0	0,6	7,2	294,1	79,1	90,9	284,0	255,3	193,5	205,1	173,4	0,19	82,63	82,25	83,66	0,18	82,87	82,83	84,84	0,06	0,05
132.0	330.0	2,9	0,6	7,2	291,1	79,2	91,0	280,8	255,0	192,7	203,7	173,6	0,19	82,62	82,28	83,62	0,18	82,87	82,84	84,80	0,06	0,05
133.0	331.0	2,9	0,6	7,2	289,1	79,3	90,8	278,4	254,8	192,3	202,6	173,9	0,19	82,64	82,28	83,60	0,18	82,88	82,85	84,72	0,06	0,05
134.0	332.0	2,9	0,6	7,2	288,8	79,3	90,7	275,9	254,6	192,1	202,0	173,9	0,19	82,62	82,29	83,54	0,18	82,87	82,86	84,67	0,06	0,05
135.0	333.0	2,9	0,6	7,2	287,4	79,3	90,7	273,7	254,6	191,5	201,3	174,2	0,19	82,61	82,28	83,50	0,18	82,89	82,86	84,62	0,06	0,05
136.0	334.0	2,9	0,6	7,3	285,2	79,3	90,6	271,3	254,3	191,2	200,6	174,4	0,19	82,60	82,32	83,48	0,18	82,90	82,87	84,56	0,06	0,05
137.0	335.0	2,8	0,7	7,2	284,1	79,4	90,5	269,1	254,3	190,3	199,8	174,6	0,19	82,58	82,32	83,43	0,18	82,87	82,87	84,50	0,06	0,05
138.0	336.0	2,8	0,7	7,2	282,5	79,4	90,6	266,9	254,0	190,0	198,9	174,7	0,19	82,58	82,32	83,40	0,18	82,85	82,89	84,46	0,06	0,05
139.0	337.0	2,8	0,6	7,2	281,3	79,4	90,1	264,7	253,6	189,4	198,3	174,9	0,19	82,57	82,32	83,33	0,18	82,85	82,88	84,41	0,06	0,05
140.0	338.0	2,8	0,7	7,2	279,3	79,4	90,4	262,9	253,6	189,0	197,5	175,1	0,19	82,58	82,34	83,32	0,18	82,84	82,88	84,31	0,06	0,05
141.0	339.0	2,8	0,7	7,2	278,1	79,4	90,2	261,0	253,2	188,4	197,0	175,2	0,19	82,54	82,33	83,26	0,18	82,82	82,89	84,29	0,06	0,05
142.0	340.0	2,8	0,7	7,2	276,6	79,4	90,2	259,2	253,2	187,8	196,5	175,3	0,19	82,56	82,34	83,26	0,18	82,81	82,88	84,24	0,06	0,05
143.0	341.0	2,7	0,7	7,2	275,5	79,5	90,3	257,6	252,7	187,4	195,4	175,4	0,18	82,57	82,33	83,24	0,18	82,81	82,87	84,21	0,06	0,05
144.0																						



182.0	380.0	2,1	0,9	6,2	238,3	79,2	88,1	215,8	241,0	169,5	176,4	172,7	0,19	82,44	82,54	82,27	0,18	82,80	83,10	83,08	0,06	0,04
183.0	381.0	2,1	0,9	6,2	237,9	79,4	88,2	215,2	240,6	169,3	176,2	172,6	0,19	82,45	82,53	82,24	0,18	82,81	83,11	83,06	0,06	0,04
184.0	382.0	2,1	0,9	6,2	236,6	79,4	88,1	214,6	240,3	168,9	175,7	172,6	0,19	82,41	82,53	82,24	0,18	82,77	83,13	83,03	0,07	0,04
185.0	383.0	2,1	0,9	6,2	236,9	79,5	88,1	214,0	240,1	168,9	175,0	172,7	0,19	82,37	82,52	82,22	0,18	82,75	83,10	83,04	0,06	0,04
186.0	384.0	2,1	0,9	6,2	235,7	79,3	88,0	213,6	239,7	168,4	175,0	172,7	0,19	82,43	82,54	82,21	0,18	82,76	83,11	83,02	0,06	0,04
187.0	385.0	2,1	0,9	6,2	236,0	79,4	88,1	212,9	239,5	168,1	174,9	172,2	0,19	82,36	82,51	82,19	0,18	82,71	83,09	82,99	0,06	0,04
188.0	386.0	2,0	0,9	6,2	235,2	79,4	88,1	212,4	239,1	167,6	174,5	172,0	0,19	82,34	82,50	82,18	0,18	82,72	83,10	82,99	0,06	0,04
189.0	387.0	2,0	0,9	6,2	235,0	79,4	87,7	211,7	238,9	167,3	174,2	171,8	0,19	82,36	82,52	82,17	0,18	82,70	83,07	82,95	0,07	0,04
190.0	388.0	2,0	0,9	6,2	235,0	79,3	88,1	211,5	238,3	167,1	174,0	171,5	0,19	82,42	82,52	82,14	0,18	82,73	83,07	82,93	0,07	0,04
191.0	389.0	2,0	0,9	6,2	234,9	79,5	87,8	211,2	238,1	166,5	173,5	171,0	0,19	82,46	82,55	82,12	0,18	82,76	83,09	82,93	0,06	0,04
192.0	390.0	2,0	0,9	6,1	234,6	79,3	88,1	210,3	237,6	166,2	173,1	170,9	0,19	82,46	82,55	82,12	0,18	82,78	83,09	82,94	0,06	0,04
193.0	391.0	2,0	0,9	6,1	234,5	79,3	87,9	209,8	237,4	166,0	173,0	170,8	0,19	82,49	82,54	82,13	0,18	82,78	83,11	82,92	0,06	0,04
194.0	392.0	2,0	0,9	6,1	234,1	79,4	88,2	209,2	237,3	165,6	172,1	170,3	0,19	82,45	82,55	82,09	0,18	82,78	83,10	82,93	0,06	0,04
195.0	393.0	1,9	0,9	6,1	233,7	79,4	88,1	208,8	236,9	165,2	171,7	170,4	0,19	82,44	82,55	82,07	0,18	82,78	83,11	82,91	0,06	0,04
196.0	394.0	1,9	0,8	6,0	233,4	79,5	87,7	208,5	236,6	165,0	171,0	170,2	0,19	82,40	82,54	82,05	0,18	82,77	83,10	82,88	0,07	0,04
197.0	395.0	1,9	0,8	6,0	233,1	79,2	87,8	208,0	236,3	164,8	170,9	169,9	0,19	82,41	82,53	82,04	0,18	82,76	83,10	82,84	0,07	0,04
198.0	396.0	1,9	0,8	6,1	232,9	79,1	87,9	207,7	236,2	164,7	170,7	169,5	0,19	82,40	82,54	82,00	0,18	82,76	83,08	82,85	0,06	0,04
199.0	397.0	1,9	0,8	6,0	232,3	79,2	87,8	207,5	236,2	164,1	170,7	169,1	0,19	82,40	82,52	81,99	0,18	82,77	83,11	82,81	0,07	0,04
200.0	398.0	1,9	0,8	6,0	231,6	79,3	87,8	207,0	236,0	163,9	170,3	168,8	0,19	82,37	82,54	81,99	0,18	82,71	83,09	82,82	0,07	0,04
201.0	399.0	1,9	0,8	6,0	231,3	79,4	88,0	206,5	235,9	163,8	169,7	168,5	0,19	82,32	82,53	81,97	0,18	82,69	83,09	82,78	0,06	0,04
202.0	400.0	1,8	0,8	6,0	231,0	79,4	87,8	205,9	235,7	163,5	169,2	168,3	0,19	82,32	82,53	81,96	0,18	82,67	83,07	82,78	0,06	0,04
203.0	401.0	1,9	0,8	6,0	231,2	79,4	87,7	205,8	235,2	163,4	169,0	168,3	0,19	82,32	82,51	81,95	0,18	82,67	83,06	82,77	0,06	0,04
204.0	402.0	1,8	0,8	6,0	230,9	79,3	87,5	205,2	234,8	163,0	168,6	168,0	0,19	82,39	82,52	81,93	0,18	82,68	83,05	82,73	0,07	0,04
205.0	403.0	1,8	0,9	6,0	230,5	79,2	87,4	205,0	234,3	163,1	168,5	168,0	0,19	82,42	82,53	81,93	0,18	82,74	83,10	82,72	0,07	0,04
206.0	404.0	1,8	0,9	6,0	230,6	79,4	87,7	204,8	233,9	162,9	168,1	167,7	0,19	82,47	82,55	81,93	0,18	82,71	83,08	82,71	0,06	0,04
207.0	405.0	1,8	0,9	6,0	230,7	79,4	87,7	204,4	233,9	162,4	167,7	167,3	0,19	82,41	82,53	81,89	0,18	82,74	83,09	82,69	0,06	0,04
208.0	406.0	1,8	0,9	6,0	230,2	79,2	87,8	203,8	233,6	162,2	167,3	167,1	0,19	82,42	82,55	81,90	0,18	82,75	83,09	82,70	0,06	0,04
209.0	407.0	1,7	0,9	6,0	229,8	79,3	87,6	203,7	233,6	162,1	167,3	166,7	0,19	82,40	82,52	81,89	0,18	82,73	83,10	82,67	0,06	0,04
210.0	408.0	1,7	0,9	6,1	229,1	79,3	87,7	203,3	233,6	161,5	167,4	166,3	0,19	82,38	82,53	81,88	0,18	82,69	83,07	82,68	0,06	0,04
211.0	409.0	1,7	0,9	6,0	229,1	79,9	87,5	202,5	233,5	161,4	166,7	166,6	0,19	82,35	82,52	81,88	0,18	82,69	83,10	82,65	0,06	0,04
212.0	410.0	1,7	0,9	6,0	228,9	79,5	87,6	202,2	233,0	161,2	166,4	166,3	0,19	82,31	82,52	81,85	0,18	82,66	83,07	82,63	0,06	0,04
213.0	411.0	1,7	0,9	6,0	228,7	79,5	87,5	201,9	232,7	160,9	165,9	165,9	0,19	82,30	82,52	81,84	0,18	82,65	83,06	82,62	0,07	0,04
214.0	412.0	1,6	0,9	6,0	228,2	79,4	87,6	201,6	232,5	160,6	165,6	165,7	0,19	82,29	82,52	81,84	0,18	82,64	83,07	82,62	0,06	0,04
215.0	413.0	1,7	0,9	6,0	228,2	79,5	87,5	201,4	232,1	160,5	165,3	165,5	0,19	82,29	82,50	81,82	0,18	82,64	83,05	82,62	0,07	0,04
216.0	414.0	1,7	0,9	6,0	227,9	79,3	87,6	201,0	231,9	160,4	165,1	165,5	0,19	82,31	82,51	81,82	0,18	82,64	83,07	82,61	0,06	0,04
217.0	415.0	1,6	0,9	6,0	227,2	79,5	87,6	200,7	231,9	160,2	164,8	165,1	0,19	82,34	82,51	81,80	0,18	82,63	83,06	82,59	0,07	0,04
218.0	416.0	1,6	0,9	6,0	227,6	79,4	87,4	200,5	231,7	159,9	164,7	164,9	0,19	82,32	82,49	81,80	0,18	82,62	83,05	82,57	0,06	0,04
219.0	417.0	1,6	0,9	6,0	227,4	79,3	87,5	200,3	231,5	159,9	164,3	164,8	0,19	82,33	82,50	81,80	0,18	82,62	83,05	82,55	0,07	0,04
220.0	418.0	1,6	0,9	6,0	227,2	79,4	87,3	200,3	231,6	159,5	164,3	164,5	0,19	82,31	82,50	81,81	0,18	82,63	83,03	82,55	0,07	0,04
221.0	419.0	1,6	0,9	6,0	227,1	79,3	87,6	200,1	231,2	159,0	164,2	164,2	0,19	82,30	82,51	81,77	0,18	82,62	83,05	82,54	0,06	0,04
222.0	420.0	1,5	0,9	6,0	226,7	79,6	87,5	199,4	230,5	159,2	164,0	164,6	0,19	82,27	82,52	81,78	0,18	82,60	83,03	82,56	0,06	0,04
223.0	421.0	1,6	0,9	6,0	226,8	79,4	87,1	199,3	230,7	159,0	164,4	164,1	0,19	82,27	82,50	81,74	0,18	82,59	83,03	82,53	0,07	0,04
224.0	422.0	1,5	0,9	6,0	226,6	79,5	87,6	198,8	230,5	158,6	163,5	163,7	0,19	82,25	82,50	81,73	0,18	82,61	83,01	82,54	0,07	0,04
225.0	423.0	1,5	0,9	6,0	226,3	79,5	87,6	198,5	230,1	158,6	163,0	163,6	0,19	82,30	82,51	81,75	0,18	82,60	83,04	82,54	0,06	0,04
226.0	424.0	1,5	0,9	6,0	226,4	79,4	87,6	198,2	229,1	158,0	162,8	162,5	0,19	82,34	82,50	81,72	0,18	82,63	83,03	82,52	0,06	0,04
227.0	425.0	1,5	0,9	6,0	225,8	79,5	87,6	197,9	229,5	158,1	162,7	163,5	0,19	82,39	82,50	81,70	0,18	82,66	83,05	82,51	0,06	0,04
228.0	426.0	1,5	0,9	6,0	225,6	79,4	87,6	197,9	229,4	157,9	162,4	163,4	0,19	82,45	82,53	81,72	0,18	82,70	83,05	82,52	0,06	0,04
229.0	427.0	1,5	0,9	6,0	225,8	79,4	87,3	197,4	229,2	158,1	162,1	163,3	0,19	82,49	82,55	81,70	0,18	82,70	83,06	82,50	0,06	0,04
230.0	428.0	1,5	0,9	6,0	225,0	79,4	87,2	197,2	228,8	157,9	162,1	163,3	0,19	82,46	82,53	81,70	0,18	82,70	83,07	82,49	0,06	0,04
231.0	429.0	1,4	0,9	6,1	225,4	79,5	87,4	197,2	229,0	157,7	162,3	162,9	0,19	82,42	82,53	81,71	0,18	82,67	83,06	82,47	0,06	0,04
232.0	430.0	1,4	1,0	6,1	225,4	79,7	87,2	197,2	228,4	157,6	162,3	163,2	0,19	82,38	82,53	81,69	0,18	82,68	83,06	82,48	0,06	0,04
233.0	431.0	1,4	1,0	6,1	225,2	79,5	87,5	197,0	227,9	157,4	162,2	163,1	0,19	82,35	82,51	81,70	0,18	82,67	83,06	82,48	0,06	0,04
234.0	432.0	1,4	1,0	6,2	225,5	79,6	87,6	197,2	228,0	157,3	162,0	163,0	0,19	82,38	82,54	81,70	0,18	82,67	83,06	82,47	0,07	0,04
235.0	433.0	1,4	1,0	6,1	225,0	79,5	87,6	196,8	227,7	157,3	162,1	162,8	0,19	82,38	82,54	81,73	0,18	82,69	83,07	82,49	0,06	0,04
236.0	434.0	1,4	1,0	6,1	225,2	79,5	87,3	197,0	227,3	157,4	161,8	162,7	0,19	82,40	82,56	81,68	0,18	82,69				

275.0	473.0	0,8	1,0	6,0	225,1	79,8	88,0	195,3	224,0	152,9	162,6	159,9	0,19	82,56	82,63	81,76	0,18	82,80	83,12	82,61	0,07	0,04
276,0	474,0	0,8	1,0	6,0	225,2	79,7	87,8	195,3	224,0	152,6	162,5	159,8	0,19	82,61	82,64	81,78	0,18	82,84	83,11	82,64	0,06	0,04
277,0	475,0	0,8	1,0	6,0	224,9	79,8	87,8	195,1	223,9	152,7	162,5	159,8	0,19	82,66	82,66	81,79	0,18	82,85	83,12	82,61	0,06	0,04
278,0	476,0	0,8	1,0	6,0	225,2	79,8	87,8	195,2	223,9	152,7	162,6	159,7	0,19	82,68	82,64	81,79	0,18	82,87	83,12	82,63	0,07	0,04
279,0	477,0	0,8	1,0	6,0	225,3	79,8	87,9	195,3	223,8	152,5	162,6	159,6	0,19	82,65	82,66	81,79	0,18	82,88	83,13	82,62	0,06	0,04
280,0	478,0	0,8	1,0	6,0	225,1	79,8	87,8	195,3	223,9	152,4	162,6	159,5	0,19	82,67	82,66	81,79	0,18	82,90	83,13	82,62	0,06	0,04
281,0	479,0	0,7	1,0	6,0	225,5	79,8	87,9	195,1	223,7	152,3	162,6	159,5	0,19	82,70	82,68	81,82	0,18	82,90	83,14	82,65	0,06	0,04
282,0	480,0	0,8	1,0	6,0	225,5	79,8	87,9	195,1	223,8	152,1	162,5	159,4	0,19	82,75	82,68	81,80	0,18	82,92	83,16	82,65	0,06	0,04
283,0	481,0	0,7	1,0	6,0	225,6	79,9	88,0	195,1	223,9	152,1	162,4	159,4	0,19	82,74	82,69	81,82	0,18	82,93	83,17	82,67	0,07	0,04
284,0	482,0	0,7	1,0	6,0	225,9	79,8	88,0	195,0	223,6	152,1	162,5	159,4	0,19	82,76	82,71	81,82	0,18	82,95	83,18	82,67	0,07	0,04
285,0	483,0	0,7	1,0	6,0	226,2	79,8	88,1	195,2	223,9	151,9	162,4	159,3	0,19	82,74	82,69	81,83	0,18	82,95	83,18	82,68	0,06	0,04
286,0	484,0	0,7	1,0	6,0	225,8	79,9	88,1	195,1	223,9	151,9	162,3	159,2	0,19	82,75	82,71	81,84	0,18	82,96	83,20	82,69	0,06	0,04
287,0	485,0	0,7	1,0	6,0	226,2	79,8	87,8	195,1	224,1	151,5	162,1	159,3	0,19	82,69	82,69	81,82	0,18	82,94	83,18	82,64	0,07	0,04
288,0	486,0	0,6	1,0	6,0	226,0	79,8	87,6	195,0	224,0	151,3	161,9	159,1	0,19	82,62	82,70	81,84	0,18	82,90	83,18	82,67	0,06	0,04
289,0	487,0	0,6	1,0	6,0	226,3	79,8	87,7	195,3	224,2	151,2	162,4	159,0	0,19	82,59	82,71	81,83	0,18	82,89	83,16	82,67	0,07	0,04
290,0	488,0	0,6	1,0	6,0	225,8	80,0	87,9	195,1	224,5	150,7	162,2	158,8	0,19	82,54	82,71	81,85	0,18	82,85	83,17	82,68	0,06	0,04
291,0	489,0	0,6	1,0	6,0	226,1	79,9	87,9	194,9	224,3	150,8	162,2	158,7	0,19	82,53	82,71	81,84	0,18	82,84	83,17	82,68	0,07	0,04
292,0	490,0	0,6	1,0	5,9	225,7	79,9	87,7	195,1	224,3	150,7	162,3	158,7	0,19	82,50	82,70	81,83	0,18	82,83	83,17	82,71	0,07	0,04
293,0	491,0	0,6	1,0	5,9	225,7	79,8	87,9	195,1	224,5	150,6	162,3	158,6	0,19	82,51	82,70	81,87	0,18	82,81	83,18	82,69	0,06	0,04
294,0	492,0	0,5	1,0	5,9	225,5	79,8	87,8	195,1	224,5	150,3	162,3	158,5	0,19	82,49	82,71	81,86	0,18	82,81	83,18	82,72	0,07	0,04
295,0	493,0	0,5	1,0	5,9	225,5	79,8	87,6	194,9	224,5	150,0	162,0	158,4	0,19	82,45	82,70	81,88	0,18	82,78	83,19	82,69	0,06	0,04
296,0	494,0	0,5	1,0	5,9	225,5	79,5	87,3	194,6	225,0	149,8	161,7	158,1	0,19	82,41	82,69	81,88	0,18	82,77	83,18	82,69	0,07	0,04
297,0	495,0	0,5	1,0	5,9	225,5	79,4	87,3	194,7	225,4	149,3	161,4	157,6	0,19	82,41	82,69	81,85	0,18	82,76	83,17	82,68	0,07	0,04
298,0	496,0	0,5	1,0	5,9	225,6	79,4	87,4	194,5	225,1	149,3	161,2	157,9	0,19	82,44	82,70	81,85	0,18	82,79	83,18	82,68	0,06	0,04
299,0	497,0	0,5	1,0	5,9	225,7	79,5	87,4	194,5	224,9	149,4	161,3	157,8	0,19	82,42	82,70	81,83	0,18	82,76	83,18	82,66	0,06	0,04
300,0	498,0	0,5	1,0	5,9	226,1	79,5	87,4	194,3	224,7	149,5	161,5	157,9	0,19	82,47	82,70	81,87	0,18	82,79	83,19	82,63	0,06	0,04
301,0	499,0	0,4	1,0	5,9	225,6	79,6	87,6	194,4	224,9	149,4	161,2	157,9	0,19	82,50	82,69	81,85	0,18	82,78	83,19	82,66	0,06	0,04
302,0	500,0	0,4	1,0	5,9	226,0	79,6	87,5	194,5	224,7	149,3	161,1	157,8	0,19	82,50	82,71	81,86	0,18	82,80	83,20	82,65	0,07	0,04
303,0	501,0	0,4	1,0	5,9	225,7	79,7	87,8	194,4	225,0	149,1	161,0	157,7	0,19	82,54	82,72	81,85	0,18	82,80	83,22	82,67	0,06	0,04
304,0	502,0	0,4	1,0	5,9	225,7	79,5	87,4	194,2	224,8	149,1	160,5	157,7	0,19	82,56	82,70	81,86	0,18	82,81	83,21	82,66	0,07	0,04
305,0	503,0	0,4	1,0	5,8	225,9	79,7	87,3	193,9	225,1	148,7	160,4	157,4	0,19	82,46	82,72	81,87	0,18	82,80	83,20	82,65	0,07	0,04
306,0	504,0	0,4	1,0	5,8	225,9	79,6	87,5	193,6	225,3	148,5	160,2	157,3	0,19	82,45	82,71	81,82	0,18	82,79	83,21	82,64	0,07	0,04
307,0	505,0	0,4	1,0	5,8	225,9	79,8	87,6	193,5	225,0	148,4	160,4	157,3	0,19	82,46	82,68	81,82	0,18	82,74	83,18	82,64	0,06	0,04
308,0	506,0	0,4	1,0	5,8	225,9	79,6	87,7	193,6	225,0	148,4	160,1	157,4	0,19	82,50	82,70	81,83	0,18	82,76	83,20	82,64	0,07	0,04
309,0	507,0	0,4	1,0	5,8	226,2	79,8	87,7	193,6	224,5	148,5	160,2	157,9	0,19	82,51	82,69	81,85	0,18	82,79	83,21	82,66	0,06	0,04
310,0	508,0	0,3	1,0	5,8	226,1	79,7	87,7	193,5	224,8	148,5	160,2	157,7	0,19	82,53	82,70	81,85	0,18	82,79	83,19	82,66	0,07	0,04
311,0	509,0	0,4	1,0	5,8	225,7	79,8	87,7	193,1	224,6	148,5	160,5	157,7	0,19	82,55	82,68	81,83	0,18	82,79	83,19	82,69	0,07	0,04
312,0	510,0	0,3	1,0	5,8	225,8	79,9	87,8	193,1	224,6	148,3	160,2	157,6	0,19	82,53	82,68	81,85	0,18	82,79	83,18	82,67	0,06	0,04
313,0	511,0	0,3	1,0	5,8	225,8	79,9	87,7	193,0	224,3	148,2	160,3	157,7	0,19	82,49	82,65	81,87	0,18	82,77	83,16	82,70	0,07	0,04
314,0	512,0	0,3	0,9	5,7	225,5	79,4	87,3	193,1	224,6	147,7	160,2	157,0	0,19	82,46	82,67	81,87	0,18	82,76	83,16	82,68	0,07	0,04
315,0	513,0	0,3	1,0	5,7	225,2	79,3	87,1	193,3	225,2	147,4	160,4	156,4	0,19	82,40	82,66	81,82	0,18	82,74	83,16	82,67	0,07	0,04
316,0	514,0	0,3	0,9	5,6	225,2	79,2	87,4	193,0	225,0	147,2	160,0	156,9	0,19	82,36	82,66	81,80	0,18	82,73	83,16	82,64	0,06	0,04
317,0	515,0	0,2	0,9	5,7	225,0	79,9	87,5	192,4	225,2	147,1	159,6	156,5	0,19	82,30	82,66	81,79	0,18	82,67	83,16	82,62	0,06	0,04
318,0	516,0	0,2	0,9	5,7	224,8	79,3	87,0	192,7	225,2	147,0	159,6	157,3	0,19	82,28	82,66	81,79	0,18	82,67	83,16	82,60	0,07	0,04
319,0	517,0	0,2	0,9	5,6	224,8	79,2	86,9	192,5	225,4	146,5	159,9	156,3	0,19	82,28	82,67	81,74	0,18	82,65	83,14	82,59	0,06	0,04
320,0	518,0	0,2	0,9	5,6	223,9	79,5	87,0	192,2	225,9	146,0	159,8	155,8	0,19	82,22	82,66	81,75	0,18	82,63	83,15	82,54	0,06	0,04
321,0	519,0	0,2	0,9	5,6	223,8	79,3	87,1	191,8	226,0	145,5	160,1	155,6	0,19	82,13	82,62	81,74	0,18	82,56	83,14	82,57	0,07	0,04
322,0	520,0	0,2	0,9	5,4	223,0	79,4	87,2	191,9	226,2	145,4	159,7	155,4	0,19	82,07	82,62	81,73	0,18	82,54	83,12	82,57	0,06	0,04
323,0	521,0	0,2	1,1	5,1	222,3	79,4	87,1	191,5	226,0	145,4	159,3	155,5	0,19	82,10	82,64	81,73	0,18	82,57	83,15	82,57	0,06	0,04
324,0	522,0	0,2	1,2	5,0	222,3	80,3	87,1	191,5	225,9	145,5	159,0	155,6	0,19	82,10	82,60	81,74	0,18	82,53	83,13	82,58	0,07	0,04
325,0	523,0	0,2	1,1	5,0	221,3	79,8	87,2	191,3	226,2	145,6	158,8	155,7	0,19	82,08	82,61	81,74	0,18	82,50	83,14	82,59	0,07	0,04
326,0	524,0	0,1	1,1	5,0	220,6	79,8	87,3	191,1	226,2	145,2	158,9	155,1	0,19	82,09	82,61	81,74	0,18	82,50	83,16	82,58	0,07	0,04
327,0	525,0	0,1	1,1	5,0	220,3	79,6	87,2	190,7	226,1	145,3	158,8	155,4	0,19	82,11	82,60	81,75	0,18	82,50	83,13	82,59	0,06	0,04
328,0	526,0	0,1	1,0	5,0	219,8	80,1	87,2	190,5	225,6	145,8	158,9	156,3	0,19	82,13	82,58	81,72	0,18	82,51	83,13	82,60	0,07	0,04
329,0	527,0	0,1	1,0	5,0	219,2	79,9	87,1	190,1	225,4	146,0	158,4	156,3	0,19	82,15	82,59	81,73	0,18	82,52	83,11	82,60	0,06	0,04
330,0	528,0																					

Manufacturer: SPARTHERM  
 Model: 700

Run: 2  
 Project #: PI 20196  
 Test Duration: 337 min

	HHV	LHV
Eff	69,76%	75,06%
Comb Eff	93,62%	93,62%
HT Eff	74,51%	80,17%
Output	16 981	kJ/h
Burn Rate	1,20	kg/h
Grams CO	618	g
Input	24 342	kJ/h
MC wet	19,74	

Note: In the "Input data", "Calc. % O<sub>2</sub>", "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<sub>2</sub>  
 CO<sub>2-ut</sub> 19,86  
 F<sub>o</sub>  
 1,050

	Air Fuel Ratio (A/F)	
Overall Heating Efficiency:	69,76%	Dry Molecular Weight (M <sub>d</sub> ) 29,82
Combustion Efficiency:	93,62%	Dry Moles Exhaust Gas (N <sub>g</sub> ): 395,60
Heat Transfer Efficiency:	74,51%	Air Fuel Ratio (A/F) 11,29

Heat Output:	16 108 Btu/h	16 981 kJ/h
Heat Input:	23 091 Btu/h	24 342 kJ/h
Burn Duration:	5,62 h	
Burn Rate:	2,66 lb/h	1,205 kg/h
Stack Temp:	327,3 Deg. F	164,0 Deg. C

## APPENDIX 2: Proportionality results

Average	Average	Average	Proportional	Highfire				Average
17,13	Inlet +	Inlet +						0,250
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	94,61	94,75	System 1	System 2		SQRT
Velocity	Meter 1	Meter 2	<b>Proportional Rates</b>		Vol.Std.	Vol.Std.		Delta-P
			<b>PR1</b>	<b>PR2</b>			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	(in H2O)2
17,182	535,3	535,5			0,078	0,049	0	0,2602589
16,895	535,4	535,5	90,97	90,88	0,131	0,112	1	0,2540748
17,013	535,6	535,6	91,04	91,32	0,184	0,176	2	0,2546787
17,199	535,7	535,7	91,51	91,64	0,184	0,176	3	0,255624
16,970	535,8	535,8	95,17	95,20	0,185	0,176	4	0,2491722
16,737	535,9	535,8	97,82	98,05	0,184	0,176	5	0,2437684
16,775	536,0	536,0	98,08	98,46	0,184	0,177	6	0,2437702
16,837	536,2	536,2	97,69	97,92	0,184	0,176	7	0,244543
16,871	536,4	536,3	97,37	97,65	0,184	0,176	8	0,2452359
16,860	536,5	536,5	97,26	97,30	0,184	0,176	9	0,2452395
16,796	536,7	536,6	97,62	97,69	0,184	0,176	10	0,2444012
16,929	536,8	536,8	97,00	97,32	0,184	0,176	11	0,2460519
17,285	537,0	536,9	95,22	95,61	0,184	0,176	12	0,2508241
16,855	537,1	537,1	97,79	98,19	0,184	0,176	13	0,2444038
16,908	537,3	537,2	97,43	97,71	0,184	0,176	14	0,2452459
17,205	537,4	537,4	96,01	96,10	0,184	0,176	15	0,249184
17,227	537,6	537,6	95,60	95,86	0,184	0,176	16	0,249799
17,315	537,8	537,7	99,56	99,84	0,184	0,176	17	0,2453633
17,107	537,9	537,9	95,70	95,84	0,184	0,176	18	0,2487707
16,917	538,0	538,0	95,76	95,90	0,184	0,176	19	0,2473238
17,273	538,1	538,1	93,47	93,78	0,183	0,176	20	0,2526581
17,032	538,2	538,2	95,54	95,60	0,183	0,175	21	0,2483611
16,997	538,3	538,4	96,36	96,68	0,183	0,176	22	0,2469086
17,032	538,4	538,5	96,00	96,06	0,183	0,176	23	0,2477409
16,906	538,5	538,6	96,67	96,91	0,183	0,175	24	0,2458689
16,906	538,6	538,7	97,09	97,04	0,184	0,175	25	0,2455824
16,803	538,8	538,8	97,73	97,88	0,184	0,175	26	0,2437735
17,126	538,9	539,0	95,95	96,30	0,183	0,175	27	0,2483151
17,232	539,0	539,1	95,48	95,84	0,183	0,176	28	0,249802
17,170	539,1	539,2	95,96	96,05	0,183	0,176	29	0,2487797
16,985	539,2	539,4	97,08	97,23	0,183	0,175	30	0,2458698
16,882	539,4	539,5	97,60	97,79	0,183	0,175	31	0,2444057
16,889	539,5	539,6	97,75	97,64	0,183	0,175	32	0,2444056
17,281	539,7	539,8	95,37	95,43	0,183	0,175	33	0,2502152
17,446	539,8	539,9	94,42	94,31	0,183	0,175	34	0,2526613
17,169	540,0	540,1	95,87	96,31	0,183	0,175	35	0,2485783
17,295	540,1	540,2	95,24	95,55	0,183	0,175	36	0,2502158
17,349	540,2	540,3	95,17	95,33	0,183	0,175	37	0,2508279
17,388	540,4	540,5	95,02	95,28	0,183	0,175	38	0,2512377
17,034	540,5	540,6	97,10	96,93	0,183	0,175	39	0,2458719
17,041	540,6	540,7	97,28	97,36	0,183	0,175	40	0,245872
17,238	540,8	540,9	95,99	96,19	0,183	0,175	41	0,2487756
17,434	540,9	541,0	94,89	94,90	0,183	0,175	42	0,2515838
17,023	541,0	541,1	96,92	97,18	0,183	0,175	43	0,2458998
17,262	541,1	541,2	95,79	96,09	0,183	0,175	44	0,2491894
17,132	541,2	541,4	96,24	96,49	0,183	0,175	45	0,2473284
17,536	541,3	541,5	94,17	94,43	0,183	0,175	46	0,2532525
17,129	541,5	541,6	96,45	96,43	0,183	0,175	47	0,2473305
17,328	541,6	541,7	95,37	95,39	0,183	0,175	48	0,2502412
17,040	541,7	541,8	96,91	97,32	0,183	0,175	49	0,2458565
17,297	541,8	541,9	96,02	95,98	0,183	0,175	50	0,2491894
17,355	541,9	542,1	95,42	95,55	0,183	0,175	51	0,2502183
17,353	542,1	542,2	95,46	95,56	0,183	0,175	52	0,2502182
17,434	542,2	542,3	94,75	94,89	0,183	0,175	53	0,2516474

17,062	542,3	542,5	96,88	96,97	0,183	0,175	54	0,2462902
17,293	542,4	542,5	95,22	95,41	0,182	0,175	55	0,2498089
17,479	542,4	542,6	94,34	94,23	0,183	0,174	56	0,2526609
17,116	542,5	542,7	96,30	96,38	0,183	0,174	57	0,247332
17,237	542,5	542,7	95,61	95,74	0,183	0,175	58	0,2490868
17,524	542,5	542,8	94,12	94,05	0,183	0,174	59	0,253275
17,003	542,5	542,8	96,74	97,00	0,183	0,175	60	0,2458748
17,366	542,5	542,8	94,76	94,97	0,183	0,175	61	0,2512443
17,345	542,5	542,8	94,54	94,47	0,183	0,175	62	0,2512438
17,164	542,5	542,8	95,37	95,60	0,183	0,174	63	0,2487812
16,977	542,5	542,8	96,43	96,60	0,183	0,175	64	0,2462942
17,053	542,5	542,8	96,04	96,27	0,183	0,175	65	0,2473335
16,837	542,5	542,8	97,20	97,32	0,183	0,175	66	0,2444114
17,063	542,5	542,8	95,71	95,91	0,183	0,175	67	0,2477481
17,129	542,5	542,8	95,11	95,26	0,182	0,175	68	0,2487809
17,106	542,5	542,8	95,08	95,41	0,182	0,175	69	0,2486418
17,036	542,5	542,9	95,69	95,60	0,183	0,175	70	0,2477462
17,005	542,5	542,9	95,72	95,94	0,183	0,175	71	0,2473248
17,096	542,5	542,9	95,04	95,04	0,183	0,175	72	0,2487713
17,260	542,5	542,9	94,15	94,29	0,183	0,174	73	0,2512454
17,279	542,5	542,9	93,92	94,11	0,183	0,175	74	0,2516527
17,102	542,5	542,9	94,75	94,90	0,182	0,175	75	0,2490846
17,203	542,5	542,9	94,07	94,20	0,182	0,174	76	0,2508205
16,960	542,5	542,9	95,45	95,45	0,183	0,174	77	0,2473361
17,233	542,5	542,9	93,94	94,01	0,183	0,174	78	0,2512545
17,249	542,5	542,9	93,61	93,78	0,182	0,175	79	0,2517128
17,075	542,5	542,9	94,64	94,73	0,183	0,175	80	0,2491964
17,509	542,5	542,9	92,25	92,46	0,183	0,175	81	0,2554982
17,025	542,5	542,9	94,89	95,22	0,183	0,175	82	0,2485261
17,205	542,5	542,9	93,88	93,79	0,183	0,175	83	0,2512472
17,348	542,5	542,9	92,85	93,48	0,182	0,175	84	0,253279
17,027	542,5	542,9	94,57	94,59	0,182	0,175	85	0,2487838
17,225	542,5	542,9	93,74	93,70	0,183	0,174	86	0,251655
17,208	542,5	542,9	93,49	93,60	0,183	0,175	87	0,2516574
17,204	542,5	542,9	93,60	93,89	0,183	0,175	88	0,2515819
17,177	542,5	542,9	93,74	93,66	0,183	0,175	89	0,2512469
16,996	542,4	542,9	94,49	94,43	0,183	0,174	90	0,2487844
17,190	542,4	542,9	93,41	93,65	0,183	0,175	91	0,2516565
17,308	542,4	542,9	92,80	92,70	0,183	0,174	92	0,2533526
17,319	542,4	542,9	92,73	92,83	0,183	0,174	93	0,253686
17,159	542,4	542,8	93,65	93,61	0,183	0,175	94	0,2514036
17,183	542,4	542,8	93,47	93,34	0,183	0,175	95	0,2517881
17,082	542,4	542,8	94,02	94,32	0,183	0,175	96	0,2502247
17,288	542,4	542,8	92,87	92,69	0,183	0,175	97	0,2532826
17,170	542,4	542,8	93,47	93,63	0,183	0,175	98	0,2515723
17,165	542,4	542,8	93,32	93,53	0,183	0,175	99	0,2516572
17,072	542,4	542,8	93,89	93,78	0,183	0,175	100	0,2503186
16,875	542,4	542,8	94,91	95,04	0,183	0,175	101	0,2474664
16,995	542,4	542,8	94,12	94,41	0,183	0,175	102	0,249197
17,059	542,4	542,8	93,72	94,18	0,183	0,175	103	0,250293
17,125	542,4	542,8	93,48	93,53	0,183	0,175	104	0,2512475
17,095	542,4	542,8	93,67	93,57	0,183	0,175	105	0,2508392
17,255	542,4	542,8	92,80	92,85	0,183	0,175	106	0,2531787
17,360	542,3	542,8	92,08	92,24	0,183	0,175	107	0,2546951
17,150	542,4	542,8	93,34	93,33	0,183	0,175	108	0,2516563
17,042	542,3	542,8	93,69	93,85	0,183	0,175	109	0,2502248
17,045	542,3	542,7	93,81	93,98	0,183	0,175	110	0,250225
17,018	542,3	542,7	93,99	94,04	0,183	0,175	111	0,2498141
17,287	542,2	542,7	92,48	92,78	0,183	0,175	112	0,2536861
17,353	542,2	542,7	92,11	92,25	0,183	0,175	113	0,2546954
17,219	542,3	542,7	92,91	92,91	0,183	0,175	114	0,252674

17,058	542,3	542,7	93,76	94,05	0,183	0,175	115	0,2502248
16,939	542,3	542,7	94,71	94,61	0,183	0,175	116	0,2483721
17,335	542,3	542,7	92,36	92,55	0,183	0,175	117	0,2542435
17,031	542,4	542,7	94,00	94,01	0,183	0,175	118	0,2498134
16,980	542,3	542,7	94,10	94,23	0,183	0,175	119	0,2491972
17,064	542,3	542,7	93,76	93,85	0,183	0,175	120	0,2504906
16,862	542,3	542,7	94,62	94,78	0,183	0,175	121	0,2477535
16,991	542,3	542,7	93,84	93,86	0,183	0,175	122	0,2498135
17,320	542,3	542,7	92,12	92,17	0,183	0,175	123	0,2546953
17,367	542,2	542,7	91,60	91,88	0,183	0,175	124	0,2554996
16,933	542,2	542,7	93,95	94,13	0,183	0,175	125	0,2491985
17,405	542,2	542,6	91,41	91,47	0,183	0,175	126	0,2561015
17,299	542,2	542,6	92,02	91,87	0,183	0,175	127	0,2546957
17,062	542,1	542,5	93,14	93,41	0,183	0,175	128	0,2512459
17,084	541,9	542,5	92,98	92,96	0,183	0,175	129	0,2516551
17,372	541,9	542,4	91,39	91,56	0,183	0,175	130	0,2559976
16,853	541,8	542,4	94,03	94,33	0,183	0,175	131	0,2484182
16,868	541,8	542,3	93,91	93,95	0,183	0,175	132	0,248783
16,931	541,8	542,3	93,58	93,71	0,183	0,175	133	0,2498164
17,262	541,9	542,3	91,76	91,95	0,183	0,175	134	0,2546944
16,932	541,9	542,4	93,56	93,63	0,183	0,175	135	0,2498105
16,858	541,9	542,3	93,93	94,13	0,183	0,175	136	0,2487727
17,397	541,9	542,4	90,78	91,19	0,183	0,175	137	0,2569222
17,212	541,9	542,4	91,83	92,14	0,183	0,175	138	0,2540886
17,139	542,0	542,4	92,17	92,27	0,183	0,175	139	0,2530713
16,921	542,0	542,4	93,38	93,56	0,183	0,175	140	0,2498132
17,111	542,0	542,4	92,46	92,55	0,183	0,175	141	0,2526173
17,248	542,0	542,4	91,63	91,73	0,183	0,175	142	0,254695
17,252	542,1	542,4	91,81	91,97	0,183	0,175	143	0,2546941
16,920	542,1	542,4	93,57	93,50	0,183	0,175	144	0,2498211

Average	Average	Average	Proportional Rates Medium/low fire					Average
17,22	Inlet +	Inlet +					0,257	
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	97,12	99,68	System 1	System 2	SQRT	
Velocity	Meter 1	Meter 2	Proportional Rates		Vol.Std.	Vol.Std.	Delta-P	
			PR1	PR2			Time	
Ft/Sec	Deg. R	Deg. R	%	%	(ft3)	(ft3)	min	
							(in H2O)2	
17,357	542,0	542,5			0,183	0,175	0	0,2555003
17,222	542,0	542,5	99,65	102,14	0,183	0,175	1	0,254695
17,590	542,0	542,6	97,43	99,99	0,183	0,175	2	0,2602748
17,340	542,1	542,6	99,08	101,42	0,183	0,175	3	0,2561014
17,365	542,1	542,6	98,95	101,42	0,183	0,175	4	0,2565024
17,340	542,1	542,6	100,19	102,78	0,183	0,175	5	0,254695
17,441	542,2	542,6	100,74	103,44	0,183	0,175	6	0,2546954
17,316	542,2	542,6	102,76	105,45	0,183	0,175	7	0,2512456
17,114	542,3	542,7	104,67	107,18	0,183	0,175	8	0,2477514
17,053	542,3	542,8	104,94	107,55	0,183	0,175	9	0,2469716
17,087	542,4	542,9	105,26	107,78	0,183	0,175	10	0,2469356
17,399	542,5	543,0	103,66	106,29	0,183	0,175	11	0,2510775
17,524	542,6	543,0	102,91	105,58	0,183	0,175	12	0,2526731
17,533	542,7	543,1	103,00	105,77	0,183	0,175	13	0,2526678
17,371	542,8	543,2	104,05	106,72	0,183	0,175	14	0,2502245
17,321	542,9	543,3	100,82	103,58	0,183	0,175	15	0,2536854
17,318	543,0	543,4	99,88	102,41	0,183	0,175	16	0,2549941
17,353	543,0	543,4	99,14	101,79	0,183	0,175	17	0,2561032
17,295	543,1	543,5	99,36	101,86	0,183	0,175	18	0,2555009
17,339	543,1	543,5	98,81	101,48	0,183	0,175	19	0,2564002
17,596	543,2	543,6	97,23	99,93	0,183	0,175	20	0,2602767
16,913	543,2	543,6	101,11	103,85	0,183	0,175	21	0,2502211
17,033	543,3	543,7	100,25	103,13	0,182	0,175	22	0,2521333
17,233	543,3	543,7	99,23	101,78	0,183	0,175	23	0,2550973
16,874	543,3	543,7	101,33	103,73	0,183	0,175	24	0,2498133
17,235	543,3	543,8	99,23	101,81	0,183	0,175	25	0,2550711
17,628	543,4	543,8	97,13	99,40	0,183	0,175	26	0,2608662
17,236	543,4	543,8	99,22	101,66	0,183	0,174	27	0,2550986
17,362	543,4	543,9	98,46	100,89	0,183	0,175	28	0,2570969
17,107	543,4	543,9	99,91	102,77	0,183	0,175	29	0,2532814
17,256	543,5	543,9	99,00	101,61	0,183	0,175	30	0,255499
16,905	543,5	543,9	101,09	103,91	0,183	0,175	31	0,2502255
17,139	543,5	544,0	99,51	102,39	0,182	0,175	32	0,2536863
17,166	543,5	544,0	99,50	102,10	0,182	0,175	33	0,2540914
17,170	543,6	544,0	99,61	101,88	0,183	0,174	34	0,2540906
17,103	543,6	544,0	99,81	102,37	0,183	0,174	35	0,2531906
17,066	543,6	544,1	100,07	102,56	0,183	0,174	36	0,2526732
17,484	543,6	544,1	97,55	100,33	0,182	0,175	37	0,2588908
17,139	543,7	544,1	99,51	102,13	0,182	0,175	38	0,2538635
16,955	543,7	544,1	100,75	102,94	0,183	0,174	39	0,251244
17,047	543,7	544,2	100,01	102,75	0,183	0,175	40	0,2526721
17,255	543,8	544,2	98,73	101,25	0,183	0,175	41	0,2557673
17,201	543,8	544,2	99,08	101,44	0,183	0,174	42	0,2550334
17,109	543,8	544,2	99,52	102,14	0,183	0,175	43	0,2536889
17,275	543,9	544,3	98,46	100,93	0,182	0,174	44	0,256102
17,456	543,9	544,3	97,48	99,77	0,182	0,174	45	0,2588925
17,524	543,9	544,3	96,96	99,75	0,182	0,174	46	0,2598845
17,520	544,0	544,3	97,11	99,27	0,182	0,174	47	0,2598805
17,474	544,0	544,4	97,29	99,93	0,183	0,174	48	0,2592884
17,132	544,0	544,4	99,14	101,69	0,182	0,175	49	0,2542037
17,329	544,0	544,4	98,05	100,61	0,182	0,174	50	0,2571016
17,511	544,0	544,4	97,00	99,48	0,182	0,174	51	0,2598834
17,310	544,0	544,4	98,05	100,56	0,182	0,174	52	0,2569371
17,442	544,0	544,4	97,35	99,94	0,182	0,174	53	0,2588939
17,573	544,0	544,5	96,72	99,25	0,183	0,175	54	0,2608681



17,371	544,1	544,5	97,78	100,37	0,183	0,175	55	0,2579008
17,440	544,1	544,5	97,22	99,99	0,182	0,175	56	0,2589173
17,182	544,2	544,5	98,84	101,27	0,182	0,175	57	0,2550967
16,940	544,3	544,6	100,18	102,89	0,183	0,174	58	0,2515269
17,161	544,3	544,6	98,66	101,34	0,182	0,174	59	0,2548497
17,153	544,3	544,6	98,90	101,50	0,182	0,174	60	0,254697
17,590	544,3	544,6	96,42	98,75	0,182	0,174	61	0,2612614
17,199	544,3	544,6	98,54	101,12	0,182	0,174	62	0,2554924
17,310	544,3	544,6	97,95	100,54	0,182	0,174	63	0,2571025
17,145	544,3	544,6	98,78	101,27	0,182	0,174	64	0,254698
17,073	544,3	544,6	99,09	101,85	0,182	0,174	65	0,2536882
17,260	544,3	544,6	98,27	100,72	0,182	0,175	66	0,2565046
17,483	544,3	544,6	96,76	99,48	0,182	0,175	67	0,2598847
17,513	544,3	544,6	96,62	99,26	0,182	0,175	68	0,2602783
17,188	544,3	544,6	98,41	101,01	0,182	0,174	69	0,2555027
17,182	544,3	544,6	98,62	101,10	0,183	0,175	70	0,2555019
17,251	544,3	544,6	97,84	100,62	0,182	0,175	71	0,2565072
17,083	544,4	544,6	99,04	101,25	0,182	0,174	72	0,254094
17,081	544,4	544,7	98,93	101,58	0,182	0,174	73	0,254067
17,226	544,5	544,7	98,25	100,60	0,182	0,174	74	0,2561118
17,152	544,6	544,8	98,39	101,09	0,182	0,174	75	0,2551015
17,124	544,8	544,9	98,55	100,96	0,182	0,174	76	0,254698
17,060	544,9	545,0	98,91	101,59	0,182	0,174	77	0,2536888
17,137	545,0	545,1	98,59	101,21	0,182	0,174	78	0,2547
17,200	545,1	545,2	98,23	101,04	0,182	0,174	79	0,2555027
17,546	545,3	545,3	96,30	98,89	0,182	0,174	80	0,2607548
17,675	545,4	545,4	95,69	98,25	0,182	0,174	81	0,2626339
17,230	545,5	545,5	98,21	100,85	0,182	0,174	82	0,256005
17,172	545,6	545,5	98,48	101,12	0,182	0,174	83	0,2550576
17,146	545,7	545,6	98,73	101,18	0,182	0,174	84	0,2546983
17,146	545,8	545,7	98,44	101,02	0,182	0,174	85	0,2546983
17,078	545,8	545,8	98,89	101,55	0,182	0,174	86	0,2536892
17,359	545,9	545,9	97,36	99,82	0,182	0,174	87	0,2578661
17,143	546,0	545,9	98,45	101,10	0,182	0,174	88	0,2546975
17,243	546,1	546,0	98,08	100,62	0,182	0,174	89	0,2561048
17,198	546,2	546,1	98,07	100,90	0,182	0,174	90	0,2555043
17,193	546,2	546,2	98,04	100,68	0,182	0,174	91	0,2555058
17,098	546,3	546,2	98,50	101,30	0,181	0,174	92	0,2540949
17,160	546,4	546,3	98,11	100,77	0,181	0,174	93	0,2551024
17,255	546,4	546,4	97,64	100,22	0,181	0,174	94	0,2565083
17,089	546,5	546,4	98,56	101,21	0,182	0,174	95	0,2540951
17,108	546,5	546,5	98,35	101,06	0,182	0,174	96	0,2544112
17,030	546,5	546,5	98,80	101,49	0,181	0,174	97	0,2532864
17,127	546,6	546,6	98,42	101,10	0,182	0,174	98	0,2546997
17,028	546,7	546,6	98,84	101,50	0,182	0,174	99	0,2532869
17,241	546,7	546,7	97,58	100,25	0,182	0,174	100	0,2565075
17,122	546,8	546,7	98,30	100,78	0,182	0,174	101	0,2547556
17,143	546,8	546,8	97,96	100,68	0,182	0,174	102	0,2551028
17,168	546,9	546,8	97,88	100,46	0,181	0,174	103	0,2555048
17,048	546,9	546,9	98,52	101,18	0,181	0,174	104	0,2536887
17,300	547,0	546,9	97,16	99,53	0,181	0,174	105	0,2574975
17,395	547,0	547,0	96,53	99,20	0,181	0,174	106	0,258898
17,122	547,0	547,0	98,05	100,58	0,181	0,174	107	0,254856
17,082	547,1	547,0	98,24	100,58	0,181	0,173	108	0,2542846
17,160	547,1	547,1	97,76	100,23	0,181	0,173	109	0,2555023
17,430	547,2	547,1	96,12	98,56	0,181	0,173	110	0,2595139
17,123	547,2	547,1	97,80	100,32	0,181	0,173	111	0,2549473
17,516	547,2	547,2	95,56	98,01	0,181	0,173	112	0,2607914
17,547	547,3	547,2	95,47	97,97	0,181	0,173	113	0,2612664
17,522	547,3	547,2	95,73	98,30	0,181	0,173	114	0,2608722
17,310	547,3	547,2	96,77	99,33	0,181	0,173	115	0,257767
17,414	547,3	547,3	96,26	98,81	0,181	0,173	116	0,2592923

17,188	547,3	547,3	97,47	100,05	0,181	0,173	117	0,2559402
17,100	547,4	547,3	97,80	100,54	0,181	0,173	118	0,2547022
16,966	547,4	547,3	98,68	101,35	0,181	0,173	119	0,2526862
17,474	547,4	547,3	95,91	98,37	0,181	0,173	120	0,2602823
17,059	547,4	547,4	98,26	100,70	0,181	0,173	121	0,2540973
17,599	547,4	547,4	95,13	97,55	0,181	0,173	122	0,2622367
17,187	547,4	547,4	97,46	99,84	0,181	0,173	123	0,2561034
17,047	547,5	547,4	98,10	100,88	0,181	0,173	124	0,2540979
17,121	547,5	547,4	97,73	100,40	0,181	0,174	125	0,2551056
17,394	547,5	547,5	96,32	98,50	0,181	0,173	126	0,2592935
17,211	547,5	547,5	97,29	99,99	0,181	0,173	127	0,2565094
17,137	547,5	547,5	97,65	99,99	0,181	0,173	128	0,2555062
17,107	547,5	547,5	97,81	100,42	0,181	0,173	129	0,2551067
17,265	547,5	547,5	96,76	99,53	0,181	0,174	130	0,2575141
17,238	547,6	547,5	97,05	99,55	0,181	0,174	131	0,2571071
17,519	547,6	547,5	95,53	97,97	0,182	0,174	132	0,2612669
17,354	547,6	547,6	96,25	98,93	0,181	0,174	133	0,2588801
17,649	547,6	547,6	94,76	97,34	0,181	0,174	134	0,2632238
17,075	547,6	547,6	97,80	100,42	0,181	0,174	135	0,2547028
17,076	547,6	547,6	97,73	100,36	0,181	0,173	136	0,2547024
17,287	547,6	547,6	96,62	99,21	0,181	0,173	137	0,2578385
17,261	547,7	547,6	96,81	99,38	0,181	0,173	138	0,2575096
17,033	547,7	547,7	98,05	100,43	0,181	0,173	139	0,2541911
17,235	547,7	547,7	96,84	99,52	0,181	0,173	140	0,2572321
17,064	547,7	547,7	97,77	100,40	0,181	0,174	141	0,2547033
17,306	547,7	547,7	96,45	98,88	0,181	0,173	142	0,2583411
17,431	547,7	547,7	95,64	98,18	0,181	0,173	143	0,2602792
17,269	547,7	547,7	96,55	99,01	0,181	0,173	144	0,257911
16,959	547,7	547,7	98,31	100,84	0,181	0,173	145	0,2532898
17,105	547,7	547,7	97,49	100,14	0,181	0,174	146	0,2555082
17,239	547,7	547,7	96,68	99,06	0,181	0,173	147	0,2575381
17,264	547,7	547,7	96,56	99,08	0,181	0,173	148	0,2579023
17,234	547,7	547,7	96,62	99,22	0,181	0,174	149	0,2575102
17,231	547,8	547,7	96,64	99,12	0,181	0,173	150	0,2575092
17,580	547,8	547,7	94,68	97,38	0,181	0,174	151	0,2627208
17,574	547,7	547,7	94,84	97,33	0,181	0,174	152	0,2626398
17,228	547,7	547,7	96,62	99,11	0,181	0,174	153	0,2575095
17,410	547,7	547,7	95,60	97,99	0,181	0,173	154	0,2602844
17,472	547,7	547,7	95,19	97,75	0,181	0,173	155	0,2612687
17,127	547,7	547,7	97,09	99,97	0,181	0,174	156	0,2561085
17,126	547,7	547,7	97,18	99,76	0,181	0,174	157	0,2561228
17,561	547,7	547,7	94,63	97,03	0,181	0,173	158	0,2625867
17,741	547,7	547,7	93,68	96,10	0,181	0,173	159	0,2653579
17,624	547,7	547,7	94,25	96,96	0,181	0,174	160	0,2636167
16,996	547,7	547,7	97,92	100,71	0,181	0,174	161	0,2540991
17,089	547,6	547,6	97,33	100,06	0,181	0,174	162	0,2555764
17,081	547,6	547,6	97,34	99,90	0,181	0,174	163	0,2555074
17,118	547,5	547,6	97,20	99,80	0,182	0,174	164	0,2561442
17,321	547,5	547,6	95,89	98,49	0,182	0,174	165	0,2591564
17,300	547,5	547,5	95,97	98,46	0,181	0,174	166	0,258901
17,459	547,5	547,5	95,10	97,72	0,181	0,174	167	0,261269
17,308	547,5	547,5	95,95	98,62	0,181	0,174	168	0,2589007
17,623	547,5	547,5	94,25	96,64	0,181	0,173	169	0,2636159
17,463	547,6	547,6	95,08	97,63	0,181	0,173	170	0,261268
17,119	547,6	547,6	97,13	99,68	0,181	0,174	171	0,2561122
16,885	547,6	547,5	98,35	101,13	0,181	0,174	172	0,2526828
17,340	547,5	547,5	95,85	98,40	0,181	0,174	173	0,259526
17,578	547,5	547,5	94,55	96,77	0,182	0,174	174	0,2632217
17,603	547,4	547,4	94,25	96,79	0,182	0,174	175	0,2636156
17,127	547,3	547,3	97,03	99,43	0,182	0,174	176	0,2565121
17,189	547,2	547,3	96,61	99,28	0,182	0,174	177	0,2574273
16,873	547,2	547,3	98,32	101,02	0,182	0,174	178	0,2526793

17,445	547,3	547,3	95,03	97,49	0,181	0,174	179	0,2612691
17,129	547,3	547,3	96,90	99,43	0,181	0,174	180	0,2565116
17,169	547,3	547,3	96,71	99,37	0,182	0,174	181	0,2571051
17,128	547,3	547,3	96,77	99,47	0,181	0,174	182	0,2565118
17,192	547,3	547,2	96,46	99,19	0,181	0,174	183	0,2575092
17,126	547,2	547,2	96,86	99,51	0,181	0,174	184	0,2565111
17,029	547,2	547,2	97,34	100,09	0,181	0,174	185	0,2551062
17,303	547,1	547,2	95,83	98,42	0,182	0,174	186	0,2592861
17,022	547,1	547,1	97,37	100,08	0,182	0,174	187	0,2551059
17,162	547,1	547,1	96,49	99,23	0,181	0,174	188	0,257182
16,998	547,1	547,1	97,49	100,24	0,181	0,174	189	0,2547032
17,051	547,1	547,1	97,16	99,79	0,181	0,174	190	0,2555088
17,026	547,1	547,1	97,44	99,97	0,182	0,174	191	0,2551061
16,999	547,2	547,1	97,47	100,12	0,182	0,174	192	0,2547031
17,095	547,2	547,1	97,01	99,60	0,181	0,174	193	0,25611
17,156	547,1	547,0	96,67	98,96	0,182	0,174	194	0,2571098
17,526	547,0	547,0	94,45	97,11	0,181	0,174	195	0,2626392
17,406	546,9	547,0	95,16	97,64	0,181	0,174	196	0,2608748
17,178	546,9	546,9	96,55	99,09	0,182	0,174	197	0,2575087
17,089	546,9	546,9	97,06	99,63	0,182	0,174	198	0,2561099
17,178	546,9	546,9	96,42	99,12	0,182	0,174	199	0,2575092
17,020	547,0	546,9	97,53	100,00	0,182	0,174	200	0,2551057
17,111	547,0	546,9	96,95	99,55	0,182	0,174	201	0,2565102
16,930	547,0	546,9	97,87	100,49	0,182	0,174	202	0,2536944
17,259	547,0	546,9	95,99	98,64	0,181	0,174	203	0,2586627
17,270	546,9	546,9	95,95	98,73	0,182	0,174	204	0,2589031
16,949	546,9	546,9	97,79	100,42	0,182	0,174	205	0,254098
17,039	546,8	546,8	97,33	99,75	0,182	0,174	206	0,2555082
17,519	546,8	546,8	94,68	97,15	0,182	0,174	207	0,262639
17,042	546,8	546,8	97,23	99,97	0,182	0,174	208	0,2555076
16,988	546,9	546,8	97,49	99,95	0,182	0,174	209	0,254704
17,527	546,9	546,8	94,53	96,96	0,182	0,174	210	0,2627919
17,082	546,9	546,8	97,01	99,40	0,182	0,174	211	0,2561095
17,290	546,9	546,8	95,82	98,36	0,182	0,174	212	0,259295
17,077	546,8	546,8	97,06	99,63	0,182	0,174	213	0,2561085
17,169	546,8	546,7	96,34	98,96	0,182	0,174	214	0,2575084
17,485	546,7	546,7	94,65	97,19	0,182	0,174	215	0,2622477
17,140	546,6	546,6	96,62	99,37	0,182	0,174	216	0,2571071
17,264	546,6	546,7	96,06	98,66	0,182	0,174	217	0,2588987
16,982	546,7	546,7	97,46	100,07	0,182	0,174	218	0,2547024
17,267	546,7	546,7	95,86	98,57	0,182	0,174	219	0,2589347
17,173	546,7	546,7	96,48	98,95	0,182	0,174	220	0,2575085
17,603	546,8	546,7	94,09	96,58	0,182	0,174	221	0,2640025
16,982	546,7	546,7	97,49	99,94	0,182	0,174	222	0,2547026
17,548	546,7	546,6	94,28	96,81	0,182	0,174	223	0,263224
17,352	546,6	546,6	95,39	98,00	0,182	0,174	224	0,2602833
17,389	546,5	546,5	95,10	97,96	0,182	0,174	225	0,2608637
16,999	546,5	546,5	97,35	100,06	0,182	0,174	226	0,2550477
17,288	546,5	546,5	95,78	98,46	0,182	0,174	227	0,2592977
16,979	546,6	546,5	97,52	100,00	0,182	0,174	228	0,2547021
17,258	546,6	546,5	95,92	98,45	0,182	0,174	229	0,2588988
17,286	546,6	546,5	95,83	98,24	0,182	0,174	230	0,2592939
17,033	546,6	546,5	97,16	99,91	0,182	0,174	231	0,2555051
16,965	546,6	546,5	97,58	100,37	0,182	0,174	232	0,2545201
17,156	546,5	546,5	96,49	98,91	0,182	0,174	233	0,2573814
17,323	546,5	546,4	95,61	98,12	0,182	0,174	234	0,2598864
17,160	546,4	546,4	96,32	99,07	0,182	0,174	235	0,2575082
17,083	546,4	546,4	96,91	99,21	0,182	0,174	236	0,2563426
17,164	546,4	546,4	96,45	99,07	0,182	0,174	237	0,2575071
16,977	546,4	546,4	97,54	100,44	0,182	0,174	238	0,2547017
17,256	546,4	546,4	95,88	98,42	0,182	0,174	239	0,2588984
17,188	546,4	546,3	96,24	99,06	0,182	0,174	240	0,2579046

17,502	546,3	546,3	94,63	97,06	0,182	0,174	241	0,2626419
17,093	546,3	546,3	96,78	99,38	0,182	0,174	242	0,2565114
17,075	546,2	546,2	96,94	99,30	0,182	0,174	243	0,2562692
16,985	546,2	546,2	97,46	100,05	0,182	0,174	244	0,2549169
17,184	546,2	546,2	96,38	99,04	0,182	0,174	245	0,2579
17,068	546,2	546,2	97,09	99,54	0,182	0,174	246	0,2561082
17,187	546,2	546,2	96,40	99,04	0,182	0,174	247	0,2579037
17,161	546,2	546,2	96,54	99,03	0,182	0,174	248	0,2575072
17,132	546,2	546,1	96,70	99,16	0,182	0,174	249	0,2571078
17,341	546,1	546,1	95,49	98,01	0,182	0,174	250	0,2602815
17,337	546,1	546,1	95,41	98,01	0,182	0,174	251	0,260276
17,468	546,1	546,1	94,76	96,98	0,182	0,174	252	0,2622473
17,375	546,0	546,0	95,20	97,77	0,182	0,174	253	0,2608774
17,494	546,0	546,0	94,62	96,95	0,182	0,174	254	0,2626387
16,996	546,0	546,0	97,38	100,05	0,182	0,174	255	0,2551047
16,998	546,1	546,0	97,39	99,91	0,182	0,174	256	0,2551272
17,063	546,1	546,0	97,06	99,42	0,182	0,174	257	0,2561087
17,006	546,1	546,0	97,27	99,75	0,182	0,174	258	0,255281
17,331	546,1	546,0	95,52	97,98	0,182	0,174	259	0,2601457
17,126	546,0	546,0	96,50	99,07	0,182	0,174	260	0,2571046
17,019	546,0	546,0	97,27	99,67	0,182	0,174	261	0,255507
17,245	545,9	545,9	95,91	98,59	0,182	0,174	262	0,2588979
17,122	545,9	545,9	96,64	99,31	0,182	0,174	263	0,2571158
17,621	545,9	545,9	93,92	96,59	0,182	0,174	264	0,2645859
17,150	545,9	545,9	96,47	99,10	0,182	0,174	265	0,2575067
17,242	546,0	545,9	95,97	98,32	0,182	0,174	266	0,2588881
17,175	546,0	545,9	96,33	98,88	0,182	0,174	267	0,2579043
17,307	545,9	545,9	95,55	98,15	0,182	0,174	268	0,2598544
17,580	545,9	545,8	94,13	96,67	0,182	0,174	269	0,2640011
17,479	545,8	545,8	94,59	97,05	0,182	0,174	270	0,2625538
17,171	545,8	545,8	96,32	98,98	0,182	0,174	271	0,2579006
17,050	545,8	545,8	96,84	99,43	0,182	0,174	272	0,2561059
17,387	545,8	545,8	95,10	97,60	0,182	0,174	273	0,2611465
17,306	545,8	545,8	95,65	97,94	0,182	0,174	274	0,2598868
17,121	545,8	545,8	96,66	99,36	0,182	0,174	275	0,2571067
17,051	545,8	545,7	96,91	99,37	0,182	0,174	276	0,2561066
17,574	545,8	545,7	93,98	96,43	0,182	0,174	277	0,264001
17,392	545,7	545,7	94,94	97,50	0,182	0,174	278	0,2612683
17,165	545,7	545,6	96,29	98,91	0,182	0,174	279	0,2578634
17,454	545,6	545,6	94,77	97,19	0,182	0,174	280	0,262246
17,391	545,6	545,6	94,99	97,59	0,182	0,174	281	0,2612652
17,390	545,5	545,6	95,09	97,69	0,182	0,174	282	0,2612647
16,984	545,5	545,5	97,26	99,97	0,182	0,174	283	0,2551035
17,522	545,5	545,5	94,25	96,79	0,182	0,174	284	0,2632215
17,316	545,5	545,5	95,45	98,01	0,182	0,174	285	0,2601626
16,953	545,5	545,5	97,46	100,18	0,182	0,174	286	0,2547009
16,951	545,4	545,4	97,59	100,14	0,182	0,174	287	0,2546994
17,004	545,4	545,4	97,35	99,88	0,182	0,174	288	0,2554887
17,165	545,4	545,4	96,36	98,70	0,182	0,174	289	0,257904
17,042	545,3	545,3	97,06	99,46	0,182	0,174	290	0,2561063
17,001	545,2	545,2	97,21	99,88	0,182	0,174	291	0,2555046
16,818	545,2	545,2	98,40	100,66	0,182	0,174	292	0,2526857
17,076	545,3	545,3	96,91	99,44	0,182	0,174	293	0,256507
17,233	545,3	545,3	96,11	98,54	0,182	0,174	294	0,2588979
17,298	545,2	545,2	95,56	98,40	0,182	0,174	295	0,2598856
17,114	545,2	545,2	96,71	99,34	0,182	0,175	296	0,2571368
16,952	545,1	545,2	97,74	100,14	0,182	0,174	297	0,2547001
16,952	545,1	545,1	97,69	100,03	0,182	0,174	298	0,2547226
17,517	545,1	545,1	94,52	96,84	0,182	0,174	299	0,2632213
17,290	545,0	545,0	95,56	98,26	0,182	0,174	300	0,2598725
17,318	545,0	545,0	95,52	97,82	0,182	0,174	301	0,2602797
17,135	545,0	545,0	96,61	98,94	0,182	0,174	302	0,2575043

17,568	545,0	545,0	94,24	96,80	0,182	0,174	303	0,2639791
17,043	545,0	545,0	97,08	99,59	0,182	0,174	304	0,2561058
17,296	545,0	545,0	95,63	98,17	0,182	0,174	305	0,2598853
17,228	545,0	545,0	95,97	98,38	0,182	0,174	306	0,2588966
17,255	545,0	544,9	95,95	98,47	0,182	0,174	307	0,2592921
17,066	544,9	544,9	96,81	99,67	0,182	0,175	308	0,256495
17,449	544,9	544,9	94,86	97,23	0,182	0,174	309	0,2622445
17,105	544,8	544,8	96,65	99,41	0,182	0,174	310	0,2571056
17,247	544,8	544,8	95,76	98,46	0,182	0,175	311	0,2592352
17,381	544,8	544,8	95,03	97,58	0,182	0,174	312	0,2612645
16,944	544,7	544,7	97,45	100,22	0,182	0,174	313	0,254699
16,990	544,7	544,7	97,41	100,20	0,182	0,175	314	0,2553514
16,978	544,8	544,8	97,50	99,98	0,182	0,175	315	0,255103
17,066	544,8	544,8	96,95	99,78	0,182	0,175	316	0,2565058
17,224	544,8	544,8	96,12	98,57	0,182	0,175	317	0,2588964
17,218	544,7	544,7	96,09	98,49	0,182	0,174	318	0,2588587
17,062	544,7	544,7	96,85	99,55	0,182	0,174	319	0,2565067
17,222	544,6	544,7	96,08	98,40	0,182	0,174	320	0,2589005
17,404	544,6	544,7	94,94	97,61	0,182	0,174	321	0,2616562
17,246	544,6	544,7	95,94	98,18	0,182	0,174	322	0,2592964
17,153	544,5	544,6	96,36	99,07	0,182	0,174	323	0,2579019
17,034	544,5	544,6	97,05	99,57	0,182	0,174	324	0,256105
17,476	544,5	544,6	94,57	97,21	0,182	0,174	325	0,2627595
17,310	544,4	544,5	95,46	98,00	0,182	0,174	326	0,2602782
17,064	544,5	544,6	96,96	99,56	0,182	0,174	327	0,2565062
17,288	544,4	544,5	95,70	98,09	0,182	0,174	328	0,2599179
17,284	544,4	544,5	95,60	98,14	0,182	0,174	329	0,2598837
17,062	544,4	544,5	96,94	99,48	0,182	0,174	330	0,2565385
16,991	544,4	544,5	97,39	99,88	0,182	0,174	331	0,2555029
17,133	544,3	544,4	96,50	98,92	0,182	0,174	332	0,257661
17,094	544,3	544,4	96,81	99,36	0,182	0,174	333	0,2571063
17,461	544,2	544,4	94,80	97,23	0,183	0,175	334	0,2626314
17,094	544,2	544,3	96,68	99,31	0,182	0,175	335	0,2571047
16,954	544,2	544,3	97,62	100,18	0,182	0,175	336	0,2549701
16,963	544,1	544,2	97,63	100,25	0,183	0,175	337	0,2551211
17,280	544,1	544,2	95,73	98,26	0,183	0,175	338	0,2598841
17,062	544,1	544,2	97,05	99,59	0,182	0,175	339	0,2565048
17,243	544,1	544,2	95,86	98,60	0,182	0,175	340	0,2592918
17,242	544,2	544,2	95,88	98,67	0,182	0,175	341	0,2592906
17,554	544,1	544,2	94,18	96,65	0,182	0,175	342	0,263998
17,123	544,1	544,2	96,75	99,12	0,183	0,174	343	0,2575036
16,994	544,0	544,1	97,23	99,90	0,182	0,175	344	0,2555552
17,307	544,0	544,1	95,66	97,95	0,182	0,174	345	0,2602764
17,120	544,0	544,1	96,57	99,10	0,183	0,174	346	0,2575046
17,550	544,0	544,1	94,22	96,84	0,182	0,175	347	0,2639981
17,146	543,9	544,0	96,58	98,92	0,183	0,175	348	0,2579009
17,118	543,9	544,0	96,72	99,05	0,183	0,174	349	0,2575028
17,024	543,9	544,0	97,13	99,70	0,183	0,175	350	0,2561044
17,021	543,8	544,0	97,08	99,62	0,182	0,175	351	0,256117
17,001	543,9	544,0	97,47	100,03	0,182	0,175	352	0,2555019
17,248	543,9	544,0	96,31	98,72	0,183	0,174	353	0,2588944
16,957	544,1	544,1	98,18	100,82	0,182	0,174	354	0,254186
17,011	544,3	544,3	98,13	100,74	0,182	0,175	355	0,2546971
16,987	544,5	544,4	98,48	100,97	0,182	0,175	356	0,2540917
17,103	544,7	544,6	97,75	100,65	0,182	0,175	357	0,2555025
17,413	545,0	544,9	96,30	98,82	0,182	0,174	358	0,2598838
17,200	545,3	545,2	97,61	100,01	0,182	0,174	359	0,2565103
17,010	545,5	545,4	99,00	101,64	0,182	0,174	360	0,2532848
17,142	545,7	545,6	98,26	100,84	0,182	0,174	361	0,2551015
17,124	546,0	545,8	98,39	101,08	0,182	0,174	362	0,2546954
17,105	546,2	546,0	98,35	100,98	0,182	0,174	363	0,2546984
17,522	546,3	546,2	95,69	98,07	0,182	0,174	364	0,2612652

17,275	546,3	546,2	96,81	99,55	0,182	0,174	365	0,2578968
17,138	546,3	546,2	97,40	99,86	0,182	0,174	366	0,2561066
17,032	546,2	546,2	97,81	100,45	0,182	0,174	367	0,2546998
17,065	546,2	546,2	97,52	100,21	0,182	0,174	368	0,2553685
17,198	546,1	546,1	96,63	99,07	0,182	0,174	369	0,2575038
17,222	546,0	546,1	96,49	99,13	0,182	0,174	370	0,2579036
17,218	546,0	546,1	96,62	99,14	0,182	0,174	371	0,2579041
17,002	546,0	546,1	97,85	100,24	0,182	0,174	372	0,2546989
17,350	546,0	546,1	95,67	98,25	0,182	0,174	373	0,2599336
17,021	545,9	546,0	97,66	99,99	0,182	0,174	374	0,2551048
17,150	545,8	546,0	96,77	99,35	0,182	0,174	375	0,2571069
17,266	545,8	545,9	96,19	98,72	0,182	0,174	376	0,2588985
17,036	545,7	545,9	97,39	100,03	0,182	0,174	377	0,2555014
17,167	545,6	545,8	96,65	99,12	0,182	0,174	378	0,2575071
17,325	545,6	545,8	95,81	98,18	0,182	0,174	379	0,2598868
17,071	545,5	545,7	97,09	99,75	0,182	0,174	380	0,2561072
17,253	545,4	545,7	96,10	98,58	0,182	0,174	381	0,2588955
17,345	545,4	545,6	95,50	98,22	0,182	0,174	382	0,26028
17,156	545,3	545,6	96,66	99,40	0,182	0,174	383	0,2574648
17,094	545,3	545,5	97,12	99,45	0,182	0,174	384	0,2565507
17,025	545,2	545,5	97,50	100,08	0,182	0,174	385	0,2555056
17,089	545,2	545,5	96,99	99,59	0,182	0,174	386	0,2565083
17,173	545,3	545,5	96,86	99,35	0,182	0,174	387	0,2575061
17,371	545,4	545,6	95,96	98,57	0,182	0,174	388	0,259887
17,422	545,6	545,7	96,05	98,57	0,182	0,174	389	0,2602816
17,091	545,7	545,8	98,02	100,60	0,182	0,174	390	0,2551042
17,082	545,9	546,0	98,38	100,75	0,182	0,174	391	0,2547015
17,314	546,1	546,1	97,06	99,64	0,182	0,174	392	0,2579049
17,248	546,3	546,3	97,37	99,95	0,182	0,174	393	0,2571065
17,482	546,4	546,4	95,67	98,44	0,182	0,174	394	0,2608727
17,514	546,4	546,5	95,42	97,85	0,182	0,174	395	0,2616592
17,417	546,4	546,5	95,76	98,18	0,182	0,174	396	0,2604031
17,397	546,3	546,4	95,73	98,35	0,182	0,174	397	0,2602832
17,175	546,3	546,4	96,96	99,55	0,182	0,174	398	0,2571059
17,132	546,2	546,4	97,06	99,73	0,182	0,174	399	0,2565107
17,287	546,1	546,4	96,16	98,61	0,182	0,174	400	0,2588987
17,125	546,1	546,3	97,09	99,48	0,182	0,174	401	0,2565091
17,028	546,1	546,4	97,65	100,17	0,182	0,174	402	0,2551061
17,618	546,1	546,3	94,35	96,75	0,182	0,174	403	0,2640036
16,991	546,0	546,3	97,71	100,30	0,182	0,174	404	0,254703
17,609	546,0	546,2	94,27	96,72	0,182	0,174	405	0,2640042
17,268	545,9	546,2	96,03	98,77	0,182	0,174	406	0,258951
17,003	545,8	546,1	97,64	100,12	0,182	0,174	407	0,2550385
17,007	545,7	546,1	97,59	100,21	0,182	0,174	408	0,2551064
17,599	545,7	546,0	94,29	96,65	0,182	0,174	409	0,2640037
17,165	545,6	546,0	96,62	99,02	0,182	0,174	410	0,2575277
16,907	545,5	545,9	98,06	100,69	0,182	0,174	411	0,2536944
17,161	545,5	545,9	96,62	99,25	0,182	0,174	412	0,2575086
17,277	545,4	545,8	96,01	98,54	0,182	0,174	413	0,259295
17,090	545,4	545,8	96,96	99,40	0,182	0,174	414	0,2565103
17,093	545,3	545,7	97,12	99,33	0,182	0,174	415	0,2565101
16,973	545,3	545,7	97,70	100,24	0,182	0,174	416	0,2547027
17,026	545,4	545,7	97,32	100,04	0,182	0,174	417	0,255507
17,331	545,3	545,7	95,74	98,10	0,182	0,174	418	0,2600995
16,969	545,3	545,7	97,69	100,28	0,182	0,174	419	0,2547047
17,128	545,3	545,6	96,82	99,14	0,182	0,174	420	0,2571082
16,972	545,2	545,6	97,90	100,45	0,182	0,174	421	0,2547021
17,086	545,3	545,6	97,28	99,88	0,182	0,174	422	0,2561311
17,029	545,4	545,7	98,01	100,46	0,182	0,174	423	0,2547021
17,049	545,5	545,8	98,13	100,65	0,182	0,174	424	0,2547021
17,183	545,7	545,9	97,42	99,99	0,182	0,174	425	0,2564773
17,042	545,9	546,1	98,41	101,16	0,182	0,174	426	0,2540885

DATA 2019-05-28 EPA PI 20196 MODEL 700 RUN 1 LOW

17,304	546,1	546,2	97,08	99,61	0,182	0,174	427	0,257905
17,096	546,0	546,3	-0,01	-0,01	0,091	0,087	428	0,255105
17,355	546,0	546,3	-0,01	-0,01	0,000	0,000	429	0,2592958
17,092	546,0	546,4	-0,01	-0,01	0,000	0,000	430	0,2555073

Average	Average	Average	Proportional Rates Medium/low fire					Average
16,92	Inlet +	Inlet +					0,254	
	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,03	100,02	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	
17,142	538,6	539,0			0,182	0,174	0 0,2493383	
17,268	538,7	539,0	104,34	106,19	0,182	0,173	1 0,2492368	
17,015	538,8	539,1	103,48	105,57	0,182	0,173	2 0,2483615	
17,240	538,8	539,1	102,57	104,32	0,182	0,173	3 0,2512353	
17,393	538,8	539,1	101,78	103,74	0,182	0,173	4 0,2532684	
17,065	538,9	539,2	103,77	106,10	0,182	0,174	5 0,2483603	
17,093	539,0	539,3	103,63	105,49	0,181	0,174	6 0,2487734	
17,083	539,0	539,3	103,81	105,91	0,181	0,173	7 0,2484698	
16,903	539,1	539,4	104,83	107,24	0,181	0,174	8 0,2458704	
17,036	539,2	539,5	104,25	106,45	0,181	0,174	9 0,2473258	
16,915	539,2	539,6	105,33	107,48	0,181	0,173	10 0,2452439	
16,967	539,3	539,6	105,21	107,30	0,181	0,173	11 0,245873	
16,944	539,4	539,7	105,60	107,49	0,181	0,173	12 0,2452437	
17,068	539,4	539,8	104,88	106,98	0,181	0,173	13 0,2469004	
16,974	539,5	539,9	105,62	107,67	0,181	0,173	14 0,2453895	
17,058	539,6	539,9	102,22	104,47	0,181	0,173	15 0,2498018	
17,183	539,7	540,0	100,27	102,26	0,181	0,173	16 0,2532754	
17,234	539,8	540,1	99,50	101,69	0,181	0,173	17 0,2546851	
17,228	539,8	540,1	99,02	101,38	0,181	0,174	18 0,2550887	
17,204	539,9	540,2	98,88	100,97	0,181	0,173	19 0,2550889	
16,849	540,0	540,2	101,03	102,77	0,181	0,173	20 0,2498877	
17,033	540,0	540,2	99,89	101,75	0,181	0,173	21 0,2526627	
17,027	540,0	540,3	99,86	101,85	0,181	0,173	22 0,2526622	
17,047	540,0	540,3	99,55	101,51	0,181	0,173	23 0,2531598	
17,054	540,1	540,4	99,44	101,55	0,181	0,173	24 0,2532718	
16,922	540,1	540,4	100,33	102,23	0,181	0,173	25 0,2512368	
17,012	540,2	540,5	99,64	101,97	0,181	0,173	26 0,2526663	
16,888	540,2	540,5	100,38	102,31	0,181	0,173	27 0,2508566	
17,080	540,3	540,5	99,15	101,24	0,181	0,173	28 0,2536755	
17,078	540,3	540,6	99,27	101,29	0,181	0,173	29 0,2536759	
17,011	540,3	540,6	99,43	101,77	0,181	0,173	30 0,2526629	
17,150	540,4	540,7	98,86	100,84	0,181	0,173	31 0,2546836	
17,135	540,5	540,7	98,66	100,78	0,181	0,173	32 0,2546864	
17,254	540,5	540,8	98,02	100,07	0,181	0,173	33 0,2564931	
17,136	540,6	540,9	98,89	100,66	0,181	0,173	34 0,2546854	
16,760	540,7	540,9	100,82	102,83	0,181	0,173	35 0,2491881	
17,041	540,7	541,0	99,39	101,27	0,181	0,173	36 0,2532724	
16,814	540,8	541,1	100,74	102,90	0,181	0,173	37 0,249804	
17,097	540,9	541,1	98,98	100,79	0,181	0,173	38 0,2540819	
16,945	541,0	541,2	99,81	101,96	0,181	0,173	39 0,2517024	
16,776	541,0	541,3	100,82	102,98	0,181	0,173	40 0,2491909	
16,886	541,1	541,3	100,14	102,00	0,181	0,173	41 0,2508312	
16,924	541,1	541,4	99,93	101,71	0,181	0,172	42 0,2514732	
16,909	541,2	541,4	100,27	101,98	0,181	0,172	43 0,2512375	
16,873	541,2	541,5	100,09	101,90	0,181	0,172	44 0,2508286	
16,818	541,3	541,6	100,25	102,39	0,180	0,172	45 0,2500721	
16,829	541,4	541,6	100,28	102,26	0,180	0,173	46 0,2502161	
17,276	541,4	541,7	97,58	99,41	0,181	0,172	47 0,2570938	
16,986	541,5	541,7	99,30	101,11	0,181	0,172	48 0,2526641	
17,049	541,5	541,7	98,75	100,66	0,180	0,172	49 0,2536986	
17,022	541,5	541,8	98,78	101,07	0,180	0,173	50 0,2532731	
16,968	541,6	541,8	99,07	101,04	0,180	0,173	51 0,2526655	
16,968	541,5	541,8	99,30	101,50	0,180	0,173	52 0,25246	
16,882	541,6	541,8	99,80	101,82	0,180	0,173	53 0,2512393	
17,077	541,6	541,9	98,56	100,70	0,180	0,173	54 0,2540835	



17,190	541,6	541,9	98,13	99,92	0,180	0,172	55	0,2556396
17,044	541,7	542,0	98,74	100,81	0,180	0,172	56	0,2536851
17,027	541,8	542,0	99,00	101,05	0,180	0,173	57	0,2532752
16,791	541,8	542,1	100,39	102,36	0,180	0,173	58	0,2497176
16,832	541,8	542,1	100,14	102,19	0,180	0,172	59	0,250287
16,972	541,9	542,2	99,12	101,03	0,180	0,172	60	0,2526683
16,781	541,9	542,2	100,34	102,26	0,180	0,172	61	0,2498079
16,915	542,0	542,3	99,51	101,42	0,180	0,172	62	0,251649
16,727	542,0	542,3	100,71	102,70	0,180	0,172	63	0,2487782
16,800	542,0	542,3	100,39	102,39	0,180	0,172	64	0,2498073
16,924	542,0	542,3	99,72	101,52	0,180	0,172	65	0,2516473
17,035	542,1	542,4	98,87	100,91	0,180	0,172	66	0,253277
16,931	542,1	542,4	99,57	101,53	0,180	0,172	67	0,2516502
16,900	542,1	542,4	99,72	101,70	0,180	0,172	68	0,251269
16,998	542,1	542,5	99,22	101,25	0,180	0,172	69	0,2526666
17,094	542,2	542,5	98,64	100,68	0,180	0,172	70	0,2540844
16,732	542,2	542,5	100,67	102,74	0,180	0,172	71	0,2487792
17,131	542,2	542,6	98,25	100,57	0,180	0,172	72	0,2546885
16,863	542,3	542,6	99,73	102,02	0,180	0,173	73	0,2508333
17,184	542,3	542,6	97,90	99,94	0,180	0,172	74	0,255485
16,922	542,3	542,7	99,36	101,43	0,180	0,172	75	0,2516488
16,986	542,3	542,7	99,04	101,10	0,180	0,172	76	0,2526678
16,972	542,3	542,7	98,95	101,02	0,180	0,172	77	0,2526688
17,421	542,4	542,7	96,42	98,44	0,180	0,172	78	0,2592824
17,044	542,4	542,8	98,63	100,68	0,180	0,172	79	0,2536812
16,971	542,4	542,8	98,92	101,03	0,180	0,172	80	0,2526681
16,901	542,4	542,8	99,25	101,43	0,180	0,172	81	0,2516479
16,794	542,5	542,9	99,87	101,90	0,180	0,172	82	0,2502194
17,104	542,5	542,9	98,17	100,00	0,180	0,172	83	0,2547692
16,857	542,5	542,9	99,30	101,50	0,180	0,172	84	0,2512421
17,013	542,5	542,9	98,54	100,30	0,180	0,172	85	0,2536808
16,746	542,5	542,9	99,91	101,75	0,180	0,172	86	0,2498092
16,731	542,5	543,0	99,71	101,77	0,180	0,172	87	0,2498094
17,065	542,6	543,0	97,67	99,86	0,180	0,172	88	0,2546906
16,913	542,6	543,0	98,68	100,64	0,180	0,172	89	0,2526699
16,852	542,6	543,0	98,97	100,93	0,180	0,172	90	0,2516524
16,958	542,6	543,0	98,23	100,39	0,180	0,172	91	0,2532734
16,649	542,6	543,0	100,03	101,97	0,180	0,172	92	0,248781
16,838	542,6	543,0	98,90	101,00	0,180	0,172	93	0,2516521
16,789	542,6	543,0	99,24	101,04	0,180	0,172	94	0,2508491
16,743	542,6	543,0	99,60	101,48	0,180	0,172	95	0,2502204
16,758	542,6	543,0	99,32	101,47	0,180	0,172	96	0,250515
17,002	542,6	543,0	97,97	99,94	0,180	0,172	97	0,2541368
16,935	542,6	543,0	98,07	100,24	0,180	0,172	98	0,2532773
16,826	542,6	543,0	98,79	100,83	0,180	0,172	99	0,2516528
16,700	542,6	543,0	99,65	101,54	0,180	0,172	100	0,2497877
16,798	542,6	543,0	98,86	100,91	0,180	0,172	101	0,2512434
16,818	542,6	543,0	98,75	100,95	0,180	0,172	102	0,2516513
16,886	542,6	543,1	98,47	100,69	0,180	0,173	103	0,2526699
16,777	542,6	543,1	98,72	100,98	0,180	0,172	104	0,2511967
16,811	542,6	543,1	98,62	100,89	0,180	0,172	105	0,2516524
17,109	542,6	543,1	97,10	99,07	0,180	0,172	106	0,256098
16,774	542,6	543,1	98,90	100,96	0,180	0,172	107	0,2512437
16,803	542,6	543,1	98,67	100,79	0,180	0,172	108	0,2516725
16,609	542,6	543,1	99,92	102,02	0,180	0,172	109	0,2487812
16,607	542,6	543,0	99,97	101,88	0,180	0,172	110	0,2487815
16,738	542,6	543,0	98,87	100,92	0,180	0,172	111	0,2508374
16,989	542,6	543,0	97,75	99,41	0,180	0,172	112	0,2546912
16,666	542,6	543,1	99,52	101,65	0,180	0,172	113	0,2498266
17,011	542,6	543,0	97,24	99,31	0,180	0,172	114	0,2550895
16,943	542,6	543,0	97,50	99,79	0,180	0,172	115	0,2540866
16,982	542,5	543,0	97,47	99,69	0,180	0,173	116	0,2546924

16,908	542,5	543,0	97,98	99,81	0,180	0,172	117	0,2536825
16,582	542,5	543,0	99,60	101,61	0,180	0,172	118	0,2487821
16,934	542,5	543,0	97,56	99,66	0,180	0,172	119	0,2540993
16,891	542,5	543,0	97,91	100,00	0,180	0,172	120	0,2535948
16,763	542,5	542,9	98,63	100,48	0,180	0,172	121	0,2516559
16,885	542,5	542,9	97,83	99,94	0,180	0,172	122	0,2534914
16,825	542,5	542,9	98,28	99,98	0,180	0,172	123	0,2526706
16,916	542,5	542,9	97,69	99,52	0,180	0,172	124	0,2540881
16,886	542,5	542,9	97,72	99,66	0,180	0,172	125	0,2536828
16,745	542,4	542,9	98,23	100,51	0,180	0,172	126	0,2516476
16,942	542,4	542,8	97,28	99,33	0,180	0,172	127	0,2546929
16,907	542,4	542,8	97,64	99,28	0,180	0,172	128	0,254117
16,644	542,4	542,8	99,26	100,87	0,181	0,172	129	0,2502213
16,848	542,4	542,8	97,85	99,86	0,180	0,172	130	0,2532793
16,868	542,4	542,8	97,57	99,65	0,180	0,172	131	0,2536838
17,022	542,5	542,9	96,76	98,77	0,180	0,172	132	0,255989
16,933	542,5	542,9	97,17	99,13	0,180	0,172	133	0,254688
16,985	542,5	542,9	96,88	98,96	0,180	0,172	134	0,2554982
16,959	542,4	542,9	97,00	99,07	0,180	0,172	135	0,2550961
16,796	542,5	542,9	98,00	99,92	0,180	0,172	136	0,2526764
16,888	542,5	542,9	97,44	99,30	0,180	0,172	137	0,2540884
16,901	542,5	542,9	97,57	99,46	0,180	0,172	138	0,2542499
16,928	542,4	542,9	97,15	99,11	0,180	0,172	139	0,2547739
16,833	542,5	542,9	97,92	99,84	0,180	0,172	140	0,2532794
16,667	542,4	542,9	98,77	100,81	0,180	0,173	141	0,2508382
16,924	542,4	542,8	97,08	99,13	0,180	0,172	142	0,2546929
16,925	542,4	542,8	97,00	99,31	0,180	0,172	143	0,2546935
17,202	542,4	542,8	95,64	97,67	0,180	0,173	144	0,2588893
16,624	542,5	542,8	98,95	101,13	0,180	0,173	145	0,2502229
16,685	542,4	542,8	98,80	100,71	0,180	0,173	146	0,2510981
16,942	542,5	542,8	96,96	99,10	0,180	0,173	147	0,2550968
16,630	542,5	542,9	98,74	100,94	0,180	0,173	148	0,2503804
16,914	542,5	542,9	97,14	99,11	0,180	0,172	149	0,2546931
16,710	542,5	542,9	98,35	100,33	0,180	0,172	150	0,251655
16,714	542,5	542,9	98,46	100,43	0,180	0,173	151	0,2516877
16,912	542,5	542,9	97,24	99,14	0,180	0,173	152	0,2546938
16,912	542,5	542,9	97,34	99,16	0,181	0,172	153	0,2546936
16,780	542,5	542,9	98,09	99,89	0,181	0,172	154	0,252672
17,099	542,5	542,9	96,29	98,05	0,181	0,172	155	0,2575001
16,760	542,5	542,9	98,14	100,26	0,181	0,173	156	0,2523984
16,870	542,5	542,9	97,50	99,57	0,180	0,173	157	0,2540897
16,937	542,5	542,9	97,09	99,12	0,180	0,173	158	0,2550975
16,909	542,5	542,9	97,21	99,22	0,180	0,173	159	0,2546926
16,904	542,5	542,9	97,01	99,00	0,180	0,172	160	0,2546979
16,818	542,5	542,9	97,83	99,80	0,180	0,172	161	0,2532913
16,888	542,5	542,9	97,06	99,30	0,180	0,173	162	0,254432
16,701	542,6	543,0	98,25	100,22	0,180	0,172	163	0,2516645
16,954	542,5	543,0	96,75	98,81	0,180	0,172	164	0,2554976
16,814	542,5	543,0	97,72	99,53	0,180	0,172	165	0,253281
16,865	542,5	543,0	97,49	99,33	0,180	0,172	166	0,2540899
16,903	542,6	543,0	97,06	99,11	0,180	0,172	167	0,2546945
16,809	542,6	543,0	97,66	99,63	0,180	0,172	168	0,2532813
16,871	542,6	543,0	97,36	99,03	0,180	0,172	169	0,2542102
16,958	542,6	543,0	96,85	98,76	0,180	0,172	170	0,2554972
16,935	542,6	543,0	96,87	98,94	0,180	0,172	171	0,2551662
16,832	542,6	543,0	97,42	99,35	0,180	0,172	172	0,2536848
16,809	542,6	543,0	97,75	99,63	0,180	0,172	173	0,2532839
16,858	542,6	543,0	97,39	99,26	0,180	0,172	174	0,2540896
16,781	542,5	543,0	97,65	99,68	0,180	0,172	175	0,2529887
16,639	542,5	543,0	98,49	100,51	0,180	0,172	176	0,2508545
16,924	542,5	543,0	96,88	98,94	0,180	0,172	177	0,2550981
16,894	542,5	543,0	97,24	98,89	0,180	0,172	178	0,2546879

16,799	542,5	542,9	97,72	99,61	0,181	0,172	179	0,2532807
17,105	542,5	542,9	95,80	97,74	0,180	0,172	180	0,2578982
17,172	542,5	543,0	95,55	97,45	0,180	0,172	181	0,2588919
16,568	542,5	542,9	99,07	101,22	0,180	0,173	182	0,2498136
16,826	542,5	543,0	97,47	99,44	0,180	0,173	183	0,2536856
16,946	542,5	542,9	96,86	98,55	0,180	0,172	184	0,2555195
16,828	542,4	542,9	97,39	99,12	0,180	0,172	185	0,2537209
16,823	542,5	542,9	97,44	99,52	0,180	0,172	186	0,2536834
16,892	542,4	542,9	97,10	98,89	0,180	0,172	187	0,2546955
16,826	542,4	542,9	97,38	99,49	0,180	0,172	188	0,2536902
17,005	542,4	542,9	96,17	98,36	0,180	0,173	189	0,2565019
17,081	542,5	542,9	95,86	98,11	0,180	0,173	190	0,2575579
16,887	542,5	542,9	96,91	98,97	0,180	0,173	191	0,2546939
16,888	542,5	542,9	97,16	99,05	0,180	0,172	192	0,2546468
16,754	542,5	542,9	97,87	99,97	0,180	0,173	193	0,252672
16,893	542,5	542,9	97,09	98,94	0,180	0,173	194	0,2546949
16,891	542,5	542,9	96,91	99,12	0,180	0,172	195	0,2546946
17,189	542,5	542,9	95,26	97,35	0,180	0,173	196	0,2592733
16,938	542,5	542,9	96,87	98,76	0,180	0,173	197	0,2554601
16,889	542,5	542,9	97,01	99,11	0,180	0,173	198	0,2546942
16,941	542,5	542,9	96,71	98,80	0,180	0,173	199	0,2554987
16,941	542,5	542,9	96,68	98,78	0,180	0,173	200	0,2554986
16,905	542,4	542,9	97,15	99,01	0,180	0,173	201	0,254912
16,981	542,4	542,9	96,55	98,47	0,181	0,173	202	0,2561024
16,819	542,4	542,9	97,40	99,54	0,180	0,173	203	0,253686
16,910	542,5	542,9	96,99	98,89	0,180	0,173	204	0,2550976
16,987	542,5	542,9	96,38	98,39	0,180	0,173	205	0,2562989
16,658	542,5	542,9	98,47	100,52	0,180	0,173	206	0,2512558
16,885	542,5	542,9	96,93	98,96	0,180	0,173	207	0,2546945
16,847	542,5	542,9	97,43	99,15	0,180	0,172	208	0,2540895
16,883	542,5	542,9	96,96	98,81	0,180	0,172	209	0,2546933
16,818	542,5	542,9	97,55	99,42	0,180	0,172	210	0,2536845
16,882	542,4	542,9	97,11	98,93	0,181	0,172	211	0,2546943
16,883	542,4	542,9	96,90	98,92	0,180	0,172	212	0,2546959
16,975	542,4	542,9	96,61	98,58	0,180	0,173	213	0,2560998
16,843	542,4	542,9	97,38	99,27	0,181	0,173	214	0,2540899
16,918	542,4	542,8	96,86	98,79	0,181	0,173	215	0,2552307
16,816	542,4	542,9	97,48	99,67	0,180	0,173	216	0,2536853
17,003	542,4	542,8	96,44	98,28	0,181	0,173	217	0,2565011
16,814	542,4	542,8	97,39	99,38	0,180	0,172	218	0,2537045
17,187	542,4	542,8	95,31	97,21	0,180	0,172	219	0,2592868
16,906	542,4	542,8	96,92	98,83	0,180	0,172	220	0,2550976
16,852	542,4	542,8	97,34	99,27	0,181	0,173	221	0,2542262
16,975	542,4	542,8	96,46	98,31	0,180	0,172	222	0,2560862
16,902	542,4	542,8	96,80	98,71	0,180	0,172	223	0,255097
17,044	542,4	542,8	96,00	97,96	0,180	0,172	224	0,2571007
16,885	542,4	542,8	96,94	99,11	0,180	0,172	225	0,254714
16,789	542,4	542,8	97,80	99,59	0,181	0,173	226	0,2532808
16,790	542,4	542,9	97,65	99,47	0,181	0,172	227	0,25328
16,883	542,5	542,9	96,93	98,81	0,180	0,172	228	0,2546945
16,838	542,5	542,9	97,37	99,29	0,180	0,172	229	0,254084
16,877	542,5	542,9	97,13	98,84	0,181	0,172	230	0,2546944
16,886	542,5	542,9	96,84	99,05	0,180	0,172	231	0,2547741
16,878	542,5	542,9	97,10	98,86	0,180	0,172	232	0,2546941
16,815	542,4	542,9	97,50	99,21	0,181	0,172	233	0,2536853
16,977	542,5	542,9	96,56	98,46	0,181	0,172	234	0,2561006
16,756	542,5	542,9	97,88	99,84	0,181	0,173	235	0,2527757
16,972	542,5	542,9	96,66	98,48	0,181	0,173	236	0,2560998
16,870	542,5	542,9	97,07	99,21	0,181	0,173	237	0,2545404
16,936	542,5	542,9	96,75	98,58	0,180	0,173	238	0,2554986
17,095	542,5	542,9	95,54	97,58	0,180	0,172	239	0,2578968
16,911	542,5	542,9	96,95	99,09	0,180	0,173	240	0,2550971

16,815	542,5	542,9	97,52	99,21	0,181	0,173	241	0,2536833
16,843	542,5	542,9	97,47	99,28	0,181	0,172	242	0,2540904
16,881	542,4	542,9	96,83	99,06	0,180	0,173	243	0,2546942
16,839	542,4	542,9	97,12	99,30	0,180	0,173	244	0,2540899
17,160	542,4	542,9	95,41	97,37	0,180	0,173	245	0,2588905
16,747	542,5	542,9	97,90	99,81	0,180	0,172	246	0,2526727
16,883	542,5	542,9	97,09	99,02	0,181	0,173	247	0,2546949
16,886	542,5	542,9	97,09	99,03	0,180	0,173	248	0,2547012
16,883	542,5	542,9	97,02	99,01	0,180	0,173	249	0,2546943
16,911	542,5	542,9	96,94	98,83	0,180	0,172	250	0,2550984
16,802	542,5	542,9	97,47	99,35	0,180	0,172	251	0,2535421
16,818	542,5	542,9	97,35	99,71	0,180	0,173	252	0,2537318
16,791	542,5	542,9	97,59	99,76	0,180	0,173	253	0,2532802
17,002	542,5	542,9	96,27	98,44	0,180	0,173	254	0,2565016
16,934	542,5	542,9	96,73	98,79	0,180	0,173	255	0,2554989
16,788	542,5	542,9	97,53	99,61	0,180	0,173	256	0,2532811
16,907	542,5	542,9	96,84	98,88	0,180	0,173	257	0,255099
17,000	542,5	542,9	96,37	98,36	0,180	0,173	258	0,2565021
16,976	542,5	542,9	96,58	98,45	0,180	0,173	259	0,2561014
17,001	542,5	542,9	96,38	98,47	0,180	0,173	260	0,2565019
17,041	542,5	542,9	96,20	98,07	0,180	0,173	261	0,2571034
16,807	542,5	542,9	97,55	99,37	0,181	0,172	262	0,2535514
17,001	542,5	542,9	96,42	98,22	0,181	0,172	263	0,2565027
16,979	542,5	542,9	96,43	98,15	0,180	0,172	264	0,256101
17,293	542,5	542,9	94,74	96,58	0,180	0,172	265	0,2608663
16,892	542,5	542,9	96,77	99,14	0,180	0,173	266	0,2548015
17,007	542,5	542,9	96,03	98,19	0,180	0,173	267	0,2565032
16,818	542,5	542,9	97,49	99,37	0,180	0,172	268	0,2536862
16,885	542,5	542,9	97,14	98,76	0,181	0,172	269	0,2546951
16,791	542,5	542,9	97,56	99,64	0,180	0,172	270	0,253282
17,289	542,5	542,9	94,75	96,80	0,180	0,173	271	0,2607789
16,913	542,6	542,9	96,81	98,80	0,180	0,173	272	0,2550976
16,912	542,6	542,9	97,05	98,94	0,180	0,173	273	0,2550979
16,885	542,6	542,9	97,17	98,93	0,181	0,172	274	0,2546949
16,916	542,6	543,0	96,71	98,73	0,180	0,172	275	0,2550979
16,847	542,6	543,0	97,23	99,14	0,180	0,172	276	0,25409
16,739	542,7	543,0	98,06	99,93	0,180	0,172	277	0,252465
16,981	542,7	543,0	96,53	98,42	0,181	0,172	278	0,2561017
16,848	542,7	543,0	97,33	99,21	0,180	0,172	279	0,2540914
16,805	542,7	543,0	97,45	99,32	0,180	0,172	280	0,2534582
16,822	542,7	543,0	97,46	99,66	0,180	0,173	281	0,2536861
16,888	542,7	543,0	96,96	99,19	0,180	0,173	282	0,2546954
17,075	542,7	543,0	96,05	98,02	0,180	0,173	283	0,2574929
17,077	542,7	543,1	95,93	97,97	0,180	0,173	284	0,2575004
16,852	542,7	543,1	97,27	99,36	0,180	0,173	285	0,254091
16,891	542,7	543,1	96,92	98,89	0,180	0,172	286	0,2546953
17,006	542,7	543,1	96,54	98,30	0,180	0,172	287	0,2565031
16,845	542,7	543,0	97,40	99,25	0,181	0,172	288	0,2540969
17,005	542,6	543,0	96,49	98,42	0,181	0,173	289	0,2565029
16,900	542,6	543,0	97,10	98,84	0,181	0,172	290	0,254875
17,324	542,6	543,0	94,80	96,59	0,181	0,172	291	0,2612606
16,987	542,6	543,0	96,38	98,43	0,180	0,173	292	0,2562204
16,754	542,6	543,0	97,94	99,99	0,180	0,173	293	0,2526736
16,911	542,6	543,0	96,87	99,02	0,180	0,173	294	0,2550615
16,818	542,6	543,0	97,54	99,23	0,180	0,172	295	0,253686
16,999	542,6	543,0	96,36	98,23	0,181	0,172	296	0,256502
16,998	542,5	543,0	96,27	98,22	0,180	0,172	297	0,2565026
16,840	542,6	543,0	97,21	99,30	0,180	0,173	298	0,2540906
16,882	542,6	543,0	97,16	99,06	0,180	0,173	299	0,2546953
16,787	542,6	543,0	97,44	99,30	0,180	0,172	300	0,2532819
16,884	542,6	543,0	96,99	98,93	0,180	0,172	301	0,2546961
17,069	542,6	543,0	96,18	98,05	0,181	0,173	302	0,257501

16,828	542,6	543,0	97,32	99,39	0,180	0,173	303	0,2538123
16,971	542,6	543,0	96,47	98,55	0,180	0,173	304	0,2561013
16,972	542,6	543,0	96,62	98,40	0,181	0,173	305	0,2561029
16,976	542,6	543,0	96,49	98,92	0,181	0,173	306	0,2561021
16,884	542,6	543,0	97,01	98,84	0,180	0,173	307	0,2546854
17,045	542,6	543,0	96,16	98,29	0,180	0,173	308	0,2570997
16,886	542,6	543,0	97,03	98,88	0,180	0,173	309	0,2546952
16,923	542,6	543,0	96,77	98,78	0,180	0,172	310	0,2552599
16,939	542,6	543,0	96,71	98,68	0,180	0,172	311	0,2555007
16,887	542,6	543,0	96,95	98,96	0,180	0,172	312	0,254695
17,034	542,6	543,0	96,16	98,25	0,180	0,173	313	0,2569363
16,906	542,6	543,0	96,88	98,84	0,180	0,173	314	0,255101
17,035	542,5	542,9	96,26	97,96	0,181	0,172	315	0,2571013
16,790	542,5	542,9	97,62	99,61	0,181	0,173	316	0,2533321
16,784	542,5	542,9	97,61	99,76	0,180	0,173	317	0,2532178
17,153	542,5	542,9	95,49	97,16	0,180	0,172	318	0,2588916
16,873	542,5	542,9	97,19	99,10	0,181	0,172	319	0,2547028
16,875	542,4	542,9	96,90	98,90	0,181	0,173	320	0,2546954
17,030	542,4	542,8	96,10	98,18	0,180	0,173	321	0,257033
16,784	542,3	542,8	97,50	99,53	0,180	0,173	322	0,2532822
16,836	542,4	542,9	97,21	99,20	0,180	0,173	323	0,2540992
16,903	542,3	542,8	96,76	98,89	0,180	0,173	324	0,255098
16,971	542,3	542,8	96,74	98,47	0,181	0,173	325	0,2560995
16,932	542,3	542,8	96,73	98,61	0,181	0,172	326	0,2555003
16,886	542,4	542,8	96,84	98,99	0,180	0,173	327	0,2548167
16,932	542,4	542,8	96,73	98,72	0,180	0,173	328	0,255504
16,835	542,4	542,8	97,29	99,26	0,180	0,173	329	0,2540884
16,858	542,4	542,8	97,17	99,00	0,180	0,172	330	0,2543787
16,839	542,4	542,8	97,27	99,31	0,180	0,172	331	0,2540906
16,971	542,4	542,8	96,42	98,33	0,180	0,172	332	0,2561016
16,746	542,4	542,8	97,88	99,96	0,180	0,173	333	0,2526721
16,747	542,4	542,8	97,79	99,82	0,180	0,173	334	0,2526735
17,040	542,4	542,9	96,01	98,25	0,180	0,173	335	0,257111
17,182	542,5	542,9	95,41	97,24	0,180	0,173	336	0,2592872
16,841	542,5	542,9	97,24	99,50	0,180	0,173	337	0,2540908

## APPENDIX 3: Calibration data

## APPENDIX 4: Unit pre burn

Temps acquisition de données	Flue	Room	scale	Right	Back	bottom	Top	Left
	temp	temp		°F	°F	°F	°F	°F
	°F	°F	lbs					
1,00	70,68	66,13	5,71	66,98	66,09	66,14	67,65	66,78
2,00	148,92	66,09	5,61	66,93	66,00	66,09	67,65	66,73
3,00	374,58	66,05	5,41	66,91	65,89	66,06	67,84	66,72
4,00	550,02	66,27	5,16	66,92	65,81	66,07	68,72	66,75
5,00	657,38	66,37	4,86	67,03	65,75	66,06	71,20	66,89
6,00	702,77	66,91	4,56	67,31	65,87	66,10	76,30	67,19
7,00	720,60	67,48	4,26	67,84	66,01	66,15	85,47	67,79
8,00	680,59	67,99	4,01	68,48	66,23	66,23	98,28	68,64
9,00	635,36	68,66	3,81	69,37	66,55	66,35	114,58	69,77
10,00	638,26	69,07	3,61	70,38	66,97	66,52	131,02	71,05
11,00	670,79	69,33	3,31	71,67	67,51	66,74	148,42	72,72
12,00	694,23	70,02	3,06	73,09	68,19	67,02	165,94	74,56
13,00	720,26	70,29	2,76	74,77	68,95	67,35	183,66	76,68
14,00	716,03	70,11	2,51	76,61	69,80	67,77	201,39	79,20
15,00	725,56	70,13	2,26	78,71	70,76	68,26	220,96	81,84
16,00	736,04	70,07	2,01	80,95	71,77	68,89	240,71	84,55
17,00	742,25	70,11	1,81	83,50	72,86	69,64	261,02	87,82
18,00	677,23	69,97	1,73	86,11	74,31	70,57	281,68	91,45
19,00	642,32	69,90	1,71	89,31	75,66	71,54	299,68	95,39
20,00	621,61	70,14	1,72	92,45	77,17	72,71	312,39	99,03
21,00	614,12	69,69	1,67	95,56	78,84	74,00	318,97	102,06
22,00	596,39	70,19	1,62	98,15	80,56	75,36	321,89	104,74
23,00	583,89	69,93	1,57	100,55	82,38	76,76	321,58	106,93
24,00	582,06	69,87	1,62	102,96	84,24	78,19	319,88	109,05
25,00	587,34	69,72	1,62	105,35	86,18	79,64	316,34	110,94
26,00	599,74	69,79	1,62	107,71	88,09	80,99	312,26	112,89
27,00	611,08	70,39	1,52	109,98	89,96	82,35	308,65	114,81
28,00	620,71	71,30	1,52	112,19	91,76	83,72	304,88	116,33
29,00	622,86	70,17	1,52	114,18	93,66	85,07	302,30	117,89
30,00	624,68	71,63	1,53	115,87	95,38	86,31	300,64	119,44
31,00	630,87	70,86	1,51	117,58	97,11	87,49	299,63	120,97
32,00	630,71	71,67	1,47	119,12	98,77	88,61	299,20	122,62
33,00	636,89	70,81	1,47	120,95	100,26	89,78	299,46	124,24
34,00	645,24	71,30	1,47	122,70	101,78	90,96	300,75	126,21
35,00	648,03	71,28	1,43	124,55	103,21	92,09	302,14	127,88
36,00	657,70	70,79	1,41	126,57	104,52	93,10	304,50	129,57
37,00	662,85	70,64	1,37	128,36	105,78	94,18	307,14	131,19
38,00	671,78	71,90	1,37	130,14	107,04	95,22	310,56	133,08
39,00	680,09	71,28	1,37	131,95	108,21	96,29	314,32	134,74
40,00	689,16	71,14	1,32	133,56	109,34	97,36	318,37	136,45
41,00	695,98	71,68	1,32	135,24	110,40	98,38	323,24	138,00
42,00	702,32	71,64	1,29	137,27	111,36	99,39	328,92	139,62
43,00	709,93	71,59	1,27	138,98	112,35	100,49	334,76	141,47
44,00	716,24	72,17	1,26	140,65	113,37	101,70	341,58	142,66
45,00	718,33	72,37	1,22	142,41	114,31	102,77	348,48	144,39
46,00	721,47	72,31	1,21	144,26	115,32	103,92	355,40	146,25
47,00	728,26	72,10	1,17	146,06	116,22	105,04	362,85	147,98
48,00	738,63	72,44	1,16	148,10	117,21	106,09	370,06	149,32
49,00	744,91	72,25	1,13	149,80	118,14	107,26	378,06	151,27
50,00	748,76	73,45	1,10	151,78	119,21	108,44	386,21	153,05
51,00	755,95	72,61	1,08	153,61	120,16	109,59	394,36	155,04
52,00	758,62	72,72	1,06	155,74	121,15	110,58	402,97	156,72
53,00	762,57	73,64	1,06	157,70	122,22	111,73	411,11	158,55
54,00	763,64	72,49	1,06	159,37	123,32	112,94	419,11	160,72
55,00	763,89	73,32	9,91	161,17	124,32	114,17	427,02	162,73
56,00	764,74	72,90	9,71	163,09	125,36	115,39	434,17	164,68
57,00	762,55	73,26	9,46	164,98	126,60	116,31	440,43	166,26
58,00	759,46	73,54	9,26	166,60	127,72	117,51	446,38	168,26
59,00	755,63	73,64	9,06	168,30	128,72	118,70	451,71	170,46
60,00	750,04	73,32	8,86	169,76	129,67	119,84	456,00	172,48
61,00	743,90	72,96	8,66	171,00	130,61	121,07	459,15	174,34
62,00	735,60	73,20	8,46	172,55	131,81	122,27	460,99	175,96
63,00	723,50	73,85	8,26	173,86	132,82	123,37	461,37	177,68
64,00	709,83	73,61	8,11	175,09	133,84	124,54	459,93	179,27
65,00	698,02	73,53	7,96	176,46	135,04	125,85	457,26	180,66
66,00	690,64	73,12	7,81	177,47	135,93	127,00	453,29	181,77
67,00	684,67	73,11	7,66	178,93	137,21	128,09	448,10	182,87
68,00	679,09	73,78	7,51	179,81	138,33	129,31	442,29	184,16
69,00	674,46	73,77	7,36	180,74	139,44	130,39	436,06	185,12
70,00	669,64	74,07	7,21	181,74	140,61	131,36	429,60	185,69
71,00	664,50	73,21	7,06	181,98	141,76	132,62	423,58	186,44
72,00	660,12	72,86	6,91	182,83	142,93	133,75	417,07	186,38
73,00	655,21	73,19	6,76	183,62	144,29	134,94	411,03	186,96
74,00	651,20	73,19	6,66	184,51	145,40	136,13	405,29	187,69
75,00	647,40	73,18	6,51	184,95	146,48	137,33	399,78	188,35
76,00	643,28	73,28	6,36	185,56	147,53	138,51	394,33	188,80
77,00	640,65	73,65	6,26	185,95	148,50	139,63	389,19	189,10
78,00	637,58	72,99	6,11	186,51	149,66	140,78	384,56	189,36
79,00	634,15	72,75	6,01	186,77	150,74	141,89	380,11	189,54
80,00	631,26	72,91	5,86	187,12	151,66	143,03	376,14	189,98
81,00	628,95	72,81	5,76	187,29	152,78	144,06	371,86	189,81
82,00	626,35	72,52	5,61	187,34	153,93	145,14	367,73	189,73
83,00	624,91	73,10	5,51	187,45	155,11	146,33	363,90	189,66
84,00	623,26	72,48	5,41	187,73	156,35	147,38	360,89	189,11
85,00	621,06	72,93	5,26	187,63	157,56	148,58	357,53	189,31
86,00	620,40	72,67	5,16	187,85	158,73	149,64	354,30	189,55
87,00	618,83	73,24	5,06	187,77	159,95	150,92	351,13	189,40
88,00	616,88	72,59	4,91	188,10	161,28	152,18	348,66	189,89
89,00	615,64	72,48	4,81	188,06	162,57	153,44	345,99	189,68
90,00	614,77	73,01	4,71	188,26	163,85	154,75	343,59	189,78
91,00	613,35	73,13	4,61	188,53	165,13	156,03	341,35	189,85



92,00	609,75	72,69	4,51	188,54	166,31	157,33	339,14	190,00
93,00	608,04	73,44	4,41	188,29	167,45	158,59	337,27	189,88
94,00	600,44	72,90	4,31	187,97	168,89	159,96	335,11	189,61
95,00	591,14	72,84	4,21	187,69	170,10	161,23	333,05	189,87
96,00	577,73	72,58	4,16	187,72	171,43	162,44	330,81	189,58
97,00	570,50	72,30	4,06	187,52	172,60	163,97	328,10	189,77
98,00	565,79	72,33	4,01	187,47	173,74	165,30	324,93	190,04
99,00	562,56	71,64	3,91	187,48	175,20	166,72	321,47	190,10
100,00	560,44	71,88	3,86	187,11	176,52	167,98	317,68	189,37
101,00	558,12	72,03	3,76	186,83	177,73	169,42	313,70	188,96
102,00	556,84	72,14	3,71	186,77	179,15	170,97	309,88	188,92
103,00	554,80	71,61	3,61	186,32	180,40	172,40	306,51	188,83
104,00	552,84	71,81	3,56	186,19	181,66	173,84	302,97	188,14
105,00	549,76	72,05	3,51	186,00	182,97	175,43	299,76	188,44
106,00	548,20	72,54	3,41	185,42	184,04	176,90	296,66	188,15
107,00	545,17	72,32	3,36	185,15	185,32	178,32	293,82	187,78
108,00	541,44	71,99	3,31	184,79	186,60	179,92	290,95	188,07
109,00	538,23	70,67	3,21	184,52	187,93	181,69	288,18	188,40
110,00	536,72	70,46	3,16	184,60	189,09	183,33	285,62	188,29
111,00	420,13	71,69	18,87	184,78	193,58	185,58	283,41	188,10
112,00	475,16	72,10	18,77	184,65	194,06	187,25	280,47	187,27
113,00	559,96	71,87	18,57	184,10	194,97	189,41	276,41	187,20
114,00	641,53	71,86	18,32	183,92	195,84	191,35	273,15	186,82
115,00	751,22	72,20	18,02	183,57	197,65	193,28	272,17	186,12
116,00	766,50	71,48	17,72	183,42	198,93	193,02	274,07	185,46
117,00	769,12	71,92	17,47	182,95	201,12	194,08	279,95	183,19
118,00	779,89	72,51	17,17	182,64	203,46	195,62	289,17	182,90
119,00	792,09	72,50	16,87	182,71	205,09	197,42	301,08	185,36
120,00	808,54	72,61	16,57	182,66	206,71	198,71	315,26	185,94
121,00	814,95	73,13	16,27	183,44	207,84	199,92	331,52	187,65
122,00	816,02	73,01	15,97	184,21	209,33	201,05	349,58	189,41
123,00	815,11	72,69	15,72	185,22	210,67	201,96	367,58	191,63
124,00	799,35	72,87	15,47	185,97	211,30	202,99	384,99	193,79
125,00	788,55	73,11	15,22	187,46	212,36	203,40	400,56	196,00
126,00	620,04	73,34	15,02	188,82	215,79	203,83	413,62	198,73
127,00	548,10	69,63	13,89	189,81	218,48	202,48	421,58	198,42
128,00	509,06	67,64	14,72	189,91	222,74	201,04	425,39	198,25
129,00	480,37	66,73	14,62	188,87	226,54	200,35	426,79	198,49
130,00	458,16	67,72	14,52	188,50	230,37	199,57	426,77	199,14
131,00	442,08	68,84	14,42	188,87	233,57	199,21	425,56	198,06
132,00	427,44	70,17	14,37	189,75	236,36	199,10	423,51	199,14
133,00	415,02	71,39	14,27	190,67	239,15	199,31	420,49	199,96
134,00	406,63	72,07	14,17	190,97	241,63	199,44	416,24	200,13
135,00	399,30	72,54	14,07	191,21	243,90	199,44	411,17	199,81
136,00	392,69	72,66	13,97	191,41	245,71	199,31	406,80	199,96
137,00	388,18	73,14	13,92	191,48	247,75	199,24	402,03	200,07
138,00	384,67	73,67	13,82	191,08	249,11	199,03	397,18	199,89
139,00	377,08	74,08	13,72	190,85	250,45	198,87	393,26	199,43
140,00	366,89	74,12	13,67	190,61	251,24	198,77	389,46	199,02
141,00	357,25	74,55	13,57	190,62	252,19	198,55	384,79	198,26
142,00	350,84	74,85	13,51	190,65	253,16	198,59	380,53	197,81
143,00	346,13	74,25	13,42	190,59	254,03	198,39	375,41	196,85
144,00	341,80	74,20	13,37	190,43	254,31	198,25	370,56	195,74
145,00	338,25	74,54	13,27	189,62	255,01	197,70	365,02	194,06
146,00	334,97	75,06	13,22	188,65	255,20	197,24	359,64	192,20
147,00	332,64	74,48	13,12	187,40	255,55	196,59	354,15	190,75
148,00	331,22	74,76	13,06	186,42	255,66	195,91	349,05	189,72
149,00	330,77	74,29	12,96	185,54	255,66	195,25	345,02	188,79
150,00	329,72	73,98	12,92	184,63	255,67	194,46	341,10	187,42
151,00	329,47	74,06	12,81	183,49	255,49	193,48	337,30	186,05
152,00	328,80	72,99	12,76	182,76	254,99	192,68	334,11	185,41
153,00	328,48	73,94	12,66	181,81	254,91	191,85	331,27	184,11
154,00	326,97	73,80	12,61	181,03	254,38	191,16	329,02	183,47
155,00	326,66	73,56	12,51	180,41	253,52	190,34	326,59	182,70
156,00	326,59	73,25	12,46	180,24	252,42	189,82	324,80	182,52
157,00	325,06	73,20	12,36	179,64	251,22	189,18	323,45	182,26
158,00	324,45	72,60	12,31	179,08	249,92	188,66	322,21	181,72
159,00	323,87	72,64	12,21	178,19	248,92	187,78	320,57	180,82
160,00	322,63	72,95	12,16	177,72	248,21	187,26	318,84	180,28
161,00	322,63	72,56	12,06	177,17	246,93	186,68	317,70	179,98
162,00	320,94	72,52	12,01	176,83	245,73	186,03	316,58	179,03
163,00	321,18	72,15	11,91	176,31	245,02	185,23	315,17	177,80
164,00	320,79	71,76	11,81	175,87	244,21	184,69	314,35	177,61
165,00	321,78	71,79	11,76	175,64	243,29	184,01	313,46	177,27
166,00	322,18	72,28	11,66	175,27	241,82	183,56	312,51	176,89
167,00	323,64	72,03	11,61	174,96	241,07	182,76	311,95	176,13
168,00	326,29	72,10	11,51	174,20	240,20	181,74	311,41	174,77
169,00	326,27	71,68	11,46	173,73	239,28	181,03	311,02	174,31
170,00	328,05	71,65	11,36	173,40	238,39	180,26	311,05	173,53
171,00	328,89	71,31	11,26	173,32	237,21	179,53	311,22	173,13
172,00	330,48	72,54	11,21	172,92	236,77	178,68	310,92	172,43
173,00	329,63	71,80	11,11	172,62	235,51	178,18	311,54	172,74
174,00	328,22	71,49	11,06	172,16	234,74	177,50	311,91	172,56
175,00	328,07	71,18	10,96	171,79	233,44	177,06	312,51	172,79
176,00	329,00	71,24	10,91	171,53	232,68	176,32	313,06	172,15
177,00	328,80	71,23	10,81	171,46	231,68	175,66	313,51	171,83
178,00	326,76	71,36	10,71	171,53	230,94	175,07	313,90	171,75
179,00	328,40	71,38	10,66	171,47	229,92	174,65	314,22	171,90
180,00	329,62	71,54	10,56	170,81	228,82	174,20	314,49	171,46
181,00	330,69	71,13	10,51	170,64	227,59	173,83	314,92	171,30
182,00	332,11	70,83	10,41	170,54	226,66	173,06	315,25	170,72
183,00	336,04	71,01	10,31	170,34	225,99	172,48	315,86	170,64
184,00	338,55	70,90	10,21	169,92	225,24	172,01	316,48	170,68
185,00	341,58	71,08	10,16	170,07	224,72	171,41	317,21	170,32
186,00	346,02	70,65	10,06	170,00	223,97	170,82	318,16	169,79

187,00	347,51	70,72	9,96	170,29	223,18	170,33	319,27	169,84
188,00	348,38	70,86	9,86	170,07	221,72	169,88	320,72	169,93
189,00	350,18	70,86	9,76	169,78	221,04	169,45	322,10	170,17
190,00	350,13	71,02	9,66	169,79	220,09	169,20	323,68	170,88
191,00	350,46	70,93	9,56	170,09	219,32	168,61	324,76	171,05
192,00	350,49	70,60	9,51	170,07	218,50	168,24	325,88	171,64
193,00	351,45	70,50	9,41	170,25	218,02	167,56	327,08	172,06
194,00	351,77	71,13	9,26	170,37	217,10	167,34	328,08	172,72
195,00	353,74	70,96	9,16	170,41	216,50	166,87	329,38	173,57
196,00	354,81	70,78	9,06	170,51	215,64	166,59	329,97	174,53
197,00	356,54	70,72	8,96	170,85	214,85	166,18	330,75	175,56
198,00	359,95	70,76	8,86	170,97	214,30	165,67	331,88	176,41
199,00	362,76	70,48	8,76	170,99	213,74	165,37	333,22	177,79
200,00	366,31	70,93	8,66	171,23	213,39	164,90	334,84	179,20
201,00	367,22	71,22	8,56	171,42	212,90	164,51	336,31	180,52
202,00	367,63	70,81	8,41	171,47	212,31	164,38	338,12	182,41
203,00	372,24	70,61	8,31	171,51	211,24	164,02	340,06	183,79
204,00	375,64	70,76	8,21	171,64	210,53	163,74	341,74	185,01
205,00	378,99	70,45	8,06	171,81	209,63	163,31	343,72	186,49
206,00	382,50	70,68	7,96	171,72	208,77	163,00	345,88	187,88
207,00	386,63	70,65	7,81	172,13	208,34	162,65	347,76	189,15
208,00	389,66	70,67	7,66	172,13	207,50	162,36	350,72	190,40
209,00	387,64	70,86	7,56	172,13	207,05	162,13	353,85	191,81
210,00	387,85	70,57	7,46	172,40	206,76	161,73	357,06	192,93
211,00	384,80	70,75	7,36	172,06	206,59	161,41	360,05	193,79
212,00	381,10	70,89	7,26	172,55	206,59	160,92	362,93	194,51
213,00	377,89	70,88	7,16	172,39	206,00	160,78	364,42	195,81
214,00	373,52	70,67	7,06	173,02	205,65	160,67	365,65	196,81
215,00	370,05	70,44	6,96	173,24	205,32	160,37	366,38	197,63
216,00	366,00	70,49	6,86	173,07	205,12	160,08	366,01	198,13
217,00	362,00	70,34	6,81	173,23	205,09	159,86	365,48	198,53
218,00	359,54	70,15	6,71	173,27	204,74	159,86	364,93	198,65
219,00	353,39	70,16	6,61	173,24	204,70	159,62	363,87	198,83
220,00	351,11	70,17	6,56	172,94	205,17	159,32	363,04	198,44
221,00	347,89	70,38	6,46	173,12	205,35	159,10	362,21	198,26
222,00	345,96	70,69	6,41	173,29	205,56	158,71	361,03	197,90
223,00	344,34	70,52	6,31	173,48	205,64	158,47	359,80	197,22
224,00	340,94	70,50	6,26	173,39	206,19	158,16	359,39	196,66
225,00	338,49	70,35	6,16	173,86	205,72	158,39	358,33	196,12
226,00	336,90	70,40	6,11	173,96	205,99	158,20	357,27	195,30
227,00	334,63	70,26	6,06	173,94	205,47	158,04	356,09	194,33
228,00	331,10	70,12	5,96	173,97	205,55	157,79	354,30	193,49
229,00	330,25	70,47	5,91	174,33	205,76	157,61	352,68	192,67
230,00	328,58	70,13	5,86	174,39	205,63	157,44	351,08	191,59
231,00	328,97	70,17	5,81	174,59	205,94	157,13	349,38	190,13
232,00	327,59	70,28	5,71	174,81	206,34	156,91	347,42	189,37
233,00	325,92	70,09	5,66	174,93	206,51	156,57	345,83	188,11
234,00	326,37	70,17	5,61	174,88	206,84	156,39	343,72	187,36
235,00	325,53	70,09	5,56	175,45	206,57	156,54	342,39	186,65
236,00	325,14	70,27	5,51	175,65	206,39	156,68	340,69	185,79
237,00	325,64	69,94	5,41	176,05	206,13	156,55	339,53	184,72
238,00	324,91	70,03	5,36	176,17	206,23	156,33	338,22	183,80
239,00	324,27	70,16	5,31	176,33	206,12	156,27	336,88	183,12
240,00	324,68	70,00	5,26	176,60	205,80	156,41	336,21	182,58
241,00	324,10	70,03	5,16	177,19	205,66	156,39	335,30	181,75
242,00	324,16	70,05	5,11	177,36	205,55	156,34	334,73	180,94
243,00	324,68	69,88	5,06	177,51	205,77	156,16	334,15	179,70
244,00	324,43	70,04	5,01	177,65	205,92	155,93	333,26	179,18
245,00	324,53	70,32	4,91	177,89	205,90	155,83	332,49	178,86
246,00	324,05	70,00	4,86	178,11	205,85	155,82	331,92	178,36
247,00	322,92	70,02	4,81	178,59	205,57	155,83	331,93	177,96
248,00	322,93	69,80	4,76	178,96	205,27	155,94	331,28	177,52
249,00	321,99	70,20	4,71	179,29	204,92	156,01	331,31	177,13
250,00	320,37	69,94	4,66	179,33	204,73	155,98	330,97	176,75
251,00	317,61	70,39	4,56	179,39	204,48	156,30	330,84	176,58
252,00	315,78	69,83	4,51	179,43	204,60	156,06	329,95	175,92
253,00	314,33	69,86	4,46	179,95	204,53	156,05	328,99	175,61
254,00	312,92	70,23	4,41	180,20	204,71	156,12	328,26	175,16
255,00	311,39	69,83	4,36	180,17	205,04	156,00	327,44	175,13
256,00	310,19	69,98	4,31	180,40	204,71	156,15	326,58	175,01
257,00	307,42	69,61	4,26	180,09	204,84	156,04	325,39	174,95
258,00	305,97	69,82	4,21	180,65	204,55	156,26	324,81	174,98
259,00	305,69	70,02	4,16	180,66	204,59	155,98	324,08	174,77
260,00	304,51	69,61	4,11	180,34	204,87	155,92	323,50	174,82
261,00	304,08	69,74	4,06	180,43	205,04	155,96	322,79	174,93
262,00	303,89	69,82	4,01	180,04	204,91	156,10	322,49	174,96
263,00	304,57	69,60	3,96	180,04	205,34	156,10	321,79	175,05
264,00	304,48	69,61	3,91	179,66	205,65	156,15	321,17	174,88
265,00	305,59	69,90	3,86	179,72	205,45	156,22	320,72	175,16
266,00	303,86	69,70	3,81	179,46	205,64	156,29	320,48	175,49
267,00	303,58	69,46	3,76	179,25	205,57	156,51	319,73	175,63
268,00	302,63	69,36	3,71	179,18	205,64	156,56	319,33	175,73
269,00	302,01	69,64	3,66	179,16	205,52	156,74	318,60	176,37
270,00	300,25	69,38	3,61	179,02	205,66	156,84	318,20	176,37
271,00	299,42	69,58	3,56	179,03	205,83	156,77	317,55	176,57
272,00	298,02	69,66	3,51	178,86	206,12	156,81	316,79	176,64
273,00	295,98	69,72	3,46	178,88	206,25	157,07	316,30	177,27
274,00	293,07	69,19	3,41	178,55	206,28	157,18	315,73	177,82
275,00	292,95	70,14	3,41	178,51	206,28	156,98	315,01	178,13
276,00	291,42	69,50	3,36	178,38	206,65	157,21	314,29	178,30
277,00	290,14	69,94	3,31	177,94	206,82	157,26	313,29	178,66
278,00	288,78	69,45	3,26	178,66	206,85	157,65	312,42	179,05
279,00	287,87	69,17	3,21	178,50	206,99	157,86	311,48	179,94
280,00	284,16	69,46	3,21	178,27	207,23	158,26	310,83	180,42
281,00	280,71	69,34	3,16	178,06	207,11	158,34	309,85	180,75

282,00	275,18	69,41	3,16	177,58	207,44	158,24	309,01	180,75
283,00	272,10	69,26	3,11	177,82	207,72	158,36	307,13	180,42
284,00	269,27	71,42	3,11	177,51	208,47	157,95	304,72	180,14
285,00	266,39	72,18	3,06	177,66	209,62	157,52	302,46	179,99
286,00	263,04	73,52	3,06	177,81	210,63	157,46	299,85	180,21
287,00	259,42	72,80	3,06	177,73	212,02	157,10	297,15	180,18
288,00	256,53	73,40	3,01	177,64	212,90	156,92	294,24	180,39
289,00	252,87	72,63	3,01	177,67	214,18	156,95	291,13	180,47
290,00	250,17	74,28	2,96	177,96	215,06	157,26	288,17	180,49
291,00	248,58	73,36	2,96	177,61	216,00	157,36	285,01	180,77
292,00	245,57	72,23	2,96	177,39	217,24	157,51	281,84	180,31
293,00	242,75	71,85	2,91	177,09	217,78	157,90	278,78	180,66
294,00	240,27	71,72	2,91	176,15	218,18	158,39	275,70	180,61
295,00	238,78	71,21	2,91	175,92	218,62	158,66	272,72	180,20
296,00	236,54	71,03	2,86	175,15	219,21	159,12	269,45	179,99
297,00	235,13	71,09	2,86	174,67	219,32	159,88	266,48	179,69
298,00	233,43	70,84	2,86	174,36	219,52	160,18	263,66	179,28
299,00	231,90	70,52	2,81	173,66	219,59	160,35	260,93	178,79
300,00	230,84	70,44	2,81	173,05	219,82	160,61	258,46	178,06
301,00	229,73	70,47	2,76	173,09	220,27	160,44	255,79	177,71
302,00	228,91	70,56	2,76	172,90	220,38	160,68	253,28	177,60
303,00	227,45	70,58	2,76	172,16	220,92	160,62	250,90	176,61
304,00	226,20	70,57	2,71	171,56	221,19	160,86	248,42	176,50
305,00	225,34	70,75	2,71	171,36	221,64	161,09	246,53	175,99
306,00	223,91	70,71	2,71	170,93	221,63	161,33	244,33	175,78
307,00	223,16	70,34	2,66	170,46	221,65	161,42	242,68	175,71
308,00	222,34	70,13	2,66	170,02	221,96	161,57	241,05	175,23
309,00	220,65	70,13	2,66	169,45	222,22	161,58	239,39	174,98
310,00	220,56	70,21	2,61	169,26	222,43	161,64	237,62	174,45
311,00	219,46	70,94	2,61	168,76	222,42	161,68	236,19	173,91
312,00	218,76	70,30	2,61	168,40	222,38	161,29	234,94	173,75
313,00	217,87	70,16	2,56	168,32	222,67	161,49	233,61	173,42
314,00	217,20	70,09	2,56	167,90	222,69	161,89	232,13	173,02
315,00	216,31	70,39	2,56	167,20	222,85	162,06	230,89	172,52
316,00	215,48	70,03	2,56	166,60	223,12	162,34	229,47	172,54
317,00	214,98	70,22	2,51	166,52	223,06	162,71	228,29	172,07
318,00	214,05	70,51	2,51	165,88	223,31	162,78	227,29	171,97
319,00	212,98	69,64	2,51	165,52	223,42	162,80	226,31	171,42
320,00	212,57	69,84	2,46	165,17	223,78	162,54	225,39	171,17
321,00	212,02	69,79	2,46	164,57	224,04	162,51	224,37	170,56
322,00	210,36	69,95	2,46	164,39	224,31	162,44	223,33	170,23
323,00	209,62	70,19	2,41	164,19	224,61	162,37	222,39	169,81
324,00	209,30	69,77	2,41	163,78	224,67	162,49	221,61	169,69
325,00	208,28	69,80	2,41	163,86	224,68	162,68	220,60	169,52
326,00	208,02	69,59	2,36	164,06	224,61	163,01	220,06	169,40
327,00	206,64	69,62	2,36	163,98	224,78	163,03	219,07	169,33
328,00	206,36	69,85	2,36	163,36	225,00	162,55	218,48	168,61
329,00	206,25	69,72	2,36	163,19	225,22	162,49	217,67	168,50
330,00	205,12	69,48	2,31	162,59	225,25	162,60	216,78	168,08
331,00	204,83	69,63	2,31	162,23	225,27	162,89	215,99	167,81
332,00	204,00	69,61	2,31	162,09	225,32	163,13	215,48	167,34
333,00	203,28	69,67	2,26	161,93	225,28	163,21	214,99	167,29
334,00	202,10	69,68	2,26	161,64	225,25	163,32	214,28	167,49
335,00	201,61	69,47	2,26	161,31	225,29	163,35	213,56	167,61
336,00	201,11	69,26	2,26	161,30	225,24	163,44	212,83	167,02
337,00	200,27	69,23	2,21	160,69	225,18	163,64	212,32	166,74
338,00	200,21	69,32	2,21	160,53	225,38	163,67	211,67	166,46
339,00	199,05	69,37	2,21	160,21	225,23	163,49	210,99	165,72
340,00	198,44	69,45	2,16	159,80	225,46	163,39	210,42	165,03
341,00	197,72	69,31	2,16	159,55	225,41	163,60	209,66	164,93
342,00	196,69	69,36	2,16	159,45	225,38	163,37	209,04	164,36
343,00	196,19	69,30	2,16	159,25	225,62	163,57	208,44	164,38
344,00	195,63	68,96	2,11	158,98	225,60	163,68	207,82	164,01
345,00	195,27	69,10	2,11	158,47	225,72	163,36	207,07	163,47
346,00	195,64	69,25	2,11	158,44	226,37	163,07	206,19	162,56
347,00	195,45	69,14	2,06	157,92	226,36	163,26	205,45	162,31
348,00	194,81	69,55	2,06	157,57	226,76	163,25	204,92	161,66
349,00	194,25	69,71	2,06	157,56	226,74	163,22	204,44	161,45
350,00	193,77	69,52	2,06	157,60	226,78	163,32	204,04	161,34
351,00	193,72	70,00	2,01	157,45	227,27	163,20	203,59	160,71
352,00	193,44	69,77	2,01	157,15	227,75	163,07	203,02	159,91
353,00	193,85	69,58	2,01	156,55	228,13	162,77	202,12	158,42
354,00	192,98	70,39	1,96	155,89	228,37	162,21	201,27	157,36
355,00	192,80	70,41	1,96	155,72	228,95	162,09	200,47	157,59
356,00	192,89	69,24	1,96	156,09	229,07	162,18	200,01	157,59
357,00	191,97	70,31	1,96	156,31	229,82	161,63	199,63	157,06
358,00	191,14	72,08	1,96	156,89	230,31	161,33	199,09	156,89
359,00	190,08	71,79	1,91	156,94	230,73	161,03	198,90	156,57
360,00	189,36	72,63	1,91	157,31	231,34	160,83	198,69	156,23
361,00	188,31	72,56	1,91	157,42	231,73	160,72	198,64	155,98
362,00	187,42	72,58	1,91	157,68	232,33	160,66	198,29	155,88
363,00	186,89	73,58	1,86	157,97	232,87	160,77	198,00	155,63
364,00	186,50	72,60	1,86	158,09	233,37	160,80	197,60	155,42
365,00	186,18	73,66	1,86	158,05	233,61	161,00	197,10	155,57
366,00	185,83	73,60	1,86	158,32	233,65	160,96	196,83	155,22
367,00	185,33	72,80	1,81	157,93	233,93	161,11	196,51	155,13
368,00	185,20	72,85	1,81	157,61	234,35	161,42	195,83	154,84
369,00	184,65	73,96	1,81	157,60	234,46	161,48	195,44	154,61
370,00	184,36	72,54	1,81	157,59	234,77	161,45	194,72	154,30
371,00	184,07	72,02	1,76	157,22	234,83	161,69	194,41	154,44
372,00	183,30	71,81	1,76	157,05	234,80	161,75	194,04	154,01
373,00	182,60	71,47	1,76	156,81	234,60	162,01	193,58	153,80
374,00	182,47	71,46	1,76	156,52	234,30	161,98	193,18	153,21
375,00	182,11	71,51	1,71	156,35	234,35	161,99	192,56	153,09
376,00	182,12	71,28	1,71	156,02	233,59	162,05	192,11	152,98

377,00	181,23	71,19	1,71	155,77	233,45	162,01	192,01	152,32
378,00	181,23	71,30	1,71	155,33	233,10	161,96	191,62	151,59
379,00	180,66	71,15	1,66	155,41	232,51	161,75	191,43	151,15
380,00	180,74	70,81	1,66	155,50	232,12	161,78	190,81	150,93
381,00	180,05	70,86	1,66	155,30	231,41	161,87	190,43	150,99
382,00	179,48	70,68	1,66	155,06	230,85	162,16	190,00	151,09
383,00	179,19	70,67	1,61	154,75	230,53	161,85	189,48	150,73
384,00	178,80	70,73	1,61	154,67	229,91	162,11	188,95	150,78
385,00	178,67	71,23	1,61	154,76	229,42	162,28	188,73	151,14
386,00	178,36	70,56	1,61	154,55	228,84	162,36	188,29	150,90
387,00	178,28	70,62	1,56	154,75	228,28	162,39	188,01	150,37
388,00	177,57	70,65	1,56	154,25	227,63	162,21	187,61	150,27
389,00	177,60	70,61	1,56	153,97	227,24	162,35	187,15	150,03
390,00	177,48	70,44	1,56	153,37	226,95	162,04	186,77	149,30
391,00	177,24	70,58	1,56	153,44	226,82	161,86	186,35	148,71
392,00	177,22	70,34	1,51	153,01	226,66	161,68	186,06	148,14
393,00	177,04	70,96	1,51	152,76	226,26	161,64	185,64	147,73
394,00	176,78	70,82	1,51	152,63	226,25	161,52	185,25	147,14
395,00	176,04	70,59	1,51	152,37	225,91	161,47	184,87	147,28
396,00	176,16	70,48	1,46	152,08	225,81	161,47	184,66	147,44
397,00	175,78	70,95	1,46	151,50	225,49	161,31	184,32	147,01
398,00	175,75	70,60	1,46	151,64	225,10	161,07	183,84	147,24
399,00	175,20	70,30	1,46	151,42	224,96	160,84	183,36	147,11
400,00	174,89	70,69	1,46	151,16	224,69	160,81	183,35	146,97
401,00	174,72	70,44	1,41	151,05	224,20	160,97	183,12	146,55
402,00	174,21	70,44	1,41	151,23	223,98	161,04	182,91	146,44
403,00	174,31	70,35	1,41	150,77	223,88	160,89	182,39	146,22
404,00	173,86	70,58	1,41	150,37	223,52	160,83	182,05	146,05
405,00	173,71	70,54	1,36	149,96	223,27	160,80	181,70	145,86
406,00	173,47	70,19	1,36	149,96	222,96	160,73	181,54	145,98
407,00	173,27	70,46	1,36	149,58	222,59	160,60	181,23	145,96
408,00	172,95	70,71	1,36	149,72	222,60	160,59	180,96	145,48
409,00	173,10	70,42	1,36	149,56	222,14	160,57	180,68	145,35
410,00	172,72	70,35	1,31	149,52	221,86	160,47	180,53	145,38
411,00	172,59	70,38	1,31	149,05	221,69	160,27	180,19	145,41
412,00	172,55	70,20	1,31	148,37	221,32	160,34	179,85	145,20
413,00	172,14	70,34	1,31	148,18	221,08	160,26	179,61	145,10
414,00	171,83	70,22	1,26	147,65	220,69	160,38	179,27	145,26
415,00	172,09	70,22	1,26	147,71	220,30	160,21	179,10	144,72
416,00	171,93	71,35	1,26	147,70	220,39	159,95	178,65	144,16
417,00	171,99	70,69	1,26	147,65	220,23	159,73	178,37	143,67
418,00	171,43	70,27	1,26	147,52	220,24	159,58	178,29	143,45
419,00	171,37	69,93	1,21	147,26	220,08	159,35	177,79	143,20
420,00	171,67	70,57	1,21	147,08	219,75	159,36	177,60	143,45
421,00	171,24	70,44	1,21	146,98	219,78	159,16	177,41	143,13
422,00	170,96	70,35	1,21	146,45	219,44	159,09	177,29	143,15
423,00	170,77	70,39	1,16	146,29	219,10	159,08	177,03	142,88
424,00	170,46	70,42	1,16	146,26	219,00	158,91	176,78	142,84
425,00	170,08	70,25	1,16	145,65	218,70	159,08	176,83	143,09
426,00	169,73	70,46	1,16	145,58	218,57	158,77	176,71	142,83
427,00	169,71	70,27	1,16	145,38	218,38	158,55	176,22	142,57
428,00	169,70	70,26	1,11	145,40	218,21	158,54	175,90	142,32
429,00	169,60	70,03	1,11	145,10	217,88	158,43	175,58	142,08
430,00	169,36	70,16	1,11	144,88	217,89	158,21	175,39	141,86
431,00	168,50	69,89	1,11	144,57	217,65	158,09	175,25	141,21
432,00	168,16	69,84	1,11	144,55	217,50	158,16	175,01	141,00
433,00	168,07	69,84	1,06	144,25	217,39	158,24	174,76	141,38
434,00	168,41	69,92	1,06	144,05	217,18	158,10	174,65	141,37
435,00	167,93	69,99	1,06	143,68	216,84	157,79	174,45	141,27
436,00	167,82	70,32	1,06	143,45	216,76	157,56	174,20	140,86
437,00	167,39	69,94	1,06	143,23	216,53	157,56	174,01	141,06
438,00	167,23	69,72	1,01	143,05	216,33	157,32	173,72	140,72
439,00	167,25	70,53	1,01	143,02	216,29	157,00	173,48	140,19
440,00	167,09	70,17	1,01	142,79	216,40	156,83	173,12	139,60
441,00	166,79	69,99	1,01	142,35	216,27	156,44	172,81	139,00
442,00	166,64	70,22	0,96	142,11	216,05	156,19	172,77	138,87
443,00	166,21	70,28	0,96	142,16	216,08	155,80	172,40	138,63
444,00	166,48	70,26	0,96	141,93	215,95	155,49	172,18	138,23
445,00	166,35	69,88	0,96	141,58	215,80	155,42	171,93	138,14
446,00	166,06	70,20	0,96	141,85	215,94	155,27	171,75	138,57
447,00	165,77	69,98	0,91	141,52	215,86	155,05	171,53	138,21
448,00	165,63	70,22	0,91	141,14	215,75	154,80	171,42	137,90
449,00	165,42	70,13	0,91	140,77	215,52	154,75	171,13	138,00
450,00	164,95	70,05	0,91	140,79	215,66	154,11	170,83	137,79
451,00	165,06	70,02	0,91	140,55	215,39	154,20	170,69	138,00
452,00	164,92	70,01	0,86	140,52	215,32	154,34	170,50	138,05
453,00	164,58	69,98	0,86	140,00	215,17	154,47	170,13	137,88
454,00	164,51	70,04	0,86	139,91	214,96	154,29	170,04	137,97
455,00	164,66	70,04	0,86	139,67	214,86	154,04	169,66	137,69
456,00	164,48	70,33	0,86	139,52	214,99	153,82	169,42	137,39
457,00	164,48	69,76	0,81	139,24	214,66	153,59	169,26	137,37
458,00	164,09	69,72	0,81	139,12	214,71	153,35	168,98	136,45
459,00	164,18	70,13	0,81	138,99	214,71	153,48	168,82	136,60
460,00	163,76	70,09	0,81	138,66	214,78	153,13	168,59	136,31
461,00	163,85	69,97	0,81	138,47	214,43	153,10	168,52	136,33
462,00	163,46	70,08	0,76	138,36	214,52	152,82	168,36	136,23
463,00	163,47	70,74	0,76	138,35	214,76	152,59	168,18	135,92
464,00	163,39	70,01	0,76	138,13	214,84	152,44	168,03	135,36
465,00	162,66	70,44	0,76	137,78	214,73	152,26	167,83	135,54
466,00	162,72	70,45	0,71	137,64	214,78	152,11	167,71	135,72
467,00	162,28	70,31	0,71	137,52	214,85	151,92	167,63	135,50
468,00	161,74	71,02	0,71	137,20	214,72	152,02	167,38	135,44
469,00	161,31	70,16	0,71	136,39	215,20	151,45	167,06	134,50
470,00	161,01	70,03	0,71	136,08	215,08	151,30	166,51	134,70
471,00	160,34	70,00	0,71	136,26	214,90	151,31	166,43	135,02

472,00	159,95	70,02	0,66	136,20	214,87	151,08	166,27	134,64
473,00	159,79	70,02	0,66	136,17	214,93	150,87	165,96	134,80
474,00	159,42	69,85	0,66	135,61	214,79	150,75	165,58	134,80
475,00	159,46	70,10	0,66	135,57	214,70	150,64	165,42	134,94
476,00	159,00	70,32	0,66	135,34	214,61	150,48	165,15	134,01
477,00	158,72	70,11	0,66	135,20	214,79	150,37	164,89	133,31
478,00	158,74	70,03	0,61	135,06	215,10	150,12	164,37	133,02
479,00	158,40	70,55	0,61	134,72	215,12	149,45	163,95	132,72
480,00	157,92	70,02	0,61	134,59	215,11	149,26	163,55	132,77
481,00	157,79	70,09	0,61	134,34	215,13	149,28	163,39	132,92
482,00	157,61	70,64	0,61	134,26	214,86	149,12	163,24	133,14
483,00	156,81	69,95	0,61	134,03	214,79	148,85	162,97	132,68
484,00	156,39	70,25	0,61	133,58	214,68	148,83	162,75	132,66
485,00	156,33	70,21	0,56	133,50	214,59	148,85	162,41	132,55
486,00	156,19	70,32	0,56	133,32	214,90	148,56	162,05	132,00
487,00	155,94	70,66	0,56	133,01	215,06	148,14	161,33	131,70
488,00	155,81	70,48	0,56	132,98	214,95	147,90	161,03	131,44
489,00	155,61	70,70	0,56	132,72	215,10	147,37	160,75	131,34
490,00	155,35	70,80	0,51	132,56	215,05	147,34	160,49	131,26
491,00	155,13	69,72	0,51	132,38	214,99	147,20	160,08	131,53
492,00	154,72	69,36	0,51	132,18	215,11	146,76	159,83	131,11
493,00	154,26	69,40	0,51	131,74	214,93	146,71	159,39	131,08
494,00	153,94	69,37	0,51	131,48	214,87	146,69	159,34	130,79
495,00	154,27	69,13	0,46	131,91	214,67	146,72	158,99	130,63
496,00	154,01	69,25	0,46	131,63	214,46	146,56	158,84	130,83
497,00	153,82	69,34	0,46	131,80	214,26	146,60	158,70	130,83
498,00	153,52	69,15	0,46	131,60	214,03	146,53	158,56	131,11
499,00	153,61	69,34	0,46	131,11	213,92	146,41	158,34	130,98
500,00	153,27	69,24	0,46	130,85	213,58	146,44	158,15	130,76
501,00	153,52	69,24	0,41	130,93	213,35	146,22	157,92	130,56
502,00	153,36	69,28	0,41	130,63	213,16	146,18	157,77	130,31
503,00	153,42	69,28	0,41	130,37	212,99	146,28	157,57	130,40
504,00	153,23	69,36	0,41	130,16	212,68	146,08	157,28	130,27
505,00	153,00	69,19	0,41	129,76	212,72	145,90	157,26	129,79
506,00	153,37	69,16	0,41	129,57	212,83	145,42	157,10	129,33
507,00	153,31	69,33	0,41	129,30	212,77	145,29	156,88	129,16
508,00	153,06	69,09	0,36	129,31	212,64	145,22	156,83	129,20
509,00	152,83	69,24	0,36	128,95	212,62	145,14	156,63	129,17
510,00	152,91	69,16	0,36	128,81	212,24	145,01	156,59	129,25
511,00	152,57	69,20	0,36	128,75	212,46	144,81	156,44	129,09
512,00	152,84	69,22	0,36	128,39	212,59	144,48	156,18	128,63
513,00	152,63	69,20	0,31	128,33	212,63	144,28	155,95	128,46
514,00	152,40	69,14	0,31	128,22	212,57	144,02	155,79	128,30
515,00	152,51	69,11	0,31	127,91	212,59	143,96	155,64	128,38
516,00	152,20	68,99	0,31	127,84	212,37	143,83	155,43	128,20
517,00	152,13	69,05	0,31	127,92	212,43	143,59	155,31	127,96
518,00	152,16	69,16	0,31	127,60	212,36	143,61	155,12	127,89
519,00	151,86	69,13	0,26	127,65	212,12	143,57	154,94	127,88
520,00	151,91	69,16	0,26	127,73	212,14	143,47	154,70	127,84
521,00	151,60	69,16	0,26	127,57	211,85	143,20	154,70	127,83
522,00	151,52	69,14	0,26	127,31	212,23	143,01	154,47	127,50
523,00	151,64	69,10	0,26	127,12	211,98	142,98	154,42	127,53
524,00	151,28	69,13	0,26	127,06	211,83	142,89	154,19	127,54
525,00	151,21	68,89	0,21	127,01	211,55	142,83	153,95	127,39
526,00	151,02	69,03	0,21	126,67	211,66	142,40	153,75	126,90
527,00	150,92	69,07	0,21	126,68	211,80	142,19	153,66	126,84
528,00	150,79	69,07	0,21	126,36	211,71	142,17	153,49	126,86
529,00	150,56	68,95	0,21	126,33	211,76	141,98	153,35	126,71
530,00	150,71	68,91	0,21	126,21	211,72	141,78	153,23	126,66
531,00	150,39	68,97	0,16	125,93	211,65	141,66	153,09	126,71
532,00	150,43	68,87	0,16	125,70	211,62	141,64	152,92	126,71
533,00	150,59	68,90	0,16	125,47	211,54	141,53	152,75	126,82
534,00	150,39	68,70	0,16	125,21	211,64	141,45	152,67	126,55
535,00	150,70	68,74	0,16	125,17	211,60	141,16	152,59	126,35
536,00	150,38	68,82	0,16	125,11	211,51	141,05	152,45	126,08
537,00	150,37	68,77	0,11	125,04	211,61	140,78	152,36	126,03
538,00	150,32	68,69	0,11	125,17	211,53	140,65	152,24	126,04
539,00	150,63	68,79	0,11	124,95	211,41	140,77	152,13	125,92
540,00	150,42	68,67	0,11	124,71	211,19	140,61	151,86	125,90
541,00	150,46	68,61	0,11	124,52	211,16	140,34	151,78	125,50
542,00	150,28	68,75	0,11	124,56	211,33	140,09	151,80	125,32
543,00	149,95	68,75	0,11	124,39	211,28	139,97	151,76	125,05
544,00	149,77	68,71	0,06	124,26	211,31	139,73	151,67	124,96
545,00	149,77	68,67	0,06	124,16	211,33	139,67	151,59	124,82
546,00	149,54	68,71	0,06	124,04	211,28	139,52	151,41	124,76
547,00	149,76	68,74	0,06	124,06	211,18	139,45	151,23	124,82
548,00	149,70	68,76	0,06	124,10	211,08	139,36	151,17	124,89
549,00	149,63	68,70	0,01	123,89	210,99	139,16	151,20	124,70
550,00	84,81	68,50	8,00	69,29	70,25	68,30	69,35	67,72
551,00	222,26	68,53	7,90	69,53	70,07	68,30	69,59	67,77
552,00	484,48	68,72	7,60	69,63	69,81	68,25	70,20	67,77
553,00	670,07	68,94	7,30	69,75	69,62	68,21	72,34	67,89
554,00	726,62	69,14	6,90	70,26	69,46	68,19	77,98	68,22
555,00	728,71	69,47	6,61	70,65	69,38	68,18	88,21	68,78
556,00	703,02	69,67	6,40	71,08	69,39	68,23	102,93	69,64
557,00	703,34	69,88	6,10	71,72	69,57	68,27	120,21	70,85
558,00	691,52	69,70	5,90	72,57	69,80	68,38	139,87	72,20
559,00	715,10	69,85	5,70	73,63	70,19	68,46	160,91	73,81
560,00	746,03	70,09	5,40	74,83	70,73	68,62	183,10	75,71
561,00	789,25	70,30	5,10	76,33	71,40	68,86	206,72	77,96
562,00	824,25	70,60	4,70	78,13	72,25	69,13	233,51	80,63
563,00	866,74	70,69	4,40	80,31	73,35	69,50	260,35	83,78
564,00	903,18	70,85	4,10	82,80	74,44	69,93	288,05	86,82
565,00	932,80	71,19	3,80	85,66	75,79	70,46	316,64	90,28
566,00	888,43	71,56	5,60	88,72	77,58	71,10	342,19	94,55

567,00	917,76	71,65	3,10	92,66	79,79	72,01	366,80	99,11
568,00	694,85	71,46	2,90	98,09	82,35	73,10	388,88	103,44
569,00	634,52	71,29	2,80	102,66	85,08	74,29	405,51	107,78
570,00	595,36	71,22	2,70	106,52	87,80	75,62	416,19	111,52
571,00	567,87	71,32	2,60	110,57	90,77	77,11	423,69	115,47
572,00	616,34	71,61	2,40	114,13	94,22	78,71	426,74	120,15
573,00	593,90	71,80	2,40	117,99	97,77	80,42	426,29	124,91
574,00	607,71	71,71	4,70	121,83	101,66	82,44	422,59	129,14
575,00	737,93	71,77	4,50	125,09	105,43	84,44	418,00	132,22
576,00	766,53	72,08	4,00	128,30	109,24	86,59	415,69	135,27
577,00	748,88	72,05	3,80	131,24	111,70	88,55	416,64	137,37
578,00	762,72	72,42	3,50	134,00	114,47	90,63	419,72	140,30
579,00	780,75	72,43	3,20	136,63	117,18	92,63	426,91	142,85
580,00	748,28	72,23	3,00	139,04	119,43	94,52	435,71	146,23
581,00	710,35	72,38	2,90	141,92	121,93	96,38	446,05	149,55
582,00	676,11	71,97	2,70	145,02	124,50	98,19	455,40	154,36
583,00	651,28	72,00	2,60	148,16	126,96	99,88	461,86	158,25
584,00	629,39	71,93	2,60	151,14	128,91	102,11	464,80	162,11
585,00	607,98	71,91	2,50	153,80	131,23	104,11	463,10	164,63
586,00	591,22	71,90	2,40	156,60	133,44	106,08	458,87	167,83
587,00	571,52	71,78	2,40	158,57	135,51	108,02	450,33	169,83
588,00	551,87	71,55	2,30	160,75	137,71	109,92	440,83	171,60
589,00	535,86	71,56	2,30	162,65	139,65	112,14	429,32	173,61
590,00	523,02	71,63	2,30	164,45	141,64	114,33	418,20	174,71
591,00	511,01	71,47	2,20	165,93	143,87	116,16	405,94	176,08
592,00	500,58	71,53	2,20	166,93	145,43	118,30	393,16	176,33
593,00	462,99	71,59	2,20	168,60	147,94	120,58	381,02	177,56
594,00	421,60	71,84	2,20	168,65	152,92	122,43	367,68	177,74
595,00	412,07	71,82	2,10	169,28	158,10	124,49	354,58	179,89
596,00	393,64	71,82	3,70	167,59	162,84	126,66	340,98	179,24
597,00	371,94	72,20	2,00	167,99	167,62	129,02	327,28	179,43
598,00	349,64	71,80	2,00	166,64	172,06	131,17	313,52	177,88
599,00	331,38	72,01	2,00	164,78	176,58	132,63	300,14	174,93
600,00	315,59	71,96	1,90	163,14	180,71	134,47	287,75	173,66
601,00	303,51	71,70	1,90	161,79	184,78	135,69	275,83	172,16
602,00	295,63	71,66	1,80	160,52	188,72	136,68	265,07	171,13
603,00	287,31	71,36	1,80	157,66	192,65	136,85	254,09	167,42
604,00	275,80	69,61	1,70	154,87	196,16	136,28	243,86	165,03
605,00	270,60	69,95	0,80	154,56	199,12	137,28	234,92	164,35
606,00	245,63	70,20	0,30	153,23	201,37	138,66	227,00	162,95
607,00	220,84	70,60	1,80	152,00	203,57	139,78	219,85	160,59
608,00	206,31	70,56	2,00	150,86	205,92	140,50	212,91	159,42
609,00	196,68	70,58	1,90	149,06	207,70	141,57	206,06	157,34
610,00	194,44	70,87	1,80	146,41	208,74	142,16	199,85	155,78
611,00	184,21	70,83	1,80	143,41	210,73	141,96	193,42	153,51
612,00	177,04	70,97	1,70	141,10	212,34	142,23	187,50	151,21
613,00	171,37	70,71	1,70	138,88	213,89	142,12	182,12	148,89
614,00	166,31	70,92	1,70	137,51	215,29	142,15	176,73	147,64
615,00	161,94	70,80	1,70	135,09	216,52	141,51	171,44	145,36
616,00	158,21	70,74	1,70	133,11	217,12	141,19	166,78	143,38
617,00	154,45	70,71	1,70	130,63	218,44	139,89	159,56	141,76
618,00	149,61	70,83	1,70	125,76	220,30	137,06	145,31	141,79
619,00	145,55	70,76	1,70	121,14	222,15	134,80	133,64	141,39
620,00	141,14	70,87	1,60	116,62	223,59	132,54	124,35	140,79
621,00	136,75	70,55	1,60	113,03	224,76	129,82	116,60	139,32
622,00	133,23	70,64	1,60	109,71	225,65	127,31	110,15	137,81
623,00	129,98	70,67	1,60	106,84	225,95	125,31	104,84	136,35
624,00	126,78	70,81	1,60	103,92	225,94	123,22	100,24	134,69
625,00	123,62	70,79	1,60	101,20	225,42	120,99	96,32	132,73
626,00	120,63	70,75	1,50	98,76	224,52	119,06	93,08	130,49
627,00	117,70	70,69	1,50	96,34	223,11	116,52	90,39	128,12
628,00	115,13	71,02	1,50	94,26	221,69	114,64	88,07	125,86
629,00	113,03	70,98	1,50	92,47	220,09	113,29	86,04	123,26
630,00	110,65	70,91	1,50	90,89	218,08	111,13	84,29	121,13
631,00	108,19	71,00	1,50	89,24	215,51	108,94	82,94	119,21
632,00	106,11	71,15	1,50	87,96	213,58	107,15	81,71	117,64
633,00	104,22	70,88	1,50	86,66	211,01	105,44	80,63	115,89
634,00	102,69	70,77	1,50	85,68	208,70	104,15	79,72	114,24
635,00	101,14	70,89	1,40	84,76	206,30	102,93	78,84	112,35
636,00	100,04	70,90	1,40	83,93	203,75	102,13	78,10	110,81
637,00	98,30	70,88	1,40	83,09	200,89	100,51	77,52	109,18
638,00	96,85	70,96	1,40	82,31	198,07	99,28	76,98	107,51
639,00	95,51	71,12	1,40	81,63	195,53	98,06	76,45	106,18
640,00	94,22	71,02	1,40	80,91	192,64	96,83	76,02	104,84
641,00	93,67	70,94	1,40	80,48	190,58	95,74	75,48	103,16
642,00	92,91	70,97	1,40	79,89	187,73	93,33	75,41	101,62
643,00	92,78	70,72	51,67	79,50	185,14	92,96	74,90	99,12
644,00	92,39	70,57	41,38	79,49	182,47	92,39	74,36	96,21
645,00	91,17	70,65	1,40	79,27	180,21	90,77	74,31	94,84
646,00	90,02	70,68	1,40	78,87	177,83	89,11	74,24	94,04
647,00	89,14	70,67	1,40	78,50	175,56	87,57	74,27	93,32
648,00	88,31	70,72	1,40	78,16	173,23	86,23	74,19	92,58
649,00	87,67	70,81	1,40	77,97	171,05	85,24	74,22	91,84
650,00	88,25	70,46	1,40	78,57	168,85	85,78	75,04	90,26
651,00	89,44	70,57	1,40	79,50	166,46	86,53	75,82	88,90
652,00	88,79	70,49	1,50	79,80	164,45	86,85	76,61	88,29
653,00	88,25	70,34	2,30	80,15	162,41	87,22	77,33	87,59
654,00	87,82	70,14	2,60	80,58	160,22	87,70	77,97	86,59
655,00	88,59	70,22	2,60	81,53	157,88	88,30	78,58	85,73
656,00	88,61	70,07	4,30	81,92	155,98	88,70	79,11	85,20
657,00	209,48	70,36	2,40	81,85	151,22	88,77	79,93	84,83
658,00	233,75	70,23	2,40	81,79	147,36	88,62	80,63	84,14
659,00	225,32	70,40	2,30	81,75	143,23	88,62	81,53	83,75
660,00	226,87	70,23	3,40	81,91	140,41	88,56	82,62	83,44
661,00	324,04	70,37	3,30	82,17	137,26	88,56	84,47	83,25

662,00	418,63	70,48	2,90	82,81	134,94	88,71	90,66	83,69
663,00	487,04	70,52	3,97	83,53	133,52	88,91	97,88	84,14
664,00	478,52	70,45	2,50	84,12	130,39	89,04	101,14	84,54
665,00	523,19	70,60	2,30	85,32	127,93	89,31	108,07	84,94
666,00	525,79	70,71	2,10	86,65	125,88	89,56	115,90	85,43
667,00	518,23	70,50	2,00	87,83	123,84	89,74	123,11	86,20
668,00	511,34	66,69	1,90	88,21	122,36	89,60	130,62	87,34
669,00	507,02	66,23	3,10	88,78	121,04	89,69	138,32	88,37
670,00	475,24	66,68	2,00	90,34	120,69	90,25	147,57	90,06
671,00	443,67	67,47	2,20	92,27	120,80	91,15	156,43	92,63
672,00	457,50	67,85	2,20	93,59	120,20	92,16	164,61	94,65
673,00	466,65	68,16	2,10	95,14	120,31	93,33	171,24	96,63
674,00	472,47	68,59	2,00	96,64	120,44	94,62	176,56	98,25
675,00	476,63	69,09	1,90	98,13	120,63	95,85	181,62	100,16
676,00	475,34	69,63	1,90	99,54	120,88	97,29	185,86	101,99
677,00	420,08	69,88	8,10	101,19	122,11	98,58	189,43	103,94
678,00	446,61	70,19	8,40	102,52	122,84	100,11	192,89	105,52
679,00	496,09	70,45	9,10	103,89	123,84	101,71	195,84	106,96
680,00	544,57	70,62	7,60	105,28	124,86	103,30	198,73	108,29
681,00	572,14	71,13	7,40	106,80	125,73	104,91	202,69	110,18
682,00	610,84	71,27	7,20	108,46	127,82	106,52	208,29	112,14
683,00	589,55	71,12	7,00	110,09	128,98	108,14	215,90	114,16
684,00	587,60	71,28	6,90	112,04	132,77	109,82	223,19	116,58
685,00	566,64	71,28	6,70	113,68	136,25	111,87	231,70	119,56
686,00	539,47	71,81	6,60	115,33	139,81	113,79	239,16	121,93
687,00	536,31	71,82	6,40	117,71	141,31	115,80	244,41	123,37
688,00	544,11	71,44	6,30	119,09	142,04	117,57	248,09	124,22
689,00	541,71	71,57	6,10	119,85	143,58	119,22	250,33	124,96
690,00	536,54	71,58	6,00	120,63	144,63	120,97	251,25	125,88
691,00	533,37	71,43	5,90	121,37	146,23	122,45	251,97	126,74
692,00	531,64	71,36	5,80	121,97	147,48	123,99	252,66	127,73
693,00	529,54	71,30	5,70	122,27	149,35	124,87	253,11	128,27
694,00	531,19	71,03	5,50	122,98	150,50	126,35	253,70	129,87
695,00	529,40	71,04	5,40	123,75	151,78	127,88	253,94	131,09
696,00	525,47	70,51	5,30	124,28	153,91	128,58	254,19	132,16
697,00	522,44	70,04	5,20	124,97	155,12	129,87	254,50	133,28
698,00	517,55	70,26	5,10	125,65	156,31	131,32	254,57	134,48
699,00	513,45	70,50	5,00	126,90	157,94	132,87	254,64	135,30
700,00	508,32	70,59	4,90	127,79	159,54	134,37	254,30	136,32
701,00	504,76	70,83	4,80	128,83	160,98	135,99	253,77	137,52
702,00	501,40	70,93	4,70	130,01	162,57	137,56	253,17	138,42
703,00	498,90	71,00	4,70	130,98	163,87	139,03	252,46	139,35
704,00	495,43	71,01	4,60	132,23	165,15	140,67	251,31	140,27
705,00	492,87	70,99	4,50	133,20	166,37	142,26	250,05	141,10
706,00	488,95	71,21	4,40	134,13	168,40	143,61	248,87	141,67
707,00	485,19	70,97	4,30	135,03	169,12	145,17	247,52	142,42
708,00	481,62	71,24	4,30	135,85	171,06	146,72	246,22	143,00
709,00	473,95	71,15	4,20	136,47	172,53	148,17	244,73	143,54
710,00	465,00	70,95	4,10	137,25	173,66	149,65	243,01	144,28
711,00	456,06	71,25	4,10	137,83	175,19	151,18	241,18	144,64
712,00	431,77	71,01	4,30	138,76	178,18	152,53	238,73	145,44
713,00	466,12	71,21	4,20	138,95	179,38	153,89	236,88	145,34
714,00	475,51	70,92	4,10	139,24	179,90	155,43	234,66	145,67
715,00	476,67	71,08	4,00	139,35	181,80	156,70	233,09	145,62
716,00	478,80	71,11	3,90	139,63	182,87	158,09	231,52	145,69
717,00	480,01	71,31	3,90	140,25	183,51	159,29	230,35	145,94
718,00	476,26	71,27	3,80	140,13	185,52	160,22	229,42	146,22
719,00	459,93	71,16	3,70	140,02	187,02	161,22	228,68	146,56
720,00	445,49	70,13	3,70	139,72	187,84	161,45	227,68	146,31
721,00	411,02	70,30	3,60	140,38	190,18	162,46	226,60	146,62
722,00	417,44	70,63	3,60	140,73	190,69	163,76	225,00	146,94
723,00	413,73	70,65	3,50	140,83	191,85	164,62	223,45	146,84
724,00	408,89	70,59	3,50	140,77	192,86	165,56	221,38	145,98
725,00	405,33	70,90	3,40	140,77	193,37	166,19	218,98	145,53
726,00	403,85	71,04	3,40	141,12	194,48	167,00	216,14	145,47
727,00	398,61	71,01	3,30	140,94	194,81	167,72	213,58	145,26
728,00	394,62	71,06	3,30	141,11	195,54	168,24	210,91	144,95
729,00	390,94	71,17	3,20	140,47	196,88	168,14	208,55	144,40
730,00	386,92	71,27	3,20	140,44	196,92	168,83	206,13	144,83
731,00	381,60	70,94	3,20	140,12	198,05	169,13	203,67	144,39
732,00	376,69	70,83	3,10	139,61	198,87	169,19	201,23	144,00
733,00	372,03	71,10	3,10	139,52	198,75	169,66	198,93	143,91
734,00	367,31	70,99	3,10	139,20	200,40	170,00	196,60	143,51
735,00	363,05	71,09	3,00	139,22	199,97	170,33	194,20	143,53
736,00	358,36	71,03	3,00	139,19	200,32	170,38	192,09	142,51
737,00	352,68	71,00	3,00	139,02	200,31	170,41	189,82	141,69
738,00	346,76	71,16	2,90	138,29	200,95	170,28	187,63	140,77
739,00	344,90	71,02	2,90	138,50	200,54	170,38	185,50	140,29
740,00	342,40	71,25	2,90	138,00	201,27	170,36	183,47	139,56
741,00	335,24	71,08	2,80	137,39	201,05	170,16	181,41	138,60
742,00	324,97	70,94	2,80	137,03	201,03	170,14	179,46	138,02
743,00	317,39	71,04	2,80	136,52	201,67	169,98	177,43	137,25
744,00	311,63	70,87	2,70	136,22	201,33	169,89	175,33	136,66
745,00	307,02	70,84	2,70	135,74	201,15	169,88	173,43	136,18
746,00	303,15	71,17	2,70	135,35	201,22	169,77	171,44	135,41
747,00	299,47	71,20	2,70	134,96	201,03	169,65	169,38	134,85
748,00	296,14	71,21	2,60	134,32	201,07	169,47	167,48	133,93
749,00	292,87	71,14	2,60	133,72	201,13	169,24	165,64	133,06
750,00	289,90	71,00	2,60	133,19	200,93	169,01	163,80	132,09
751,00	287,54	70,96	2,60	132,32	201,36	168,73	161,96	131,20
752,00	285,26	70,75	2,50	131,62	201,11	167,93	160,04	129,88
753,00	283,34	70,66	2,50	131,49	200,19	167,80	158,42	129,74
754,00	280,58	70,69	2,50	131,00	200,26	167,69	156,76	129,12
755,00	279,15	70,94	2,50	130,46	199,63	167,50	155,32	128,40
756,00	277,19	70,94	2,40	129,93	199,17	167,40	153,92	127,70

757,00	275,47	70,96	2,40	129,29	198,85	167,10	152,54	126,98
758,00	273,82	70,87	2,40	128,91	198,29	166,94	151,12	126,44
759,00	272,53	70,82	2,40	128,19	198,04	166,68	149,88	125,81
760,00	272,27	71,00	2,30	127,78	197,73	166,39	148,71	125,28
761,00	279,03	70,84	2,30	127,18	196,79	166,18	147,58	124,74
762,00	282,67	70,96	2,30	126,53	196,23	165,88	146,54	124,08
763,00	285,60	70,94	2,30	126,12	195,89	165,60	145,67	123,50
764,00	287,46	70,93	2,20	125,55	195,56	165,35	144,85	122,95
765,00	287,44	70,85	2,20	124,95	195,53	165,02	144,11	122,39
766,00	283,41	70,92	2,20	124,51	194,69	164,78	143,37	121,92
767,00	278,23	70,75	2,20	124,15	194,22	164,49	142,74	121,28
768,00	277,37	70,92	2,20	124,03	193,74	164,24	142,28	120,66
769,00	276,31	70,96	2,20	123,56	193,43	164,06	141,72	120,29
770,00	274,66	70,96	2,20	123,35	192,74	163,89	141,18	119,84
771,00	272,32	70,97	2,10	123,02	192,16	163,72	140,79	119,43
772,00	270,33	70,91	2,10	122,36	191,86	163,54	140,38	119,07
773,00	268,75	70,99	2,10	122,30	191,38	163,33	139,82	118,66
774,00	266,57	70,99	2,10	121,72	191,14	163,22	139,54	118,31
775,00	264,07	70,97	2,10	121,35	190,51	163,12	139,05	117,86
776,00	262,16	71,01	2,10	121,05	190,56	162,88	138,52	117,47
777,00	259,89	70,87	2,10	120,74	190,07	162,64	138,06	117,05
778,00	257,65	70,94	2,10	120,63	189,53	162,54	137,60	116,63
779,00	256,76	70,87	2,00	120,13	189,50	162,23	137,15	116,33
780,00	255,20	70,93	2,00	119,83	189,02	162,03	136,53	116,07
781,00	253,66	70,92	2,00	119,48	188,77	161,82	136,05	115,77
782,00	251,67	70,89	2,00	119,10	188,53	161,49	135,53	115,38
783,00	249,91	70,75	2,00	119,06	188,14	161,26	135,07	115,07
784,00	248,21	70,85	2,00	118,75	187,78	160,94	134,65	114,76
785,00	246,06	70,78	2,00	118,40	187,27	160,66	134,05	114,43
786,00	244,32	70,74	2,00	117,97	187,18	160,33	133,56	114,14
787,00	242,76	70,79	2,00	117,83	186,48	160,03	133,10	113,60
788,00	241,22	70,81	2,00	117,60	185,90	159,78	132,47	113,45
789,00	239,57	70,75	2,00	117,27	185,89	159,39	132,03	113,05
790,00	238,03	70,75	2,00	116,89	185,46	158,98	131,51	112,67
791,00	236,09	70,70	1,99	116,50	185,05	158,63	131,02	112,35
792,00	234,39	70,69	1,90	116,18	184,99	158,29	130,39	111,99
793,00	233,02	70,67	1,90	115,79	184,27	157,88	129,91	111,68
794,00	231,50	70,72	1,90	115,50	183,98	157,55	129,37	111,26
795,00	230,30	70,64	1,90	115,39	183,27	157,18	128,82	111,04
796,00	228,62	70,65	1,90	115,05	182,94	156,75	128,35	110,65
797,00	227,62	70,76	1,90	114,67	182,63	156,31	127,92	110,31
798,00	226,59	70,74	1,90	114,35	182,69	155,87	127,38	109,91
799,00	225,37	70,67	1,90	114,11	182,40	155,53	126,81	109,67
800,00	223,95	70,66	1,90	113,84	181,83	154,99	126,27	109,28
801,00	222,49	70,54	1,90	113,54	181,47	154,61	125,78	109,04
802,00	221,33	70,65	1,90	113,35	180,63	154,20	125,29	108,82
803,00	220,60	70,49	1,90	113,20	180,18	153,75	124,78	108,42
804,00	219,70	70,52	1,90	112,70	179,84	153,20	124,29	107,97
805,00	218,95	70,58	1,90	112,45	179,60	152,82	123,83	107,75
806,00	218,20	70,50	1,90	112,07	178,79	152,41	123,31	107,41
807,00	217,73	70,50	1,80	111,80	178,48	151,88	122,96	106,97
808,00	217,22	70,49	1,80	111,61	177,85	151,48	122,48	106,67
809,00	216,50	70,47	1,80	111,14	177,85	150,90	122,14	106,23
810,00	215,71	70,43	1,80	110,84	176,79	150,51	121,74	105,99
811,00	214,45	70,47	1,80	110,65	176,51	150,12	121,33	105,70
812,00	213,41	70,48	1,80	110,37	175,90	149,68	120,91	105,36
813,00	212,58	70,47	1,80	110,01	175,50	149,29	120,67	104,99
814,00	211,59	70,51	1,80	109,77	174,94	148,79	120,30	104,80
815,00	210,01	70,52	1,80	109,47	174,50	148,47	119,98	104,41
816,00	208,81	70,48	1,80	109,17	174,03	148,05	119,54	104,26
817,00	207,98	70,38	1,80	108,98	173,30	147,59	119,24	104,11
818,00	207,00	70,32	1,80	109,00	173,26	147,27	118,89	103,90
819,00	205,98	70,36	1,80	108,50	172,55	146,79	118,54	103,56
820,00	205,12	70,37	1,80	108,32	171,97	146,38	118,20	103,26
821,00	204,61	70,33	1,80	108,12	171,93	146,01	117,87	102,86
822,00	204,24	70,38	1,80	107,85	171,31	145,65	117,55	102,58
823,00	203,88	70,41	1,80	107,66	170,66	145,26	117,19	102,32
824,00	203,57	70,36	1,70	107,23	170,26	144,92	116,86	101,94
825,00	202,98	70,39	1,70	107,04	169,61	144,64	116,55	101,86
826,00	202,63	70,42	1,70	106,72	169,15	144,31	116,26	101,55
827,00	202,34	70,37	1,70	106,61	168,76	143,98	115,92	101,35
828,00	201,93	70,33	1,70	106,44	168,13	143,64	115,61	101,02
829,00	201,33	70,29	1,70	106,00	167,87	143,32	115,37	100,82
830,00	201,11	70,27	1,70	105,86	166,96	143,01	115,17	100,91
831,00	200,73	70,34	1,70	105,64	166,32	142,66	114,83	100,55
832,00	200,97	70,30	1,70	105,32	166,06	142,23	114,55	100,21
833,00	201,73	70,29	1,70	105,12	165,11	141,96	114,32	100,11
834,00	202,86	70,26	1,70	104,92	164,77	141,62	114,05	99,72
835,00	204,22	70,26	1,70	104,70	163,98	141,34	113,88	99,45
836,00	205,93	70,28	1,70	104,51	163,55	141,09	113,62	99,25
837,00	207,20	70,25	1,70	104,37	162,97	140,75	113,48	99,03
838,00	208,13	70,22	1,70	104,13	162,44	140,58	113,28	98,80
839,00	208,11	70,23	1,70	103,84	162,07	140,25	113,14	98,55
840,00	207,30	70,26	1,60	103,80	161,47	140,04	113,00	98,33
841,00	206,69	70,25	1,60	103,66	161,04	139,78	113,00	98,14
842,00	205,88	70,20	1,60	103,53	160,41	139,55	112,87	98,11
843,00	204,30	70,23	1,60	103,24	160,20	139,33	112,86	97,95
844,00	203,39	70,29	1,60	103,18	159,42	139,14	112,80	97,87
845,00	202,61	70,21	1,60	103,03	159,39	138,97	112,76	97,65
846,00	201,51	70,21	1,60	102,99	158,87	138,85	112,67	97,65
847,00	200,52	70,18	1,60	102,84	158,23	138,65	112,59	97,59
848,00	199,56	70,28	1,60	102,64	158,02	138,52	112,40	97,19
849,00	198,78	70,24	1,60	102,62	157,44	138,35	112,31	97,22
850,00	197,93	70,19	1,60	102,54	156,94	138,25	112,21	97,00
851,00	197,07	70,19	1,60	102,47	156,62	138,03	112,09	96,81



852,00	195,88	70,05	1,60	102,27	156,86	137,73	111,91	96,49
853,00	194,56	70,09	1,60	102,28	155,93	137,50	111,67	96,39
854,00	193,49	70,07	1,60	102,15	155,42	137,32	111,53	96,33
855,00	181,25	70,05	1,60	102,13	157,31	137,32	111,30	96,47
856,00	162,71	70,09	1,60	101,74	159,10	137,02	111,10	96,60
857,00	152,96	70,16	1,60	101,49	160,63	136,89	110,86	96,47
858,00	146,76	70,01	1,60	101,14	162,28	136,74	110,65	96,47
859,00	142,17	70,17	1,60	100,80	163,77	136,62	110,32	96,52
860,00	138,54	70,09	1,60	100,46	165,06	136,45	109,95	96,45
861,00	135,62	70,13	1,60	100,24	166,18	136,21	109,51	96,40
862,00	132,96	70,11	1,60	99,87	167,26	135,98	108,92	96,31
863,00	130,45	70,10	1,60	99,50	168,28	135,69	108,36	96,07
864,00	128,56	70,06	1,60	99,21	169,14	135,34	107,82	95,95
865,00	126,39	69,98	1,60	98,89	169,77	134,97	107,19	95,75
866,00	124,26	70,05	1,60	98,48	170,32	134,59	106,56	95,40
867,00	122,67	70,14	1,60	98,21	171,03	134,28	105,83	95,72
868,00	121,09	70,13	1,60	97,86	171,30	133,69	105,26	95,75
869,00	119,46	70,16	1,60	97,53	171,63	133,28	104,68	95,49
870,00	118,01	70,09	1,60	97,12	171,64	132,81	104,07	95,26
871,00	116,63	69,97	1,60	96,77	171,77	132,33	103,48	94,90
872,00	115,11	69,91	1,60	96,38	171,68	131,82	102,92	94,64
873,00	113,53	69,99	1,60	96,05	171,64	131,26	102,31	94,46
874,00	112,14	70,10	1,60	95,66	171,45	130,75	101,71	94,25
875,00	110,72	70,14	1,60	95,32	171,32	130,21	101,10	93,82
876,00	109,27	70,06	1,60	94,94	171,04	129,62	100,44	93,25
877,00	108,00	70,02	1,60	94,62	170,81	129,01	99,79	93,00
878,00	106,73	70,09	1,60	94,22	170,18	128,50	99,28	92,82
879,00	105,60	69,98	1,60	93,85	169,96	127,73	98,64	92,20
880,00	104,56	70,00	1,60	93,52	169,50	127,16	98,06	92,04
881,00	103,62	69,92	1,60	93,07	168,96	126,55	97,68	91,64
882,00	102,62	69,78	1,60	92,70	168,63	125,94	97,18	91,25
883,00	101,63	69,75	1,60	92,29	168,00	125,31	96,65	90,92
884,00	100,80	69,72	1,60	91,77	167,36	124,63	96,27	90,57
885,00	99,95	69,67	1,60	91,38	166,83	123,93	95,81	90,45
886,00	98,51	69,40	1,60	90,98	166,38	122,74	95,41	90,07
887,00	97,79	69,56	1,60	90,57	165,54	122,22	94,98	89,76
888,00	97,01	69,64	1,60	90,25	164,79	121,64	94,53	89,47
889,00	96,40	69,63	1,60	89,98	164,25	121,03	94,14	89,18
890,00	95,72	69,64	1,60	89,57	163,36	120,45	93,69	88,94
891,00	95,30	69,65	1,60	89,29	162,73	119,81	93,30	88,67
892,00	94,66	69,75	1,60	89,05	161,76	119,17	92,93	88,41
893,00	94,20	69,71	1,60	88,74	160,91	118,58	92,57	88,20
894,00	93,65	69,68	1,60	88,32	160,05	117,96	92,18	87,87
895,00	93,22	69,73	1,60	88,05	159,31	117,29	91,75	87,50
896,00	92,70	69,82	1,60	87,75	158,50	116,65	91,36	87,05
897,00	92,31	69,67	1,60	87,44	157,74	116,02	91,04	86,90
898,00	91,93	69,81	1,60	87,22	156,96	115,43	90,75	86,70
899,00	91,45	69,76	1,60	86,97	156,09	114,78	90,36	86,49
900,00	91,12	69,82	1,60	86,72	155,19	114,19	90,01	86,34
901,00	90,67	69,86	1,60	86,44	154,40	113,55	89,67	86,10
902,00	90,29	69,72	1,60	86,22	153,58	112,92	89,40	85,72
903,00	89,99	69,77	1,60	85,91	152,72	112,38	89,14	85,53
904,00	89,60	69,77	1,60	85,72	151,84	111,82	88,91	85,37
905,00	89,24	69,79	1,60	85,48	150,96	111,21	88,61	85,03
906,00	89,00	69,82	1,60	85,33	150,20	110,56	88,35	84,90
907,00	88,70	69,75	1,60	85,16	149,40	110,07	88,09	84,78
908,00	88,30	69,69	1,60	84,89	148,56	109,48	87,85	84,48
909,00	87,99	69,61	1,60	84,65	147,74	108,90	87,59	84,29
910,00	87,83	69,78	1,60	84,47	147,07	108,31	87,32	84,05
911,00	87,50	69,74	1,60	84,22	146,28	107,73	87,07	83,72
912,00	91,11	70,84	2,40	81,68	155,04	90,55	85,43	83,33
913,00	149,88	69,27	2,20	82,03	152,02	90,40	86,50	82,82
914,00	162,52	68,55	2,20	82,92	149,36	90,69	86,90	82,44
915,00	174,33	69,03	2,20	83,08	146,32	90,83	87,03	82,23
916,00	200,75	69,38	2,10	83,56	143,70	91,07	87,23	82,09
917,00	204,89	69,67	2,00	83,40	140,08	90,84	87,52	81,99
918,00	216,90	70,02	1,90	83,14	136,79	90,59	88,06	82,02
919,00	229,58	70,02	1,80	83,04	133,46	90,26	88,80	82,00
920,00	253,06	70,29	1,70	82,97	130,48	89,99	89,72	81,99
921,00	297,85	70,43	1,60	83,01	127,85	89,87	90,91	82,05
922,00	357,63	70,48	1,40	83,27	125,66	89,73	92,58	82,29
923,00	397,25	70,59	1,30	83,62	123,30	89,63	94,83	82,54
924,00	424,39	70,77	1,10	84,11	121,78	89,50	98,15	83,12
925,00	444,93	71,02	1,00	84,93	120,39	89,60	102,78	83,79
926,00	463,89	71,19	0,80	86,09	119,41	89,56	108,76	84,58
927,00	492,47	71,29	2,80	87,89	119,23	89,83	116,55	85,84
928,00	474,69	71,30	2,70	89,72	117,77	90,16	126,26	87,37
929,00	499,43	71,38	2,50	91,80	117,40	90,73	136,36	89,17
930,00	522,68	71,51	2,30	93,82	117,31	91,40	147,33	91,16
931,00	550,18	71,26	2,00	95,97	117,67	92,14	159,29	93,50
932,00	556,59	71,40	1,90	98,43	117,77	93,21	173,19	96,09
933,00	569,84	71,39	1,70	101,34	118,37	94,47	188,87	99,01
934,00	579,48	70,53	1,50	104,33	119,58	95,52	205,46	101,98
935,00	584,35	70,94	1,40	107,79	120,38	97,11	222,70	105,75
936,00	589,88	71,02	1,20	111,45	121,59	98,90	241,65	109,88
937,00	585,31	71,33	1,10	115,37	122,80	100,62	259,95	113,84
938,00	579,53	71,47	1,00	119,50	124,46	102,60	277,99	118,45
939,00	569,20	71,54	0,90	123,73	125,97	104,69	295,23	123,18
940,00	562,21	71,67	0,80	128,00	127,73	106,97	310,50	128,13
941,00	548,00	71,98	12,00	132,31	130,88	109,18	321,11	133,24
942,00	464,82	71,91	11,40	136,29	134,10	111,70	329,75	138,66
943,00	443,13	71,78	11,40	140,26	137,23	114,14	336,44	142,24
944,00	441,99	71,75	11,30	143,77	138,97	116,93	338,14	144,88
945,00	452,28	71,88	11,10	146,40	141,24	119,36	334,59	146,82
946,00	488,39	71,73	11,00	147,48	143,46	121,81	328,11	147,88

947,00	508,43	71,84	10,90	148,65	145,37	124,25	321,58	148,96
948,00	518,20	71,99	10,70	149,52	148,24	126,30	315,36	149,36
949,00	525,17	71,81	10,50	149,98	150,19	128,22	311,19	149,53
950,00	527,85	71,76	10,40	150,40	152,11	130,11	307,72	150,22
951,00	531,66	71,77	10,20	151,19	153,97	131,83	305,63	150,52
952,00	535,02	71,81	10,10	152,16	155,94	133,37	304,52	151,66
953,00	537,07	71,84	9,90	153,13	158,27	134,71	304,28	152,87
954,00	539,83	72,08	9,80	153,83	159,17	136,16	304,53	153,56
955,00	542,49	71,92	9,60	155,07	160,36	137,36	305,97	154,70
956,00	544,53	71,93	9,40	156,02	161,52	138,76	307,66	156,49
957,00	547,87	71,76	9,30	157,00	162,57	139,91	309,53	157,21
958,00	549,37	72,19	9,10	158,25	163,91	141,09	311,96	159,23
959,00	551,34	71,95	9,00	159,42	165,09	142,06	314,83	160,64
960,00	552,70	71,98	8,80	160,36	166,04	143,09	317,56	162,12
961,00	555,14	72,12	8,70	161,62	167,23	143,90	320,67	163,91
962,00	557,62	72,07	8,50	162,78	167,50	144,83	323,86	165,46
963,00	559,17	72,12	8,30	164,61	168,04	145,76	327,12	166,99
964,00	560,97	72,47	8,20	165,70	168,85	146,46	330,31	167,76
965,00	563,37	72,26	8,00	167,41	169,44	147,24	333,70	169,55
966,00	566,03	72,71	7,90	168,19	170,05	147,88	337,11	171,61
967,00	566,55	72,24	7,70	169,31	170,75	148,70	340,28	172,15
968,00	567,45	72,57	7,50	170,46	171,27	149,59	343,12	173,98
969,00	568,62	72,60	7,40	172,09	171,65	150,43	346,36	175,48
970,00	569,01	72,67	7,20	173,42	172,67	151,14	349,47	177,07
971,00	571,40	72,48	7,10	175,04	173,39	151,84	351,92	178,50
972,00	574,68	72,68	6,90	175,74	173,94	152,42	354,60	178,88
973,00	576,28	72,43	6,80	176,64	175,21	152,67	357,51	180,25
974,00	577,33	72,42	6,60	177,47	175,44	152,68	359,88	181,20
975,00	579,11	72,58	6,40	179,31	175,85	153,25	363,07	182,69
976,00	579,43	72,32	6,30	180,52	176,66	153,90	366,25	184,34
977,00	580,83	72,71	6,10	181,41	177,06	154,73	369,26	185,30
978,00	581,36	72,56	6,00	183,08	177,23	155,46	372,29	186,63
979,00	581,89	72,74	5,80	184,44	178,00	156,10	374,88	188,66
980,00	580,83	72,93	5,70	185,88	178,72	156,86	377,73	189,82
981,00	494,12	72,74	5,50	186,94	181,07	156,16	380,93	192,40
982,00	443,12	72,96	5,40	188,64	183,59	155,99	382,47	193,98
983,00	418,94	72,96	5,40	190,35	185,08	157,09	384,17	194,92
984,00	400,57	72,73	5,30	191,37	186,49	158,11	385,23	195,81
985,00	385,69	72,69	5,20	192,53	188,64	158,88	385,32	196,11
986,00	373,35	72,77	5,10	193,57	190,32	159,96	384,38	196,97
987,00	363,41	72,62	5,10	193,91	191,58	160,62	382,02	196,76
988,00	356,25	72,77	5,00	194,83	193,36	161,47	379,29	196,41
989,00	349,30	72,57	4,90	194,60	195,03	162,05	376,24	196,41
990,00	344,06	72,56	4,90	194,94	196,85	162,71	372,36	195,55
991,00	340,21	72,69	4,80	195,19	198,63	162,85	368,92	195,01
992,00	336,95	72,30	4,70	194,35	200,15	163,32	365,49	194,45
993,00	334,58	72,25	4,60	194,51	201,29	163,69	362,34	194,10
994,00	332,31	72,35	4,60	193,61	202,85	164,09	358,87	193,56
995,00	329,60	72,38	4,50	193,29	204,23	164,35	356,00	192,90
996,00	326,35	72,40	4,40	192,87	205,29	164,67	353,21	192,09
997,00	322,66	72,50	4,30	192,56	206,50	164,90	350,61	191,95
998,00	319,36	72,41	4,30	192,14	207,71	165,05	348,07	191,26
999,00	316,51	72,46	4,20	191,57	208,63	165,02	345,88	190,92
1000,00	313,65	72,51	4,20	190,65	209,76	164,93	343,26	189,58
1001,00	309,96	72,49	4,10	189,99	211,06	164,81	340,68	189,32
1002,00	306,48	72,54	4,00	189,64	212,11	164,82	338,09	188,70
1003,00	304,07	72,35	4,00	188,85	212,83	164,81	334,89	187,85
1004,00	300,97	72,32	3,90	187,96	213,84	164,77	331,69	187,28
1005,00	297,83	72,51	3,90	187,34	214,53	164,68	328,76	187,03
1006,00	295,31	72,08	3,80	186,66	215,79	164,25	325,40	186,52
1007,00	292,42	72,29	3,80	185,72	216,34	163,98	322,72	185,73
1008,00	290,73	72,10	3,70	184,92	217,11	163,95	320,04	185,06
1009,00	287,46	72,13	3,60	184,13	217,76	163,58	316,95	184,16
1010,00	284,40	72,16	3,60	183,45	218,91	163,29	314,13	183,48
1011,00	282,70	72,29	3,60	183,08	219,28	163,32	311,47	183,31
1012,00	279,58	72,23	3,50	182,70	219,63	163,36	308,91	182,98
1013,00	277,11	72,27	3,50	182,55	220,09	163,25	306,28	182,00
1014,00	275,37	72,17	3,40	182,05	220,61	163,06	303,85	181,45
1015,00	274,39	72,38	3,40	181,37	221,29	162,54	301,08	180,86
1016,00	273,48	72,37	3,40	180,18	221,65	162,13	299,26	180,01
1017,00	271,67	72,31	3,30	178,98	221,73	162,05	297,46	179,05
1018,00	270,47	72,33	3,30	179,04	222,31	161,95	295,65	178,28
1019,00	268,54	72,10	3,20	178,39	222,23	161,80	293,82	178,33
1020,00	266,29	72,03	3,20	177,22	222,56	161,22	292,43	176,68
1021,00	265,41	71,90	3,20	176,81	222,94	160,94	291,31	176,06
1022,00	263,90	72,08	3,10	175,66	223,41	160,73	289,88	175,00
1023,00	262,91	72,05	3,10	174,94	223,80	160,54	288,47	174,56
1024,00	260,65	72,07	3,10	174,10	223,88	160,37	287,41	174,11
1025,00	258,40	72,02	3,00	173,46	224,19	159,95	286,00	173,27
1026,00	256,17	71,94	3,00	172,37	224,31	159,57	284,73	172,94
1027,00	254,30	72,08	3,00	171,66	224,59	159,49	282,98	172,76
1028,00	252,41	72,28	2,90	171,37	224,63	159,56	281,56	172,46
1029,00	250,84	72,25	2,90	170,35	225,07	159,34	279,64	171,94
1030,00	248,64	72,10	2,90	169,96	225,14	159,31	277,97	171,59
1031,00	246,87	72,12	2,90	169,77	225,22	159,29	276,07	171,38
1032,00	243,44	72,20	2,80	169,00	226,16	158,55	274,10	171,19
1033,00	239,45	72,34	2,80	168,76	226,26	158,57	271,79	170,06
1034,00	236,37	72,01	2,80	168,04	226,55	158,40	269,20	168,91
1035,00	233,55	72,19	2,80	167,69	226,97	158,42	266,16	168,28
1036,00	231,40	71,86	2,70	166,57	227,08	158,37	263,86	168,38
1037,00	229,14	71,99	2,70	165,56	227,45	158,12	260,68	166,81
1038,00	227,26	72,06	2,70	165,15	228,09	158,09	257,67	166,43
1039,00	224,99	72,13	2,70	164,56	228,45	157,93	254,37	165,54
1040,00	222,74	72,15	2,60	163,78	228,79	157,62	251,20	165,08
1041,00	220,54	72,37	2,60	163,27	229,13	157,50	248,46	165,08

1042.00	273.74	72.47	10.23	163.21	230.45	157.43	245.17	164.69
1043.00	317.48	72.36	10.00	162.09	228.46	157.64	242.27	163.76
1044.00	355.63	72.43	9.90	160.71	226.88	157.73	239.11	163.74
1045.00	387.24	72.37	9.80	160.24	224.85	157.72	235.66	162.23
1046.00	417.98	72.27	9.70	159.05	222.89	157.73	232.85	161.06
1047.00	453.73	72.22	9.50	158.12	221.09	157.67	230.83	160.01
1048.00	441.90	72.50	9.40	157.54	222.31	157.09	229.67	159.26
1049.00	347.90	72.45	9.30	157.05	222.35	157.27	230.06	158.84
1050.00	309.13	72.52	9.30	156.98	222.61	157.57	230.83	158.17
1051.00	287.53	72.63	9.20	156.62	223.44	157.79	231.36	157.94
1052.00	273.91	72.33	9.20	155.74	224.50	157.70	231.47	157.71
1053.00	263.11	72.28	9.10	155.08	226.04	157.70	230.98	156.47
1054.00	254.33	72.26	9.10	154.38	227.32	157.72	230.55	156.21
1055.00	246.93	72.36	9.00	153.40	228.19	157.75	229.46	155.59
1056.00	241.66	72.14	9.00	153.12	228.59	158.20	228.03	155.25
1057.00	237.30	72.30	8.90	152.38	229.75	158.26	226.19	154.47
1058.00	235.66	72.25	8.90	151.93	230.15	158.28	224.22	153.44
1059.00	231.56	72.31	8.80	151.22	230.56	158.55	222.02	153.16
1060.00	227.29	72.12	8.80	150.50	230.99	158.62	220.17	152.83
1061.00	225.70	72.20	8.70	149.89	231.10	158.63	218.33	152.06
1062.00	225.49	72.13	8.70	149.28	231.25	158.71	216.28	151.08
1063.00	224.43	72.36	8.60	148.79	231.23	158.27	214.17	149.81
1064.00	222.97	72.15	8.60	147.93	231.16	157.91	212.17	147.89
1065.00	221.30	72.17	8.50	146.96	230.94	157.74	210.64	147.16
1066.00	220.11	72.07	8.40	145.99	230.72	157.59	209.35	145.94
1067.00	219.46	72.09	8.40	145.47	230.32	157.48	208.05	145.54
1068.00	218.56	72.26	8.30	145.15	229.81	157.28	206.95	145.32
1069.00	217.55	72.23	8.30	144.45	229.06	157.04	205.95	144.71
1070.00	216.14	72.19	8.20	143.99	228.51	156.70	204.87	144.16
1071.00	215.25	72.22	8.20	143.40	227.80	156.26	203.99	143.24
1072.00	214.57	72.24	8.10	142.88	227.82	156.00	203.33	142.98
1073.00	214.28	72.14	8.00	142.47	227.04	155.66	202.18	142.87
1074.00	213.77	72.26	8.00	141.85	226.05	155.34	201.55	142.38
1075.00	214.15	72.24	7.90	141.39	225.50	154.88	200.40	141.72
1076.00	215.30	72.24	7.90	140.87	224.44	154.49	200.05	141.44
1077.00	216.02	72.28	7.80	140.75	223.66	154.26	199.64	141.48
1078.00	216.30	72.12	7.70	140.23	222.67	154.06	199.19	141.43
1079.00	216.47	72.09	7.70	139.69	221.79	153.78	199.01	141.53
1080.00	217.63	72.20	7.60	139.45	220.84	153.23	199.10	141.31
1081.00	219.10	72.22	7.60	139.26	220.04	153.00	199.21	140.90
1082.00	222.43	72.20	7.50	139.11	218.84	152.69	199.43	140.81
1083.00	230.36	72.22	7.40	138.93	217.82	152.26	200.16	140.93
1084.00	238.87	72.04	7.30	138.70	216.80	151.82	200.97	140.31
1085.00	246.62	72.22	7.30	138.51	215.60	151.51	202.16	140.48
1086.00	252.98	72.25	7.20	137.99	214.82	151.06	204.23	140.53
1087.00	259.62	72.34	7.10	137.60	214.01	150.39	206.66	140.16
1088.00	268.06	72.27	7.00	137.34	212.66	149.92	209.92	139.44
1089.00	277.13	72.35	6.90	137.48	211.74	149.57	213.74	139.75
1090.00	284.45	72.21	6.80	137.37	210.97	149.44	218.51	140.44
1091.00	292.43	72.28	6.70	137.46	209.63	148.97	223.97	140.74
1092.00	297.61	72.32	6.60	137.74	208.72	148.66	230.26	142.27
1093.00	301.63	72.21	6.50	137.71	207.88	148.15	236.75	142.44
1094.00	306.61	72.31	6.40	138.52	207.51	147.67	243.56	143.51
1095.00	310.05	72.45	6.30	139.00	206.37	147.55	250.79	145.17
1096.00	313.54	72.49	6.20	139.53	205.31	147.59	258.29	147.07
1097.00	317.43	72.40	6.10	139.82	204.65	147.24	265.38	148.30
1098.00	321.28	72.23	6.00	140.03	204.44	146.77	272.28	149.49
1099.00	323.93	72.30	5.90	140.51	203.70	146.54	279.54	150.64
1100.00	325.95	72.44	5.80	141.27	203.10	146.39	286.72	152.37
1101.00	327.75	72.48	5.70	142.14	202.83	146.13	293.97	154.06
1102.00	329.95	72.36	5.60	142.82	202.50	146.05	300.88	155.43
1103.00	331.99	72.46	5.50	143.48	202.35	145.83	307.37	156.55
1104.00	333.56	72.38	5.40	144.29	201.72	145.68	313.73	158.52
1105.00	336.40	72.46	5.40	145.28	201.78	145.28	319.77	160.06
1106.00	337.71	72.55	5.20	146.16	201.70	145.01	325.42	160.69
1107.00	340.12	72.49	5.10	147.64	201.60	144.86	330.59	161.65
1108.00	340.82	72.57	5.10	148.49	201.40	144.75	335.63	163.11
1109.00	341.38	72.58	5.00	149.52	201.45	144.61	340.09	163.82
1110.00	339.94	72.58	4.90	150.72	201.53	144.36	344.41	164.90
1111.00	338.63	72.55	4.80	151.85	201.86	144.18	348.62	165.56
1112.00	337.32	72.52	4.70	152.75	202.03	143.96	352.75	166.37
1113.00	336.10	72.58	4.70	153.95	202.10	143.70	355.80	166.95
1114.00	334.21	72.42	4.60	155.10	202.54	143.51	358.50	167.68
1115.00	333.48	72.58	4.50	155.91	203.14	143.06	360.31	167.95
1116.00	332.26	72.69	4.40	156.75	203.18	142.80	361.84	168.12
1117.00	330.77	72.72	4.30	158.08	203.19	142.77	362.93	168.61
1118.00	329.23	72.72	4.30	159.01	203.89	142.20	364.29	169.57
1119.00	326.79	72.79	4.20	159.76	204.13	142.35	365.49	170.40
1120.00	323.44	72.88	4.20	160.39	204.43	142.32	365.60	170.44
1121.00	320.14	72.70	4.10	161.12	204.54	142.30	365.25	170.62
1122.00	317.41	72.59	4.00	161.69	204.93	142.34	364.19	170.61
1123.00	314.36	72.57	4.00	162.34	205.04	142.44	363.31	170.68
1124.00	311.32	72.70	3.90	163.28	205.47	142.21	361.68	171.13
1125.00	307.72	72.68	3.90	164.13	206.04	142.08	359.81	172.36
1126.00	304.89	72.63	3.80	164.07	206.69	141.83	357.46	172.08
1127.00	301.72	72.82	3.70	164.58	206.59	142.17	355.10	173.18
1128.00	297.90	72.60	3.70	164.76	207.01	141.78	352.48	172.73
1129.00	294.63	72.80	3.60	164.98	207.53	141.93	349.10	172.08
1130.00	291.42	72.64	3.60	165.22	207.78	142.05	345.76	171.89
1131.00	288.45	72.59	3.50	165.23	208.42	141.87	341.91	172.98
1132.00	284.98	72.68	3.50	165.59	208.55	141.99	338.15	172.22
1133.00	281.95	72.69	3.40	165.72	209.16	141.89	334.01	172.86
1134.00	278.54	72.73	3.40	165.84	209.87	142.00	330.60	172.92
1135.00	275.23	72.60	3.40	166.03	209.94	142.28	326.41	172.71
1136.00	272.59	72.63	3.30	165.95	210.38	142.53	322.61	172.39

1137,00	270,38	72,56	3,30	166,19	210,50	142,70	318,89	172,28
1138,00	268,15	72,59	3,20	166,42	210,96	142,65	314,94	172,41
1139,00	265,73	72,57	3,20	166,68	211,18	142,93	311,06	172,70
1140,00	263,37	72,56	3,10	166,74	211,47	143,32	307,24	172,13
1141,00	261,39	72,49	3,10	167,07	211,82	143,69	304,24	172,64
1142,00	259,66	72,39	3,00	166,66	211,66	144,00	300,77	172,37
1143,00	258,41	72,45	3,00	166,41	211,84	144,26	297,30	171,65
1144,00	257,38	72,45	3,00	166,44	211,84	144,40	294,35	171,45
1145,00	256,10	72,53	2,90	166,12	212,31	144,42	291,39	171,53
1146,00	254,84	72,59	2,90	165,74	212,54	144,28	288,77	171,32
1147,00	254,11	72,78	2,80	165,74	212,37	144,48	286,44	170,64
1148,00	253,41	72,65	2,80	165,74	212,54	144,67	284,31	170,14
1149,00	252,90	72,38	2,80	165,53	212,49	144,56	282,54	169,86
1150,00	252,73	72,47	2,70	165,89	212,57	145,17	281,40	170,30
1151,00	251,77	72,43	2,70	165,57	212,91	145,32	280,06	169,62
1152,00	250,99	72,39	2,60	165,32	212,76	145,54	278,96	170,02
1153,00	250,79	72,37	2,60	165,15	212,80	145,84	278,38	169,99
1154,00	250,43	72,46	2,60	164,75	212,72	146,07	277,46	170,32
1155,00	250,40	72,38	2,50	164,88	212,65	146,32	276,90	170,68
1156,00	250,20	72,40	2,50	164,69	212,78	146,60	276,58	171,00
1157,00	250,19	72,40	2,40	164,66	212,56	146,89	276,07	171,18
1158,00	249,95	72,38	2,40	164,58	212,50	147,25	275,94	171,48
1159,00	250,53	72,40	2,40	164,38	212,58	147,47	275,65	171,48
1160,00	250,45	72,39	2,30	164,13	212,47	147,64	275,58	171,60
1161,00	251,58	72,38	2,30	163,90	212,24	147,78	275,36	171,69
1162,00	251,73	72,34	2,20	163,80	212,12	148,02	275,55	172,08
1163,00	252,57	72,36	2,20	163,72	212,07	148,21	275,63	172,06
1164,00	253,19	72,31	2,10	163,67	211,91	148,33	275,57	172,00
1165,00	254,25	72,35	2,10	163,77	211,98	148,47	276,07	172,36
1166,00	255,09	72,35	2,10	163,44	211,98	148,54	277,04	172,58
1167,00	257,24	72,37	2,00	163,40	211,88	148,67	277,60	172,45
1168,00	259,24	72,37	2,00	163,32	211,82	148,76	278,16	172,54
1169,00	260,42	72,35	1,90	163,40	212,02	148,72	279,27	172,65
1170,00	259,77	72,32	1,90	163,37	212,01	148,74	280,74	172,71
1171,00	258,08	72,31	1,80	163,31	212,16	148,81	281,68	172,77
1172,00	257,66	72,29	1,80	163,36	212,07	148,86	283,06	173,18
1173,00	254,50	72,33	1,80	163,32	212,15	148,83	283,82	173,35
1174,00	252,06	72,34	1,70	163,48	212,53	148,91	284,45	173,33
1175,00	250,56	72,26	1,70	163,44	212,57	148,87	284,93	173,62
1176,00	249,20	72,34	1,70	163,25	212,52	148,80	284,41	173,74
1177,00	247,58	72,31	1,60	163,26	212,83	148,80	283,96	173,84
1178,00	246,53	72,32	1,60	163,27	213,09	148,73	283,06	173,56
1179,00	245,46	72,34	1,60	163,28	213,32	148,66	282,66	173,71
1180,00	244,03	72,36	1,60	163,12	213,55	148,71	282,03	173,77
1181,00	242,55	72,39	1,50	163,25	213,94	148,66	281,12	173,64
1182,00	241,18	72,41	1,50	163,37	214,32	148,60	280,12	173,36
1183,00	238,75	72,33	1,50	163,32	214,69	148,46	279,12	173,27
1184,00	236,62	72,37	1,50	163,07	214,86	148,42	277,94	173,37
1185,00	234,89	72,33	1,40	163,02	215,11	148,51	276,61	173,12
1186,00	232,92	72,31	1,40	163,13	215,48	148,27	274,93	172,83
1187,00	231,03	72,28	1,40	162,87	215,59	148,29	273,40	172,75
1188,00	229,25	72,28	1,40	162,96	216,07	148,16	271,77	172,64
1189,00	227,71	72,25	1,40	162,78	216,26	148,31	269,63	172,58
1190,00	226,05	72,26	1,30	162,44	216,24	148,24	267,34	172,20
1191,00	224,51	72,30	1,30	162,37	216,67	148,16	265,74	171,97
1192,00	223,09	72,31	1,30	162,37	216,98	148,13	263,46	171,58
1193,00	221,56	72,31	1,30	162,06	217,01	148,00	261,11	171,21
1194,00	220,25	72,25	1,30	161,78	217,25	148,01	258,79	170,83
1195,00	219,04	72,27	1,30	161,66	217,35	147,94	256,73	170,65
1196,00	217,63	72,26	1,20	161,55	217,80	147,80	254,55	170,37
1197,00	216,34	72,26	1,20	161,23	217,84	147,66	252,47	169,80
1198,00	215,20	72,23	1,20	161,12	218,16	147,59	250,64	169,64
1199,00	213,81	72,26	1,20	160,88	218,54	147,44	248,90	169,17
1200,00	212,77	72,22	1,20	160,42	218,71	147,27	246,60	168,65
1201,00	211,61	72,22	1,10	160,25	218,90	147,22	245,01	168,71
1202,00	210,89	72,22	1,10	159,96	219,02	147,11	243,23	168,35
1203,00	209,78	72,22	1,10	159,67	219,08	147,06	241,33	168,03
1204,00	208,77	72,20	1,10	159,47	219,39	146,94	239,94	167,69
1205,00	208,15	72,13	1,10	159,09	219,52	146,88	238,47	167,13
1206,00	206,94	72,18	1,00	158,81	219,80	146,76	237,11	167,16
1207,00	206,04	72,16	1,00	158,43	219,98	146,67	235,57	166,78
1208,00	205,01	72,10	1,00	158,09	219,98	146,48	234,02	166,36
1209,00	204,19	72,11	1,00	157,77	220,33	146,38	232,97	166,06
1210,00	203,65	72,14	1,00	157,28	220,49	146,28	231,93	165,68
1211,00	202,90	72,10	1,00	157,01	220,74	146,23	230,44	165,23
1212,00	202,07	72,15	0,90	156,72	220,86	146,15	229,10	164,84
1213,00	201,19	72,09	0,90	156,36	220,79	146,12	227,96	164,48
1214,00	200,55	72,09	0,90	156,05	221,07	146,00	226,94	164,48
1215,00	199,88	72,12	0,90	155,80	221,36	145,88	225,73	164,18
1216,00	199,20	72,07	0,90	155,43	221,80	145,79	224,67	163,93
1217,00	198,16	72,06	0,90	155,23	221,80	145,67	223,76	163,92
1218,00	197,64	72,07	0,80	154,97	221,94	145,45	222,82	163,51
1219,00	196,63	72,02	0,80	154,71	222,48	145,19	221,84	163,44
1220,00	196,08	72,02	0,80	154,51	222,48	145,04	220,94	163,29
1221,00	195,31	72,00	0,80	154,06	222,84	144,91	220,13	162,82
1222,00	195,06	71,98	0,80	153,77	222,79	144,78	219,33	162,22
1223,00	194,37	72,02	0,80	153,40	222,81	144,64	218,35	161,67
1224,00	193,76	72,00	0,80	153,10	222,96	144,55	217,62	161,59
1225,00	192,83	71,98	0,70	152,86	223,04	144,37	216,65	161,22
1226,00	192,56	71,92	0,70	152,48	223,39	144,15	216,33	161,03
1227,00	192,12	71,91	0,70	152,14	223,21	143,91	215,33	160,40
1228,00	191,31	71,86	0,70	151,73	223,61	143,74	214,61	160,14
1229,00	191,01	71,82	0,70	151,49	223,57	143,79	214,02	159,57
1230,00	190,32	71,85	0,70	151,22	223,43	143,76	212,93	159,21
1231,00	190,07	71,79	0,60	150,90	223,71	143,57	212,11	158,86

## Aging 700

1232.00	189.54	71,80	0,60	150,64	223,53	143,49	211,06	158,18
1233.00	188,60	71,79	0,60	150,33	223,75	143,33	210,36	157,70
1234.00	188,55	71,74	0,60	149,98	223,58	143,17	209,38	157,33
1235.00	187,95	71,77	0,60	149,85	223,60	143,00	208,61	156,95
1236.00	187,19	71,74	0,60	149,56	223,78	142,76	207,77	156,61
1237.00	186,57	71,73	0,60	149,31	223,91	142,67	206,99	156,04
1238.00	186,16	71,69	0,50	149,10	223,72	142,58	206,23	155,85
1239.00	185,74	71,65	0,50	149,00	223,90	142,39	205,51	155,75
1240.00	184,81	71,66	0,50	148,78	223,86	142,29	204,91	155,07
1241.00	184,49	71,67	0,50	148,63	224,00	142,11	204,11	154,98
1242.00	184,90	71,52	0,50	148,36	223,90	141,93	203,44	154,46
1243.00	184,10	71,53	0,50	147,97	223,84	141,75	202,79	154,08
1244.00	183,30	71,49	0,40	147,88	224,01	141,60	202,05	153,45
1245.00	182,90	71,56	0,40	147,70	223,99	141,43	201,38	153,28
1246.00	182,99	71,45	0,40	147,50	224,16	141,36	200,91	152,97
1247.00	182,20	71,49	0,40	147,21	224,12	141,24	200,35	152,71
1248.00	181,71	71,39	0,40	147,04	224,11	141,09	199,87	152,48
1249.00	180,86	71,42	0,40	146,96	224,19	141,08	199,17	152,10
1250.00	180,29	71,29	0,40	146,55	224,28	141,00	198,62	152,03
1251.00	180,12	71,34	0,30	146,35	224,19	141,01	198,05	151,78
1252.00	179,49	71,44	0,30	146,12	224,27	140,91	197,37	151,31
1253.00	178,97	71,31	0,30	146,01	224,28	140,85	196,84	151,19
1254.00	178,38	71,36	0,30	146,02	224,04	140,83	196,31	151,31
1255.00	178,18	71,39	0,30	145,81	223,94	140,81	195,68	151,09
1256.00	177,56	71,36	0,30	145,71	223,77	140,88	195,15	150,76
1257.00	176,76	71,30	0,30	145,63	223,75	141,01	194,67	150,49
1258.00	176,38	71,30	0,30	145,45	223,57	141,11	193,89	150,15
1259.00	175,60	71,30	0,20	145,30	223,49	141,24	193,50	150,16
1260.00	175,07	71,40	0,20	145,05	223,35	141,36	192,92	149,84
1261.00	174,35	71,42	0,20	144,81	223,12	141,49	192,35	149,47
1262.00	173,55	71,39	0,20	144,77	222,95	141,53	191,72	149,33
1263.00	173,49	71,31	0,20	144,72	222,55	141,71	191,20	149,33
1264.00	172,70	71,34	0,20	144,52	222,40	141,84	190,58	149,05
1265.00	172,64	71,29	0,20	144,21	222,46	141,92	189,87	148,63
1266.00	172,28	71,26	0,20	144,05	222,21	142,08	189,21	148,39
1267.00	171,99	71,26	0,20	143,78	221,78	142,21	188,72	148,08
1268.00	171,60	71,27	0,10	143,59	221,67	142,27	188,06	147,65
1269.00	171,26	71,22	0,10	143,30	221,61	142,38	187,42	147,41
1270.00	170,96	71,30	0,10	143,16	221,32	142,43	186,85	147,17
1271.00	170,46	71,32	0,10	142,65	221,09	142,40	186,40	146,72
1272.00	170,12	71,16	0,10	142,37	220,79	142,49	185,88	146,54
1273.00	169,63	71,16	0,10	142,05	220,51	142,54	185,24	146,08
1274.00	169,25	71,24	0,10	141,95	220,09	142,62	184,71	145,76
1275.00	169,11	71,27	0,10	141,53	219,89	142,63	184,33	145,60
1276.00	168,50	71,22	0,10	141,33	219,63	142,63	183,72	145,17
1277.00	168,20	71,10	0,00	141,19	219,48	142,58	183,22	144,80
1278.00	88,47	68,95	2,3027	70,148	68,5451	67,8103	71,51	68,03
1279.00	178,16	69,05	2,2030	70,205	68,5670	67,8083	71,85	68,04
1280.00	199,84	69,31	2,1028	70,293	68,5123	67,8232	72,05	68,13
1281.00	262,50	69,22	2,0030	70,419	68,5062	67,8368	72,32	68,32
1282.00	379,40	69,32	1,7031	70,627	68,4860	67,8578	73,00	68,67
1283.00	460,24	69,48	1,5032	70,881	68,4803	67,9435	74,76	69,31
1284.00	494,81	69,37	1,2033	71,367	68,5151	68,0518	78,17	70,39
1285.00	516,99	69,59	1,0034	72,161	68,7096	68,2262	83,92	71,94
1286.00	522,64	69,78	0,8034	73,219	68,9138	68,5049	92,45	73,81
1287.00	517,79	70,23	1,5031	74,575	69,2676	68,9344	103,56	76,30
1288.00	522,20	70,32	2,9014	76,405	69,8139	69,5671	117,89	79,49
1289.00	530,02	70,36	2,0028	78,826	70,6042	70,3734	134,28	82,61
1290.00	551,05	70,39	1,8029	81,107	71,4685	71,3210	150,61	85,60
1291.00	559,06	70,21	1,6030	83,331	72,5884	72,4772	167,26	88,75
1292.00	562,51	70,33	1,4031	85,602	74,0200	73,7781	184,95	91,96
1293.00	561,29	70,05	1,3031	88,209	75,5471	75,1802	203,04	95,36
1294.00	560,05	70,25	1,1031	91,168	77,3601	76,6398	221,26	99,21
1295.00	559,96	70,10	1,0032	94,456	79,2807	78,1948	239,010	102,96
1296.00	553,77	69,86	0,9031	97,790	81,4191	79,8722	255,827	106,93
1297.00	546,21	69,92	11,2976	101,250	84,0510	81,6149	268,973	111,63
1298.00	493,75	69,89	10,9977	105,049	86,4197	83,5878	283,770	115,87
1299.00	457,63	69,95	10,9977	108,427	89,4182	85,6302	290,895	119,46
1300.00	446,15	69,77	10,8978	111,292	92,3117	87,6569	293,604	122,45
1301.00	450,83	69,77	10,7978	114,286	94,9194	89,7791	296,401	124,81
1302.00	441,38	69,80	10,6979	116,121	97,5540	91,8005	294,025	126,08
1303.00	438,16	69,71	10,6978	117,821	100,3235	93,7312	290,399	127,45
1304.00	434,25	69,83	10,5979	119,251	102,9650	95,6532	285,220	128,32
1305.00	440,35	69,92	10,4978	121,050	105,5321	97,4033	279,481	128,91
1306.00	462,35	69,86	10,2982	122,372	107,9535	99,1075	273,325	129,48
1307.00	477,03	69,97	10,1981	123,612	110,5304	100,7119	268,19	129,75
1308.00	474,32	70,06	10,0981	124,841	112,7687	102,3366	263,67	130,28
1309.00	475,51	69,82	9,8982	125,304	115,2674	103,6671	259,99	130,32
1310.00	492,82	69,83	9,7984	126,175	117,4837	105,0382	257,03	130,77
1311.00	505,86	69,80	9,5982	127,097	119,3045	106,3701	254,98	131,07
1312.00	513,19	69,84	9,4984	127,860	121,3904	107,4103	253,85	132,17
1313.00	520,60	69,93	9,2984	129,209	123,0099	108,5194	254,09	132,90
1314.00	524,68	70,03	9,0986	130,366	124,7972	109,7431	255,88	133,72
1315.00	527,70	69,93	8,9985	131,789	126,4619	110,9899	259,11	135,30
1316.00	531,49	69,88	8,7987	133,337	127,7624	112,2413	262,85	136,98
1317.00	536,80	69,99	8,5987	135,011	129,4099	113,4191	267,43	138,61
1318.00	539,81	70,11	8,4988	136,899	130,9993	114,5581	272,06	140,47
1319.00	544,38	69,94	8,2988	138,798	132,4316	115,6796	277,12	142,43
1320.00	549,02	69,93	8,0988	140,369	133,7579	116,7728	282,53	144,21
1321.00	551,94	69,99	7,8991	142,418	135,1108	117,9780	288,56	146,45
1322.00	555,05	70,33	7,7990	144,595	136,3629	118,9324	294,82	148,34
1323.00	557,76	70,13	7,5991	146,104	137,6818	119,8620	301,20	150,42
1324.00	561,20	70,12	7,3992	148,796	139,0215	120,8466	307,24	153,30
1325.00	564,37	70,09	7,2993	150,103	140,5291	121,6236	313,57	154,68
1326.00	568,49	70,13	7,0994	152,228	141,6255	122,7035	319,50	156,93

## Aging 700

1327.00	572.66	70.42	6,8993	155,645	142,6238	123,5351	325,61	159,66
1328.00	578.03	70.58	6,6997	157,569	144,2513	124,1145	331,14	161,25
1329.00	579,55	70,57	6,5996	159,523	145,3611	125,0439	337,53	162,75
1330.00	582,16	70,38	6,3998	161,251	146,9350	126,1498	343,97	164,92
1331.00	583,22	70,51	6,1999	163,007	148,1400	127,4063	350,29	167,05
1332.00	583,89	70,45	5,9997	164,862	149,3425	128,5997	356,20	168,96
1333.00	583,97	70,50	5,8998	167,081	150,5672	129,8295	361,87	171,12
1334.00	586,85	70,38	5,6999	169,541	151,9152	131,0647	366,61	173,77
1335.00	585,62	70,83	5,5001	171,416	153,2444	132,2118	371,58	176,14
1336.00	586,57	70,65	5,4001	173,835	154,6039	133,4823	376,30	178,74
1337.00	587,18	70,59	5,2001	176,502	155,7960	134,8071	380,18	180,82
1338.00	587,64	70,83	5,0002	178,907	157,5928	136,1344	384,12	182,97
1339.00	588,74	71,52	4,9003	180,598	158,9384	137,3277	387,57	184,73
1340.00	589,16	71,49	4,7003	182,904	161,2013	138,5086	390,33	186,49
1341.00	589,09	71,52	4,5003	184,817	162,3596	139,7011	393,95	188,34
1342.00	589,59	71,36	4,4004	187,311	164,1250	141,1955	397,46	190,87
1343.00	588,18	71,64	4,2005	189,343	166,1968	142,3574	400,66	192,97
1344.00	586,97	72,16	4,1005	191,074	167,7992	143,6788	403,47	194,42
1345.00	584,20	71,86	3,9005	193,335	169,5887	145,1437	405,89	197,11
1346.00	582,32	72,63	3,8006	194,953	171,1878	146,8867	407,18	199,44
1347.00	580,58	72,08	3,7007	196,807	172,6269	148,6044	408,90	201,24
1348.00	578,09	72,20	3,5007	198,850	174,5328	150,3653	410,28	202,75
1349.00	576,57	72,30	3,4008	200,340	176,1539	151,9906	410,17	204,67
1350.00	574,89	72,14	3,3007	202,395	177,8407	153,7478	409,97	205,99
1351.00	572,14	72,54	3,1010	203,744	180,1183	155,2096	409,55	207,55
1352.00	570,16	72,63	3,0010	205,132	181,8911	157,0229	408,57	209,18
1353.00	568,15	72,78	2,9001	206,640	183,9932	158,6476	407,44	210,56
1354.00	567,78	72,48	2,8011	207,530	185,9975	160,4318	406,18	211,56
1355.00	565,75	72,60	2,7011	208,694	188,0826	162,1624	404,98	213,31
1356.00	563,64	72,78	2,6012	209,239	190,4411	163,7257	403,94	214,36
1357.00	561,16	72,86	2,5011	210,204	193,0953	165,2255	403,10	215,59
1358.00	556,03	73,13	2,4011	211,211	195,3064	166,5423	401,51	217,19
1359.00	548,19	72,27	2,3011	210,861	196,9627	168,2779	399,71	217,57
1360.00	540,64	72,97	2,2014	210,967	198,8732	169,9588	397,64	218,25
1361.00	531,15	72,72	2,2014	212,086	200,7253	171,4701	394,04	218,71
1362.00	522,22	72,65	2,1012	212,932	202,8356	172,8444	389,71	217,67
1363.00	518,28	72,23	10,2040	213,442	206,0327	174,1167	384,33	217,89
1364.00	490,00	72,50	9,9972	212,830	208,0709	175,7841	377,95	219,04
1365.00	499,71	72,46	9,8971	211,188	209,3054	177,3971	369,90	217,00
1366.00	533,56	71,95	9,6972	210,324	211,2903	179,0784	362,09	215,64
1367.00	562,14	69,87	9,4973	209,022	213,5020	179,2410	354,92	213,52
1368.00	577,03	70,44	9,2974	208,083	215,2384	180,7225	349,74	212,05
1369.00	586,53	70,67	9,0975	206,816	216,3785	182,1299	347,22	211,89
1370.00	589,78	70,77	8,8976	205,269	218,4325	183,3783	346,30	211,07
1371.00	593,44	71,00	8,5977	203,878	220,1288	184,6414	346,91	210,01
1372.00	597,70	71,16	8,3978	202,954	222,5207	185,3244	349,40	209,47
1373.00	599,70	71,28	8,1980	202,080	224,3230	186,2315	352,68	208,18
1374.00	601,93	71,08	7,9980	201,966	224,7904	187,0169	356,63	207,97
1375.00	602,37	71,43	7,7981	202,166	226,6088	186,9557	361,08	208,51
1376.00	604,57	71,68	7,5982	200,917	227,3605	186,6785	365,28	208,57
1377.00	605,14	71,74	7,3983	200,534	228,4450	186,5068	369,42	208,90
1378.00	605,72	71,51	7,1984	200,078	229,8558	186,8449	373,08	208,99
1379.00	606,72	71,75	6,9985	200,530	230,8517	186,8112	376,79	209,72
1380.00	607,48	71,53	6,7985	199,693	231,1434	186,3346	380,65	209,40
1381.00	607,61	71,40	6,5987	199,992	231,2676	186,8007	383,82	209,97
1382.00	607,65	71,43	6,3990	200,976	231,4227	187,1211	387,75	210,66
1383.00	607,85	71,76	6,2990	201,925	231,5967	187,6301	390,76	211,99
1384.00	607,85	71,53	6,0990	202,4006	231,46	187,88	393,461243	213,15
1385.00	606,41	71,74	5,8991	202,73	232,07	188,310028	395,63	214,01
1386.00	606,65	71,54	5,7983	203,62	233,08	188,260941	398,11	215,42
1387.00	607,79	71,64	5,5992	203,73	233,14	188,053146	399,22	215,95
1388.00	608,78	71,73	5,3992	203,63	232,85	187,989243	401,12	216,09
1389.00	609,98	71,82	5,1994	204,30	232,36	188,064438	402,99	217,46
1390.00	609,11	71,78	5,0994	204,86	232,91	188,190918	404,86	218,15
1391.00	608,75	71,98	4,8995	205,50	233,50	187,846863	406,49	218,96
1392.00	610,28	71,87	4,7995	206,53	233,27	188,189117	408,07	220,18
1393.00	613,63	71,80	4,5996	206,89	233,09	188,513153	410,45	221,04
1394.00	614,13	72,03	4,3997	207,68	233,34	188,595139	412,83	221,68
1395.00	607,03	72,20	4,2998	208,62	232,82	188,589447	415,37	222,61
1396.00	599,42	72,32	4,1998	208,85	233,14	188,962845	417,43	224,30
1397.00	591,85	72,33	4,0997	210,24	232,84	189,201675	418,01	225,39
1398.00	587,46	72,00	3,8998	210,36	232,53	189,663513	417,52	226,32
1399.00	581,27	72,16	3,7999	211,12	232,13	189,745148	415,99	227,53
1400.00	574,10	72,11	3,7000	211,79	232,27	189,883347	413,29	228,61
1401.00	567,55	72,22	3,6000	211,43	231,92	189,965561	409,57	227,92
1402.00	561,78	72,31	3,5000	211,50	232,13	189,911606	404,71	227,98
1403.00	556,29	72,13	3,4001	211,42	232,00	189,875671	399,50	227,46
1404.00	551,73	72,28	3,3000	211,77	232,28	189,733734	394,14	227,99
1405.00	547,05	72,13	3,2002	211,64	233,10	189,287903	388,15	228,09
1406.00	543,96	72,43	3,1004	211,65	232,76	189,427582	382,57	227,51
1407.00	540,78	72,17	3,1004	211,66	232,37	189,846893	376,98	226,72
1408.00	537,55	72,24	3,0004	212,06	231,82	190,167908	372,12	227,17
1409.00	535,07	72,19	2,8994	211,99	231,53	190,593979	367,03	226,12
1410.00	532,09	72,02	2,8006	211,56	231,41	190,833099	362,19	224,79
1411.00	528,79	72,23	2,7005	211,80	230,78	191,12355	357,56	224,66
1412.00	526,66	72,13	2,6006	211,27	231,19	191,082794	352,85	223,68
1413.00	524,28	72,45	2,5005	211,14	230,79	191,257462	348,61	222,75
1414.00	522,88	72,45	2,5005	210,60	231,17	191,366531	344,90	223,06
1415.00	520,88	72,18	2,4005	210,45	230,48	192,009949	341,98	222,29
1416.00	518,19	72,59	2,3005	211,19	230,84	192,123611	338,57	221,91
1417.00	515,11	72,47	2,2009	211,04	229,93	192,723465	335,40	221,20
1418.00	512,35	72,48	2,2008	211,03	229,57	193,017487	333,01	221,50
1419.00	509,22	72,42	2,1007	211,36	229,79	192,770493	330,49	221,73
1420.00	505,90	72,51	2,0008	210,44	230,35	192,628937	327,00	220,31
1421.00	502,33	72,62	1,9009	210,32	229,36	193,100311	324,49	219,59

1422.00	500.52	72.40	1,9009	210.25	229.07	193,564178	322,22	219,66
1423.00	497.77	72.56	1,8008	210.52	228.80	193,973175	319,33	218.00
1424.00	495.21	72.47	1,7009	210.51	228.43	194,375153	316,44	217,56
1425.00	493.63	72.39	1,7009	210.16	228.79	194,744019	313,60	216,91
1426.00	490.76	72.56	1,6010	210.36	228.48	194,988876	311,19	216,39
1427.00	489.20	72.41	1,5009	210.01	228.64	195,396912	308,28	215,90
1428.00	488.27	72.27	1,5009	209.15	228.70	195,208817	305,83	214,20
1429.00	486.79	72.37	1,4010	209.12	229.08	195,571747	303,29	214,21
1430.00	484.96	72.26	1,4010	209.11	229.62	195,892761	301,10	214,01
1431.00	482.84	72.31	1,3010	208.02	229.67	196,019867	298,82	212,79
1432.00	481.63	72.52	1,2010	207.64	229.41	196,2164	296,88	211,63
1433.00	480.05	72.67	1,2010	207.53	229.77	196,486298	294,87	211,02
1434.00	479.34	72.59	1,1010	206.97	230.19	196,807877	293,40	210,78
1435.00	477.89	72.48	1,0011	206.50	230.21	197,094971	291,21	209,66
1436.00	476.18	72.69	1,0011	206.10	230.53	197,491608	289,65	209,46
1437.00	476.54	72.49	0,9010	205.97	230.72	197,666031	288,15	209,14
1438.00	475.76	72.70	0,9010	205.03	232.42	196,965775	286,70	208,62
1439.00	472.87	72.48	0,8011	205.29	232.35	197,360565	285,34	207,80
1440.00	469.63	72.53	0,8011	205.26	232.73	197,647476	283,62	206,69
1441.00	464.90	72.43	0,7012	205.77	232.66	198,119537	282,57	206,07
1442.00	459.74	72.54	0,7012	205.57	233.54	198,221222	280,60	204,64
1443.00	456.40	72.21	0,6012	204.91	233.33	198,438766	278,80	204,50
1444.00	453.61	72.27	0,6012	204.51	233.99	198,806839	276,98	203,92
1445.00	449.93	72.31	0,5012	203.69	235.07	198,395294	274,82	202,67
1446.00	446.21	72.24	0,5012	203.39	234.98	198,548828	272,35	202,31
1447.00	442.90	72.15	0,4011	203.15	235.76	198,727707	270,01	202,13
1448.00	439.66	72.31	0,4012	202.93	236.41	198,778992	268,16	202,01
1449.00	436.49	72.28	0,4011	202.51	236.60	198,940117	265,67	201,29
1450.00	434.05	72.05	0,3012	202.30	237.22	199,230453	263,31	201,20
1451.00	431.23	72.16	0,3012	202.16	237.30	199,580215	261,25	201,15
1452.00	428.97	72.45	0,3012	202.01	237.48	199,758224	259,17	200,70
1453.00	426.67	72.37	0,3012	202.08	237.91	200,135086	256,75	200,04
1454.00	424.04	72.28	0,2012	201.70	238.10	200,366287	254,71	199,51
1455.00	421.39	72.38	0,2012	201.70	238.08	200,506927	252,36	198,60
1456	418.66	72.38	0,2012	201.02	238.82	200,562546	250,15	198,04
1457	416.67	72.47	0,1012	200.61	239.10	200,706879	248,25	197,42
1458	414.23	72.30	0,1011	199.89	240.38	200,409744	245,98	195,37
1459	412.39	72.32	0,1011	198.44	240.84	199,256073	244,24	194,71
1460	410.77	72.24	0,0000	197.53	242.78	198,918793	242,41	193,51
1461	74.10	74.14	1,98	74.11	73.56	73,88	74.66	74.34
1462	144,13	74,39	2,77	74,10	73,55	73,90	75,10	74,35
1463	349,19	74,35	2,50	74,18	73,60	73,92	75,54	74,45
1464	528,25	74,38	2,27	74,33	73,62	73,92	76,56	74,58
1465	595,67	74,57	1,98	74,45	73,66	73,95	79,24	74,82
1466	620,97	74,76	1,68	74,62	73,72	73,96	84,32	75,28
1467	655,90	74,91	1,37	74,88	73,85	74,05	92,55	76,02
1468	628,91	75,03	1,18	75,30	74,05	74,17	103,86	77,11
1469	644,52	75,13	0,87	75,95	74,35	74,33	117,77	78,50
1470	597,04	75,22	52,96	76,74	74,80	74,58	133,34	80,36
1471	484,09	75,41	0,58	77,80	75,45	74,91	149,22	82,47
1472	436,77	75,55	0,50	79,22	76,30	75,35	165,14	84,86
1473	412,61	75,46	0,48	80,86	77,42	75,92	180,12	87,57
1474	393,21	75,28	0,38	82,65	78,77	76,59	193,24	90,40
1475	379,72	75,16	0,38	84,39	80,28	77,38	204,96	93,03
1476	368,80	75,22	0,27	86,21	81,91	78,27	215,39	95,41
1477	350,86	75,24	0,17	87,97	83,87	79,32	224,23	97,85
1478	335,23	75,07	0,17	89,83	85,98	80,42	230,94	100,20
1479	319,64	75,10	0,17	91,61	88,20	81,66	235,07	102,23
1480	307,39	74,68	0,17	93,28	90,70	82,87	237,00	103,99
1481	296,77	74,40	0,07	95,22	93,22	84,24	238,23	105,73
1482	285,92	74,67	0,07	96,80	95,88	85,61	238,26	107,55
1483	277,88	74,92	0,07	98,54	98,44	87,11	237,72	108,49
1484	279,55	74,81	4,87	99,99	101,21	88,63	235,93	109,41
1485	302,62	74,86	4,68	101,78	103,39	90,21	234,02	110,60
1486	310,57	74,75	4,68	103,09	105,91	91,57	231,50	111,12
1487	307,88	74,57	4,68	104,24	108,39	92,93	228,11	112,13
1488	303,16	74,67	4,58	105,14	110,80	94,44	224,12	112,68
1489	299,57	74,57	4,58	105,94	112,81	95,82	219,73	112,99
1490	304,58	74,92	4,47	106,86	115,82	97,13	214,49	113,29
1491	284,09	74,91	4,37	107,97	118,10	98,53	209,86	113,79
1492	278,72	74,89	4,37	108,80	120,42	99,75	206,12	114,30
1493	283,02	74,97	4,27	109,50	122,55	100,99	202,93	114,76
1494	305,38	75,11	4,17	110,35	124,63	102,14	200,41	115,13
1495	314,09	75,20	4,08	111,10	126,51	103,20	198,52	115,50
1496	324,36	75,42	3,98	111,41	128,37	104,14	197,30	115,90
1497	332,10	75,44	3,88	112,09	130,08	105,09	196,83	116,51
1498	337,03	75,61	3,77	112,61	131,80	105,92	197,24	116,83
1499	345,40	75,72	3,77	112,97	133,40	106,91	198,07	117,52
1500	353,73	75,77	3,67	113,49	134,90	107,78	199,52	118,09
1501	362,04	76,02	3,57	114,13	136,20	108,70	202,08	118,85
1502	369,41	75,91	3,47	114,61	137,67	109,57	205,35	119,73
1503	376,80	76,00	3,38	115,23	138,76	110,45	209,24	120,70
1504	383,72	75,97	3,28	115,71	140,02	111,20	213,56	121,67
1505	389,82	76,23	3,17	116,41	141,14	112,06	218,47	122,91
1506	391,53	76,27	3,07	117,18	142,45	112,92	223,58	124,09
1507	396,73	76,36	2,95	117,91	143,77	113,61	228,11	125,39
1508	402,19	76,48	2,77	118,50	144,87	114,39	233,08	126,32
1509	412,36	76,54	2,68	119,97	145,78	115,20	238,37	127,56
1510	419,72	76,75	2,58	121,07	147,01	115,81	243,91	128,91
1511	422,30	76,96	2,47	122,48	148,19	116,54	249,90	130,30
1512	423,95	76,84	2,37	123,26	149,39	117,13	255,83	131,41
1513	426,30	77,24	2,27	124,84	150,52	117,95	261,60	132,62
1514	430,46	77,34	2,17	126,42	151,76	118,73	267,76	133,95
1515	433,22	77,02	2,07	127,96	152,89	119,48	273,65	135,39
1516	435,33	77,01	1,98	129,53	154,02	120,17	279,84	136,57

1517	435,49	77,19	1,87	130,99	155,21	121,11	285,42	138,19
1518	433,20	77,45	1,77	133,26	156,34	121,93	291,09	139,65
1519	434,16	77,40	1,67	135,12	157,49	122,80	296,18	141,50
1520	435,22	77,79	1,57	137,16	158,91	123,52	301,28	142,89
1521	432,66	77,68	1,47	138,48	160,33	124,33	305,51	144,44
1522	427,11	77,96	1,37	140,71	161,60	125,26	309,66	146,07
1523	419,45	77,79	1,27	142,30	163,31	125,94	313,12	147,64
1524	412,03	77,88	1,27	144,51	164,64	126,94	315,63	149,19
1525	405,12	78,18	1,17	146,23	166,43	127,81	317,03	150,23
1526	398,50	78,28	1,14	148,00	168,13	128,65	317,41	151,29
1527	393,36	78,18	1,07	149,84	169,82	129,68	317,62	152,48
1528	388,59	78,48	1,04	151,71	171,26	130,75	316,32	153,53
1529	383,37	78,43	0,97	153,08	172,89	131,67	315,13	154,64
1530	379,43	78,51	0,97	154,17	174,64	132,67	313,22	155,39
1531	374,36	78,67	0,87	155,30	176,05	133,82	310,61	156,40
1532	369,06	78,67	0,87	156,20	178,17	134,57	307,98	157,21
1533	361,82	78,62	0,87	157,66	179,41	135,68	305,23	157,40
1534	355,03	78,74	0,83	158,86	181,25	136,75	302,22	158,26
1535	348,79	78,77	0,77	159,52	182,79	137,67	299,28	158,59
1536	342,62	78,84	0,77	160,05	184,29	138,61	295,47	159,34
1537	337,79	78,85	0,67	160,72	186,00	139,50	292,16	159,46
1538	333,07	79,20	0,67	161,33	187,70	140,33	288,48	159,29
1539	329,77	78,85	0,67	161,94	189,13	141,18	284,71	159,42
1540	325,82	79,24	0,67	162,21	190,45	142,18	280,46	159,68
1541	320,60	79,29	0,59	162,25	192,01	142,96	277,10	159,75
1542	310,43	79,25	0,57	162,56	193,23	143,87	273,41	160,03
1543	302,50	79,20	2,44	162,38	194,82	144,61	269,63	159,93
1544	314,30	79,36	9,88	163,56	196,89	145,67	264,70	159,65
1545	286,64	79,64	9,78	163,99	198,40	146,25	260,81	159,22
1546	274,62	79,52	9,78	162,88	200,06	146,66	256,34	158,98
1547	277,33	79,39	9,77	162,08	199,42	147,29	251,78	158,56
1548	305,19	79,45	9,77	161,76	201,90	148,25	246,88	157,64
1549	296,87	79,56	9,68	162,08	203,40	149,34	241,23	156,83
1550	299,64	79,83	11,28	160,85	202,65	149,52	235,68	156,03
1551	424,92	79,25	11,08	157,95	203,25	149,50	230,72	154,77
1552	501,40	78,90	10,88	155,32	203,00	148,61	226,40	153,55
1553	574,56	79,36	10,58	153,60	200,82	148,93	224,13	152,56
1554	638,43	79,81	10,28	152,60	198,42	149,10	225,09	151,72
1555	651,62	79,78	10,08	151,36	196,82	149,26	230,14	151,58
1556	649,90	80,21	9,77	150,90	195,42	149,48	239,08	152,06
1557	639,52	80,48	9,58	150,39	194,39	149,37	250,84	152,74
1558	642,38	80,35	9,28	150,92	193,12	149,62	264,72	153,65
1559	649,47	80,83	9,07	151,74	192,17	149,83	280,42	155,43
1560	654,13	81,22	8,88	152,70	191,43	149,87	296,56	157,26
1561	656,21	81,11	8,68	154,08	190,26	150,32	312,67	159,48
1562	663,50	81,00	8,47	154,84	189,84	150,73	328,72	161,95
1563	670,88	81,22	8,28	156,83	189,65	151,16	344,50	164,11
1564	673,77	81,61	7,98	158,44	189,34	151,75	359,75	166,90
1565	667,97	81,18	7,88	160,06	190,10	151,22	373,70	170,07
1566	659,90	81,77	7,67	163,08	188,96	152,07	387,01	172,54
1567	653,65	81,98	7,38	165,68	188,96	152,71	398,21	174,97
1568	649,19	82,00	7,28	167,63	188,73	153,31	408,04	177,64
1569	646,76	82,11	7,07	169,82	188,62	154,04	415,90	180,32
1570	645,55	82,14	6,88	171,75	188,59	154,80	422,01	182,83
1571	641,59	82,12	6,78	174,16	188,94	155,56	426,59	185,65
1572	640,86	82,44	6,57	176,31	189,26	156,20	430,13	187,96
1573	638,96	82,16	6,43	178,33	190,10	156,76	432,95	190,83
1574	638,03	82,81	6,27	181,72	190,28	157,47	434,95	192,34
1575	636,79	82,54	6,08	184,73	190,58	158,34	436,58	194,36
1576	635,06	82,15	5,98	186,38	190,92	159,08	436,82	195,99
1577	632,49	82,88	5,77	188,42	191,16	160,05	437,97	197,87
1578	631,63	82,89	5,57	189,43	191,36	161,19	438,53	199,74
1579	628,00	83,02	5,48	191,46	191,85	162,05	438,51	201,13
1580	623,50	82,99	5,28	193,51	192,38	162,96	438,11	203,24
1581	618,67	83,04	5,17	195,00	192,94	163,91	437,34	204,71
1582	612,34	83,50	5,07	197,51	193,73	164,79	436,74	206,34
1583	606,87	83,04	4,87	198,73	194,14	165,90	435,08	207,18
1584	603,81	83,24	4,78	199,53	195,15	166,53	433,37	208,19
1585	599,17	83,06	4,68	201,93	195,89	167,45	430,82	209,25
1586	596,42	83,33	4,57	203,41	196,44	168,33	428,47	210,08
1587	543,02	83,43	4,47	204,86	197,66	169,27	425,32	211,37
1588	515,93	83,11	4,37	205,51	199,57	170,33	422,94	211,93
1589	501,12	83,48	4,27	207,50	201,00	171,23	419,44	212,80
1590	491,70	83,17	4,17	208,10	202,36	172,20	416,56	213,40
1591	483,06	83,16	4,08	207,98	204,05	173,17	413,79	214,28
1592	475,78	83,36	4,06	209,04	205,61	174,13	410,86	214,72
1593	470,49	83,11	3,97	209,16	206,84	175,01	407,31	215,62
1594	466,14	83,37	3,87	209,24	208,24	175,76	403,44	216,22
1595	462,85	83,45	3,77	209,67	209,35	176,53	400,11	216,06
1596	459,10	83,05	3,67	209,06	210,83	177,36	396,59	216,05
1597	454,58	83,16	3,67	208,62	212,47	177,40	392,65	215,82
1598	451,09	82,30	3,57	208,51	213,97	177,81	389,27	215,98
1599	448,38	82,34	3,47	208,47	215,33	178,06	385,80	215,82
1600	444,60	82,10	3,37	208,15	216,55	178,63	382,12	215,19
1601	442,23	81,58	3,37	207,89	217,89	178,78	378,59	214,07
1602	439,11	81,45	3,27	207,78	218,89	179,18	375,04	213,87
1603	435,56	81,77	3,26	207,13	219,85	179,42	371,90	213,19
1604	432,08	81,48	3,07	205,92	220,56	179,90	368,85	212,24
1605	429,73	81,10	3,07	204,16	221,62	179,81	365,51	211,26
1606	426,59	80,04	2,97	203,64	222,75	179,96	362,10	211,27
1607	425,25	80,91	2,97	203,28	223,53	180,40	359,04	211,16
1608	425,84	80,62	2,87	202,93	224,05	180,54	356,34	210,23
1609	424,59	80,92	2,87	203,06	224,59	180,63	354,01	209,02
1610	419,84	81,23	2,77	202,65	225,12	180,71	352,06	208,49
1611	414,47	81,53	2,77	201,89	225,75	181,03	349,86	208,27



1612	409,20	81,59	2,77	201,52	226,32	181,21	347,50	207,67
1613	405,60	81,54	2,77	200,73	227,01	181,14	344,51	207,11
1614	402,29	81,48	2,67	200,22	227,25	181,16	341,80	205,47
1615	399,36	81,63	2,67	199,24	228,07	181,09	338,73	205,36
1616	396,93	81,65	2,57	199,49	228,35	180,86	335,77	204,72
1617	395,04	81,05	2,57	198,34	229,07	181,01	332,68	202,75
1618	392,42	80,88	2,47	196,97	229,25	181,17	329,59	201,69
1619	389,38	80,89	2,47	197,45	229,80	181,47	326,39	201,20
1620	386,33	81,05	2,47	197,17	229,92	181,47	323,14	199,93
1621	387,39	80,63	8,67	197,74	230,88	181,34	320,22	199,79
1622	380,65	80,55	8,57	195,63	231,37	181,35	316,85	198,82
1623	392,02	81,32	8,57	196,17	231,43	181,67	312,93	197,98
1624	420,66	81,28	8,37	194,15	231,54	181,59	310,59	196,89
1625	434,30	80,96	8,28	193,74	231,98	181,30	308,82	196,03
1626	440,85	80,42	8,18	192,97	231,57	181,28	308,64	194,31
1627	452,43	81,07	8,08	192,54	231,43	181,59	309,56	192,89
1628	462,72	81,16	7,97	192,24	231,24	181,54	311,79	191,92
1629	466,24	81,60	7,78	191,50	231,17	181,89	315,20	191,16
1630	465,66	81,83	7,77	191,09	231,08	181,85	319,46	190,53
1631	465,00	81,63	7,58	190,86	230,93	181,72	324,57	190,23
1632	465,50	80,91	7,54	191,92	230,72	181,56	329,49	189,84
1633	461,44	81,85	7,37	192,18	230,38	181,63	333,72	189,72
1634	458,80	82,15	7,27	192,11	230,34	181,27	337,72	189,13
1635	455,85	81,71	7,17	191,63	230,11	181,04	340,63	189,15
1636	455,96	81,63	7,07	190,68	230,42	180,76	342,99	188,49
1637	457,06	82,21	6,97	190,91	230,69	180,74	344,50	189,02
1638	456,89	82,36	6,88	192,14	230,58	180,80	346,09	189,54
1639	454,23	81,89	6,83	192,99	230,57	180,40	347,39	189,84
1640	453,04	82,30	6,78	193,75	230,15	180,50	348,76	190,69
1641	450,63	81,32	6,67	192,39	230,19	180,06	350,02	190,71
1642	448,11	81,65	6,57	192,63	230,75	179,75	350,46	191,35
1643	446,32	81,46	6,47	193,74	230,46	180,12	350,97	191,32
1644	444,07	81,19	6,46	193,56	230,68	179,88	350,90	191,24
1645	443,45	80,75	6,33	192,40	230,95	179,58	350,53	191,33
1646	441,85	81,12	6,27	193,23	231,23	179,41	350,32	191,23
1647	440,17	81,56	6,18	193,65	231,42	179,78	349,83	191,88
1648	439,04	80,95	6,07	194,22	231,27	179,89	349,08	191,77
1649	437,26	80,94	5,97	193,26	231,13	179,81	347,98	191,94
1650	435,98	80,95	5,87	194,03	231,32	180,03	347,26	191,95
1651	435,01	81,18	5,87	194,01	231,30	179,98	346,72	192,82
1652	433,26	81,07	5,77	193,24	231,37	179,92	345,89	192,94
1653	432,37	81,44	5,67	193,77	231,40	180,17	345,06	192,87
1654	431,17	81,08	5,66	192,95	231,21	180,10	344,25	192,47
1655	429,03	80,54	5,57	193,11	231,32	180,13	343,08	192,66
1656	427,53	81,09	5,48	193,37	231,94	180,12	341,91	192,31
1657	425,23	81,03	5,37	193,11	232,15	180,33	340,95	191,90
1658	424,80	80,76	5,37	193,59	232,19	180,71	338,91	192,02
1659	423,44	80,39	5,19	194,38	232,15	180,99	338,19	191,89
1660	423,45	80,61	5,17	194,66	231,83	180,84	336,83	192,01
1661	422,47	80,52	5,11	193,86	232,10	180,76	336,03	192,13
1662	421,85	80,77	5,07	194,22	232,32	181,04	334,62	192,06
1663	420,99	81,08	4,97	194,14	232,64	181,06	333,99	191,76
1664	420,13	81,06	4,97	193,98	232,76	181,29	333,12	191,62
1665	420,05	80,32	4,87	194,12	232,59	181,51	331,87	191,39
1666	419,07	80,65	4,77	193,29	233,04	181,26	331,18	191,12
1667	418,71	80,85	4,77	194,09	233,38	181,26	330,28	191,39
1668	418,54	79,94	4,67	194,02	233,11	181,65	329,67	191,14
1669	417,98	81,00	4,57	193,86	233,32	181,35	329,27	191,20
1670	416,44	80,24	4,47	192,82	233,87	180,37	328,78	191,84
1671	417,18	80,44	4,47	193,52	234,11	180,42	328,24	191,36
1672	417,12	80,47	4,47	193,41	234,09	180,44	327,24	191,41
1673	416,49	78,78	4,37	192,88	234,30	179,84	327,11	191,26
1674	416,25	79,37	4,27	193,22	234,51	179,62	326,71	190,91
1675	415,92	79,55	4,27	192,13	234,74	179,13	326,38	190,90
1676	416,87	79,94	4,17	191,96	234,77	179,77	326,21	189,83
1677	415,99	80,08	4,07	192,43	234,82	180,11	326,00	189,35
1678	415,78	79,97	4,07	192,10	234,64	180,24	325,83	189,54
1679	415,79	79,76	3,97	191,96	234,27	180,34	325,65	189,35
1680	414,84	79,87	3,87	191,30	234,82	180,34	325,33	189,57
1681	414,15	78,88	3,87	191,06	235,06	179,82	325,13	189,53
1682	413,81	78,72	3,87	190,02	235,65	179,82	325,07	189,34
1683	413,80	79,21	3,77	191,13	235,86	179,96	324,97	188,74
1684	413,20	79,34	3,67	191,18	235,64	179,91	324,58	188,15
1685	412,69	79,47	3,67	192,25	235,51	180,47	324,55	188,11
1686	411,18	80,15	3,57	192,51	235,30	181,06	324,40	187,79
1687	409,94	80,06	3,57	192,21	235,15	181,11	324,37	188,03
1688	408,14	79,93	3,47	192,47	235,45	181,60	324,36	187,76
1689	406,81	79,94	3,37	192,20	235,12	181,71	324,06	187,62
1690	405,60	80,66	3,37	192,91	235,44	181,73	323,47	187,87
1691	404,68	80,94	3,28	193,19	235,10	182,29	322,99	187,38
1692	403,14	81,24	3,27	193,01	235,06	182,64	322,28	187,21
1693	401,36	80,69	3,27	192,58	234,88	182,57	321,27	187,90
1694	399,93	81,13	3,17	192,28	234,97	183,31	320,53	187,26
1695	398,20	80,75	3,17	192,18	235,03	183,11	319,84	187,45
1696	397,12	81,10	3,07	192,87	235,42	183,49	318,95	187,55
1697	394,26	81,40	3,07	193,44	235,32	183,75	318,07	187,20
1698	389,58	81,20	2,99	192,94	235,38	184,65	317,06	186,73
1699	384,38	81,27	2,97	192,47	235,40	184,98	315,77	186,76
1700	380,00	81,53	2,87	191,90	235,82	185,60	314,12	186,58
1701	375,75	81,27	2,97	191,52	236,15	185,83	312,36	186,60
1702	371,43	81,78	2,87	191,84	236,57	186,07	310,23	186,35
1703	365,64	81,57	2,87	192,26	236,81	186,56	308,17	186,04
1704	359,43	81,94	2,87	192,30	236,96	187,20	305,54	185,97
1705	354,44	82,19	2,77	191,74	237,17	187,87	303,01	185,73
1706	349,74	81,88	2,77	191,68	237,44	188,24	300,09	185,13

1707	345,80	81,72	2,77	192,07	238,01	188,48	297,04	185,27
1708	341,34	81,66	2,77	191,93	237,61	189,17	293,61	185,38
1709	337,13	81,69	2,67	191,22	238,34	188,98	290,39	184,96
1710	333,85	81,50	2,67	190,40	238,47	189,40	286,82	184,35
1711	330,16	81,61	2,72	190,33	238,94	189,57	283,09	184,05
1712	326,37	80,93	2,67	190,23	239,16	190,20	279,98	183,37
1713	323,35	81,07	2,67	189,78	239,42	190,32	276,39	182,71
1714	320,25	82,08	2,67	189,66	239,64	190,39	273,55	182,20
1715	317,95	81,36	2,67	189,41	239,94	190,80	270,30	181,97
1716	315,20	81,17	2,57	188,33	240,16	190,83	267,30	181,39
1717	312,96	81,35	2,57	188,14	240,76	191,38	264,54	180,58
1718	310,89	82,07	2,57	188,52	240,50	191,80	261,80	180,51
1719	309,00	80,97	2,57	186,95	240,21	192,58	259,38	180,31
1720	307,23	81,18	2,49	186,31	240,67	192,68	256,34	180,02
1721	305,46	81,50	2,47	185,30	241,15	192,99	253,97	179,52
1722	304,75	81,28	2,47	185,47	241,34	193,30	251,68	179,25
1723	303,82	81,37	2,47	185,31	241,62	193,18	249,79	178,66
1724	302,10	81,00	2,47	185,25	241,70	193,58	247,57	177,86
1725	301,07	81,41	2,37	185,17	241,76	193,63	245,80	177,21
1726	300,04	81,47	2,47	184,65	242,11	194,35	244,10	176,98
1727	298,91	81,70	2,37	184,14	242,02	194,59	242,53	176,20
1728	297,83	82,01	2,37	183,72	242,34	194,60	241,11	176,20
1729	296,75	81,92	2,37	183,08	242,17	194,54	239,59	176,58
1730	296,03	80,88	2,27	181,81	242,17	194,55	238,19	175,41
1731	295,11	81,43	2,27	181,52	242,30	194,75	236,82	174,95
1732	293,70	80,95	2,27	181,00	242,55	194,69	235,39	174,99
1733	291,82	81,08	2,27	180,91	242,45	194,98	234,07	174,83
1734	291,04	81,03	2,27	180,34	242,49	194,92	232,92	174,33
1735	289,79	80,24	2,27	179,58	242,47	195,08	231,63	173,92
1736	288,91	80,63	2,17	179,43	242,40	195,38	230,48	173,03
1737	288,08	80,36	2,27	179,24	242,47	195,01	229,50	172,87
1738	286,85	80,37	2,17	178,72	242,26	195,10	228,19	172,34
1739	286,28	80,72	2,17	178,34	242,54	195,67	227,20	172,14
1740	285,39	80,56	2,17	177,46	242,36	195,99	226,24	171,94
1741	285,10	80,83	2,11	177,27	241,99	195,89	225,47	171,02
1742	284,10	80,89	2,07	177,08	241,76	195,78	224,73	170,64
1743	283,13	80,93	2,07	176,23	241,96	196,20	223,71	170,70
1744	282,25	80,56	2,07	175,26	241,74	196,38	222,83	170,59
1745	282,03	80,90	2,07	175,14	241,54	196,50	222,13	170,32
1746	281,59	81,38	2,07	175,53	241,63	196,68	221,50	170,45
1747	279,98	81,58	2,07	174,98	241,58	196,51	220,80	170,74
1748	279,50	81,30	1,97	175,46	240,91	196,91	220,24	170,80
1749	279,46	81,30	1,97	175,65	240,75	196,82	219,43	170,26
1750	279,04	81,03	1,97	174,93	240,62	196,64	219,00	170,21
1751	278,84	81,77	1,97	175,29	240,85	195,95	218,21	170,24
1752	278,54	81,27	1,97	175,50	240,74	196,26	217,81	169,45
1753	277,78	80,78	1,97	175,56	240,23	196,12	217,15	169,15
1754	277,54	81,28	1,88	174,97	240,42	196,25	216,32	168,73
1755	277,18	80,57	1,87	174,22	239,98	196,55	215,86	167,79
1756	276,60	81,05	1,87	173,07	240,56	196,12	215,35	168,34
1757	275,54	81,32	1,87	171,90	240,00	196,52	214,76	167,78
1758	277,11	80,72	1,79	172,61	240,23	196,18	214,05	167,68
1759	277,01	81,09	5,87	172,37	240,45	196,06	213,88	167,85
1760	284,16	80,51	5,87	171,25	240,27	195,53	213,24	167,82
1761	294,38	80,42	5,77	170,94	239,82	195,20	212,66	166,58
1762	305,07	80,56	5,77	169,96	239,74	195,56	211,78	165,92
1763	323,02	80,88	5,67	170,36	239,02	195,38	211,37	164,99
1764	331,21	80,87	5,47	170,40	238,53	195,62	211,72	164,65
1765	348,49	80,29	5,47	169,63	237,77	195,39	212,17	164,03
1766	363,72	79,97	5,37	169,19	237,57	195,04	213,31	164,00
1767	372,09	80,73	5,27	169,30	236,58	195,32	215,05	163,83
1768	385,31	80,37	5,17	169,53	236,12	194,57	217,86	164,14
1769	401,67	81,19	5,07	169,72	234,80	194,70	221,71	164,36
1770	416,73	81,49	4,97	169,15	233,96	194,66	226,48	164,89
1771	432,10	80,83	4,87	169,57	233,39	194,08	232,91	165,37
1772	445,03	81,11	4,77	170,04	232,67	193,31	240,72	165,78
1773	454,01	81,64	4,57	169,70	232,08	192,56	249,34	166,80
1774	458,41	81,57	4,47	169,79	231,05	192,61	258,69	167,66
1775	462,74	81,38	4,37	169,60	230,47	192,30	268,55	168,34
1776	464,93	81,63	4,27	170,09	229,99	191,29	278,65	169,77
1777	466,57	81,73	4,17	171,55	229,48	190,82	288,31	170,89
1778	469,09	81,88	4,07	172,86	228,91	190,17	297,33	172,75
1779	472,28	81,74	3,97	172,84	228,57	190,43	305,07	174,38
1780	466,15	82,33	3,87	173,86	228,20	190,04	312,67	176,03
1781	457,43	81,37	3,77	174,49	227,86	189,41	319,15	177,81
1782	450,34	82,75	3,67	175,23	228,07	188,56	325,08	179,32
1783	442,50	82,53	3,67	175,90	227,50	188,81	329,72	180,25
1784	437,19	82,28	3,57	176,08	227,56	188,41	332,62	181,31
1785	433,37	82,13	3,47	177,06	228,32	187,99	334,88	183,46
1786	428,77	82,48	3,38	178,40	227,93	186,88	336,00	184,81
1787	425,90	82,25	3,35	180,45	227,64	187,61	337,08	185,14
1788	423,33	82,75	3,27	181,01	227,99	187,04	336,77	185,98
1789	420,46	82,47	3,18	182,34	228,07	186,02	336,59	186,95
1790	414,79	82,54	3,17	183,71	228,38	185,88	335,99	187,89
1791	410,24	82,11	3,09	183,47	228,57	186,04	334,70	187,47
1792	406,14	82,51	3,06	183,67	228,86	186,16	333,11	187,69
1793	402,37	82,09	2,97	184,22	229,30	186,02	331,32	188,07
1794	398,62	81,89	2,95	184,84	229,46	186,14	329,29	188,28
1795	395,15	82,13	2,87	184,95	229,78	185,99	326,47	187,44
1796	391,72	81,54	2,87	185,80	230,15	185,41	324,73	188,80
1797	386,95	82,01	2,77	186,02	230,90	185,13	322,06	188,77
1798	380,84	82,43	2,77	186,42	231,28	184,67	319,52	188,82
1799	375,26	82,25	2,77	187,14	231,50	184,16	316,79	189,02
1800	370,65	82,53	2,77	187,42	231,84	184,31	313,73	188,34
1801	365,51	82,32	2,67	187,58	232,33	184,17	310,75	188,87

1802	360,64	81,76	2,67	186,88	232,74	183,53	307,55	188,03
1803	356,24	82,20	2,57	186,42	233,05	183,56	304,03	187,70
1804	352,24	81,64	2,57	186,18	233,21	183,40	301,13	187,14
1805	348,74	82,04	2,57	185,84	233,72	183,69	297,51	186,32
1806	346,09	82,24	2,57	186,16	233,81	183,56	294,25	186,15
1807	343,14	82,28	2,48	186,07	234,16	182,90	290,69	186,32
1808	340,24	82,03	2,47	186,26	234,04	183,69	287,67	185,66
1809	337,38	81,80	2,43	185,32	234,38	183,15	284,55	185,24
1810	334,55	81,49	2,37	184,67	234,92	182,45	281,84	184,67
1811	332,61	82,08	2,37	184,01	235,06	182,75	278,36	183,97
1812	329,82	81,92	2,37	183,06	234,78	182,96	275,61	183,57
1813	327,97	81,91	2,37	182,54	234,89	182,98	272,76	182,08
1814	325,74	81,99	2,36	182,04	234,83	183,27	270,25	181,82
1815	324,01	82,18	2,37	182,28	234,98	183,11	267,53	181,73
1816	322,23	82,20	2,27	181,39	234,67	182,88	265,54	180,81
1817	319,51	82,07	2,27	180,69	234,82	182,80	263,14	180,20
1818	317,43	82,07	2,27	179,60	234,92	182,30	260,92	180,71
1819	316,46	81,24	2,17	179,54	234,99	182,01	258,67	180,15
1820	311,22	81,73	2,17	178,48	234,59	181,46	256,33	179,36
1821	303,94	81,31	2,17	177,67	234,99	181,22	254,43	179,01
1822	299,14	81,36	2,17	177,46	234,67	181,07	252,39	177,97
1823	294,99	81,37	2,17	176,96	234,80	181,25	249,87	177,21
1824	292,27	81,88	2,17	177,30	234,21	180,81	247,77	176,86
1825	289,76	81,80	2,07	175,92	234,33	180,82	245,22	176,29
1826	287,15	81,79	2,07	174,70	234,18	180,05	242,80	176,19
1827	284,82	81,34	2,07	173,88	234,54	179,46	240,45	175,92
1828	282,83	81,85	2,07	173,73	234,48	179,70	238,01	175,27
1829	281,26	81,49	2,07	173,12	234,25	179,13	235,79	173,98
1830	276,56	81,35	8,57	173,21	234,59	179,03	233,55	173,64
1831	267,88	81,87	8,57	172,73	234,26	179,12	231,32	172,51
1832	261,99	81,67	8,57	171,25	234,02	179,20	228,99	171,85
1833	257,90	81,83	8,47	170,74	234,09	179,12	226,55	171,29
1834	254,61	82,06	8,45	169,93	233,54	178,95	223,81	170,38
1835	251,92	81,53	8,37	168,08	233,37	179,01	221,31	169,46
1836	249,29	81,47	8,47	166,38	233,67	178,17	219,02	169,11
1837	306,21	81,37	8,18	167,11	233,55	178,38	215,62	167,72
1838	312,17	80,79	8,18	165,46	233,55	178,15	213,38	165,88
1839	331,54	81,73	8,08	165,94	233,00	177,70	211,89	165,36
1840	352,92	81,20	7,97	164,31	231,68	177,30	211,09	164,91
1841	372,03	82,30	7,77	164,23	230,73	176,70	211,51	164,47
1842	388,11	81,64	7,77	163,74	229,52	176,56	212,98	164,14
1843	403,66	81,24	7,58	161,95	228,39	176,18	215,59	163,16
1844	415,64	81,01	7,48	160,25	227,10	175,53	219,78	162,87
1845	427,98	80,84	7,37	159,60	226,02	175,25	225,19	162,60
1846	441,05	81,28	7,27	158,50	224,72	174,98	231,91	163,06
1847	453,39	82,23	7,17	159,43	223,60	174,22	239,67	164,19
1848	428,85	82,33	7,01	160,19	223,18	174,41	248,42	164,98
1849	412,41	81,80	6,88	159,58	222,78	174,12	257,70	165,13
1850	406,09	81,36	6,88	159,16	222,67	173,81	266,93	165,77
1851	403,96	82,48	6,77	160,25	223,00	173,63	275,40	166,98
1852	402,63	82,01	6,58	160,42	222,87	173,49	283,36	167,74
1853	401,76	81,45	6,57	160,49	222,84	173,06	290,89	168,52
1854	401,32	81,36	6,47	161,10	223,33	172,41	297,14	169,65
1855	400,45	82,46	6,37	163,01	223,62	171,81	302,73	170,82
1856	401,45	82,47	6,30	164,46	223,79	172,13	307,93	171,34
1857	401,86	82,50	6,27	164,54	224,07	172,03	312,56	172,26
1858	401,66	82,52	6,18	165,33	224,38	171,88	316,37	172,94
1859	402,08	81,78	6,07	165,66	224,75	171,55	320,04	172,99
1860	402,64	81,43	5,97	166,60	224,78	171,19	323,30	173,22
1861	402,77	81,34	5,87	166,77	224,87	170,84	326,21	174,02
1862	403,39	82,04	5,84	168,31	225,44	170,54	328,68	175,35
1863	403,11	82,73	5,77	169,45	225,61	170,16	331,14	176,03
1864	403,51	82,62	5,67	170,42	225,71	169,86	333,44	176,19
1865	403,32	82,66	5,57	170,85	225,83	169,68	335,22	176,70
1866	403,74	82,36	5,49	170,92	226,17	169,79	336,84	176,81
1867	403,45	82,20	5,47	171,80	226,19	169,44	338,68	177,47
1868	403,42	81,36	5,34	172,95	226,79	169,20	340,29	178,12
1869	403,54	82,10	5,27	173,46	227,06	168,97	341,38	178,46
1870	402,38	81,56	5,17	173,91	227,23	168,69	342,76	178,56
1871	399,59	82,93	5,17	175,82	227,46	168,14	343,72	179,86
1872	395,37	83,10	5,07	176,70	227,90	167,90	344,83	180,40
1873	391,65	82,07	4,97	177,34	228,01	167,84	345,44	180,10
1874	387,91	82,36	4,97	177,09	228,29	167,91	345,38	179,26
1875	384,38	82,50	4,87	177,60	228,39	167,46	345,12	180,52
1876	381,51	82,44	4,77	178,76	228,60	167,28	344,39	180,72
1877	378,76	82,05	4,77	178,84	229,05	167,25	342,90	180,70
1878	376,65	82,25	4,67	179,01	229,36	167,13	341,34	180,84
1879	374,16	83,21	4,57	179,77	229,48	166,77	339,67	180,87
1880	371,38	82,78	4,57	179,34	229,88	166,60	337,93	180,95
1881	368,84	82,78	4,57	179,59	230,13	166,99	336,87	181,20
1882	366,68	82,25	4,47	179,31	230,97	166,37	335,07	181,05
1883	364,92	82,74	4,37	180,08	230,99	166,24	333,56	181,23
1884	362,25	82,45	4,37	179,83	231,83	166,16	331,46	181,76
1885	360,03	82,69	4,37	180,21	232,09	166,29	329,43	181,25
1886	357,78	82,29	4,20	180,29	232,37	165,69	327,62	181,51
1887	356,07	82,93	4,17	181,44	232,87	165,38	325,55	182,31
1888	354,13	83,28	4,17	182,13	233,08	164,99	323,60	182,11
1889	352,76	83,32	4,17	182,57	233,25	164,99	322,01	182,21
1890	350,81	83,54	4,07	180,44	233,47	165,22	320,35	180,63
1891	349,46	82,64	4,06	180,14	233,59	165,33	318,36	180,72
1892	348,83	82,21	3,97	179,69	233,79	164,72	317,01	180,44
1893	346,78	82,96	3,87	180,00	233,96	164,47	315,21	181,46
1894	345,14	82,29	3,87	179,57	234,47	164,56	313,42	180,57
1895	343,13	83,46	3,87	179,70	234,83	164,28	311,75	180,67
1896	339,82	83,45	3,87	179,40	234,72	164,00	310,01	180,43

1897	336,92	83,27	3,77	178,47	235,44	164,41	308,44	180,50
1898	333,88	82,79	3,77	177,78	235,61	164,43	306,75	180,51
1899	331,19	83,80	3,77	177,84	235,78	165,07	304,91	179,99
1900	329,15	82,88	3,67	178,33	235,89	164,52	302,88	179,30
1901	326,82	82,83	3,67	178,17	236,42	164,29	300,37	179,90
1902	324,56	82,32	3,60	176,98	236,66	163,94	298,63	179,41
1903	322,56	82,65	3,57	176,90	237,08	164,07	296,17	179,14
1904	319,80	82,01	3,57	176,08	237,52	163,83	293,79	179,04
1905	317,93	83,11	3,57	176,07	237,42	163,73	290,93	178,86
1906	316,03	82,92	3,47	176,11	237,65	163,29	288,95	178,55
1907	314,34	81,83	3,47	175,46	237,48	163,13	286,20	178,14
1908	311,86	82,43	3,42	174,63	237,66	162,63	284,10	177,27
1909	310,54	81,77	3,37	174,17	237,87	162,35	281,73	176,84
1910	308,29	82,65	3,37	172,57	238,09	162,90	279,55	175,98
1911	307,65	81,64	3,37	172,53	238,28	162,95	277,41	175,11
1912	305,73	81,93	3,27	172,41	238,23	162,53	275,30	175,15
1913	306,26	82,75	3,27	172,51	238,18	162,72	273,42	174,74
1914	294,19	82,43	9,27	172,67	238,23	162,55	271,68	174,54
1915	278,55	81,81	9,27	172,28	238,61	162,63	269,04	174,10
1916	270,52	82,87	9,17	171,16	238,67	161,78	265,84	173,53
1917	265,17	82,10	9,07	170,80	238,56	162,02	262,69	172,32
1918	261,58	80,87	9,07	169,93	238,49	162,13	258,70	171,42
1919	420,88	82,17	8,88	169,11	236,02	162,04	255,43	170,19
1920	515,12	81,89	8,67	167,78	233,90	161,81	252,74	168,95
1921	551,73	82,16	8,47	167,58	230,47	161,38	253,14	168,02
1922	566,73	82,66	8,28	166,66	227,69	161,24	256,36	167,50
1923	580,12	82,63	8,08	165,86	225,16	160,88	262,55	166,44
1924	585,81	82,67	7,87	166,18	222,58	161,14	271,49	167,09
1925	588,75	81,66	7,77	165,94	220,55	160,85	282,56	167,03
1926	583,16	81,91	7,58	166,36	218,89	160,56	294,71	167,63
1927	577,76	82,60	7,37	167,34	216,94	160,42	307,65	168,59
1928	574,95	81,67	7,27	167,90	215,49	160,08	319,71	169,07
1929	570,38	82,27	7,17	169,08	214,48	159,77	331,63	170,43
1930	568,40	83,06	7,05	171,24	213,49	159,73	342,56	171,91
1931	567,79	82,83	6,88	172,50	211,85	159,97	352,31	172,71
1932	567,96	81,96	6,77	173,37	211,72	159,60	360,60	174,18
1933	564,83	82,32	6,67	173,31	210,96	159,57	367,66	175,19
1934	562,70	81,94	6,57	174,21	210,20	159,57	372,80	177,16
1935	560,17	81,18	6,40	175,63	209,62	159,41	377,15	178,01
1936	558,56	81,48	6,27	176,98	209,61	159,35	380,37	179,64
1937	556,65	82,12	6,20	177,88	209,20	159,30	383,20	181,06
1938	553,62	82,45	6,07	179,79	209,07	159,59	384,75	182,50
1939	550,04	81,55	5,97	181,15	208,63	159,65	386,06	183,95
1940	546,59	81,96	5,87	181,74	208,20	160,03	386,94	184,91
1941	544,74	81,92	5,77	181,81	208,36	159,95	386,91	186,00
1942	540,49	81,61	5,67	182,42	208,34	160,24	386,15	186,69
1943	538,52	81,24	5,57	183,07	208,41	160,54	385,04	187,43
1944	535,45	80,87	5,47	183,47	208,32	161,13	383,42	188,33
1945	531,59	81,47	5,37	184,67	208,82	161,15	382,12	189,66
1946	528,99	81,49	5,37	185,60	208,97	161,08	380,65	190,70
1947	525,33	81,28	5,27	184,86	210,06	161,18	378,51	191,82
1948	522,43	79,18	5,12	184,10	210,89	160,97	375,97	192,11
1949	519,17	79,58	5,07	185,35	210,89	161,59	372,51	191,88
1950	515,91	77,98	4,97	185,43	211,65	161,42	369,55	192,25
1951	512,79	78,68	4,87	186,04	211,67	162,16	366,20	191,69
1952	510,43	77,87	4,87	186,27	212,42	161,75	363,97	192,73
1953	513,13	78,26	4,67	186,30	213,40	161,66	361,52	193,31
1954	512,35	78,03	4,67	186,78	213,66	161,79	359,48	193,96
1955	508,50	78,51	4,57	187,58	213,57	162,22	358,11	194,63
1956	503,99	79,31	4,47	188,21	214,09	162,53	356,82	195,28
1957	499,35	78,82	4,47	188,58	213,86	163,17	354,46	194,28
1958	494,72	78,23	4,37	188,16	214,41	162,92	351,94	193,87
1959	491,11	77,69	4,27	188,20	214,85	163,00	350,08	194,52
1960	486,49	77,63	4,27	188,69	215,20	163,37	347,20	195,12
1961	482,87	76,33	4,17	188,70	216,12	163,32	344,80	195,27
1962	479,36	77,94	4,17	189,02	216,65	163,56	341,65	195,44
1963	476,11	78,91	4,07	190,94	216,72	164,03	339,31	196,22
1964	473,55	79,76	4,07	192,81	216,57	164,93	336,96	196,22
1965	470,65	80,60	3,97	192,59	216,54	165,45	334,88	196,10
1966	467,81	79,87	3,97	192,23	217,12	165,46	331,78	195,52
1967	464,96	79,66	3,89	191,96	217,16	165,63	329,10	196,30
1968	462,98	79,30	3,87	191,82	217,53	166,15	325,92	196,63
1969	460,52	79,46	3,77	192,38	217,62	167,05	322,67	195,79
1970	458,93	79,04	3,77	193,14	217,63	167,10	319,89	196,38
1971	457,17	80,05	3,67	192,65	217,81	167,31	317,53	196,25
1972	454,65	79,87	3,67	192,15	217,96	167,38	315,39	195,89
1973	453,19	79,82	3,57	190,83	217,92	167,81	312,64	195,53
1974	451,86	79,50	3,52	191,12	218,30	167,79	310,36	195,22
1975	450,12	78,66	3,47	190,85	218,07	167,94	307,96	194,77
1976	448,63	79,10	3,47	189,84	218,19	168,17	305,64	194,03
1977	444,01	78,75	3,47	189,51	218,53	168,49	303,02	193,48
1978	434,10	78,87	3,37	189,32	218,28	168,56	301,03	193,35
1979	377,74	79,53	12,98	190,61	219,89	169,10	298,86	193,33
1980	402,86	78,93	16,83	190,22	221,38	168,85	295,79	193,35
1981	386,90	78,94	16,68	188,42	221,98	168,46	291,83	192,67
1982	399,59	78,42	16,58	185,82	222,41	168,31	287,51	191,91
1983	368,59	78,26	16,48	184,65	222,30	168,89	281,79	190,39
1984	345,51	78,19	16,38	184,32	223,50	169,46	276,46	189,01
1985	336,63	78,28	16,28	182,56	225,02	169,52	271,47	187,20
1986	335,35	78,78	16,18	182,69	226,02	170,47	266,75	185,56
1987	338,06	78,57	16,18	181,37	226,84	170,53	262,76	184,72
1988	349,92	79,07	15,98	180,63	227,62	170,57	259,13	183,76
1989	376,69	78,33	15,88	178,90	227,86	170,88	255,99	182,04
1990	410,11	78,88	15,68	177,47	228,56	170,46	254,61	180,39
1991	429,51	77,95	15,58	176,09	228,37	170,47	254,18	179,19

1992	438,86	77,97	15,45	175,00	228,40	170,33	255,84	177,64
1993	448,12	78,64	15,28	174,80	228,08	170,92	259,39	176,94
1994	457,56	78,23	15,18	173,90	228,03	170,33	263,83	175,82
1995	466,10	78,29	15,08	173,74	227,56	169,64	269,92	175,07
1996	477,23	77,91	14,88	173,35	227,17	169,51	277,37	174,78
1997	488,60	78,28	14,76	172,99	226,91	169,24	285,61	174,01
1998	498,52	78,38	14,58	173,12	226,31	169,23	294,15	173,17
1999	506,16	78,24	14,38	173,23	226,05	169,31	303,90	172,56
2000	521,59	78,10	14,18	173,64	225,46	169,35	314,00	172,19
2001	532,73	77,92	13,98	173,79	224,77	169,26	324,07	172,05
2002	538,99	78,18	13,78	174,38	224,23	169,09	334,67	172,02
2003	545,77	78,45	13,58	175,33	223,72	168,67	345,64	173,27
2004	547,36	79,79	13,38	176,93	223,01	168,73	357,45	175,10
2005	550,97	80,71	13,17	178,28	222,18	168,67	369,14	176,55
2006	552,78	81,24	12,98	177,81	221,82	168,72	380,24	177,85
2007	554,97	81,51	12,87	178,53	221,59	168,62	390,10	179,63
2008	556,87	82,05	12,58	179,56	221,34	168,59	399,22	181,57
2009	558,93	81,90	12,38	181,27	220,94	168,60	408,07	183,35
2010	558,53	82,04	12,18	182,46	220,94	168,46	415,35	185,36
2011	560,05	82,17	12,08	183,18	221,53	168,27	422,38	187,33
2012	560,54	82,48	11,88	185,01	221,68	168,06	429,21	189,18
2013	560,14	82,52	11,68	185,84	221,26	168,08	435,41	191,50
2014	560,72	83,17	11,49	187,23	221,19	167,64	440,07	193,19
2015	560,46	82,77	11,33	188,19	221,15	167,80	444,96	195,11
2016	560,89	82,73	11,17	188,79	221,37	167,45	448,88	196,84
2017	560,56	83,54	10,98	189,90	221,75	167,22	452,68	198,43
2018	559,39	83,15	10,78	190,57	222,07	167,10	456,45	200,42
2019	557,87	83,05	10,58	191,26	222,24	166,75	458,65	201,98
2020	557,61	82,78	10,47	192,28	222,45	166,57	460,58	203,56
2021	558,06	83,57	10,28	194,47	222,68	166,36	463,51	205,59
2022	556,83	83,66	10,08	195,76	222,40	166,52	466,61	207,02
2023	555,96	83,63	9,98	196,74	222,71	166,30	468,39	208,63
2024	555,41	83,59	9,77	197,70	222,80	166,19	469,99	209,69
2025	555,05	83,65	9,58	198,16	223,00	165,92	471,53	211,22
2026	554,10	83,82	9,48	199,24	223,13	165,71	472,29	212,60
2027	551,65	83,75	9,28	199,80	223,50	165,50	473,56	214,01
2028	549,64	83,29	9,07	200,27	223,90	165,26	474,54	215,28
2029	550,39	83,53	8,98	201,34	224,40	165,07	475,76	216,31
2030	548,54	84,12	8,88	203,04	224,77	164,82	476,56	217,62
2031	549,10	83,69	8,68	203,92	224,51	164,99	478,55	218,73
2032	549,18	84,15	8,57	204,13	224,60	164,88	480,20	219,86
2033	545,97	83,73	8,47	204,74	224,99	164,70	481,30	220,49
2034	543,42	84,24	8,28	204,61	225,16	164,66	482,95	220,76
2035	541,88	83,68	8,18	205,16	225,38	164,63	483,89	221,14
2036	542,17	83,67	8,08	204,85	225,43	164,63	484,15	221,16
2037	539,02	83,35	7,97	204,69	225,58	164,70	484,01	221,09
2038	536,21	83,38	7,87	204,82	225,92	164,66	483,44	220,70
2039	533,06	84,22	7,67	206,15	226,04	164,51	482,56	220,79
2040	530,13	83,84	7,67	206,17	226,27	164,41	481,51	220,79
2041	527,38	84,20	7,57	205,44	226,31	164,35	480,36	220,41
2042	523,05	84,19	7,38	205,94	226,75	164,56	478,34	219,65
2043	519,77	83,88	7,27	205,69	226,55	164,78	477,24	219,47
2044	515,02	84,29	7,27	205,75	226,95	164,67	475,75	219,09
2045	509,14	83,54	7,17	205,56	227,28	164,77	473,17	219,00
2046	505,04	83,27	7,07	205,75	227,36	164,96	470,46	218,61
2047	500,93	83,44	6,97	206,24	227,88	164,98	466,74	218,03
2048	495,23	84,10	6,97	207,25	227,55	165,00	463,72	218,30
2049	487,60	83,81	6,88	207,32	227,81	164,78	460,90	218,15
2050	478,52	83,69	6,78	206,35	227,92	164,95	457,40	218,04
2051	467,42	83,80	6,70	206,39	228,12	165,03	452,28	217,87
2052	459,58	83,41	6,67	206,55	228,15	165,24	447,66	217,68
2053	453,09	83,73	6,57	206,41	228,37	165,32	441,38	217,29
2054	447,07	83,48	6,57	206,41	228,65	165,60	436,27	217,04
2055	441,02	83,60	6,47	206,62	228,68	165,83	429,65	216,57
2056	436,27	84,31	6,47	207,77	228,73	165,82	423,53	216,47
2057	430,72	83,86	6,39	207,90	228,66	166,03	418,99	216,65
2058	425,55	84,21	6,37	206,94	229,02	166,07	413,33	216,39
2059	420,24	83,90	6,27	206,58	229,26	166,26	407,20	215,86
2060	416,39	84,11	6,27	206,93	229,30	166,57	402,44	215,68
2061	410,66	83,78	6,19	206,52	229,60	166,73	396,93	215,20
2062	404,73	83,76	6,18	206,28	229,74	167,12	391,67	214,60
2063	400,37	83,47	6,18	206,06	230,09	167,44	386,07	214,43
2064	396,62	83,20	6,17	206,54	230,48	167,56	380,17	213,80
2065	392,79	83,97	6,07	207,67	230,55	167,55	375,41	214,00
2066	389,43	83,55	6,07	207,34	230,54	167,62	370,86	213,87
2067	385,44	83,58	5,97	206,78	230,79	167,86	366,44	213,34
2068	381,87	83,50	5,97	205,96	230,95	167,97	360,96	212,69
2069	378,67	83,57	5,97	206,24	230,92	168,14	356,77	212,17
2070	375,48	83,54	5,87	205,53	231,45	168,46	352,16	211,47
2071	372,27	83,30	5,87	205,09	231,69	168,69	347,26	210,63
2072	368,95	83,29	5,87	204,50	232,02	168,99	343,00	210,18
2073	362,47	83,06	5,87	205,16	232,78	168,90	338,24	209,55
2074	356,93	83,55	5,87	205,75	232,69	169,11	334,91	209,51
2075	352,54	83,21	5,77	205,56	232,66	169,12	331,69	208,93
2076	348,42	83,53	5,77	205,02	233,06	169,26	327,33	208,12
2077	344,83	83,14	5,73	204,39	233,44	169,52	323,49	207,61
2078	342,10	83,61	5,77	204,38	233,58	169,66	320,03	206,64
2079	339,16	83,71	5,67	203,29	234,10	169,91	316,10	206,04
2080	336,71	83,51	5,67	202,54	234,46	170,10	312,64	205,26
2081	333,98	83,05	5,67	202,35	234,29	170,25	309,14	204,72
2082	332,06	83,30	5,62	202,90	234,92	170,03	305,22	204,44
2083	330,33	83,43	5,67	202,96	234,99	170,20	302,23	204,22
2084	328,99	82,96	5,57	202,52	234,78	170,12	299,50	203,51
2085	326,55	83,04	5,57	201,88	235,15	170,07	296,44	203,17
2086	324,76	83,31	5,57	202,09	235,06	170,17	293,92	202,57

2087	322,87	83,09	5,47	201,09	235,43	170,31	291,35	202,08
2088	320,73	83,01	5,47	200,97	235,71	170,59	288,70	201,30
2089	319,14	82,97	5,47	199,73	236,06	170,75	285,95	200,60
2090	318,02	82,84	5,47	199,69	236,15	170,78	283,78	199,87
2091	316,93	83,25	5,47	200,67	236,27	170,53	281,59	200,28
2092	315,86	83,27	5,37	200,30	236,03	170,59	279,48	199,96
2093	314,84	82,93	5,37	199,44	236,41	170,59	277,75	199,25
2094	312,96	83,07	5,37	198,45	236,47	170,62	275,82	198,81
2095	312,20	83,66	5,37	198,75	236,57	170,66	274,32	198,34
2096	310,97	82,93	5,37	197,99	236,51	170,68	272,78	197,83
2097	309,54	82,59	5,27	197,29	236,53	170,82	271,07	197,11
2098	308,56	82,93	5,27	196,68	236,56	170,99	269,17	196,65
2099	306,99	82,83	5,27	197,19	237,09	170,79	267,22	196,37
2100	306,44	82,89	5,17	197,54	236,43	170,82	266,19	196,37
2101	305,83	82,71	5,18	197,10	236,58	170,84	265,18	196,30
2102	304,59	82,89	5,17	197,00	236,65	170,89	264,16	195,91
2103	303,92	83,10	5,17	196,26	236,99	170,90	262,89	195,56
2104	302,50	83,25	5,17	195,67	236,57	170,93	261,76	195,21
2105	301,42	83,19	5,07	194,87	236,94	171,04	260,32	194,72
2106	300,37	82,86	5,08	194,34	236,69	171,31	259,13	194,04
2107	299,89	82,82	5,07	193,98	236,79	171,22	257,86	193,64
2108	299,15	82,59	5,07	194,13	237,06	171,13	256,31	193,32
2109	299,01	82,98	5,07	194,70	236,85	171,07	255,41	193,40
2110	298,85	82,74	4,97	194,07	236,88	171,01	254,71	193,06
2111	298,06	82,79	4,97	194,62	237,30	171,09	253,89	193,01
2112	297,62	82,76	4,97	193,81	237,17	171,23	253,16	192,73
2113	296,43	82,83	4,97	193,14	237,02	171,29	252,49	192,19
2114	295,43	82,80	4,87	192,38	237,00	171,13	251,39	191,76
2115	295,05	82,35	4,87	192,79	237,11	171,52	250,82	191,24
2116	294,05	82,52	4,87	192,28	237,06	171,66	249,92	190,84
2117	293,55	82,75	4,87	192,47	237,46	171,53	248,67	190,66
2118	293,09	82,41	4,87	192,63	237,16	171,56	248,00	190,50
2119	292,88	83,11	4,87	192,06	237,01	171,60	247,42	190,10
2120	293,03	82,73	4,84	192,62	236,91	171,51	246,97	190,15
2121	292,46	82,79	4,77	191,44	237,05	171,62	246,39	189,87
2122	291,14	82,59	4,77	190,98	236,99	171,68	245,61	189,23
2123	289,80	82,83	4,77	190,13	236,93	171,73	244,84	188,41
2124	288,92	82,97	4,77	190,34	237,05	171,95	244,21	188,11
2125	288,62	83,03	4,67	189,99	236,73	171,72	243,56	187,49
2126	287,86	82,46	4,67	190,44	237,17	171,71	242,64	187,39
2127	287,57	82,49	4,67	190,56	236,73	171,69	241,97	187,21
2128	287,97	82,26	4,67	190,32	236,69	171,60	241,44	187,23
2129	287,47	82,55	4,67	190,54	236,74	171,64	241,17	187,01
2130	287,58	82,54	4,59	189,45	236,73	171,72	240,89	186,55
2131	286,66	82,52	4,57	189,19	236,37	171,75	240,17	186,34
2132	286,20	82,36	4,57	188,58	236,30	171,82	239,34	185,60
2133	285,40	82,40	4,57	188,23	236,41	171,91	238,43	184,86
2134	285,34	82,17	4,57	187,85	236,29	171,69	238,06	184,53
2135	284,66	82,46	4,47	188,51	236,60	171,61	237,25	184,54
2136	284,58	82,46	4,47	188,59	236,02	171,65	236,96	184,57
2137	284,26	82,52	4,47	188,15	235,94	171,66	236,81	183,87
2138	284,27	82,49	4,47	187,94	235,90	171,56	236,19	183,75
2139	283,59	82,47	4,47	187,02	235,82	171,67	235,84	183,21
2140	282,70	82,33	4,47	186,64	235,62	171,78	235,48	182,88
2141	281,75	81,92	4,47	186,67	235,46	171,74	235,04	182,30
2142	280,76	82,26	4,37	186,21	235,51	171,87	234,19	182,23
2143	280,31	82,34	4,37	185,62	235,43	171,87	233,85	181,62
2144	279,75	82,23	4,37	185,84	235,66	171,86	233,18	181,57
2145	280,03	82,27	4,37	186,06	234,93	171,67	232,59	181,29
2146	279,86	82,29	4,27	185,22	234,95	171,77	232,13	181,52
2147	279,64	82,42	4,27	185,43	234,90	171,74	231,95	181,30
2148	278,80	82,45	4,27	184,35	234,87	171,73	231,49	181,16
2149	278,41	81,94	4,27	184,02	234,69	171,75	231,03	180,63
2150	277,92	82,68	4,27	183,65	234,63	171,80	230,51	180,02
2151	277,33	82,12	4,27	184,09	234,85	171,81	230,12	179,52
2152	277,08	81,90	4,17	183,22	234,45	171,75	229,72	179,14
2153	276,45	82,14	4,17	183,70	234,75	171,64	228,90	179,19
2154	276,27	82,07	4,17	183,72	233,80	171,50	228,70	178,90
2155	275,45	82,37	4,17	182,96	234,16	171,61	228,33	178,99
2156	275,58	82,18	4,17	183,67	233,97	171,58	227,97	178,67
2157	274,97	82,53	4,17	182,33	233,91	171,59	227,75	178,35
2158	273,91	81,85	4,07	181,84	233,78	171,79	227,06	177,93
2159	273,60	82,21	4,07	181,42	233,55	171,65	226,76	177,37
2160	273,38	82,02	4,07	180,90	233,63	171,53	226,02	176,87
2161	272,95	81,81	4,07	180,47	233,32	171,56	225,73	176,42
2162	272,53	82,09	4,07	181,21	233,43	171,47	225,04	176,67
2163	272,60	81,79	4,00	180,69	233,09	171,36	224,36	176,34
2164	272,06	82,00	3,97	180,10	233,09	171,47	223,85	176,06
2165	272,03	82,00	3,97	180,71	233,04	171,44	223,88	176,00
2166	271,43	82,04	3,97	179,78	232,77	171,37	223,67	175,60
2167	270,50	82,44	3,97	179,24	232,80	171,33	223,20	175,11
2168	269,92	81,87	3,87	179,22	232,48	171,33	223,23	174,75
2169	269,67	81,72	3,87	178,89	232,52	171,46	222,66	174,40
2170	269,36	82,07	3,87	178,14	232,49	171,43	222,15	173,74
2171	268,94	82,01	3,87	179,24	232,53	171,22	221,50	174,21
2172	268,42	81,83	3,87	178,44	232,27	171,17	221,17	173,74
2173	267,89	81,94	3,78	178,31	232,23	171,16	220,70	173,59
2174	267,40	81,88	3,83	178,40	232,28	171,02	220,54	173,47
2175	266,93	81,89	3,77	177,46	232,27	170,90	220,40	172,91
2176	266,19	82,02	3,77	176,83	232,47	170,91	219,93	172,47
2177	265,51	82,12	3,77	176,56	232,20	170,98	219,44	171,93
2178	264,91	81,52	3,77	176,08	231,94	171,07	218,91	171,69
2179	264,97	82,08	3,77	175,58	231,72	170,82	218,51	171,39
2180	264,07	81,89	3,73	175,18	231,48	170,88	218,18	170,83
2181	263,97	81,77	3,67	176,04	231,94	170,70	217,44	171,12

2182	263,47	81,82	3,67	175,87	231,33	170,61	217,36	170,85
2183	263,17	81,67	3,67	175,55	231,25	170,65	216,68	170,63
2184	262,30	81,81	3,67	176,26	231,22	170,59	216,60	170,65
2185	261,92	81,63	3,67	174,95	231,18	170,65	216,24	170,34
2186	260,92	81,50	3,67	174,09	231,02	170,41	215,81	169,98
2187	260,36	81,75	3,64	173,86	230,93	170,40	215,38	169,59
2188	259,52	81,78	3,57	173,36	231,11	170,60	215,01	169,09
2189	259,25	81,55	3,57	173,03	230,75	170,71	214,43	168,85
2190	259,17	81,69	3,57	172,90	230,57	170,47	214,08	168,39
2191	258,66	81,72	3,57	173,11	230,75	170,44	213,22	168,41
2192	258,62	81,87	3,57	173,30	230,40	170,21	212,88	168,45
2193	258,41	81,79	3,47	173,00	230,25	170,09	212,48	167,84
2194	258,09	81,71	3,47	173,46	230,43	170,02	212,36	167,85
2195	257,91	81,48	3,47	172,60	230,18	170,00	211,99	167,55
2196	257,19	81,71	3,47	171,90	229,99	169,78	211,52	167,16
2197	256,84	81,51	3,47	171,45	229,96	169,74	211,17	166,88
2198	255,92	81,59	3,47	171,20	229,69	169,79	210,81	166,54
2199	255,50	81,61	3,39	170,63	229,42	169,62	210,33	166,11
2200	255,58	81,70	3,37	170,45	228,99	169,33	209,96	165,83
2201	255,11	81,59	3,37	170,73	229,24	169,41	209,39	165,80
2202	255,07	81,81	3,37	170,98	228,61	169,26	209,07	165,67
2203	254,39	81,51	3,37	170,63	228,51	169,24	208,46	165,21
2204	254,18	81,59	3,37	170,99	228,49	169,19	208,03	165,32
2205	254,12	81,45	3,37	170,38	228,41	169,06	208,05	165,14
2206	253,77	81,55	3,27	169,82	228,21	168,89	207,75	164,69
2207	251,54	81,47	3,27	169,12	228,06	169,00	207,47	164,30
2208	250,65	81,44	3,27	168,78	227,92	169,11	207,16	164,04
2209	249,78	81,46	3,27	168,16	227,49	168,96	206,61	163,64
2210	248,78	81,54	3,27	167,96	227,37	168,86	206,19	163,11
2211	248,44	81,45	3,27	168,29	227,34	168,77	205,40	163,07
2212	247,97	81,63	3,27	168,45	227,10	168,53	205,22	163,08
2213	246,79	81,48	3,27	168,31	226,81	168,47	204,83	162,58
2214	246,33	81,53	3,17	168,43	226,63	168,34	204,18	162,42
2215	246,24	81,40	3,17	167,80	226,54	168,06	203,83	162,06
2216	245,37	81,27	3,17	166,96	226,38	167,93	203,49	161,61
2217	244,74	81,39	3,17	166,40	226,39	167,92	202,83	161,46
2218	243,98	81,44	3,17	166,23	226,36	167,82	202,32	161,19
2219	243,15	81,56	3,17	165,91	225,94	167,90	201,70	160,53
2220	243,00	81,23	3,15	165,74	225,61	167,79	201,31	160,15
2221	242,68	81,38	3,07	166,45	225,34	167,47	200,55	160,48
2222	242,37	80,98	3,07	166,00	224,71	167,38	199,99	159,82
2223	241,76	81,57	3,07	166,13	224,79	167,08	199,68	159,58
2224	241,53	81,37	3,07	165,79	224,45	166,90	199,06	159,58
2225	240,12	81,36	3,07	164,92	224,13	166,54	198,88	159,09
2226	238,71	81,28	3,07	164,46	224,03	166,39	198,21	158,74
2227	237,84	81,35	3,07	164,00	223,88	166,20	197,65	158,18
2228	236,75	81,32	2,97	163,70	223,54	166,22	197,18	158,07
2229	236,07	81,31	3,07	163,43	223,23	165,65	196,45	157,52
2230	235,21	81,20	3,06	163,59	223,40	165,55	195,73	157,41
2231	235,21	81,48	3,04	163,44	222,71	165,45	195,47	157,33
2232	234,32	81,03	2,97	163,16	222,63	165,29	194,78	157,16
2233	233,84	81,30	2,97	163,79	222,47	165,20	194,42	156,93
2234	233,62	81,04	2,97	162,49	222,24	165,02	194,01	156,73
2235	232,88	81,07	2,97	161,71	222,04	164,83	193,25	156,38
2236	232,19	81,36	2,97	161,12	221,94	164,65	192,73	155,85
2237	232,11	81,18	2,88	160,71	221,57	164,59	192,33	155,68
2238	231,51	81,18	2,97	160,36	221,25	164,38	191,61	155,08
2239	230,56	81,19	2,97	160,14	220,85	164,11	191,13	154,94
2240	230,02	81,27	2,97	160,72	220,78	163,85	190,57	155,23
2241	229,06	81,26	2,87	160,08	220,18	163,88	189,96	154,64
2242	228,47	81,03	2,87	159,70	220,22	163,61	189,31	154,40
2243	228,47	80,92	2,87	159,28	219,80	163,47	189,00	154,28
2244	227,63	81,03	2,87	158,29	219,54	163,01	188,51	153,65
2245	227,22	81,04	2,87	158,10	219,30	162,91	187,92	153,51
2246	226,55	81,19	2,87	157,40	219,04	162,73	187,40	153,28
2247	226,01	81,01	2,83	156,99	218,98	162,60	187,02	153,06
2248	225,43	80,84	2,77	156,76	218,55	162,24	186,38	152,57
2249	224,92	81,01	2,77	157,03	218,39	162,06	185,76	152,88
2250	224,41	80,88	2,77	156,55	217,57	161,84	185,40	152,19
2251	223,81	80,93	2,77	156,38	217,74	161,59	184,69	151,94
2252	223,32	80,77	2,77	156,02	217,31	161,44	184,39	151,74
2253	222,56	80,66	2,77	154,93	216,98	161,13	184,14	151,45
2254	222,20	81,05	2,77	154,33	216,61	160,80	183,45	151,18
2255	221,41	80,80	2,77	153,97	216,34	160,58	183,09	151,09
2256	221,04	81,09	2,67	153,57	216,10	160,34	182,50	150,78
2257	220,71	80,91	2,77	152,99	215,93	160,04	182,04	150,35
2258	219,90	80,69	2,67	153,34	215,81	159,70	181,42	150,23
2259	219,83	80,97	2,67	152,98	215,07	159,59	181,23	150,04
2260	219,16	80,88	2,67	152,91	215,26	159,49	180,70	150,08
2261	218,57	80,79	2,67	152,80	214,76	159,33	180,52	149,86
2262	217,77	80,61	2,67	151,57	214,36	159,16	180,05	149,58
2263	216,77	80,75	2,67	150,85	214,17	158,76	179,73	149,15
2264	216,23	80,86	2,67	150,40	213,62	158,58	179,13	149,00
2265	215,64	80,71	2,67	150,10	213,44	158,49	178,62	148,54
2266	215,00	80,70	2,57	150,05	213,11	158,22	178,19	148,06
2267	214,44	80,51	2,57	149,60	212,90	157,96	177,87	147,93
2268	213,94	80,97	2,67	150,08	212,67	157,67	177,39	148,05
2269	213,31	80,46	2,67	149,45	211,81	157,58	177,05	147,48
2270	212,67	80,66	2,57	149,59	212,02	157,38	176,59	147,30
2271	212,39	80,57	2,67	149,06	211,73	157,15	176,20	147,10
2272	211,79	80,52	2,57	147,85	211,46	156,75	175,91	146,71
2273	211,30	80,87	2,57	147,57	211,07	156,49	175,46	146,46
2274	210,82	80,88	2,57	146,99	210,60	156,18	175,05	146,14
2275	210,17	80,53	2,57	146,74	210,38	156,17	174,65	145,84
2276	209,84	80,70	2,57	146,46	210,24	155,78	174,22	145,46

2277	209,27	80,40	2,57	146,38	210,04	155,61	173,71	145,23
2278	208,79	80,67	2,57	146,02	209,70	155,35	173,40	144,96
2279	208,25	80,25	2,53	146,04	209,66	155,15	173,00	144,71
2280	208,30	80,51	2,47	146,75	209,18	154,96	172,65	144,55
2281	207,83	80,42	2,47	145,58	209,01	154,90	172,43	144,26
2282	207,18	80,38	2,47	144,73	208,71	154,53	172,06	143,85
2283	206,84	80,57	2,47	144,16	208,36	154,30	171,52	143,64
2284	206,29	80,67	2,47	143,90	207,93	154,06	171,21	143,36
2285	206,05	80,38	2,47	143,98	207,61	154,07	170,79	142,99
2286	205,81	80,46	2,47	143,41	207,59	153,77	170,22	142,53
2287	205,18	80,25	2,47	143,34	207,46	153,56	169,78	142,50
2288	204,60	80,62	2,47	143,07	206,88	153,29	169,56	142,31
2289	204,43	80,27	2,37	142,70	206,89	153,16	168,98	141,83
2290	204,13	80,35	2,47	143,32	206,41	152,91	168,77	141,63
2291	203,77	80,19	2,37	142,36	206,24	152,76	168,58	141,37
2292	203,08	80,17	2,38	141,61	205,82	152,45	168,05	141,00
2293	202,58	80,51	2,37	141,04	205,57	152,25	167,63	140,81
2294	202,36	80,52	2,37	140,63	205,26	152,02	167,42	140,64
2295	201,78	80,41	2,37	140,33	205,08	151,74	167,02	140,24
2296	201,28	80,38	2,37	140,04	204,78	151,56	166,67	139,91
2297	200,75	80,26	2,37	139,95	204,85	151,26	166,06	139,71
2298	200,57	80,47	2,37	140,04	204,26	151,08	165,98	139,59
2299	200,15	80,37	2,37	139,60	204,32	150,93	165,39	139,32
2300	199,87	80,30	2,31	140,20	204,08	150,70	165,06	139,15
2301	199,85	80,09	2,36	139,24	203,73	150,51	164,99	138,98
2302	199,30	80,13	2,37	138,64	203,38	150,36	164,67	138,67
2303	198,69	80,16	2,36	138,24	203,07	150,02	164,24	138,35
2304	198,64	80,19	2,27	138,04	202,70	149,72	164,00	138,18
2305	198,15	80,08	2,27	138,00	202,63	149,70	163,65	137,76
2306	197,63	80,06	2,27	137,70	202,43	149,35	163,20	137,38
2307	197,55	80,04	2,27	137,35	202,58	149,08	162,76	137,35
2308	197,27	80,25	2,27	137,44	202,04	148,85	162,71	137,15
2309	197,09	80,10	2,27	136,98	202,15	148,75	162,20	136,74
2310	196,90	80,08	2,27	137,68	201,79	148,48	161,94	136,62
2311	196,50	79,95	2,27	136,74	201,61	148,41	161,80	136,39
2312	196,30	80,06	2,27	136,23	201,15	148,29	161,61	136,11
2313	195,78	80,19	2,27	135,87	201,06	148,02	161,32	136,01
2314	195,54	79,94	2,27	135,68	200,79	147,72	161,02	135,65
2315	195,05	79,86	2,27	135,46	200,60	147,67	160,73	135,35
2316	194,35	80,07	2,22	135,39	200,38	147,48	160,42	135,01
2317	193,97	80,17	2,27	134,92	200,40	147,23	159,90	134,85
2318	193,49	80,08	2,27	135,21	200,18	147,01	159,81	134,69
2319	193,19	79,61	2,17	135,07	199,93	146,72	159,48	134,53
2320	192,55	79,96	2,17	135,03	199,72	146,70	159,07	134,30
2321	192,12	80,05	2,17	134,45	199,50	146,60	158,89	134,08
2322	191,76	79,83	2,17	134,02	199,40	146,44	158,84	133,72
2323	190,99	79,98	2,17	133,65	199,11	146,18	158,41	133,54
2324	190,70	79,97	2,17	133,40	198,78	146,00	158,23	133,28
2325	190,02	79,78	2,17	133,00	198,73	145,95	157,77	133,00
2326	189,29	79,81	2,17	132,97	198,62	145,71	157,47	132,66
2327	188,72	79,79	2,17	132,52	198,60	145,56	156,85	132,49
2328	188,37	79,80	2,07	132,49	198,83	145,28	156,60	132,35
2329	187,77	79,90	2,17	132,57	198,08	145,03	156,28	132,07
2330	187,32	79,79	2,17	132,58	198,20	144,92	155,94	131,77
2331	187,15	79,86	2,07	132,10	197,96	144,81	155,71	131,65
2332	186,91	79,88	2,09	131,45	197,91	144,54	155,55	131,22
2333	186,29	79,66	2,07	131,29	197,65	144,45	155,09	131,00
2334	185,97	79,60	2,07	130,88	197,44	144,32	154,55	130,86
2335	185,56	79,60	2,07	130,81	197,38	144,32	154,22	130,49
2336	185,02	79,66	2,07	130,57	197,25	144,11	153,91	130,23
2337	184,99	79,73	2,07	130,36	197,09	143,86	153,62	129,90
2338	184,64	79,62	2,07	130,25	197,27	143,59	153,21	129,80
2339	184,11	79,80	2,07	130,20	196,64	143,40	153,16	129,65
2340	183,52	79,58	2,07	130,06	196,74	143,22	152,66	129,15
2341	183,05	79,60	2,07	129,94	196,58	143,17	152,33	129,12
2342	182,53	79,66	2,07	129,53	196,62	143,04	152,10	128,83
2343	182,09	79,72	2,07	129,17	196,41	142,87	151,57	128,49
2344	181,60	79,57	2,07	128,83	196,15	142,68	151,48	128,39
2345	181,17	79,64	2,07	128,65	195,90	142,65	151,11	128,10
2346	180,53	79,42	2,07	128,42	195,72	142,59	150,86	127,88
2347	180,04	79,61	2,07	128,17	195,70	142,38	150,59	127,62
2348	179,42	79,47	1,98	127,84	195,55	142,23	150,18	127,47
2349	178,86	79,48	1,97	127,96	195,73	141,91	150,00	127,30
2350	178,67	79,60	2,07	127,92	195,01	141,69	149,74	127,03
2351	177,89	79,43	2,03	128,06	195,20	141,57	149,28	126,76
2352	177,57	79,50	1,97	127,70	195,04	141,48	149,05	126,67
2353	177,33	79,43	1,97	127,19	194,92	141,33	148,77	126,36
2354	177,18	79,50	1,97	126,98	194,67	141,11	148,49	126,16
2355	176,90	79,61	1,97	126,58	194,51	141,08	148,24	126,02
2356	176,23	79,52	1,97	126,43	194,20	141,05	147,83	125,72
2357	175,52	79,42	1,97	126,10	194,10	140,95	147,37	125,47
2358	175,19	79,47	1,97	125,85	193,91	140,87	147,07	125,23
2359	174,67	79,36	1,97	125,61	194,30	140,54	146,79	125,13
2360	174,13	79,58	1,97	125,60	193,77	140,34	146,57	124,91
2361	173,51	79,42	1,97	125,30	194,06	140,17	146,15	124,47
2362	173,18	79,36	1,97	125,58	193,64	140,05	145,78	124,35
2363	172,79	79,24	1,97	125,00	193,66	139,89	145,50	124,03
2364	172,66	79,35	1,97	124,65	193,53	139,75	145,20	123,69
2365	172,02	79,30	1,97	124,34	193,38	139,64	144,80	123,52
2366	171,63	79,45	1,97	124,11	193,18	139,56	144,47	123,34
2367	171,30	79,16	1,96	123,84	192,94	139,47	144,19	123,15
2368	170,67	79,22	1,87	123,80	192,95	139,12	143,92	122,95
2369	170,33	79,22	1,87	123,45	192,82	139,01	143,56	122,75
2370	170,05	79,42	1,87	123,61	192,75	138,69	143,39	122,71
2371	169,64	79,10	1,87	123,56	192,55	138,45	142,90	122,22



2372	169,05	79,25	1,87	123,33	192,43	138,44	142,62	121,96
2373	168,62	79,18	1,87	122,85	192,56	138,40	142,39	121,84
2374	168,32	79,27	1,87	122,69	192,40	138,15	142,14	121,59
2375	168,14	79,29	1,87	122,57	192,21	138,02	141,82	121,53
2376	167,56	79,27	1,87	122,15	191,95	137,83	141,60	121,38
2377	167,12	79,23	1,87	121,95	191,85	137,82	141,24	121,18
2378	166,77	79,03	1,87	121,77	191,66	137,62	140,89	120,99
2379	166,16	79,09	1,87	121,71	191,64	137,37	140,60	120,72
2380	165,72	79,14	1,87	121,49	191,73	137,15	140,36	120,60
2381	165,18	79,24	1,87	121,35	191,16	136,97	140,18	120,48
2382	164,72	79,04	1,87	121,12	191,48	136,83	139,84	120,05
2383	164,44	79,05	1,87	121,02	191,33	136,69	139,57	119,92
2384	164,13	79,13	1,87	120,64	191,05	136,50	139,28	119,80
2385	163,80	79,24	1,87	120,48	190,82	136,40	139,06	119,53
2386	163,29	79,20	1,87	120,30	190,66	136,42	138,74	119,44
2387	163,06	79,17	1,87	120,11	190,40	136,39	138,44	119,29
2388	162,30	79,00	1,87	119,84	190,25	136,24	138,09	119,06
2389	161,84	78,93	1,87	119,77	190,08	136,08	137,86	118,88
2390	161,33	79,05	1,77	119,51	189,77	135,93	137,59	118,70
2391	160,77	79,06	1,77	119,43	190,02	135,66	137,41	118,71
2392	160,37	79,19	1,87	119,47	189,46	135,46	137,22	118,36
2393	159,91	79,09	1,77	119,44	189,64	135,33	136,81	118,05
2394	159,55	79,00	1,87	119,25	189,45	135,21	136,44	118,00
2395	158,94	78,96	1,77	119,00	189,43	135,06	136,26	117,87
2396	158,64	79,04	1,77	118,75	189,36	134,92	135,92	117,68
2397	158,14	78,98	1,77	118,44	189,25	134,88	135,71	117,49
2398	157,64	78,92	1,77	118,17	188,96	134,76	135,35	117,35
2399	157,20	78,80	1,77	118,09	188,81	134,66	135,14	117,14
2400	156,81	78,74	1,77	118,00	188,63	134,60	134,90	116,95
2401	156,30	78,89	1,77	117,97	188,45	134,36	134,75	116,79
2402	156,18	78,86	1,77	117,66	188,59	134,14	134,44	116,76
2403	155,76	79,06	1,77	117,51	187,97	133,95	134,28	116,59
2404	155,30	78,91	1,77	117,40	187,93	133,90	133,90	116,33
2405	155,03	78,92	1,77	117,55	187,82	133,78	133,68	116,20
2406	154,68	78,68	1,77	117,17	187,70	133,70	133,36	116,03
2407	154,44	78,96	1,77	116,97	187,39	133,55	133,11	115,85
2408	153,88	78,87	1,77	116,54	187,15	133,39	132,80	115,74
2409	153,68	79,02	1,67	116,45	186,85	133,31	132,57	115,55
2410	153,26	78,89	1,77	116,21	186,60	133,25	132,28	115,43
2411	153,00	78,93	1,77	116,15	186,21	133,00	132,08	115,30
2412	152,70	79,01	1,77	116,07	185,95	132,92	131,92	115,17
2413	152,18	78,78	1,77	115,70	185,95	132,63	131,60	115,16
2414	151,83	78,91	1,77	115,69	185,49	132,46	131,58	114,97
2415	151,41	78,93	1,77	115,62	185,31	132,34	131,19	114,60
2416	150,97	78,77	1,77	115,44	185,10	132,24	130,99	114,46
2417	150,77	78,60	1,73	115,33	184,96	132,15	130,75	114,39
2418	150,22	78,86	1,67	115,11	184,70	132,02	130,53	114,28
2419	149,86	78,82	1,67	114,97	184,43	131,86	130,19	114,12
2420	149,32	78,71	1,72	114,65	184,07	131,77	130,03	114,01
2421	148,97	78,74	1,67	114,56	183,90	131,66	129,87	113,95
2422	148,72	78,71	1,67	114,49	183,51	131,58	129,63	113,75
2423	148,33	78,78	1,67	114,35	183,18	131,47	129,37	113,65
2424	147,89	78,70	1,67	113,95	183,25	131,08	129,12	113,54
2425	147,42	78,77	1,67	113,95	182,59	130,91	129,00	113,27
2426	147,06	78,61	1,67	113,79	182,71	130,85	128,59	112,93
2427	146,83	78,61	1,67	113,86	182,34	130,85	128,32	112,96
2428	146,59	78,49	1,67	113,72	182,03	130,68	128,19	112,92
2429	146,27	78,66	1,67	113,58	181,87	130,48	127,93	112,78
2430	146,06	78,58	1,67	113,36	181,62	130,45	127,73	112,67
2431	145,72	78,60	1,67	113,21	181,35	130,38	127,58	112,56
2432	145,45	78,65	1,67	113,00	181,18	130,23	127,38	112,50
2433	145,30	78,67	1,67	112,74	180,84	130,11	127,14	112,33
2434	145,09	78,65	1,67	112,64	180,59	129,98	126,94	112,19
2435	144,81	78,58	1,67	112,24	180,60	129,75	126,64	112,13
2436	144,54	78,66	1,67	112,17	180,27	129,49	126,64	112,00
2437	144,11	78,67	1,67	112,16	180,10	129,41	126,30	111,63
2438	143,90	78,50	1,67	112,04	179,76	129,42	126,03	111,60
2439	143,66	78,48	1,67	111,76	179,53	129,30	125,83	111,61
2440	143,45	78,56	1,67	111,71	179,47	129,15	125,65	111,43
2441	143,29	78,64	1,67	111,64	179,13	128,98	125,40	111,28
2442	143,06	78,41	1,67	111,33	178,88	128,90	125,23	111,24
2443	142,47	78,40	1,67	111,26	178,60	128,79	125,04	111,11
2444	142,59	78,59	1,67	111,22	178,41	128,69	124,78	110,95
2445	142,40	78,41	1,67	111,12	178,04	128,58	124,49	110,89
2446	142,06	78,51	1,67	110,93	177,74	128,46	124,42	110,82
2447	141,91	78,46	1,67	110,61	177,69	128,21	124,26	110,78
2448	141,73	78,51	1,67	110,51	177,35	128,02	124,26	110,65
2449	193,71	74,64	2,67	82,89	105,98	94,41	87,38	85,36
2450	265,59	74,63	2,56	82,74	104,97	94,24	87,61	85,25
2451	354,94	74,73	2,37	82,72	103,66	94,17	88,36	85,19
2452	403,42	74,76	2,17	82,72	103,47	94,00	89,66	85,19
2453	407,16	74,91	2,07	82,81	102,72	93,91	91,71	85,26
2454	456,38	74,88	1,87	83,04	101,84	93,74	94,99	85,56
2455	477,39	73,29	1,75	83,19	100,92	93,27	99,67	86,04
2456	500,17	72,78	1,57	83,50	100,22	92,95	105,61	86,31
2457	497,15	73,93	12,18	84,44	99,92	93,07	113,77	87,08
2458	463,38	73,88	11,98	85,64	99,66	93,06	123,24	87,93
2459	504,20	74,07	11,78	86,89	99,28	93,09	132,38	88,80
2460	552,37	74,37	11,58	87,98	99,17	93,23	142,19	89,74
2461	584,83	73,69	11,38	89,18	99,22	93,31	152,30	90,67
2462	613,88	74,27	11,11	90,14	99,28	93,48	164,29	91,90
2463	625,59	74,67	10,88	91,30	99,73	93,80	178,31	93,33
2464	635,83	74,92	10,68	92,82	100,04	94,10	194,16	94,97
2465	656,06	75,35	10,47	94,61	100,85	94,42	212,24	96,83
2466	664,02	75,43	10,27	95,98	101,78	94,74	232,95	98,77

2467	663,15	75,30	9,98	98,31	102,53	95,16	254,07	100,99
2468	661,96	75,63	9,77	99,93	103,67	95,54	274,57	103,29
2469	661,69	75,95	9,58	101,92	104,95	95,98	294,66	105,79
2470	661,97	76,33	9,38	104,20	106,23	96,39	313,69	108,41
2471	662,09	75,86	9,17	106,56	107,62	96,86	330,79	111,18
2472	653,05	76,14	8,98	109,42	109,02	97,36	347,28	114,11
2473	632,32	76,16	8,78	112,17	110,58	97,94	360,20	117,46
2474	623,61	75,87	8,68	114,86	112,23	98,45	371,02	120,28
2475	629,28	75,85	8,42	118,40	113,85	99,10	380,37	123,42
2476	627,98	76,21	8,28	120,93	115,47	99,66	388,04	126,33
2477	621,74	75,99	8,08	123,41	117,42	100,33	394,11	129,33
2478	616,09	76,18	7,97	126,30	119,15	100,89	399,48	132,11
2479	611,90	76,36	7,77	130,16	120,80	101,60	404,04	135,10
2480	608,18	76,10	7,58	133,31	122,37	102,30	407,94	137,97
2481	606,14	76,52	7,47	136,06	124,07	102,91	410,42	140,80
2482	604,36	76,56	7,27	139,01	125,72	103,74	412,87	143,48
2483	602,30	76,48	7,17	141,47	127,54	104,40	414,07	146,10
2484	600,10	76,20	6,97	143,53	129,20	105,02	414,51	148,31
2485	597,21	76,44	6,79	145,54	131,21	105,81	414,24	150,71
2486	595,29	76,33	6,67	147,89	133,34	106,59	413,96	152,94
2487	593,15	76,45	6,57	150,72	135,41	107,47	413,94	155,32
2488	590,76	74,44	6,38	152,79	137,09	107,95	412,45	157,09
2489	588,75	72,20	6,27	153,85	139,03	108,42	410,64	158,95
2490	587,31	72,02	6,07	155,44	140,89	108,90	408,84	159,97
2491	584,81	72,94	5,97	156,68	142,80	109,33	406,71	160,84
2492	582,31	72,14	5,85	158,08	144,55	109,68	405,07	161,60
2493	579,78	72,20	5,67	159,28	146,41	110,37	403,66	163,21
2494	577,03	73,36	5,57	160,28	148,16	111,17	402,80	164,83
2495	575,59	73,56	5,47	161,83	150,04	112,13	401,98	166,86
2496	572,78	74,29	5,27	164,03	151,87	113,08	401,88	168,72
2497	570,10	74,51	5,17	165,03	153,85	113,90	400,56	170,44
2498	569,23	74,76	5,07	167,15	155,83	114,84	399,92	172,42
2499	566,18	75,53	4,97	168,04	157,78	115,70	399,46	174,03
2500	560,78	75,34	4,87	169,38	159,76	116,67	398,44	175,59
2501	553,61	75,78	4,77	170,76	161,85	117,65	396,82	177,17
2502	547,11	75,72	4,67	171,96	163,71	118,64	394,74	178,62
2503	541,69	75,54	4,57	173,46	165,72	119,62	392,03	179,85
2504	535,62	75,73	4,47	175,63	167,53	120,75	389,38	181,03
2505	530,90	76,07	4,37	176,99	169,07	121,76	386,34	182,31
2506	525,40	76,19	4,27	177,90	170,60	122,74	382,63	183,17
2507	521,29	76,10	4,17	178,16	172,20	123,65	378,80	184,31
2508	517,87	76,10	4,12	179,72	173,45	124,65	374,61	185,05
2509	513,30	76,20	4,07	181,27	174,89	125,63	370,59	186,28
2510	508,80	76,02	3,97	181,90	176,18	126,62	366,17	186,80
2511	504,80	76,13	3,97	182,31	177,62	127,60	362,38	187,21
2512	500,97	76,17	3,87	182,75	178,85	128,62	358,63	187,32
2513	498,34	76,17	3,77	183,01	180,29	129,44	354,21	187,43
2514	494,96	76,12	3,67	183,63	181,32	130,48	350,03	187,92
2515	490,87	76,44	3,59	184,15	182,74	131,43	346,05	188,11
2516	487,90	76,35	3,57	183,46	183,90	132,26	341,49	187,87
2517	485,10	76,23	3,47	184,05	185,20	133,18	337,98	187,75
2518	483,04	76,19	3,47	184,28	186,17	134,13	334,12	187,91
2519	479,69	76,26	3,37	184,36	187,24	134,99	330,41	188,20
2520	476,55	76,29	3,29	184,68	188,40	135,86	327,08	188,29
2521	474,05	76,20	3,27	184,24	189,18	136,75	323,82	188,02
2522	471,01	76,22	3,17	184,19	190,63	137,63	320,26	187,69
2523	467,76	76,19	3,17	184,43	191,50	138,45	317,29	187,70
2524	464,11	76,16	3,07	184,55	192,43	139,23	314,46	187,37
2525	460,81	76,43	3,07	184,52	193,21	139,94	311,48	187,49
2526	457,63	76,25	2,97	184,22	194,28	140,66	308,32	187,10
2527	452,56	76,09	2,97	183,63	194,96	141,39	305,55	187,06
2528	449,08	76,24	2,87	183,59	195,85	142,18	302,68	186,95
2529	446,73	76,24	2,87	183,16	196,58	142,97	299,90	186,59
2530	443,22	76,30	2,77	182,85	197,80	143,60	296,84	186,03
2531	441,27	76,38	2,77	182,59	198,53	144,25	294,19	185,38
2532	439,00	76,34	2,67	182,60	199,58	144,90	291,58	185,30
2533	436,84	76,32	2,67	182,10	200,01	145,67	289,10	185,06
2534	434,81	76,29	2,67	181,84	200,71	146,22	286,53	184,73
2535	432,05	76,18	2,57	181,57	201,41	146,81	284,11	184,55
2536	430,72	76,28	2,57	181,23	202,25	147,47	281,89	183,80
2537	428,80	76,31	2,47	180,94	202,92	148,15	279,20	183,36
2538	427,41	76,57	2,47	180,53	203,30	148,81	276,78	183,15
2539	410,73	76,38	13,48	180,34	204,98	149,77	274,34	183,05
2540	494,29	76,46	13,28	179,46	205,45	150,24	273,01	182,32
2541	573,86	76,30	12,98	178,42	205,56	150,67	272,12	181,61
2542	631,30	76,72	12,78	178,22	205,47	151,44	273,61	181,19
2543	662,81	76,98	12,48	177,36	205,58	151,79	279,37	180,77
2544	680,01	77,06	12,18	177,29	205,52	152,36	289,19	180,81
2545	689,02	77,30	11,97	177,27	205,83	152,83	302,79	181,29
2546	687,38	77,22	11,68	177,98	205,82	153,31	318,56	182,38
2547	679,76	77,49	11,48	178,42	206,16	153,68	336,14	183,56
2548	667,48	77,20	11,28	178,80	206,38	154,22	353,74	184,92
2549	647,34	77,45	11,08	179,22	206,75	154,46	370,11	186,39
2550	624,59	77,22	10,88	180,31	207,34	154,66	385,07	187,99
2551	610,38	77,42	10,78	181,60	207,67	154,99	397,19	189,67
2552	600,08	77,45	10,68	182,71	208,13	155,18	405,76	191,03
2553	593,03	77,47	10,47	183,82	208,46	155,52	411,07	192,14
2554	587,34	77,26	10,28	185,06	209,13	155,76	413,92	193,29
2555	583,20	77,34	10,18	186,52	209,49	155,96	415,61	194,50
2556	579,49	77,39	10,08	187,47	210,27	156,02	415,00	195,27
2557	576,69	77,44	9,87	188,34	210,89	156,20	415,09	196,00
2558	574,16	77,41	9,77	188,87	211,28	156,48	413,06	196,87
2559	570,80	77,56	9,68	189,31	211,70	156,74	411,08	197,31
2560	567,52	77,12	9,48	190,81	212,14	156,83	408,52	198,17
2561	565,24	77,36	9,38	191,60	212,55	156,95	406,37	198,52

2562	561,92	77,43	9,27	193,07	212,78	156,95	404,99	198,95
2563	558,45	77,38	9,07	193,92	213,00	157,15	402,82	199,46
2564	554,47	77,55	8,98	195,10	213,49	157,25	400,33	199,67
2565	551,78	77,42	8,88	195,91	213,80	157,22	398,12	199,62
2566	548,71	77,48	8,78	196,53	214,02	157,14	395,57	199,87
2567	545,26	77,57	8,67	197,73	214,59	157,09	392,92	200,19
2568	542,04	77,39	8,57	198,66	215,24	157,39	390,49	200,47
2569	539,02	77,52	8,37	199,31	215,49	157,47	387,44	200,63
2570	535,77	77,68	8,28	199,52	215,36	157,53	384,47	200,77
2571	532,34	77,43	8,18	200,24	215,68	157,45	380,89	200,83
2572	529,92	77,69	8,08	200,49	215,84	157,53	377,79	200,62
2573	527,33	77,09	7,97	200,51	216,23	157,56	375,10	201,03
2574	524,66	77,48	7,87	200,98	216,41	157,72	372,48	201,21
2575	522,29	77,33	7,77	201,10	216,63	157,84	369,07	201,34
2576	519,81	77,63	7,67	201,45	216,06	157,85	366,49	201,10
2577	516,66	77,17	7,58	201,34	216,30	157,94	364,06	200,68
2578	513,79	77,98	7,48	201,03	216,22	158,14	360,58	201,02
2579	512,89	77,60	7,37	200,65	216,81	158,13	357,37	200,95
2580	512,08	77,52	7,24	201,41	217,24	158,20	354,31	200,87
2581	510,91	77,18	7,17	201,30	217,41	158,48	351,94	200,95
2582	508,80	77,52	7,07	201,30	217,69	158,45	349,84	200,74
2583	506,01	77,44	6,97	201,51	217,86	158,61	347,51	200,91
2584	502,49	77,23	6,88	200,93	217,83	158,72	344,76	200,95
2585	499,33	76,83	6,77	200,71	218,15	158,87	342,37	200,88
2586	496,73	77,42	6,67	200,89	218,51	158,89	340,30	200,75
2587	494,03	77,06	6,57	200,70	218,72	158,91	338,00	200,20
2588	490,99	77,15	6,57	200,05	218,49	159,16	335,71	200,17
2589	488,27	77,42	6,47	200,18	218,64	159,32	333,74	200,00
2590	485,88	77,61	6,37	200,18	218,48	159,38	331,56	199,77
2591	483,35	77,29	6,29	199,88	218,23	159,67	329,68	199,48
2592	480,87	76,92	6,27	199,06	218,08	159,85	327,02	199,69
2593	479,66	77,14	6,18	198,70	218,13	160,00	324,36	199,46
2594	477,13	76,91	6,07	198,29	217,82	160,22	321,78	199,41
2595	474,90	77,06	5,97	197,81	218,07	160,41	318,78	199,10
2596	474,22	77,19	5,97	197,73	218,15	160,48	316,32	199,10
2597	473,01	77,25	5,87	197,76	218,07	160,63	314,73	198,96
2598	472,56	76,81	5,77	197,31	217,98	160,89	312,84	198,55
2599	471,74	76,93	5,67	196,68	218,02	161,13	310,74	198,57
2600	472,34	77,06	5,67	196,13	218,05	161,22	308,66	198,01
2601	471,98	77,00	5,57	195,26	218,14	161,44	306,52	197,40
2602	471,03	77,21	5,48	193,90	218,44	161,56	304,52	197,20
2603	463,03	76,02	9,58	193,44	219,75	161,93	302,55	197,29
2604	506,65	76,73	9,38	192,72	220,22	162,00	301,51	196,89
2605	545,01	77,18	9,23	193,22	220,46	162,19	302,56	196,27
2606	561,75	77,30	9,07	192,43	220,77	162,31	306,57	196,35
2607	566,87	77,28	8,88	193,24	220,56	162,69	312,55	196,96
2608	564,62	77,12	8,67	193,43	220,61	162,68	321,44	197,75
2609	561,93	77,35	8,57	193,52	220,52	162,80	331,98	198,93
2610	556,43	77,35	8,47	194,15	220,52	162,81	342,18	199,97
2611	549,77	77,53	8,28	194,38	220,25	163,06	352,79	200,70
2612	543,49	77,41	8,18	194,67	220,00	163,41	361,86	201,67
2613	538,37	77,63	8,08	194,84	220,09	163,52	369,37	202,47
2614	533,61	77,38	7,97	194,92	220,32	163,75	375,85	203,93
2615	530,51	77,25	7,87	195,68	220,50	163,83	380,47	204,92
2616	525,80	77,48	7,77	196,14	220,50	163,97	383,88	205,77
2617	523,15	77,67	7,67	196,28	220,50	164,24	386,44	206,73
2618	519,91	77,47	7,58	195,76	220,85	164,37	387,95	207,13
2619	517,70	77,60	7,43	196,11	221,50	164,57	388,13	208,04
2620	516,62	77,52	7,37	196,30	221,78	164,76	388,52	208,91
2621	513,35	77,41	7,27	196,70	222,08	165,16	388,57	210,06
2622	508,32	77,27	7,21	196,65	222,64	165,13	388,21	210,89
2623	502,89	77,44	7,17	196,27	223,25	165,44	387,56	211,08
2624	497,11	77,32	7,07	197,13	223,19	165,54	385,99	211,85
2625	492,84	77,47	6,97	197,35	223,63	165,63	383,56	211,72
2626	488,66	77,49	6,88	197,35	224,03	165,88	380,76	211,90
2627	484,40	77,49	6,78	197,38	224,48	166,07	377,47	211,99
2628	480,29	77,55	6,77	196,26	225,33	166,33	373,97	212,07
2629	477,39	77,40	6,67	196,08	225,99	166,57	369,93	212,22
2630	474,65	77,39	6,57	196,52	226,19	166,73	366,75	212,36
2631	471,12	77,64	6,48	196,32	226,74	166,88	363,16	211,93
2632	468,80	77,80	6,47	197,30	227,09	166,97	359,89	211,54
2633	465,95	77,31	6,37	197,33	227,28	167,33	357,09	211,67
2634	463,26	77,55	6,27	197,03	227,16	167,41	354,53	211,63
2635	460,77	77,70	6,27	197,17	227,46	167,58	351,71	211,43
2636	458,73	77,58	6,18	197,17	227,86	167,70	347,86	211,39
2637	456,43	77,59	6,18	197,42	227,93	168,01	345,61	211,37
2638	454,88	77,30	6,07	197,25	227,87	168,19	343,07	211,04
2639	452,62	77,45	6,00	196,99	228,30	168,42	339,79	210,74
2640	450,56	77,63	5,97	196,82	228,68	168,54	337,27	210,53
2641	448,88	77,19	5,87	196,63	228,89	168,78	334,73	210,12
2642	446,77	77,61	5,87	195,99	229,20	168,88	332,29	209,78
2643	444,76	77,55	5,77	195,92	229,33	169,05	329,81	209,34
2644	443,12	77,24	5,77	196,12	229,36	169,30	328,01	209,32
2645	440,44	77,41	5,67	195,94	229,81	169,43	326,21	208,77
2646	437,64	77,44	5,57	195,55	229,95	169,72	324,14	208,32
2647	434,78	77,45	5,57	195,70	230,29	169,86	322,48	207,75
2648	431,73	77,35	5,57	196,02	230,33	170,19	320,83	207,59
2649	429,38	77,33	5,47	195,96	230,68	170,36	318,91	207,30
2650	426,61	77,38	5,47	195,94	230,79	170,58	316,74	207,16
2651	423,54	77,05	5,37	196,45	230,68	170,75	314,32	206,87
2652	421,30	77,49	5,37	196,18	230,67	171,03	312,18	206,79
2653	419,08	77,42	5,37	195,79	231,09	171,19	309,45	206,18
2654	416,58	77,44	5,27	195,28	231,00	171,42	307,45	205,41
2655	414,81	77,36	5,27	195,35	231,19	171,61	305,36	205,18
2656	413,02	77,37	5,25	195,67	231,31	171,56	303,44	204,79

2657	408,82	77,25	5,17	195,14	231,27	171,81	301,04	204,59
2658	405,12	77,07	5,07	195,18	231,55	171,91	298,79	204,25
2659	402,05	77,04	5,07	195,38	231,19	172,19	296,86	203,97
2660	399,41	77,12	5,07	194,72	231,07	172,56	295,15	203,51
2661	395,88	77,40	4,97	194,25	231,06	172,83	292,88	203,57
2662	390,04	77,23	4,97	194,08	231,21	173,04	290,62	202,74
2663	386,86	77,32	4,87	193,77	231,26	173,18	288,34	202,24
2664	380,42	77,35	4,87	193,20	231,22	173,46	285,48	201,44
2665	377,08	77,12	4,79	192,18	231,31	173,61	282,95	201,10
2666	372,55	77,18	4,77	191,96	231,41	173,77	280,74	200,37
2667	370,11	77,17	4,77	191,78	231,62	174,05	278,36	199,59
2668	367,33	77,13	4,77	191,48	231,44	174,39	276,14	199,36
2669	365,46	77,03	4,67	190,55	231,64	174,44	273,40	198,11
2670	363,09	77,07	4,67	190,25	231,67	174,64	270,88	197,71
2671	361,08	77,32	4,67	189,90	231,81	174,71	268,26	197,18
2672	358,88	77,20	4,57	189,28	231,66	174,85	265,79	196,44
2673	356,81	77,31	4,57	188,63	231,41	174,90	263,61	196,05
2674	355,55	77,22	4,57	188,39	231,50	174,98	261,65	195,35
2675	354,38	77,02	4,47	187,34	231,26	175,12	259,58	194,98
2676	352,51	76,99	4,47	186,70	231,31	175,34	257,01	194,12
2677	351,39	77,20	4,37	186,32	231,20	175,27	254,96	193,18
2678	350,44	77,16	4,37	185,58	231,21	175,47	253,03	192,39
2679	349,71	77,20	4,37	185,33	230,94	175,53	251,40	192,21
2680	349,19	76,96	4,27	185,11	230,81	175,57	249,72	191,46
2681	348,70	77,07	4,27	184,58	230,42	175,76	248,16	191,18
2682	352,90	77,03	4,27	184,46	230,17	175,75	246,62	190,45
2683	349,52	77,00	4,17	183,51	229,77	175,90	245,14	189,86
2684	352,72	77,13	4,17	183,05	229,44	176,00	244,03	189,61
2685	352,51	77,04	4,17	182,72	228,90	176,14	242,82	189,00
2686	352,32	76,99	4,12	181,89	228,90	176,19	241,77	188,56
2687	356,81	77,13	4,07	181,91	228,67	176,09	241,14	188,60
2688	358,43	76,89	4,07	181,78	228,37	175,97	240,83	187,94
2689	358,00	77,02	3,98	181,10	228,24	176,06	239,99	187,72
2690	357,61	76,91	3,97	181,01	227,82	175,97	239,75	187,54
2691	356,53	76,93	3,97	180,48	227,69	176,00	239,39	187,54
2692	355,93	76,90	3,87	180,05	227,39	175,96	238,55	187,54
2693	353,51	77,03	3,87	179,97	226,89	175,86	238,45	187,51
2694	350,32	76,98	3,87	179,50	226,64	175,96	237,85	187,47
2695	348,07	77,02	3,77	179,02	226,28	175,98	237,53	187,72
2696	345,23	77,07	3,77	178,69	226,20	175,84	237,46	187,33
2697	342,38	76,82	3,77	178,12	226,35	175,68	236,82	187,19
2698	338,65	77,01	3,77	177,32	226,15	175,69	236,09	187,21
2699	336,13	76,84	3,76	177,37	226,03	175,67	235,00	187,06
2700	335,52	76,88	3,67	177,07	225,96	175,56	234,38	187,12
2701	333,26	77,06	3,67	176,70	225,66	175,52	233,43	186,99
2702	331,98	76,80	3,67	176,16	225,64	175,44	232,10	186,94
2703	330,64	76,73	3,57	175,35	225,33	175,53	231,39	186,84
2704	329,66	76,58	3,57	174,88	225,23	175,67	230,63	186,55
2705	328,37	76,74	3,57	174,88	224,77	175,44	229,34	186,36
2706	326,89	77,04	3,50	174,58	224,47	175,41	228,51	185,79
2707	325,56	76,87	3,47	173,97	224,34	175,48	227,33	185,70
2708	324,08	77,09	3,47	173,69	224,27	175,27	226,08	185,61
2709	323,34	76,82	3,40	173,48	224,00	175,11	225,32	185,64
2710	322,10	76,74	3,37	173,15	223,98	175,18	224,15	184,84
2711	322,62	76,67	3,37	172,58	223,70	175,17	223,05	184,68
2712	321,53	76,88	3,37	172,06	223,45	174,99	222,33	184,25
2713	319,88	76,88	3,37	171,40	223,15	174,87	221,43	184,13
2714	318,77	76,81	3,27	170,74	223,17	174,68	220,31	183,96
2715	317,62	76,79	3,27	170,55	222,88	174,54	219,55	183,47
2716	316,60	76,67	3,27	170,19	222,48	174,51	218,58	183,57
2717	315,79	76,80	3,27	169,88	222,18	174,44	217,90	182,92
2718	314,59	76,73	3,27	168,97	222,06	174,34	216,86	182,69
2719	313,06	76,87	3,17	168,83	221,84	174,24	215,86	182,33
2720	312,00	76,76	3,17	168,19	221,75	174,11	215,13	181,92
2721	311,19	76,76	3,17	167,54	221,35	174,04	214,35	181,62
2722	310,12	76,76	3,15	166,50	221,19	174,01	213,47	181,32
2723	309,32	76,71	3,07	166,29	220,80	173,80	212,68	181,11
2724	308,61	76,67	3,17	165,88	220,86	173,59	211,87	180,92
2725	307,62	76,80	3,07	165,76	220,44	173,47	211,05	180,57
2726	306,63	76,73	3,07	165,50	219,98	173,35	210,14	180,28
2727	306,06	76,66	3,07	164,76	219,77	173,23	209,34	179,88
2728	305,39	76,79	3,00	164,36	219,42	173,09	208,82	179,50
2729	304,55	76,82	3,07	163,87	219,07	173,03	208,27	179,45
2730	303,68	76,73	2,97	163,06	218,76	172,93	207,57	178,76
2731	302,88	76,77	2,97	162,80	218,53	172,92	206,82	178,51
2732	302,29	76,63	2,97	162,29	218,26	172,85	206,15	178,10
2733	301,62	76,81	2,97	161,92	217,86	172,71	205,88	178,29
2734	300,66	76,51	2,87	161,80	217,98	172,58	205,01	177,65
2735	300,57	76,60	2,88	161,04	217,65	172,41	204,45	177,44
2736	300,51	76,49	2,87	160,75	217,13	172,36	203,67	177,00
2737	299,92	76,63	2,87	160,49	216,79	172,22	202,98	176,59
2738	299,45	76,56	2,87	159,91	216,39	172,24	202,49	176,06
2739	298,67	76,76	2,79	159,47	216,21	172,11	202,16	175,67
2740	298,11	76,74	2,87	159,26	216,01	171,93	201,75	175,13
2741	297,39	76,67	2,77	158,87	215,88	171,68	201,05	174,79
2742	296,72	76,87	2,77	158,70	215,22	171,65	200,70	174,99
2743	296,24	76,60	2,77	158,16	215,06	171,57	200,27	174,16
2744	295,24	76,50	2,74	157,71	214,67	171,46	199,77	173,78
2745	294,13	76,69	2,77	157,49	214,17	171,21	199,51	173,87
2746	293,84	76,64	2,67	156,87	214,10	171,09	198,92	173,25
2747	292,99	76,48	2,67	156,73	213,83	171,07	198,52	173,10
2748	292,14	76,67	2,67	156,56	213,52	170,97	197,97	172,58
2749	291,77	76,54	2,67	156,29	212,93	170,78	197,69	172,14
2750	290,61	76,47	2,67	155,56	212,66	170,69	197,21	171,62
2751	289,88	76,42	2,67	155,21	212,38	170,48	196,83	171,41

2752	289,68	76,59	2,57	155,49	212,11	170,22	196,01	171,14
2753	288,77	76,72	2,62	155,19	211,99	170,00	195,82	171,00
2754	288,19	76,48	2,57	154,70	211,66	169,83	195,19	170,32
2755	287,67	76,40	2,57	154,60	211,35	169,54	194,86	170,29
2756	286,93	76,34	2,57	154,25	211,29	169,46	194,28	170,32
2757	286,89	76,59	2,57	154,07	210,82	169,18	193,75	170,03
2758	286,18	76,37	2,55	153,61	210,50	169,06	193,29	169,84
2759	285,26	76,47	2,57	153,44	210,19	168,94	192,66	169,85
2760	284,80	76,41	2,47	152,92	209,92	168,72	192,36	169,84
2761	284,01	76,41	2,47	152,25	209,86	168,68	191,91	169,34
2762	282,94	76,40	2,47	152,19	209,42	168,46	191,49	169,49
2763	283,03	76,64	2,47	152,26	208,94	168,25	191,01	169,19
2764	281,78	76,48	2,47	151,66	209,07	168,09	190,63	168,82
2765	281,16	76,34	2,37	151,39	208,64	167,92	189,94	168,61
2766	280,74	76,36	2,37	150,93	208,19	167,72	189,76	168,22
2767	279,59	76,40	2,37	150,42	207,90	167,67	189,18	168,00
2768	279,42	76,42	2,37	150,03	207,71	167,49	188,97	167,67
2769	278,63	76,54	2,37	149,99	207,30	167,35	188,44	167,50
2770	278,05	76,29	2,37	149,76	206,99	167,25	187,96	167,09
2771	277,78	76,58	2,37	149,32	206,61	167,03	187,72	166,86
2772	277,00	75,10	2,37	148,82	206,42	166,84	186,84	166,27
2773	275,52	74,57	2,27	148,20	206,11	166,67	185,51	165,34
2774	274,53	75,03	2,27	147,44	206,22	166,30	184,78	164,58
2775	273,36	74,88	2,27	146,41	206,31	166,00	184,25	163,89
2776	272,65	75,37	2,27	145,96	206,11	165,78	184,00	163,61
2777	272,02	75,29	2,27	145,91	206,09	165,60	183,72	163,22
2778	271,38	75,47	2,17	145,80	206,12	165,32	183,41	162,96
2779	271,41	75,46	2,20	146,07	206,00	165,06	183,10	162,79
2780	271,11	75,88	2,17	146,40	205,10	164,73	182,84	162,62
2781	270,59	76,02	2,17	146,50	204,54	164,49	182,29	162,14
2782	270,27	76,03	2,17	146,05	204,04	164,16	181,88	162,05
2783	269,47	76,09	2,17	145,68	203,54	163,94	181,75	161,88
2784	268,79	76,10	2,17	145,25	203,09	163,78	181,22	161,62
2785	268,34	76,28	2,07	145,26	202,76	163,60	180,98	161,38
2786	267,79	76,11	2,17	145,00	202,29	163,48	180,67	161,04
2787	267,28	76,30	2,07	145,00	202,05	163,34	180,54	161,15
2788	266,49	76,15	2,07	144,87	201,62	163,17	180,26	161,09
2789	266,11	76,05	2,07	144,43	201,31	163,02	179,88	160,73
2790	265,20	76,18	2,07	144,35	201,13	162,72	179,56	160,48
2791	264,51	76,15	2,07	144,17	200,81	162,54	179,12	160,26
2792	264,14	76,19	2,07	144,08	200,43	162,37	178,72	160,23
2793	263,60	76,14	2,07	143,58	200,16	162,22	178,44	160,28
2794	262,91	76,09	1,97	143,67	199,72	162,03	178,31	159,74
2795	262,28	76,19	1,97	143,35	199,44	161,87	177,66	159,57
2796	261,99	76,30	1,97	143,44	199,09	161,60	177,17	159,10
2797	261,39	76,27	1,97	142,96	198,83	161,56	176,69	158,74
2798	260,79	76,23	1,97	142,66	198,39	161,30	176,49	158,64
2799	259,83	76,14	1,97	142,35	197,99	161,14	176,10	158,20
2800	259,78	76,21	1,97	142,29	197,73	160,88	175,67	158,28
2801	259,14	76,26	1,97	142,12	197,54	160,62	175,32	157,82
2802	258,22	76,39	1,97	141,67	197,18	160,52	174,87	157,56
2803	257,58	76,33	1,89	141,28	197,00	160,24	174,65	156,89
2804	257,02	76,46	1,87	141,24	196,67	160,03	173,95	156,83
2805	256,66	76,28	1,87	140,93	196,52	159,92	173,61	156,22
2806	255,90	76,33	1,87	140,64	196,06	159,66	173,07	155,94
2807	255,21	76,35	1,87	140,55	195,77	159,53	172,98	155,44
2808	254,60	76,31	1,87	140,21	195,54	159,36	172,48	155,28
2809	254,41	76,34	1,87	140,10	195,21	159,06	172,08	154,82
2810	254,03	76,31	1,78	139,56	195,05	158,88	171,66	154,71
2811	253,14	76,32	1,77	139,12	194,59	158,73	171,24	154,30
2812	252,32	76,30	1,77	138,97	194,27	158,59	170,76	154,20
2813	251,91	76,22	1,77	138,85	193,90	158,33	170,45	153,65
2814	251,71	76,31	1,77	138,47	193,61	158,12	170,00	153,19
2815	250,95	76,25	1,77	138,02	193,23	157,95	169,88	153,16
2816	250,15	76,36	1,77	137,95	192,82	157,67	169,44	153,07
2817	249,75	76,40	1,77	137,88	192,51	157,61	169,11	152,72
2818	249,33	76,26	1,77	137,61	192,28	157,26	168,76	152,27
2819	248,80	76,29	1,67	137,29	192,13	157,08	168,29	151,72
2820	248,56	76,16	1,67	137,06	191,57	156,89	167,93	151,39
2821	248,42	76,38	1,67	136,75	191,29	156,77	167,58	151,16
2822	248,30	76,11	1,67	136,69	191,07	156,54	167,50	150,92
2823	247,92	76,38	1,67	136,37	190,75	156,35	166,86	150,76
2824	247,71	76,34	1,67	136,18	190,48	156,17	166,67	150,59
2825	247,54	76,29	1,67	135,87	190,24	156,02	166,35	150,35
2826	246,93	76,29	1,59	135,57	189,92	155,90	166,11	150,02
2827	246,36	76,33	1,57	135,25	189,72	155,68	165,75	149,86
2828	245,68	76,36	1,57	135,27	189,31	155,38	165,52	149,92
2829	245,17	76,26	1,67	134,92	189,10	155,25	165,32	149,60
2830	244,43	76,24	1,57	134,58	188,86	155,12	164,74	149,22
2831	244,13	76,18	1,57	134,49	188,63	155,00	164,59	149,10
2832	243,54	76,28	1,57	134,03	188,37	154,74	164,35	148,96
2833	243,53	76,18	1,57	134,00	187,95	154,48	164,04	148,70
2834	242,54	76,18	1,57	133,48	187,89	154,33	163,73	148,36
2835	242,00	76,15	1,57	133,37	187,61	154,31	163,51	148,29
2836	241,29	76,28	1,47	133,17	187,21	154,13	163,32	148,10
2837	240,77	76,24	1,47	133,28	186,82	153,92	163,03	147,89
2838	240,71	76,29	1,57	133,27	186,63	153,73	162,62	147,83
2839	240,14	76,11	1,47	132,86	186,54	153,66	162,39	147,72
2840	239,92	76,25	1,47	132,84	186,28	153,49	162,17	147,48
2841	239,13	76,13	1,47	132,63	185,98	153,31	161,74	147,17
2842	238,81	76,30	1,47	132,44	185,62	153,11	161,39	147,13
2843	238,45	76,15	1,47	132,36	185,49	152,96	161,29	146,98
2844	238,22	76,26	1,38	132,06	185,16	152,77	160,97	146,55
2845	238,53	76,25	1,37	131,68	185,11	152,63	160,71	146,45
2846	238,06	76,28	1,47	131,56	184,74	152,55	160,40	146,42

2847	237,89	76,28	1,37	131,23	184,50	152,41	160,07	146,22
2848	237,63	76,22	1,40	131,03	184,05	152,20	159,85	146,31
2849	237,25	76,21	1,37	130,72	183,95	152,06	159,48	145,97
2850	237,29	76,13	1,37	130,45	183,71	151,91	159,21	145,76
2851	237,18	76,16	1,37	130,39	183,49	151,80	158,90	145,71
2852	237,14	76,19	1,37	130,12	183,28	151,57	158,52	145,47
2853	236,78	76,20	1,37	130,08	183,02	151,49	158,40	145,77
2854	236,47	76,17	1,37	130,05	182,67	151,27	158,24	145,35
2855	236,17	76,27	1,37	129,97	182,38	151,21	158,07	145,16
2856	235,06	76,23	1,27	129,78	182,14	151,06	157,92	145,04
2857	234,33	76,19	1,27	129,51	181,86	150,93	157,56	144,73
2858	233,53	76,02	1,27	129,04	181,79	150,78	157,49	144,62
2859	232,92	76,19	1,27	128,99	181,36	150,68	157,10	144,37
2860	232,42	76,20	1,27	128,86	181,07	150,41	156,94	144,18
2861	231,46	76,17	1,27	128,61	181,06	150,37	156,76	143,99
2862	230,67	76,09	1,27	128,45	180,61	150,13	156,44	144,00
2863	229,71	76,13	1,27	128,07	180,56	150,11	156,32	143,85
2864	229,14	76,16	1,18	128,05	180,31	149,86	155,88	143,48
2865	228,16	76,21	1,17	127,74	180,25	149,74	155,58	143,26
2866	227,44	76,20	1,17	127,81	179,94	149,67	155,24	143,20
2867	226,54	76,25	1,17	127,49	179,83	149,51	155,18	143,01
2868	225,45	76,18	1,27	127,18	179,66	149,21	154,75	142,77
2869	224,88	76,25	1,17	126,71	179,56	149,14	154,48	142,49
2870	224,00	76,17	1,17	126,57	179,23	149,00	154,15	142,30
2871	223,40	76,14	1,17	126,38	179,03	148,80	153,84	142,11
2872	222,81	76,18	1,17	126,14	178,78	148,75	153,47	141,86
2873	222,20	76,25	1,17	126,09	178,62	148,51	153,17	141,44
2874	221,78	76,13	1,17	125,72	178,48	148,43	152,87	141,40
2875	221,09	76,13	1,08	125,51	178,31	148,15	152,47	141,01
2876	220,52	76,06	1,17	125,17	178,10	148,01	152,04	140,80
2877	219,92	76,04	1,07	124,94	177,81	147,90	151,68	140,64
2878	219,60	76,15	1,17	124,76	177,50	147,66	151,38	140,29
2879	219,29	76,08	1,07	124,76	177,36	147,50	150,99	139,96
2880	218,74	76,10	1,07	124,69	177,21	147,35	150,74	139,67
2881	218,45	76,15	1,07	124,30	176,87	147,16	150,31	139,51
2882	217,60	76,11	1,17	124,13	176,56	147,12	149,99	139,26
2883	217,19	76,08	1,07	123,84	176,20	146,92	149,62	138,85
2884	216,66	76,06	1,07	123,56	176,07	146,77	149,35	138,61
2885	215,96	76,05	1,07	123,35	175,94	146,57	149,00	138,39
2886	215,46	76,05	1,07	123,05	175,67	146,45	148,67	138,11
2887	214,97	76,12	1,07	122,99	175,44	146,24	148,47	137,80
2888	214,41	76,03	1,07	122,73	175,21	146,04	148,06	137,52
2889	213,97	75,95	1,01	122,72	174,95	145,96	147,74	137,21
2890	213,44	76,00	1,07	122,53	174,69	145,81	147,52	136,94
2891	212,73	75,99	0,97	122,25	174,38	145,59	147,15	136,71
2892	212,24	76,05	1,07	121,94	174,22	145,47	146,85	136,46
2893	211,60	76,07	1,07	121,98	173,91	145,31	146,44	136,24
2894	211,15	75,90	0,97	121,71	173,54	145,08	146,12	136,06
2895	210,76	76,02	0,97	121,52	173,33	144,94	145,82	135,80
2896	210,17	76,00	0,97	121,38	173,16	144,63	145,54	135,45
2897	209,52	76,14	1,07	121,24	172,93	144,46	145,21	135,11
2898	209,01	76,09	0,97	121,07	172,70	144,21	144,84	134,80
2899	208,60	75,95	0,97	121,02	172,51	144,11	144,67	134,52
2900	207,82	75,99	0,97	120,73	172,24	143,92	144,32	134,24
2901	207,31	76,10	0,97	120,55	172,08	143,77	144,04	134,16
2902	206,55	76,02	0,97	120,24	171,74	143,46	143,68	133,71
2903	205,66	76,00	0,97	120,10	171,46	143,29	143,53	133,58
2904	204,85	75,88	0,97	119,89	171,21	143,11	143,10	133,27
2905	204,10	75,95	0,97	119,74	170,95	142,98	142,73	132,98
2906	203,31	75,94	0,97	119,50	170,78	142,89	142,58	132,88
2907	202,47	75,96	0,88	119,30	170,42	142,71	142,22	132,50
2908	201,63	75,93	0,87	119,11	170,24	142,42	141,90	132,25
2909	200,88	75,91	0,87	118,79	169,98	142,18	141,58	131,92
2910	81,95	66,71	1,64	68,86	70,90	69,11	70,06	69,50
2911	113,64	66,74	2,37	68,87	70,77	69,08	71,05	69,46
2912	96,97	66,59	2,27	68,91	70,70	69,05	71,12	69,44
2913	117,87	66,36	1,47	68,94	70,63	68,99	71,62	69,39
2914	133,14	66,59	1,47	69,01	70,56	68,95	71,72	69,34
2915	123,83	66,00	1,47	69,03	70,49	68,87	71,75	69,33
2916	112,09	66,59	1,47	69,02	70,44	68,86	71,82	69,33
2917	104,02	66,23	1,47	69,02	70,41	68,79	71,94	69,27
2918	96,58	66,53	1,37	69,22	70,40	68,83	72,09	69,26
2919	119,53	66,42	1,53	69,17	70,44	68,90	72,95	69,31
2920	163,76	66,58	1,37	69,24	70,49	68,93	73,33	69,35
2921	171,84	66,49	2,67	69,37	70,58	68,96	74,21	69,34
2922	250,99	66,50	2,47	69,57	70,64	68,98	75,63	69,36
2923	355,30	66,59	2,27	69,76	70,68	69,08	76,66	69,46
2924	433,63	66,31	2,07	69,87	70,79	69,11	78,14	69,63
2925	484,30	66,26	1,92	69,97	70,92	69,17	80,68	69,93
2926	489,24	66,67	5,57	70,13	71,09	69,30	85,74	70,46
2927	498,88	66,44	5,37	70,56	71,27	69,41	91,49	71,17
2928	546,53	66,67	5,14	70,91	71,64	69,58	98,54	72,00
2929	591,14	67,19	4,87	71,40	71,99	69,83	107,09	72,99
2930	491,06	66,82	4,77	71,83	72,63	70,12	117,17	74,23
2931	447,56	66,65	4,67	72,35	73,42	70,48	128,69	75,79
2932	433,33	66,26	4,47	72,95	74,33	70,83	140,29	77,34
2933	426,68	66,72	4,37	73,67	75,44	71,29	152,35	79,03
2934	429,49	66,90	4,27	74,45	76,72	71,74	163,88	81,01
2935	441,90	66,61	4,17	75,33	78,11	72,26	174,93	82,82
2936	454,22	66,53	4,05	76,31	79,66	72,78	186,34	84,74
2937	454,81	66,50	3,87	77,28	81,32	73,38	198,00	86,61
2938	458,15	66,78	3,77	78,37	83,12	73,98	209,01	88,76
2939	469,58	66,82	3,67	79,57	84,89	74,63	220,74	90,94
2940	471,99	67,08	3,47	81,01	86,79	75,38	232,91	93,17
2941	472,56	66,96	3,37	82,23	88,85	76,02	244,54	96,04

2942	477,77	67,27	3,17	83,71	90,79	76,74	255,93	98,61
2943	479,40	67,01	3,07	85,24	93,03	77,41	267,03	101,47
2944	481,19	67,07	2,97	86,95	95,05	78,22	277,77	103,63
2945	482,81	67,53	2,77	88,78	97,25	79,02	288,14	106,26
2946	484,91	67,73	2,67	90,78	99,26	79,86	297,94	108,75
2947	483,55	67,80	2,57	92,84	101,63	80,64	307,78	111,71
2948	482,87	67,26	2,40	94,96	103,68	81,54	315,31	113,33
2949	482,00	67,31	2,27	97,04	105,95	82,46	323,08	115,79
2950	478,28	67,41	2,17	99,24	108,28	83,36	329,18	118,22
2951	474,50	68,01	2,07	101,83	110,59	84,42	335,11	120,68
2952	469,92	67,37	1,97	104,04	113,22	85,29	339,69	123,58
2953	465,78	67,46	1,87	106,66	115,50	86,39	343,41	125,31
2954	461,48	67,51	1,77	109,32	117,98	87,29	346,39	126,95
2955	456,71	67,57	1,67	111,74	120,44	88,30	348,64	128,56
2956	452,32	67,33	1,67	114,01	123,03	89,36	349,82	130,40
2957	446,17	67,59	1,57	116,32	125,62	90,46	351,01	132,36
2958	448,38	68,04	6,88	119,11	128,73	91,71	351,36	134,67
2959	436,51	67,98	6,77	121,11	131,41	92,82	350,83	135,97
2960	445,20	67,47	6,67	123,36	134,27	93,98	348,83	137,69
2961	455,42	67,92	6,57	125,57	136,76	95,31	346,29	138,54
2962	460,13	67,52	6,37	127,58	139,18	96,58	344,60	139,56
2963	466,50	67,57	6,27	129,16	141,77	97,85	343,59	140,38
2964	472,09	67,37	6,18	130,41	144,33	99,12	343,49	141,23
2965	478,54	67,93	5,97	131,81	146,86	100,40	344,52	142,05
2966	486,38	68,22	5,87	133,63	149,31	101,78	346,45	143,31
2967	492,34	67,91	5,67	135,09	151,67	102,80	349,71	144,44
2968	497,30	68,09	5,56	137,02	153,89	104,08	353,28	145,25
2969	498,29	67,75	5,37	138,39	155,79	105,30	357,00	146,33
2970	499,65	67,78	5,27	139,63	157,70	106,32	361,01	147,92
2971	504,63	68,02	5,17	141,29	159,69	107,38	365,08	149,36
2972	506,83	68,40	4,97	143,54	161,63	108,53	369,67	150,83
2973	500,96	68,27	4,87	144,88	163,08	109,65	374,59	152,05
2974	498,29	68,21	4,77	146,56	164,70	110,70	378,35	152,79
2975	496,27	68,26	4,66	148,40	166,40	111,78	381,78	155,05
2976	493,41	67,88	4,47	149,85	167,95	112,83	384,54	156,24
2977	489,71	68,07	4,37	150,66	169,30	113,80	387,16	157,43
2978	485,79	68,92	4,27	152,56	171,00	115,03	389,24	158,77
2979	480,54	68,40	4,17	155,34	172,38	116,14	390,95	159,91
2980	475,57	68,16	4,07	156,20	173,62	117,07	391,93	161,26
2981	470,00	68,15	3,97	156,94	174,81	117,95	392,01	162,78
2982	463,52	68,09	3,87	158,21	176,20	118,68	391,71	164,95
2983	457,37	68,06	3,77	159,47	177,58	119,62	390,91	166,78
2984	451,57	68,25	3,67	161,37	179,05	120,65	389,46	168,32
2985	446,90	68,58	3,57	162,46	180,02	121,72	387,62	169,18
2986	442,68	68,48	3,47	163,56	181,28	122,42	385,53	171,00
2987	437,71	68,82	3,47	165,13	182,34	123,69	382,59	171,31
2988	431,15	68,23	3,37	165,19	183,50	124,29	379,61	172,53
2989	423,49	68,49	3,27	167,26	184,85	125,41	376,10	173,62
2990	417,41	68,00	3,18	167,47	186,11	126,17	372,56	174,49
2991	411,66	68,09	3,17	167,39	187,10	127,07	368,62	174,83
2992	407,39	68,52	3,07	167,99	188,25	128,08	363,47	174,67
2993	403,99	68,41	3,07	169,51	189,67	128,96	359,25	175,85
2994	399,38	68,37	2,97	170,47	191,15	129,81	354,68	176,81
2995	396,34	68,36	2,93	170,55	191,92	130,61	350,45	176,82
2996	393,37	68,67	2,87	170,80	193,41	131,40	346,00	176,65
2997	389,62	68,58	2,87	171,20	194,53	132,08	341,26	177,23
2998	386,77	68,33	2,77	172,09	195,35	132,83	337,31	177,82
2999	382,18	68,67	11,38	172,80	196,52	134,04	333,38	177,63
3000	380,26	68,14	11,28	171,97	197,33	134,51	328,87	176,84
3001	408,63	68,20	11,17	172,01	198,57	135,18	324,38	176,82
3002	432,49	68,03	11,08	172,37	199,29	136,01	321,58	176,48
3003	446,40	68,27	10,88	171,70	199,66	136,63	320,49	175,22
3004	458,05	68,18	10,78	170,93	200,16	137,38	320,91	173,88
3005	464,91	68,34	10,68	170,51	200,59	138,16	323,34	173,10
3006	470,68	68,24	10,47	170,34	201,10	138,74	327,24	172,32
3007	477,19	68,87	10,35	169,43	201,36	139,39	331,42	171,78
3008	482,97	69,03	10,18	169,67	201,79	140,08	337,04	171,65
3009	487,17	68,55	10,05	169,33	201,92	140,36	342,21	171,32
3010	490,63	68,76	9,87	169,32	202,62	141,01	347,22	170,83
3011	494,03	68,55	9,77	168,63	203,26	141,29	352,74	170,64
3012	495,17	68,67	9,58	168,19	203,86	141,60	358,82	170,70
3013	497,53	69,11	9,48	167,57	203,66	141,74	363,87	171,01
3014	497,16	68,47	9,27	167,52	204,19	141,95	369,13	170,26
3015	499,26	69,06	9,17	168,76	205,00	142,47	374,21	170,75
3016	500,05	68,41	9,07	168,01	205,00	142,23	378,63	171,09
3017	501,81	68,61	8,88	168,95	205,25	142,73	382,42	171,08
3018	503,46	69,38	8,78	170,06	205,15	143,31	386,70	171,75
3019	506,32	69,89	8,60	170,09	205,36	143,23	390,51	172,46
3020	506,89	69,64	8,47	170,25	205,64	143,62	394,26	173,35
3021	506,88	69,76	8,37	170,54	205,60	143,80	398,05	174,23
3022	506,86	70,36	8,18	171,06	205,57	143,75	401,69	174,76
3023	507,63	69,65	8,08	170,85	205,80	143,93	404,74	175,25
3024	508,71	69,73	7,97	171,50	206,26	144,28	407,11	175,82
3025	509,35	69,86	7,77	172,15	205,96	144,20	409,43	177,19
3026	508,96	69,39	7,67	172,00	206,13	144,09	411,62	177,80
3027	508,83	69,65	7,51	172,88	206,69	143,95	413,33	178,73
3028	508,68	69,93	7,37	172,33	206,77	144,04	414,35	179,00
3029	508,22	69,74	7,27	173,03	207,00	144,24	416,28	180,18
3030	506,98	69,33	7,07	173,42	207,18	144,26	417,93	180,54
3031	505,16	68,69	7,07	173,83	207,62	144,21	419,42	181,44
3032	503,33	69,36	6,88	175,00	207,71	144,32	420,72	182,11
3033	500,28	69,32	6,78	175,33	208,19	144,07	421,55	183,14
3034	498,47	69,34	6,67	175,76	208,58	144,00	422,29	183,82
3035	495,19	69,62	6,52	175,47	209,05	144,08	422,13	184,61
3036	490,73	69,48	6,37	175,73	209,53	144,18	422,39	184,93

3037	487,45	69,32	6,27	176,48	210,22	144,29	422,09	185,69
3038	483,91	69,18	6,18	175,99	210,67	144,16	421,45	186,09
3039	481,46	69,34	6,07	176,45	211,33	144,20	420,64	186,56
3040	480,41	69,02	5,97	176,66	211,84	144,39	419,26	186,67
3041	478,59	68,75	5,87	176,34	212,74	144,21	417,44	187,37
3042	475,44	69,25	5,77	177,39	213,49	144,63	415,56	187,89
3043	473,14	69,85	5,67	177,83	214,12	145,01	413,70	188,07
3044	472,00	69,47	5,57	177,82	214,42	144,80	412,27	188,93
3045	468,92	69,71	5,48	178,53	215,12	145,25	410,01	189,30
3046	467,30	69,16	5,37	179,06	215,95	145,38	408,64	189,49
3047	465,60	69,68	5,37	179,11	216,21	145,69	406,19	189,72
3048	462,57	68,58	5,27	178,76	217,14	145,64	404,95	190,43
3049	461,03	68,62	5,09	179,02	217,89	145,58	403,28	191,10
3050	458,69	68,75	5,07	178,59	218,47	145,52	402,55	191,43
3051	455,01	68,54	4,97	178,11	219,65	145,42	401,07	191,86
3052	451,76	68,69	4,87	178,81	220,18	145,68	399,85	192,16
3053	448,75	67,93	4,77	178,80	220,90	145,75	398,53	192,43
3054	445,44	69,04	4,77	179,77	221,86	146,17	397,65	192,67
3055	441,64	68,61	4,67	179,16	222,56	146,16	396,55	192,55
3056	438,89	68,54	4,57	178,59	223,01	146,40	394,97	192,84
3057	436,00	68,70	4,47	178,89	224,08	147,01	393,11	193,32
3058	432,09	68,44	4,47	180,37	224,64	147,96	391,51	193,47
3059	425,99	68,84	4,37	179,36	225,21	147,70	389,72	193,80
3060	421,66	69,35	4,27	179,32	225,86	148,34	387,00	193,08
3061	417,90	69,26	4,27	179,36	226,99	149,18	384,70	193,62
3062	415,38	69,71	4,17	180,94	227,55	150,24	381,28	193,28
3063	412,41	68,65	4,17	180,47	227,95	150,33	378,57	193,34
3064	409,70	69,06	4,07	180,44	228,98	150,62	375,51	193,44
3065	407,80	69,17	4,07	179,60	230,04	150,95	371,92	193,60
3066	404,98	69,07	3,97	179,17	231,04	151,42	369,14	193,69
3067	402,79	68,93	3,97	178,50	232,46	151,74	365,60	193,88
3068	400,09	69,21	3,87	178,02	233,31	152,61	362,25	193,56
3069	396,60	68,93	3,87	177,58	234,18	153,01	358,92	193,57
3070	391,44	69,45	3,77	177,95	235,09	153,80	355,63	193,08
3071	399,83	69,90	13,13	178,85	236,88	155,13	352,71	193,92
3072	379,64	70,52	12,78	178,54	238,21	157,36	348,93	194,80
3073	401,35	69,14	12,68	177,76	239,22	158,78	344,42	194,48
3074	429,02	69,28	12,58	177,23	239,96	160,71	340,64	193,70
3075	447,15	69,07	12,48	176,01	240,49	162,68	337,72	193,06
3076	460,34	68,49	12,28	175,49	240,90	164,48	337,07	191,64
3077	471,64	68,80	12,18	174,10	241,39	166,36	338,74	190,66
3078	484,35	68,88	12,01	172,19	241,77	167,92	341,35	190,01
3079	494,19	68,91	11,87	171,18	242,24	169,20	345,45	189,48
3080	502,44	68,85	11,68	170,69	242,26	170,79	350,15	189,18
3081	505,82	69,12	11,58	170,62	242,46	171,92	356,38	189,38
3082	504,38	68,96	11,38	169,05	242,54	172,32	362,58	189,68
3083	504,70	68,79	11,28	167,59	243,60	172,90	367,57	190,88
3084	508,87	67,68	11,08	166,57	244,55	172,61	373,66	192,16
3085	512,05	68,71	10,98	166,96	244,29	172,57	379,27	192,65
3086	512,18	67,45	10,86	166,64	244,26	172,13	384,06	193,11
3087	513,37	67,84	10,68	166,10	244,37	171,64	388,26	193,70
3088	514,83	68,33	10,48	167,47	244,26	171,09	392,80	194,36
3089	511,65	68,60	10,38	168,52	243,93	169,68	396,98	194,85
3090	509,21	68,89	10,28	168,88	244,27	169,80	400,20	195,40
3091	510,21	68,92	10,08	169,12	243,39	168,41	403,59	196,38
3092	511,42	68,57	9,97	169,66	243,05	167,26	406,66	196,36
3093	506,00	68,19	9,87	170,34	242,80	166,05	410,03	196,71
3094	501,39	68,67	9,68	170,92	242,68	165,12	412,44	197,21
3095	496,13	68,47	9,58	171,33	242,59	164,60	414,90	197,64
3096	492,76	69,01	9,48	170,77	242,35	163,36	415,67	198,05
3097	490,11	68,69	9,38	171,24	242,10	162,22	415,65	198,60
3098	486,41	69,37	9,25	171,74	242,40	161,82	414,99	198,72
3099	484,26	69,29	9,14	172,78	241,83	161,07	414,64	198,98
3100	480,49	67,88	8,98	173,17	241,60	159,92	414,33	198,85
3101	477,30	69,34	8,88	174,84	241,34	159,70	412,72	198,67



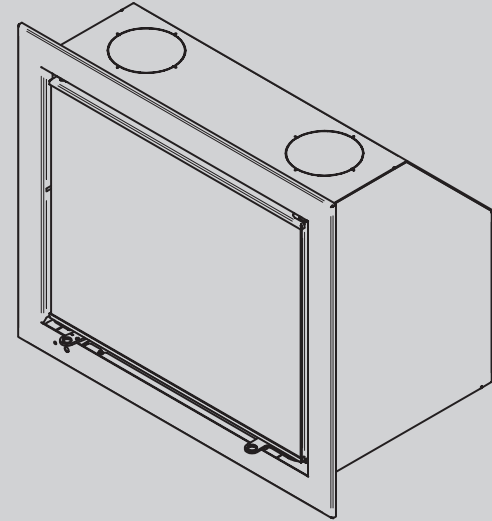
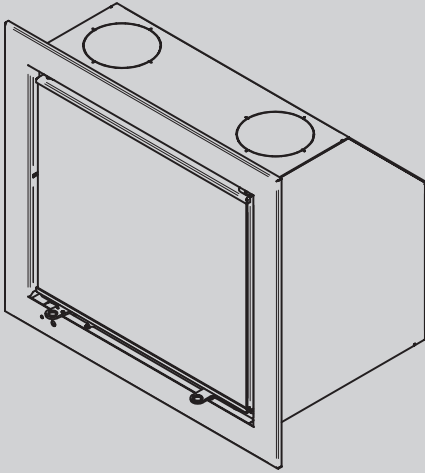
## APPENDIX 5: Participants

**Danick Power ing.**  
v-p operation  
**Services Polytests inc.**  
450.741.3636  
[www.polytests.com](http://www.polytests.com)

**Sébastien Boulais**  
Technicien  
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450.741.3636  
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**Maxime Martin**  
Technicien  
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## APPENDIX 7: Operator's manual



# Installation and Operating Instructions

Wood Fireplace

S 600 INSERT

M 700 INSERT



Spartherm Feuerungstechnik GmbH  
Maschweg 38 · D-49324 Melle  
Phone +49 (0) 5422 94 41-0  
Fax +49 (0) 5422 9441-14  
[www.spartherm.com](http://www.spartherm.com)

Keep this instruction for future use.

INTRODUCTION AND UNIT DESCRIPTION  
SPARTHERM S600/M700 INSERT RANGE.

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL  
YOUR S600/M700 INSERT UNIT.

PLEASE READ THE MANUAL FOR OPERATING INSTRUCTIONS AND HOW TO BURN  
THE FIRE THAT YOU HAVE A CLEAN AND EFFICIENT FIRE.

FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY  
INJURY, OR EVEN DEATH.

Save this manual and keep it in a safe place that it is easy to refer to it.

“DO NOT INSTALL IN A MOBILE HOME”

WARNING: DO NOT OVERFIRE.

IF THE STOVE TOP OR CHIMNEY OR CONNECTOR GLOW RED, YOU ARE OVERFIRING!  
THIS IS DANGEROUS AND WILL VOID THE WARRANTY.

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.

This range of inserts/stoves/zero clearance inserts have been tested by...

POLYTEST –

Polytests Services Inc.

695 B rue Gaudette,

St-Jean-sur-Richelieu

Québec, Canada, J3B 7S7

450.741.3636

[www.polytests.com](http://www.polytests.com)

AND ARE LISTED TO UL1482-2011 AND ULC S627-00.

THEY ARE ALSO EPA CERTIFIED – U.S. ENVIRONMENTAL PROTECTION AGENCY  
Certified to comply with 2020 particulate emission standards using CORD WOOD.  
600 insert 1.67 g/hr  
700 insert 1.14 g/hr

WARRANTY.

PLEASE REFER TO WARRANTY CONDITIONS IN THE MANUAL.

“U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020  
particulate emission standards using cord wood.

# SAFETY INFORMATION

## WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE INJURY OR PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH. PLEASE READ ENTIRE MANUAL BEFORE YOU INSTALL AND USE YOUR APPLIANCE. THIS APPLIANCE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE APPLIANCE.

- This appliance can be very hot when burning.
- Combustible materials such as firewood, wet clothing, etc. placed too close can catch fire.
- Children and pets must be kept from touching the appliance when it is hot.
- The chimney must be sound and free of cracks. Before installing this unit, contact the local building or fire authority and follow their guidelines.
- Operate only with the door tightly closed.
- Do not use an elevated grate or otherwise raise the fire.
- At least 14 square inches (90,3 square centimeters) of outside air must be admitted to the room or directly to the unit through a 4" (101,6mm) diameter pipe. Failure to provide this may starve other fuel burning appliances from an adequate air supply.
- Make sure not to create negative pressure in the installation room, e.g. by means of an exhaust fan or similar mechanical blower, as this could affect the combustion of the fireplace or increase the possibility of smoke leakage.
- This appliance is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried

- seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods.
- Do not burn green or freshly cut wood.
- Do not start a fire with chemicals or fluids such as gasoline, engine oil, etc.
- Do not burn treated wood, coal, charcoal, colored paper, cardboard, solvents or garbage.
- Do not let the appliance become hot enough for any part to glow red.
- KEEP THE STOVE TOP TEMPERATURE BELOW 700°F (371°C). Attempts to achieve heat output rates that exceed design specifications can result in steel distortion and damage.

## WARNING

HOT GLASS WILL CAUSE BURNS.  
DO NOT TOUCH GLASS UNTIL COOLED.  
NEVER ALLOW CHILDREN TO TOUCH GLASS.

## NOTICE

- DO NOT DISCARD THIS MANUAL
- IMPORTANT OPERATING AND MAINTENANCE INSTRUCTIONS INCLUDED.
  - READ, UNDERSTAND AND FOLLOW THESE INSTRUCTIONS FOR SAFE INSTALLATION AND OPERATION.
  - LEAVE THIS MANUAL WITH PARTY RESPONSIBLE FOR USE AND OPERATION.

## Safe Wood-Burning Practices

When using your wood burning appliance, follow these guidelines for safe operation:

Keep flammable items, like curtains, furniture, newspapers, and books, away from your appliance.

Only use newspaper, dry kindling and all-natural or organic fire starters. Never start a fire with gasoline, kerosene, or charcoal starter.

Do not burn wet or green (unseasoned) wood.

Many wax and sawdust logs are made for open hearth fireplaces only. Check your wood stove or fireplace insert operating instructions before using artificial logs.

If you use manufactured logs, choose those made from 100 percent compressed sawdust.

Build hot fires. For most appliances, a smoldering fire is not safe or efficient.

Keep the doors of your wood-burning appliance closed unless loading or stoking the live fire. Harmful chemicals, like carbon monoxide, can be released into your home.

Regularly remove ashes into a covered, metal container. Store the container outdoors on a nonflammable surface.

Keep a fire extinguisher handy.

## Do not burn:

1. Garbage
2. Lawn clippings or yard waste
3. Materials containing rubber, including tires
4. Materials containing plastic
5. Waste petroleum products, paints or paint thinners, or asphalt products
6. Materials containing asbestos
7. Construction or demolition debris
8. Railroad ties or pressure-treated wood
9. Manure or animal remains
10. Salt water driftwood or other previously salt water saturated materials
11. Unseasoned wood
12. Paper products, cardboard, plywood, or particleboard. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater. Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke.

·	TABLE OF CONTENTS.	PAGE	·	FLANGES AND ANCHOR PLATE	27
·	INTRODUCTION AND UNIT DESCRIPTION -	2	·	INSTALLATIONS –HEARTH EXTENSIONS	29
·	SAFETY INFORMATION -	3	·	DISTANCE TO COMBUSTIBLE MANTLE	30
·	SAFE WOOD-BURNING PRACTICES	5	·	CHIMNEY INSTALLATIONS	31
·	TABLE OF CONTENTS	6	·	LISTED CHIMNEYS	31
·	SPECIFICATIONS INSERT 600/700	8 & 9	·	CHIMNEY INSTALLATION NOTES	31
·	INSTALLATION OVERVIEW	10 & 11	·	CHIMNEY INSTALLATION INSTRUCTIONS	33
·	EXAMPLES OF IDENTIFICATION PLATES	12 & 13	·	EXAMPLES OF TYPICAL INSTALLATIONS	34&35&36
·	DIMENSIONS S600	15	·	LIST OF MANDATORY COMPONENTS	37
·	DIMENSIONS M700	16	·	MASONARY INSTALLATION –EXSISTING	37 & 38
·	SPECIFICATIONS ON OUTPUT	17	·	FACTORY BUILT FIREPLACE	38 & 39
·	GENERAL INSTRUCTIONS	17	·	CONVECTION AIR	39
·	GENERAL INFORMATION	18	·	FINISHING –BRICKS AND BAFFELS	40 & 41
·	AIR SYSTEMS S600	19	·	DOOR REMOVAL/INSTALLATION	41 & 42
·	AIR SYSTEMS M700	20	·	OPERATION	43 & 44
·	CONNECTION DIRECTLY TO THE UNIT	21	·	CONBUSTION AIR CONTROL LEVER	45
·	EXAMPLES OF AIR INTAKE OPTIONS	22	·	FIRE EXTINGUISHERS/SMOKE DETECTORS	47
·	CLOSURE VALVE-INTAKE AIR	23	·	FUEL – WOOD	47
·	INSTALLATION PLANNING	24	·	LIGHTING A FIRE	48
·	MINIMUM CLEARANCES TO COMBUSTIBLES	25	·	FLASH FIRE	48
·	PLACEMENT OF S600 INSTALLATION	27	·	EXTENDED FIRE	48
·	PLACEMENT OF M700 INSTALLATION	28	·	SMOKING	49



·	MAINTENANCE	49
·	ASH REMOVAL PROCEDURES	50
·	CREOSOTE FORMATION AND REMOVAL	50
·	RUNAWAY OR CHIMNEY FIRE	50
·	CHIMNEY CLEANING	51
·	GLASS REPLACEMENT	51
·	CARE OF GLASS	52
·	CLEANING THE GLASS CERAMIC SHEET	52
·	CARE OF PLATED PARTS	53
·	REPLACEMENTS	53
·	EXPLODED VIEW	54
·	TROUBLESHOOTING	56
·	GENERAL WARRANTY TERMS AND CONDITIONS	56
·	REQUIREMENT OF THE WARRANTY	57
·	WARRANTY EXCLUSIONS	57

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood 600 insert 1.67 g/hr and 700 insert 1.14 g/hr, Method 28R

This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

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.

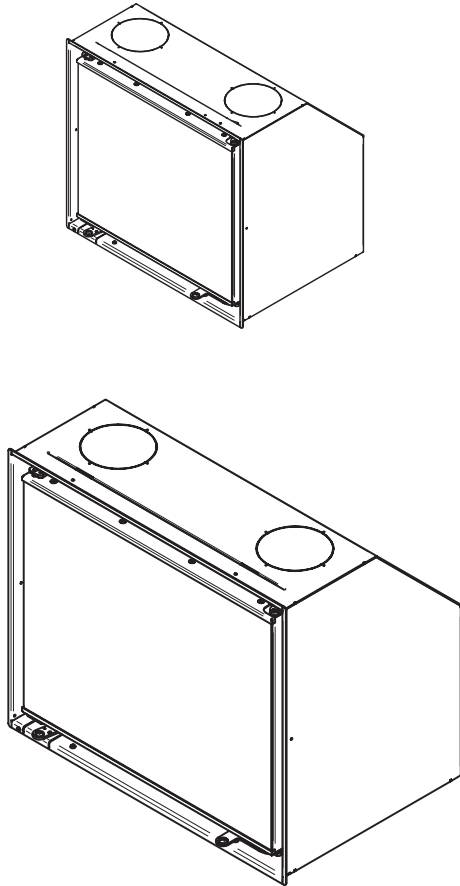
600=10,613 – 47,417 btu/hr 4kg of wood burned in 52minutes efficiency 65.5%

700=13,129 - 29,452 btu/hr 6.39kg of wood burned in 125 minutes efficiency 59%

## Specifications Cassette 600 Insert / 700 Insert:

	Spartherm Cassette Insert	
	600 Insert	700 Insert
Weight of Insert	lbs (kg)	lbs (kg)
Weight of Insert	lbs (kg)	lbs (kg)
Insert exterior: Width/depth/height (inches)	22,25"/16,25"/22,25"	26,188"/17,375"/22,625"
Firebox interior: Width/depth/height (inches)	17,25"/8,5"/13,35"	21"/8,937"/11,875" (back), 14,125" (front)
Heating capacity at -20°C / -4°F	App m <sup>2</sup> / sq. ft	App m <sup>2</sup> / sq. ft
Recommended amount of wood when fueling (lbs/kg) wood: 2-3 logs of wood of app. 9.8-12.9 inches / 25-33 cm	1,8 kg/hr	2,1 kg/hr
Intermittent operation:		
Flue gas mass flow:	grams per second	grams per second
Flue gas temperature:	°C/°F	°C/°F
Single wall connector stove pipe:	6" (153 mm)	6" (153 mm)
Chimney pipe - class A. UL-103 HT:	6" (153 mm)	6" (153 mm)
Optimal thermal output:	19,000 BTU	15,000 BTU/hr
Min. /Max. output (kW):	10,613 - 47,417 BTU	13,129 - 29,452 BTU/hr
Minimum stove draft pressure at above output:	"WC (Pa)	"WC (Pa)
Tested EPA emission particulate rate:	1.67 g/hr	1.14 g/hr

# 1. INSTALLATION OVERVIEW



Example shown: S 600 and M 700

# 2. INTRODUCTION




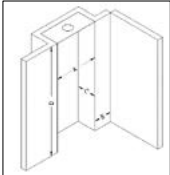
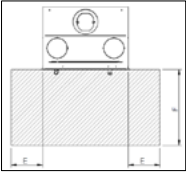

The Spartherm fireplaces have been tested and certified by CSA based on the following standards: UL 127 / ULC S-610-M87. EPA : U.S.ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 emissionstandards using cord wood. Before installing your Spartherm fireplace,PLEASE NOTE: THE LOCAL AUTHORITY HAVING JURISDICTION (MUNICIPAL BUILDING DEPARTMENT, FIRE PREVENTION BUREAU, ETC)SHOULD BE CONSULTED BEFORE INSTALLATION TO DETERMINE THE NEED TO OBTAIN A PERMIT. Please read this manual carefully before installing or using your fireplace. Incorrect installation may result in fire. To reduce the risk of fire, follow the installation instructions. Failure to do so may result in property damage, bodily injury or even death. Keep this manual handy so you can refer to it whenever necessary.

## WARNING

- THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED.
- ANY CHANGES OR ALTERATIONS TO THIS APPLIANCE OR ITS CONTROLS CAN BE DANGEROUS AND IS PROHIBITED:
- Do not operate appliance before reading and understanding operating instructions. Failure to operate appliance according to operating instructions could cause fire or injury.
- Before installing this appliance, contact the local building or fire authority and follow their guidelines.
- This appliance must be installed by a qualified installer.
- Do not use a fireplace insert or other product no specified for use with this fireplace.
- Risk of burns. The appliance should be turned off and cooled before servicing.
- Do not operate without fully assembling all components.
- Risk of cuts and abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges may be sharp.
- Children and adults should be alerted to the hazards of high surface.

- temperature and should stay away to avoid burns or clothing ignition.
- Young children should be carefully supervised when they are in the same room as the appliance. Toddlers, young children and others may be susceptible to accidental contact burns. A physical barrier is recommended if there are at risk individuals in the house. To restrict access to an appliance or stove, install an adjustable safety gate to keep toddlers, young children and other at risk individuals out of the room and away from hot surfaces.
- Clothing or other flammable material must not be placed on or near the appliance. Objects placed in front of the appliance must be kept a minimum of 48" (1220 mm) away from the front face of the appliance.
- Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.
- Ensure you have incorporated adequate safety measure to protect infants/toddlers from touching hot surfaces.
- Even after the appliance is out, the glass and/or screen will remain hot for an extended period of time.
- Check with your local hearth specialty dealer for safety screens and hearth guards to protect children from hot surfaces. These screens and guards must be fastened to the floor.
- Any safety screen or guard removed for servicing must be replaced prior to operating the appliance.
- Under no circumstances should this appliance be modified.
- This appliance must not be connected to a chimney flue pipe servicing a separate solid fuel burning appliance.
- Do not operate the appliance with glass door removed, cracked or broken. Replacement of the glass should be done by a licensed or qualified service person.
- Do not strike or slam shut the appliance glass door.
- Only doors / optional fronts certified with the unit are to be installed on the appliance.
- Keep the packaging material out of reach of children and dispose of the material in a safe manner. As with all plastic bags, these are not toys and should be kept away from children and infants.
- If the appliance is not properly installed, a house fire may result. Do not expose the appliance to the elements (ex. rain, etc.) and keep the appliance dry at all times. Wet insulation will produce an odour when the appliance is used.
- The chimney must be sound and free of cracks. Clean your chimney a minimum of twice a year and as required.
- Do not start a fire with chemicals or fluids such as gasoline, engine oil, etc.
- Your appliance requires periodic maintenance and cleaning. Failure to maintain your appliance may lead to smoke spillage in your home.
- Lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or too green or freshly cut hardwoods. Burning wet unseasoned wood can cause excessive creosote accumulation. When this is ignited it can cause a chimney fire that may result in a serious house fire.
- This appliance is designed to burn natural wood only. Do not burn treated wood, coal, charcoal, coloured paper, cardboard, solvents or garbage.
- Burn wood directly on the firebricks. Do not elevate grate or otherwise raise the fire.
- Do not store wood within appliance installation clearances or within the space required for re-fueling and ash removal.
- Ashes must be disposed in a metal container with a tight lid and placed on a non-combustible surface well away from the home or structure until completely cool.
- Ensure clearances to combustibles are maintained when building a mantel or shelves above the appliance. Elevated temperatures on the wall or in the air above the appliance can cause melting, discolouration or damage to decorations, a T.V. or other electronic components.
- Do not install this fireplace insert in a factory- built fireplace unless certified with the fireplace.

## 2.1 EXAMPLE OF IDENTIFICATION PLATE

Safety Information / Informations Sur La Sécurité	
	<p>Listed by / Listée par: Spartherm Feuerungstechnik GmbH Maschweg 38 D – 49324 Melle, Germany info@spartherm.com</p> <p>Manufactured by / Fabriqué par: Spartherm Feuerungstechnik GmbH Maschweg 38 D – 49324 Melle, Germany info@spartherm.com</p>
<p>Solid Fuel Room Heater – For Use with Solid Wood Fuel only / Appareil de Chauffage à combustion solides Tested to Standards/ Testés aux Normes: UL-127-11, ULC-S610 M87. U.S. Environment Protection Agency. Certified to comply with 1.67 g/hr Particulate emission standards using cord wood</p>	
<p><b>TO PREVENT HOUSE FIRES:</b> Contact local building or fire officials about restrictions and installation inspection in your area. Install and use only in accordance with manufacturer's installation and operating instructions and local codes. In the absence of any local codes, installation must meet minimum requirements of NFPA 211 in the USA, and B365 in Canada. Refer to manufacturer's instructions and local codes for precautions required for passing a chimney through a combustible wall or ceiling. Inspect and clean chimney system frequently in accordance with manufacturer's instruction. Do not connect this stove to a chimney flue serving another appliance. Do not use grate or elevate fire. Build wood fire directly on hearth. Installation only with listed ULC-S604, ULC-S610 or UL-103 HT chimney diameter 6".</p> <p><b>TO PREVENT CREOSOTE FIRES:</b> Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly. Do not use fuels other than firewood.</p> <p><b>CAUTION:</b> Only operate the wood heater with the doors fully closed. Replace glass only with original 4 mm Robax ceramic glass. Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with the manufacturer's installation instructions. If provided with a hearth extension, the hearth extension must be installed according to the installation instructions! Air is needed for fireplace operation! At least 14 square inches (90.3 square centimeters) of outside air must be admitted to the room or directly to the unit through a 4" (101.6mm) diameter pipe. Failure to provide this may starve other fuel burning appliances from an adequate air supply. Do not obstruct air inlet and outlet in any case. Components used with fireplace must be listed. See manual. Do not use fireplace insert or other products specified to use with this product. <b>CAUTION:</b> Gas logs shall be certified for the application. This unit is not certified to operate with gas log sets.</p> <p>This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.</p> <p>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.</p>	<p><b>POUR EVITER LES INCENDIES DOMESTIQUES:</b> Contactez les Autorités des bâtiments et les officiers pour obtenir des instructions concernant les restrictions et inspections d'installation dans votre région. Installez et utilisez cet appareil uniquement en respectant les instructions d'installation et d'utilisation du fabricant. Respectez également les réglementations locales. En l'absence de réglementations locales, l'installation doit respecter les normes minimales de NFPA 211 aux Etats-Unis et B365 au Canada. Référez-vous aux instructions du fabricant aux réglementations locales pour obtenir des instructions concernant les précautions nécessaires pour le passage de la cheminée à travers une paroi ou un plafond combustible. Inspectez et nettoyez le système de cheminée fréquemment selon les instructions du fabricant. Ne connectez pas ce poêle à un conduit de cheminée utilisé par un autre appareil. N'utilisez pas de grille et ne faites pas monter le feu. Établissez le feu de bois directement dans l'âtre. L'installation doit être faite exclusivement avec le cheminée listé selon la norme ULC-S604, ULC-S610 ou UL-103 HT de diamètre 10".</p> <p><b>POUR EVITER LES FEUX DE CREOSOTE :</b> Inspectez et nettoyez la cheminée régulièrement - Sous certaines condition d'emploi, la creosote peut s'accumuler rapidement. Ne pas utiliser d'autres combustibles que le bois.</p> <p><b>ATTENTION:</b> N'utilisez le poêle lorsque les portes sont complètement fermées. Remplacer la vitre uniquement avec du verre Robax céramique de 4 mm. Il faut que les zones du foyer vitré qui portent les canaux d'alimentation d'air chaud et froid soient conformes à l'instruction de montage du fabricant. L'approvisionnement en rovement fait de matériaux ininflammables devant fourvoyer du foyer vitré doit être installé conforme à l'instruction de montage du fabricant. L'aération suffisante pour l'utilisation du foyer est nécessaire! Dans l'emplacement du foyer vitré il faut assurer au moins 14 pouces carrés (90.3 centimètres carrés) de l'air de dehors ou il faut assurer l'alimentation en air de combustion directe au foyer vitré par une tube d'un diamètre de 4 pouces carré (101,6mm). Un manque d'air d'appoint pourrait priver les autres appareils de combustion d'une alimentation d'air adéquate. Ne pas obstruer les entrées et sorties d'air en aucun cas. Les composants utilisées dans l'appareil doivent être répertoriés. Voir manuel. N'utilisez pas d'insert de cheminée ou autres produits qui ne sont pas autorisés pour l'usage de ce produit.</p> <p><b>ATTENTION:</b> Pour cette application on aura bûchettes décoratives certifiées. Avec celles-ci installées, la cheminée sera fixée à demeure dans une position ouverte pour pouvoir effectivement aérer l'appareillage. La certification des bûchettes décoratives selon la norme ANSI Z21.60 (CSA 2.26-2017) est obligatoire pour les installer dedans le foyer. N'utilisez pas des bûchettes décoratives dans un foyer sans cheminée. Laissez la porte complètement ouverte en utilisant des bûchettes décoratives.</p> <p>Ce foyer vitré à bois doit être entretenu et réparé à intervalles réguliers pour assurer un fonctionnement correct. Veuillez consulter, s.v.p. pour de plus amples informations les instructions du fabricant. Il est contraire aux dispositions de l'autorité d'exploiter ce foyer vitré à bois incompatible au manuel du fabricant.</p>
 <p>Floor protection for Canada: 20" (500mm) from unit to front of floor protector.</p>	 <p>Protection de sol pour Canada: 20" (500 mm) de l'avant de l'appareil au bord de la protection.</p>
<p><b>MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS</b></p> <p>A. Unit width B. 15" C. Unit depth D. ? E. 6" each side F. 15" <b>IN FRONT OF UNIT</b></p> <p>* Not Tested - NFPA Guidelines in the USA, CAN/CSA B365-M91 in Canada. Floor protection must be minimum 3/8-inch non-combustible material extending beneath the stove, and to the front and sides from door opening and to the rear as indicated.</p>	<p><b>ECARTEMENT MINIMUM AUX MATERIAUX COMBUSTIBLES</b></p> <p>A. B. C. D. E. F. <b>DEVANT L'APPAREIL</b></p> <p>* Non testé - Exigences NFPA aux Etats-Unis, CAN/CSA B365-M91 au Canada. La protection de sol doit avoir une épaisseur de 3/8 pouces (1 cm), être d'un matériau non combustible et être placée devant et à côté de la porte ainsi qu'à l'arrière, comme indiqué.</p>
<p><b>CAUTION:</b> HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN AND CLOTHING AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE MANUEAL AND INSTRUCTIONS. KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM THIS APPLIANCE. NOT SUITABLE FOR MOBILE HOME INSTALLATION. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING.</p>	<p><b>ATTENTION:</b> CHAUD PENDANT LE FONCTIONNEMENT – NE PAS TOUCHER. TENIR LOIGNÉS LES ENFANTS ET LES VÊTEMENTS – LE CONTACT FEU CAUSER DES BRULURES. CONSULTEZ LA PLAQUE D'IMMATRICULATION ET LES INSTRUCTIONS. TENIR LES FOURNITURES ET AUTRES MATIERES COMBUSTIBLES A DISTANCE DE L'APPAREIL. NE PAS INSTALLER DANS UNE MAISON MOBILE. EVITER DE SURCHAUFFER – SI LE FEU OU LA CHEMINÉE DEVIENT ROUGE, VOUS SURCHAUFFEZ.</p> 
Spartherm – v2.1, 11. Apr. 2018	
DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ETIQUETTE	



Listed by / Listée par:  
Spartherm Feuerungstechnik GmbH  
Maschweg 38  
D – 49324 Melle, Germany  
info@spartherm.com

Manufactured by / Fabriqué par:  
Spartherm Feuerungstechnik GmbH  
Maschweg 38  
D – 49324 Melle, Germany  
Info@spartherm.com

Solid Fuel Room Heater – For Use with Solid Wood Fuel only /  
Appareil de Chauffage a combustion solides  
Tested to Standards/ Testés aux Normes:  
UL-127-11, UL-C-5610 MB7  
U.S. Environment Protection Agency: Certified to comply with 1.14 g/hr  
Particulate emission standards using cord wood.

Model: Spartherm Cassette 700 Insert  
Date of Manufacture / Date de Fabrication:  
Month/Year / Mois/Année: 01/2018  
Serial Number / No de Serie: M 700 Insert

**TO PREVENT HOUSE FIRES:** Contact local building or fire officials about restrictions and installation inspection in your area. Install and use only in accordance with manufacturer's installation and operating instructions and local codes. In the absence of any local codes, installation must meet minimum requirements of NFPA 211 in the USA, and B365 in Canada. Refer to manufacturer's instructions and local codes for precautions required for passing a chimney through a combustible wall or ceiling. Inspect and clean chimney system frequently in accordance with manufacturer's instruction. Do not connect this stove to a chimney flue serving another appliance. Do not use grate or elevate fire. Build wood fire directly on hearth. Installation only with listed UL-C-5604.

ULC-S610 or UL-103 HT chimney diameter 6".  
**TO PREVENT CREOSOTE FIRES:** Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly. Do not use fuels other than firewood.

**CAUTION:** Only operate the wood heater with the doors fully closed. Replace glass only with original 4 mm Robax ceramic glass. Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with the manufacturer's installation instructions. If provided with a hearth extension, the hearth extension must be installed according to the installation instructions! Air is needed for fireplace operation! At least 14 square inches (90.3 square centimeters) of outside air must be admitted to the room or directly to the unit through a 4" (101.6mm) diameter pipe. Failure to provide this may starve other fuel burning appliances from an adequate air supply. Do not obstruct air inlet and outlet in any case. Components used with fireplace must be listed. See manual. Conclude fireplace insert or other products specified for use with this product. **CAUTION:** Gas logs shall be certified for the application. This unit is not tested for gas log set installation.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

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.

**POUR EVITER LES INCENDIES DOMESTIQUES:**

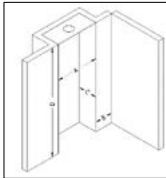
Contactez les Autorités des bâtiments et les pompiers pour obtenir des instructions concernant les restrictions et inspections d'installation dans votre région. Installez et utilisez cet appareil uniquement en respectant les instructions d'installation et d'utilisation du fabricant. Respectez également les réglementations locales. En l'absence de réglementations locales, l'installation doit respecter les normes minimales de NFPA 211 aux Etats-Unis et B365 au Canada. Référez-vous aux instructions du fabricant aux réglementations locales pour obtenir des instructions concernant les précautions nécessaires pour le passage de la cheminée à travers une paroi ou un plafond combustible. Inspectez et nettoyez le système de cheminée fréquemment selon les instructions du fabricant. Ne connectez pas ce poêle à un conduit de cheminée utilisé par un autre appareil. N'utilisez pas de grille et ne faites pas monter le feu. Établissez le feu de bois directement dans l'âtre. L'installation doit être faite exclusivement avec le cheminée listé selon la norme ULC-S604, ULC-S610 ou UL-103 HT de diamètre 10".

**POUR EVITER LES FEUX DE CREOSOTE :**

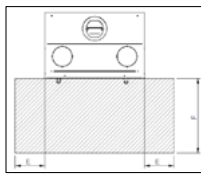
Inspectez et nettoyez la cheminée régulièrement - Sous certaines condition d'emploi, la creosote peut s'accumuler rapidement. Ne pas utiliser d'autres combustibles que le bois.

**ATTENTION:** N'utilisez ce poêle que lorsque les portes sont complètement fermées. Remplacez la vitre uniquement avec du verre Robax céramique de 4 mm. Il faut que les zones du foyer vitré qui portent les canaux d'alimentation d'air chaud et froid soient conformes à l'instruction de montage du fabricant. L'approvisionnement en revêtement fait de matériaux ininflammables devant l'ouverture du foyer vitré doit être installé conforme à l'instruction de montage du fabricant. L'aération suffisante pour l'utilisation du foyer est nécessaire! Dans l'emplacement du foyer vitré il faut assurer au moins 14 pouces carré (90,3 centimètres carré) de l'air de dehors ou il faut assurer l'alimentation en air de combustion directe au foyer vitré par une tube d'un diamètre de 4 pouces carré ( 101,6mm). Un manque d'air d'appoint pourrait priver les autres appareils de combustion d'une alimentation d'air adéquate. Ne pas obstruer les entrées et sorties d'air en aucun cas. Les composants utilisés dans l'appareil doivent être répertoriés. Voir manuel. N'utilisez pas d'insert de cheminée ou autres produits qui ne sont pas autorisés pour l'usage de ce produit.

**ATTENTION:** Pour cette application on aura bûchettes décoratives certifiées. Avec celles-ci installées la cheminée sera fixée à demeure dans une position ouverte pour pouvoir facilement retirer l'appareil. La certification des bûchettes décoratives selon la norme ANSI Z21.60/CSA 2.25-2011 est obligatoire pour les installer dedans le foyer. N'utilisez pas des bûchettes décoratives dans un foyer sans cheminée. Laissez la porte complètement ouverte en installant les bûchettes décoratives.  
Ce foyer vitré à bois doit être entretenu et réparé à intervalles réguliers pour assurer un fonctionnement correct. Veuillez consulter s.v.p. pour de plus amples informations les instructions du fabricant. Il est contraire aux dispositions de l'autorité d'exploiter ce foyer vitré à bois incompatible au manuel du fabricant.



Floor protection for Canada: 20" (500mm) from unit to front of floor protection.



Protection de sol pour Canada: 20" (500 mm) de l'avant de l'appareil au bord de la protection.

**MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS**

- A. Unit width
- B. 15"
- C. Unit depth
- D. ?
- E. 6" each side
- F. 18"

**IN FRONT OF UNIT**

\* Not Tested to NFPA Guidelines in the USA, CAN/CSA B365-M01 in Canada. Floor protection must be minimum 3/8-inch non-combustible material extending beneath the stove, and to the front and sides from door opening and to the rear as indicated.

**ÉCARTEMENT MINIMUM AUX MATERIAUX COMBUSTIBLES**

- A.
- B.
- C.
- D.
- E.
- F.

**DEVANT L'APPAREIL**

\* Non Testé - Exigences NFPA aux Etats-Unis, CAN/CSA B365-M01 au Canada. La protection de sol doit avoir une épaisseur de 3/8 pouce (1 cm), être d'un matériau non combustible et être placée devant et à côté de la porte ainsi qu'à l'arrière, comme indiqué.

**CAUTION:**  
HOT WHILE IN OPERATION, DO NOT TOUCH.  
KEEP CHILDREN AND CLOTHING AWAY.  
CONTACT MAY CAUSE SKIN BURNS. SEE NAME PLATE AND INSTRUCTIONS. KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM THE APPLIANCE.  
NOT SUITABLE FOR MOBILE HOME INSTALLATION.  
DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING.

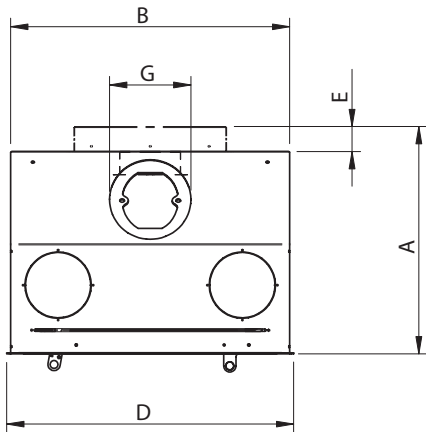
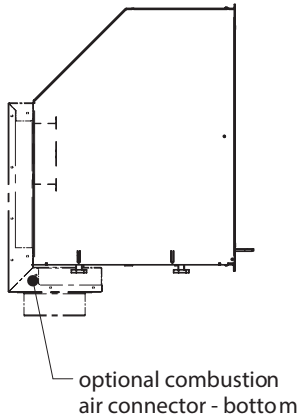
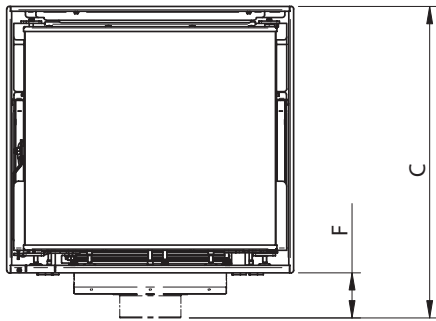


**ATTENTION:**  
CHAUD PENDANT LE FONCTIONNEMENT – NE PAS TOUCHER.  
TENIR ELOIGNES LES ENFANTS ET LES VÊTEMENTS – LE CONTACT PEU CAUSER DES BRULURES. CONSULTEZ LA PLaque d'IMMATRICULATION ET LES INSTRUCTIONS.  
TENIR LES FOURNITURES ET AUTRES MATIERES COMBUSTIBLES A DISTANCE DE L'APPAREIL.  
NE PAS INSTALLER DANS UNE MAISON MOBILE.  
EVITER DE SURCHAUFFER - SI LE FEU OU LA CHEMINÉE DEVIENT ROUGE, VOUS SURCHAUFFEZ.

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**DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ETIQUETTE**

## 2.2 DIMENSIONS

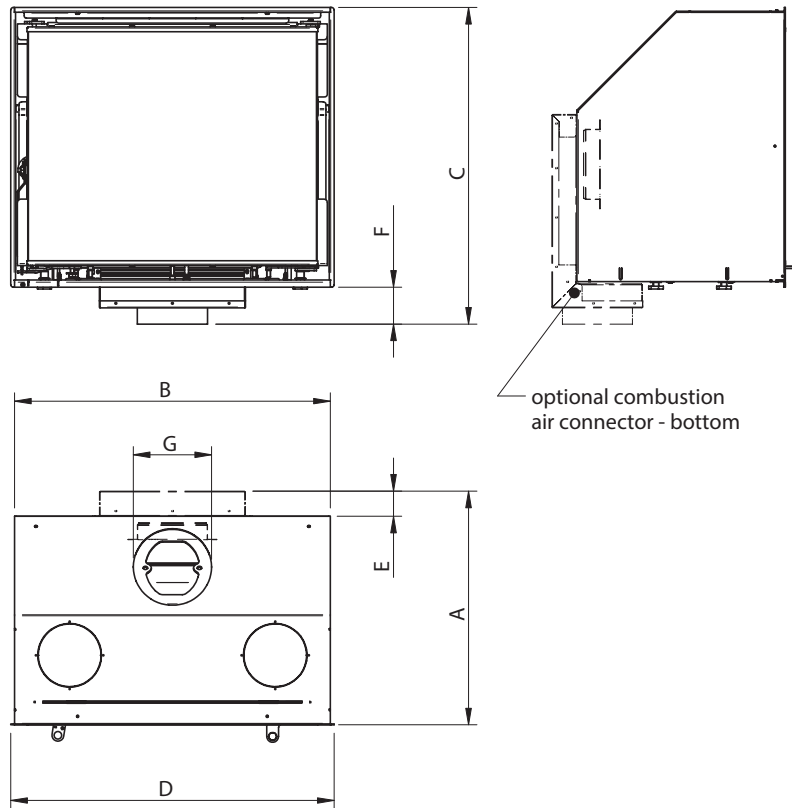


	S 600 Insert
A	18 1/7" / 461mm
B	22 2/7" / 566mm
C	24 7/8" / 632mm
D	23" / 582mm
E	2" / 50mm
F	3 5/8" / 92mm
G	6"

Example shown: S 600



## 2.2.2 DIMENSIONS SINGLE FACED



	M 700 Insert
A	19 2/5" / 493mm
B	22 2/7" / 566mm
C	26 2/7" / 668mm
D	26 2/7" / 682mm
E	2" / 53mm
F	3" / 78mm
G	6"

Example shown: M 700

## 2.3 SPECIFICATION

	Fire chamber volume	Minimum Power	Maximum power	Efficiency*	Chimney type	Unit weight	ideal fuel size
S 600 Insert	0,95 ft <sup>3</sup>	10 613 BTU/h	47 417 BTU/h	70.29 %	6"	lbs	17"
M 700 Insert	1,58 ft <sup>3</sup>	13 129 BTU/h	29 452 BTU/h	66.77 %	6"	lbs	2"

### Conversion Factors

Inches to millimeters (mm): 1" = 25.4 mm

British Thermal Unit BTU/h to Watt: 1BTU/h = 0.293 Watt

Kilogramm to Pound: 1kg = 2.205 lb

Cubicmeter to cubicfeet:

$$1\text{m}^3 = 35.314 \text{ft}^3$$

## 2.4 GENERAL INSTRUCTIONS



THIS APPLIANCE HAS NOT BEEN TESTED WITH ANY VENTED OR UNVENTED GAS LOG SET: TO REDUCE RISK OF FIRE OR PREVENT INJURY, DO NOT

INSTALL A VENTED OR UNVENTED GAS LOG SET INTO THE APPLIANCE.

### CAUTION:

These inserts are not certified for gas log sets.

DO NOT CONNECT THIS APPLIANCE TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

THIS APPLIANCE AND THE COMPONENTS ARE DESIGNED TO BE INSTALLED AND OPERATED AS A SYSTEM. ANY ALTERATION TO OR SUBSTITUTION FOR ITEMS IN THIS SYSTEM, UNLESS ALLOWED BY THESE INSTALLATION INSTRUCTIONS, WILL VOID THE LISTING AND MAY VOID THE PRODUCT WARRANTY. IT MAY ALSO CREATE A HAZARDOUS INSTALLATION. READ THROUGH THESE INSTRUCTIONS THOROUGHLY BEFORE STARTING YOUR INSTALLATION AND FOLLOW THEM CAREFULLY THROUGHOUT YOUR PROJECT.

- Before beginning your installation, consult with your local building code agency or fire officials and insurance representative to ensure compliance.

- Non-toxic smoke will be emitted during the paint curing process, to help dissipate the smoke open a window near the appliance.
- Remove any dust or debris off the top of the appliance before firing the appliance as the paint will become soft as the appliance heats up and will harden as the appliance cures. To cure the paint on your appliance burn your appliance moderately hot during the first few fires.
- To keep the gasket from sticking to the appliance as the paint is curing, periodically open the door every 5-10 minutes.
- For the first two weeks use generous amounts of fuel and burn the appliance for an hour as the appliance goes through a process of eliminating moisture in the steel and firebricks. The initial heat output will be reduced while the moisture is being drawn from the appliance and it will be necessary to build several hot fires to remove this moisture. DURING THIS PROCESS DO NOT OVERFIRE THE APPLIANCE.

## 2.5 GENERAL INFORMATION

The chimney vent system used on your wood burning appliance should be designed with the least amount of restriction possible to enable the exhaust products to easily flow through it. Chimney vent systems that are too short or too long (refer to point 4.3 "chimney installation") can also have an adverse affect on the flow of exhaust through it. The wood burning appliance and chimney vent system also require a sufficient supply of combustion air not only to support the combustion in the combustion chamber but to replace the exhaust leaving it so it can flow freely up through the vent system and out into the atmosphere. It is the correct balance of combustion air and the chimney vent system that will ensure the appliance provides you with its optimum performance.

Be sure to provide sufficient combustion air. There are many other appliances in your home competing for air such as a kitchen range hood, forced air heating devices or a bathroom exhaust fan.



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).



Expansion / contraction noises during heating up and cooling down cycles are normal and to be expected.

After extended periods of non-operation such as following a vacation or a warm weather season, the appliance may emit a slight odour for a few hours. This is caused by dust particles on the firebox burning off. Open a window to sufficiently ventilate the room.

### CALIFORNIA PROP 65 WARNING:

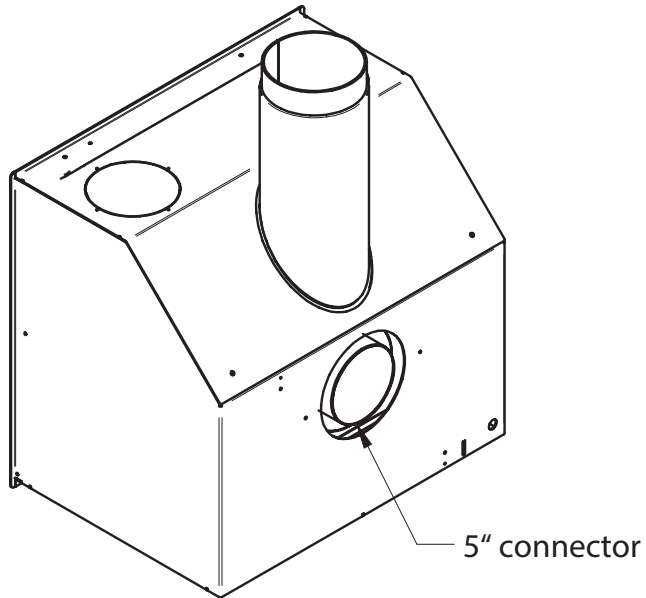
Use of this product may produce smoke which contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

If you experience smoking problems, you may need to open a door, a window or otherwise provide some method of supplying combustion air to the appliance.

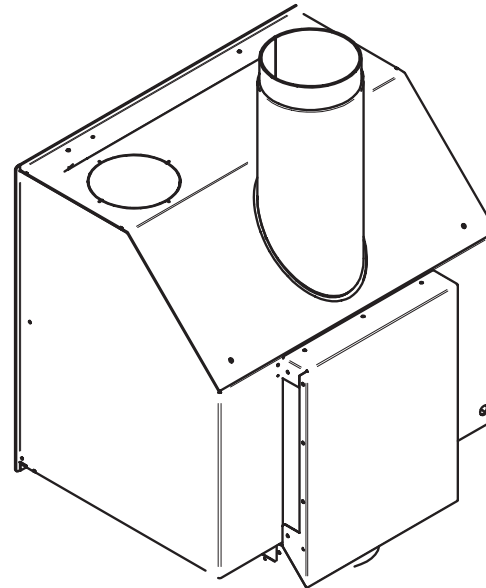
## 2.6 AIR SYSTEM

When mounting the air system ensure that the air control system provides fresh air from the outside. In order for the air system to function, you have to ensure in the structure that no vacuum occurs in the housing. If convection grates are installed, be sure not to block them. Air system (accessory) is connected to the bottom of the stove.

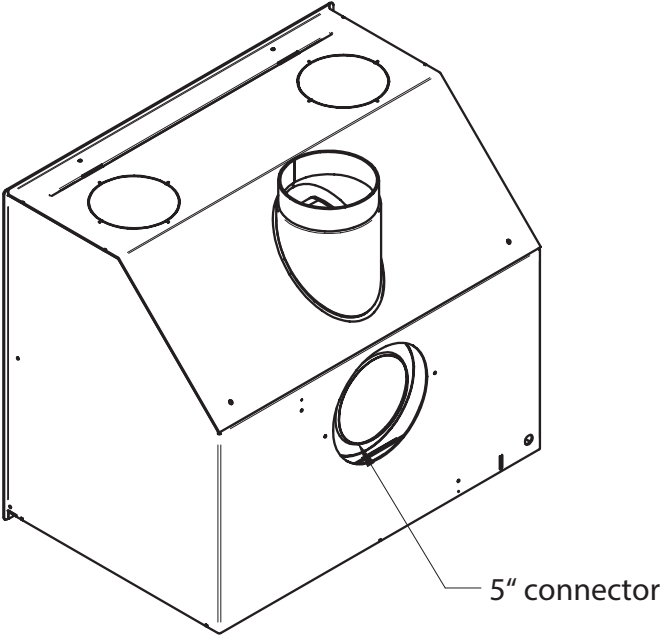
S 600 - backside air intake



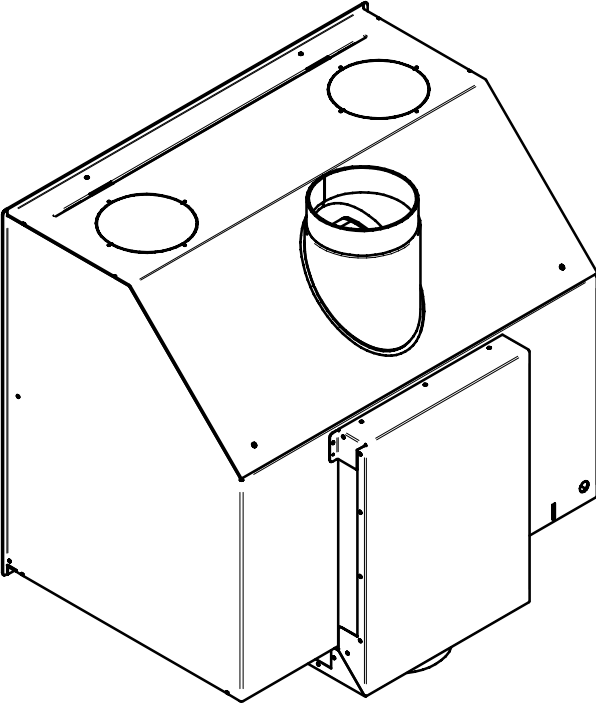
S 600 - groundside air intake



M 700 - backside air intake

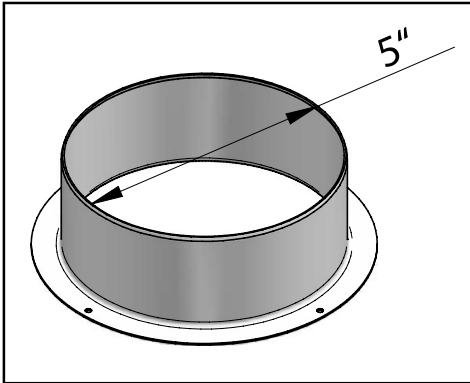


M 700 - groundside air intake



## 2.6.1 CONNECTION DIRECTLY TO THE UNIT

To connect the separate combustion air directly to the unit you need to have the right separate combustion air connector  $\varnothing$  5/6". Fix the connector directly to the unit. It can be oriented to the left side, right side or to the back.



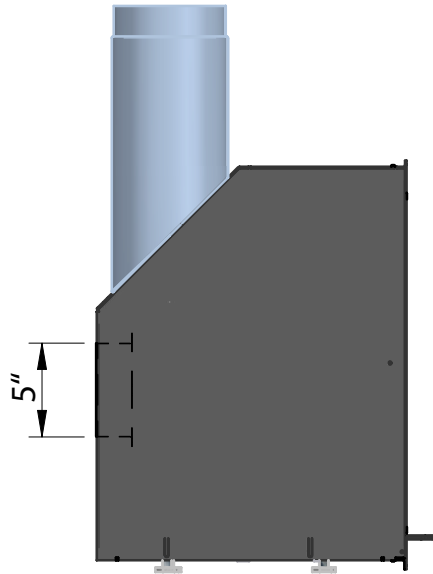
### Fresh air ducts

The ducts providing the outside combustion air should be as short as possible to prevent pressure loss and to prevent making the house cold.

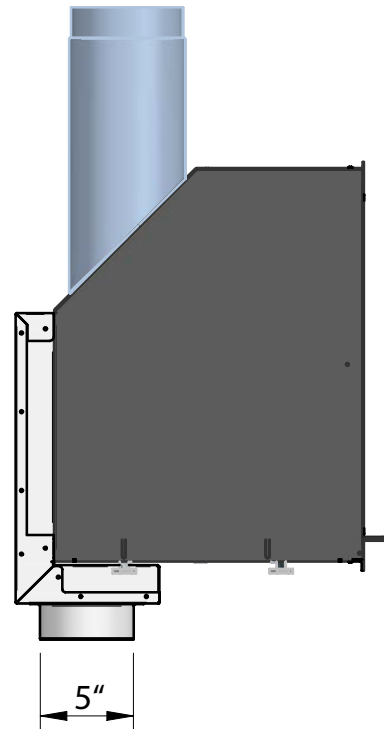
### Grills

The combustion air ducts will be protected at the outside by a grill. The free passage section of those grills is at least equivalent to the section of the air inlet. Please note that the infiltration of water and the effect of the wind can damage the system.

backside air take



groundside air take



## Closure valve

If you decide to connect separate combustion air it is mandatory to install a closure valve to prevent condensate formation and to prevent the room from becoming cold while the stove is not in use. It should ideally be located as close as possible to the outside wall. It can be controlled from inside if it is not too far from the stove (cable length = 47").



## PLEASE NOTE: COMBUSTION AIR INTAKE REQUIREMENTS.

It is recommended that the 5" Combustion air intake duct is installed in a correct manner.

Please find the following information.

Outside Air- ducts must...

- Be protected on the outside by a grill where the free air- flow that is at least equivalent to the section of the air inlet.

Please note that the infiltration of wind, weather, snow and water can effect or damage the air combustion system.

- Ideally be fitted with a butterfly valve so that it can manually, be used to close the cold air from entering the firebox.

Please note that the butterfly valve has to be 100% open or 100% closed and should not!!!

Be used to adjust burn rate.

Try to keep the butterfly valve as close to the outside wall as possible.

- The air-duct should be insulated and the distance from the fireplace to the outside should be as short as possible.

For 5" air duct please refer to the maximum lengths and elbows.

Number of elbows

4' 4 elbows

8' 4 elbows

10' 2 elbows

12' 0 elbow

If you exceed these guidelines, you must compensate by using a larger diameter and/or a smoother duct. Careful not to crush the duct!

It should ideally be located as close as possible to the outside wall.

- If it is not possible to bring in combustion air to the fireplace please insure that there is sufficient air to feed the fireplace in the room –please note that this is not ideal.



Please contact your dealer who offers suitable parts for air inlet ducts (pipes and damper).

Make sure that the wire mesh is mounted at the combustion air inlet.

### 3. INSTALLATION PLANNING

Clean all ashes out of the inside of the existing fireplace opening. Make sure

that the chimney and fireplace are free of cracks, loose mortar, creosote deposits, blockage or other signs of deterioration. If necessary, have any repair work done by a qualified professional before installing the insert.

Do NOT remove bricks or mortar from the fireplace. In case of an outside air inlet or ash dump, fill with fiberglass insulation. Adhere to minimum clearances as illustrated.



WEAR GLOVES AND SAFETY GLASSES FOR PROTECTION. CAREFULLY FOLLOW THE INSTRUCTIONS FOR ASSEMBLY OF THE PIPE AND OTHER PARTS NEEDED TO INSTALL THE APPLIANCE. FAILURE TO DO SO MAY RESULT IN A FIRE, ESPECIALLY IF COMBUSTIBLES ARE TOO CLOSE TO THE APPLIANCE OR CHIMNEY AND AIR SPACES ARE BLOCKED, PREVENTING THE FREE MOVEMENT OF COOLING AIR. DO NOT DRAW OUTSIDE AIR FROM GARAGE SPACES. EXHAUST PRODUCTS OF GASOLINE ENGINES ARE HAZARDOUS. DO NOT INSTALL OUTSIDE AIR DUCTS SUCH THAT THE AIR MAY BE DRAWN FROM ATTIC SPACES, BASEMENTS OR ABOVE THE ROOFING WHERE OTHER HEATING APPLIANCES OR FANS AND CHIMNEYS EXHAUST OR UTILIZE AIR. THESE PRECAUTIONS WILL REDUCE THE POSSIBILITY OF APPLIANCE SMOKING OR AIR FLOW REVERSAL. THE OUTSIDE AIR INLET MUST REMAIN

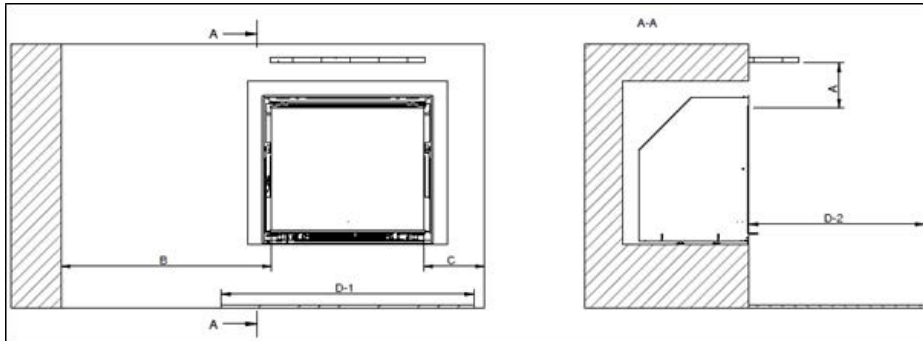
CLEAR OF LEAVES, DEBRIS ICE AND/OR SNOW OR ANY OTHER OBSTACLES. IT MUST BE UNRESTRICTED WHILE APPLIANCE IS IN USE TO PREVENT ROOM AIR STARVATION WHICH CAN CAUSE SMOKE SPILLAGE AND AN INABILITY TO MAINTAIN A FIRE. SMOKE SPILLAGE CAN ALSO SET OFF SMOKE ALARMS. NEGATIVE PRESSURE WITHIN YOUR HOME MAY INADVERTENTLY AFFECT YOUR APPLIANCE. TO PREVENT CONTACT WITH SAGGING OR LOOSE INSULATION, THE APPLIANCE MUST NOT BE INSTALLED AGAINST VAPOUR BARRIERS OR EXPOSED INSULATION. LOCALIZED OVERHEATING COULD OCCUR AND A FIRE COULD RESULT. DO NOT USE MAKESHIFT COMPROMISES DURING INSTALLATION. DO NOT BLOCK OR RESTRICT AIR, GRILLE OR LOUVRE OPENINGS. DO NOT ADD A HOOD. KEEP HAND TOOLS IN GOOD CONDITION; SHARPEN CUTTING EDGES AND MAKE SURE TOOL HANDLES ARE SECURE. ALWAYS MAINTAIN THE MINIMUM AIR SPACE REQUIRED TO THE ENCLOSURE TO PREVENT FIRES. DO NOT PACK REQUIRED AIR SPACES WITH INSULATION OR OTHER MATERIALS. COMBUSTION AIR INLET DUCTS ARE NOT TO TERMINATE IN ATTIC SPACES OR CRAWL SPACES.

#### 3.1 MINIMUM CLEARANCES TO COMBUSTIBLES

DO NOT PLACE ANY COMBUSTIBLE MATERIALS (FURNITURE, FIREWOOD, ETC.) WITHIN 48"(1220mm) IN FRONT AND ON THE SIDES OF THE INSERT.

COMBUSTIBLE MATERIALS CAN'T PROTRUDE ONTO THE METAL PARTS OF THE UNIT, THEY MUST BE COVERED WITH NON COMBUSTIBLE MATERIALS.

Clearance requirements to combustibile surfaces



A	Combustible mantle to insert
B	Sidewall to insert
C	Side facing
D-1	Hearth extension, width
D-2	Hearth extension, length

Informations to D-1/D-2:

The floor in front of the fireplace requires thermal protection. This protection must be non-combustible. Also this floor protector must be listed to UL 1618.

Do NOT install in a mobile home

	Canada	USA
A	20" for 1" thickness/ 28" for 8" thickness	20" for 1" thickness/ 28" for 8" thickness
B	15"	15"
C	15"	15"
D-1	unit with and add 6" on each side	unit with and add 6" on each side
D-2	18" min	18" min

#### Distance to furniture

The recommend minimum distance from stove to furniture is 48 inches. Note that some furniture is more easily affected by heat and may need to be moved to greater distance. This is your responsibility.

In addition other combustible materials, away from the stove. In general, a distance of 48 inches must be maintained between the stove and moveable combustible item such as drying clothes, newspapers, firewood etc. Failure to meet the required clearances can endanger property and personal safety.

Note:

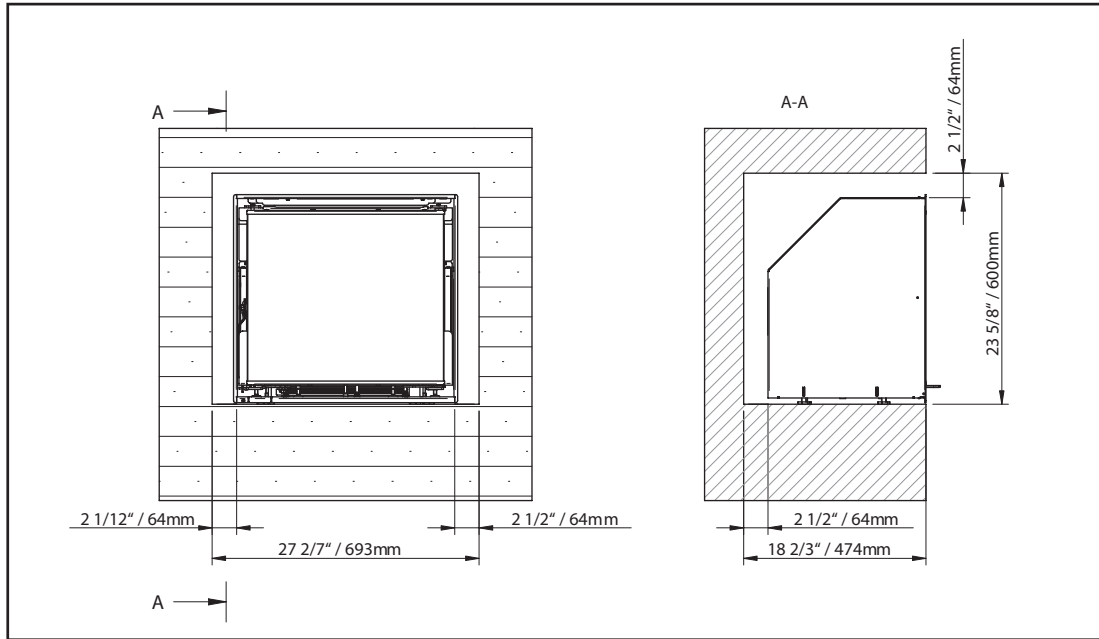
#### Acid Protection

If acid-washing the masonry around the stove, protect the stove surface with an acid-proof cover.

#### Fresh Air Inlet

Unless there is deemed to be insufficient residual air into the room via doorways, windos and the like, a dedicated fresh air inlet will be needed. This inlet should have 2 square inches (1250 square mm) of free air space. This is particularly important where the room is well sealed, or where an extractor hood or ventilation system disturbs the natural air pressure. Such an inlet should not be on a wall that is usually subject to negative pressure from normal wind pattern. Avoid placing the inlet directly across the room from the stove, thus causing a cold air draft.

### 3.2 PLACEMENT



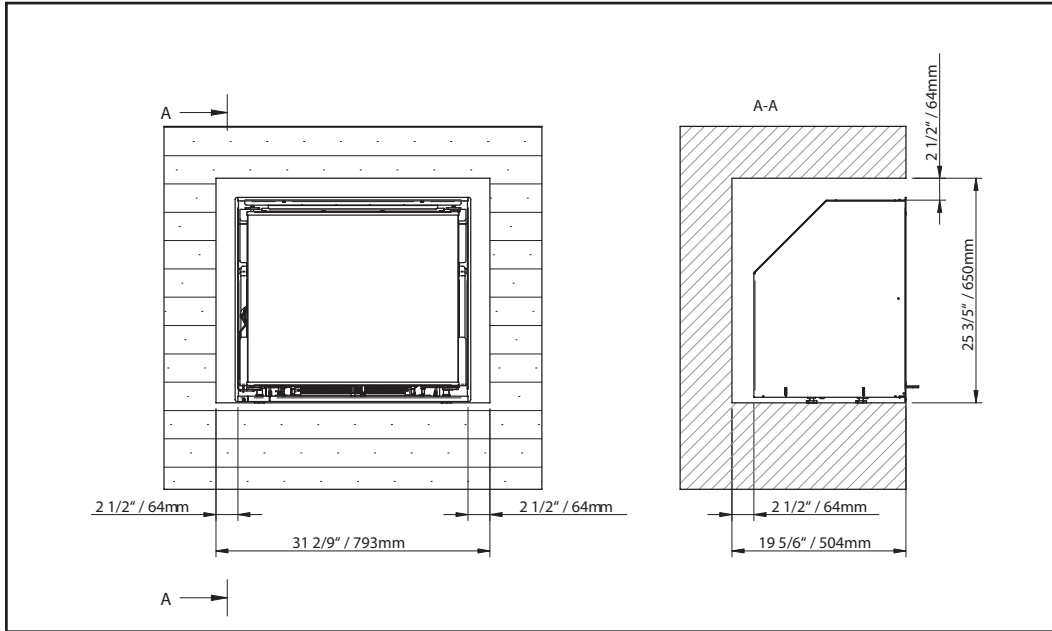
### 3.3 FLANGES AND ANCHOR PLATE

NOTE! The anchor plate is not included with the unit. Use only an chimney certified as UL 103HT or ULC S-629. Be sure to place the convection and exhaust connectors before placing the top elements of the insulation shell. The dimensions and positioning of the different air inlet and outlet are available in the table in chapter „dimensions“.

#### Minimum hearth requirement (Cassette Insert 600)

Make sure there is enough space for the wood heater. If the fireplace is fitted with a frame (that's conceals the contours of the recess) an additional tolerance of 1-1/2" ca be set when the recess is made.

The wood heater must be able to expand freely. The brickwork or decorative materials must not enter into contact with the wood heater under any circumstances; leave a gap of at 2-1/2".



#### Minimum hearth requirement (Cassette Insert 700)

Make sure there is enough space for the wood heater. If the fireplace is fitted with a frame (that's conceals the contours of the recess) an additional tolerance of 1-1/2" ca be set when the recess is made.

The wood heater must be able to expand freely. The brickwork or decorative materials must not enter into contact with the wood heater under any circumstances; leave a gap of at 2-1/2".

## 4. INSTALLATION

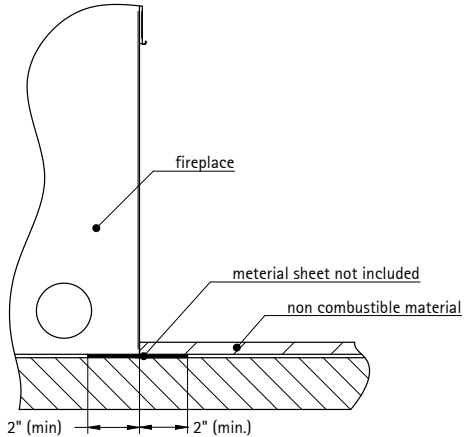
### 4.1 HEARTH EXTENSION



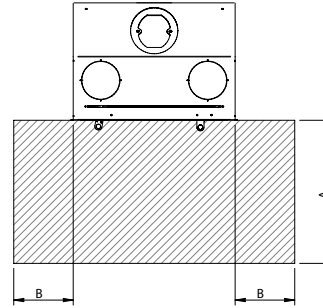
INSTALL THE HEARTH EXTENSION ONLY AS ILLUSTRATED!

A 20" x 12" (508mm x 305mm) minimum hearth extension made of non combustible material is required. To prevent any burning embers falling between the fireplace and the hearth extension from coming into contact with the floor, insert a metal sheet under the front of the fireplace. This sheet must extend 4" (100mm) on both sides of the fireplace and 2" (50mm) in front. You can also prevent embers from falling in the joint between the fireplace and the hearth extension by filling it with mortar grout.

The non combustible material that is used must be UL 1618

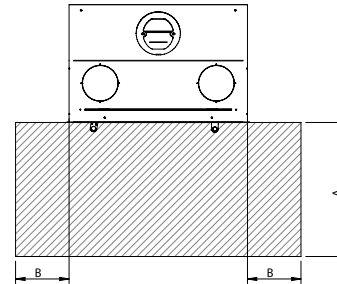


#### 4.1.1 S 600



S 600	
A	20" (508mm)
B	12" (305mm) = 6" on each side

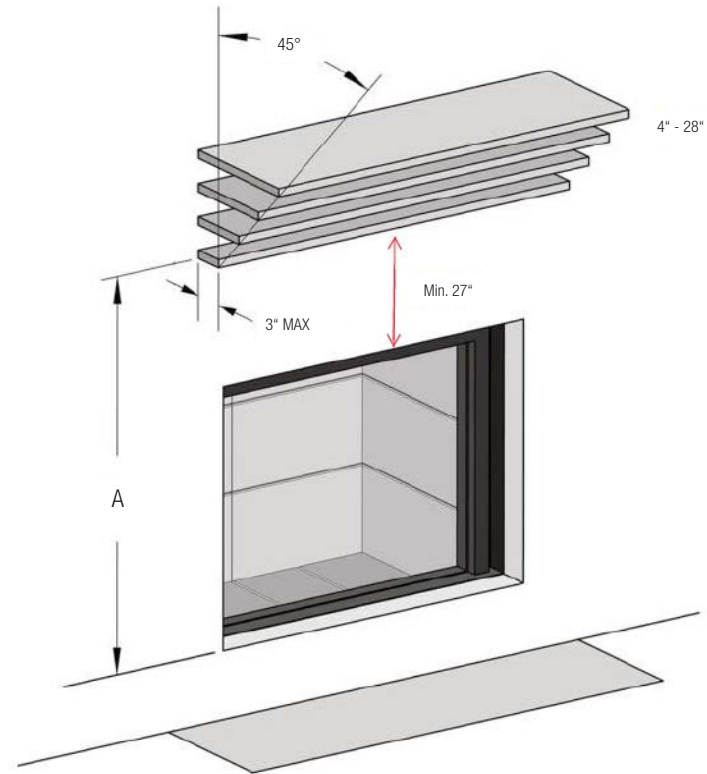
#### 4.1.2 M 700



M 700	
A	20" (508mm)
B	12" (305mm) = 6" on each side"

## 4.2 DISTANCE COMBUSTIBLE MANTLE

Mantle minimum clearances	
For mantle that is 1" deep	20"
For mantle that is 8" deep	28"



## 4.5 CHIMNEY INSTALLATION

This fireplace is designed and approved for installation with the following brands of chimneys measuring 8 and 10" (200 and 250mm) in diameter as well as a minimum of 15' (4,6m) and maximum of 45' (13,5m) in height.

### 4.5.1 LISTED CHIMNEYS

This appliance must be installed with a listed 6" (150mm) chimney system approved under the following standards: CAN-ULC S629 (IN CANADA) OR UL 103HT (IN U.S.).

MAINTAIN CLEARANCES TO COMBUSTIBLES AS SPECIFIED IN THE CHIMNEY MANUFACTURERS

INSTALLATION INSTRUCTIONS. YOU MUST FOLLOW THE CHIMNEY MANUFACTURER'S

INSTALLATION INSTRUCTIONS FOR INSTALLATION OF ALL CHIMNEY COMPONENTS.

USE APPROPRIATE SUPPORTS, CAPS, FLASHING AND SHIELDS IN ACCORDANCE WITH THE

CHIMNEY MANUFACTURERS INSTALLATION INSTRUCTIONS.

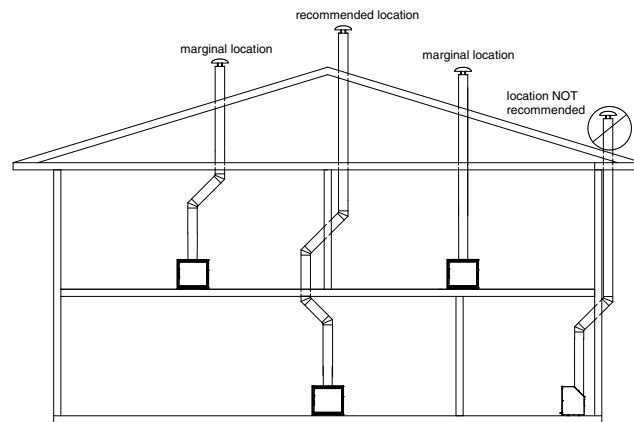
CAUTION: THE STRUCTURAL INTEGRITY OF THE FLOOR, WALL AND CEILING/ROOF MUST BE MAINTAINED.

The anchor plate is not included with the unit. Use only a chimney certified as UL 103HT or ULC S-629

### 4.5.2 CHIMNEY INSTALLATION NOTES

No other device must be added to the chimney connected to the fireplace.

- All chimney installations must include at least one support. Reducing the amount of chimney weight on the fireplace will help avoid the noise created when the fireplace expands. This can be achieved by having the chimney supported by the supports. The maximum chimney length that should be supported by the fireplace is 9 ft. (2.75 m) for 2" Solid Pack Chimney and 12 ft. (3.7 m) for 1" Solid Pack Chimney.
- The chimney must extend at least 3 ft. (92 cm) above its point of contact with the roof and at least 2 ft. (61 cm) higher than any wall, roof or building within 10 ft. (3.1 m) of it.
- Deviations should be avoided whenever possible, especially the most pronounced. Each deviation adds some restriction to the chimney system and may lead to draft problems.
- If the chimney extends higher than 5 ft. (1.5 m) above its point of contact with the roof, it must be secured using a roof brace.
- A rain cap must be installed on top of the chimney. Failure to install a rain cap may cause corrosion problems.
- Cut and frame square holes in all floors, ceilings and roof that the chimney will go through to provide a 2" (51 mm) minimum clearance between the chimney and any combustible materials. Do not fill this space with insulation or any other combustible material.
- Portions of the chimney which may extend through accessible spaces must be enclosed to avoid contact with combustible materials or damage the chimney.
- To limit creosote buildup, it is strongly recommended that an empty enclosure space be left between the chimney stack and the outer framing of the chimney. Make sure that at all points a minimum clearance of 2" (51 mm) separates the chimney and any combustible materials.





The table below shows the minimum height requirements, fireplace included, according to the number of elbows:

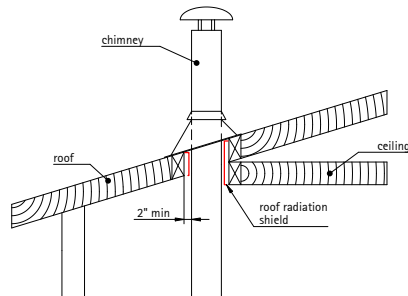
chimney	number of elbows	minimum height
straight installation	-	15' (4.6 m)
1 - 15° offset	2 - 15° elbows	15' (4.6 m)
2 - 15° offset	4 - 15° elbows	18' (5.5 m)
1 - 30° offset	2 - 30° elbows	15' (4.6 m)
2 - 30° offset	4 - 30° elbows	20' (6.1 m)
* 1 - 45° offset	* 2 - 45° elbows	16' (4.9 m)
* 2 - 45° offset	* 4 - 45° elbows	23' (7.0 m)

\* permitted only in Canada

Refer to building code to make sure the installation seals the penetration of the building envelope or refer to the listed chimney installation manual.

### 4.5.3 CHIMNEY INSTALLATION INSTRUCTIONS

1. Cut and frame the holes in the ceiling, floor and roof where the chimney will pass and install radiation shields (see figure X). Use a plumb bob to line up the center of the holes. Make sure that the size of the floor and ceiling holes are in accordance with the chimney manufacturer's instructions.



2. From below, install a firestop supplied by the chimney manufacturer in each ceiling/floor separation through which the chimney will pass. At the attic level, install an attic radiation shield from above.

3. Follow the chimney's manufacturers' instructions and place the first chimney length on the fireplace. For all chimneys, you must use an anchor plate supplied by the chimney manufacturer before installing the first chimney length (see figure 24). Continue installing chimney lengths making sure to lock each length in place.

4. Every time the chimney passes through a ceiling or a wall, install the appropriate firestop. When you reach the desired height, install the roof support. (Refer to instructions included with the support.)

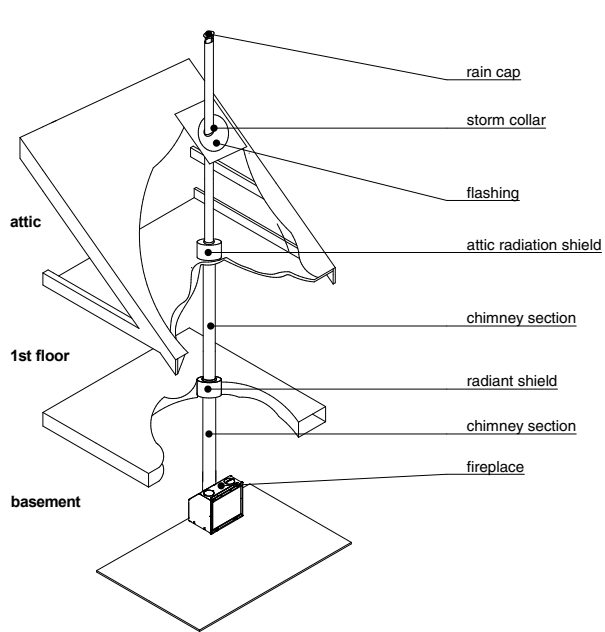
5. Then, put the roof flashing in place and seal the joint between the roof and the flashing with roofing pitch (see figures 24). For sloping roofs, place the flashing under the upper shingles and on top of the lower shingles. Nail the flashing to the roof, using roofing nails.

6. Place the storm collar over the flashing, and tighten it with the bolt supplied. Finally, seal the joint between the storm collar and the chimney, using silicone caulking.

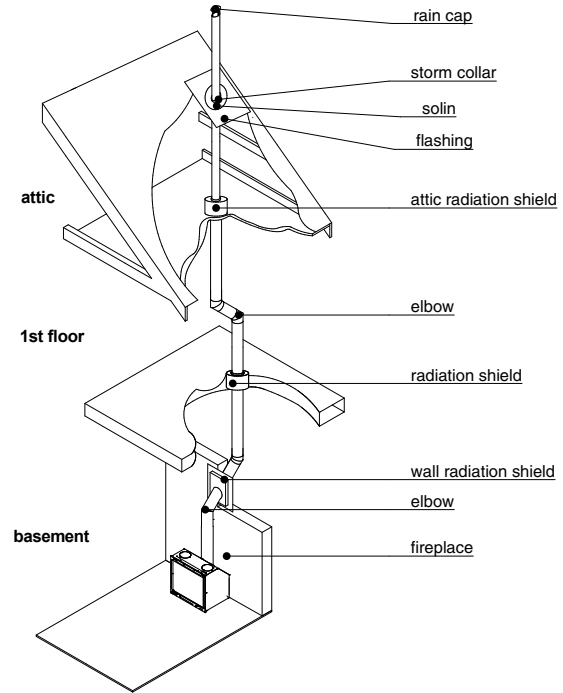
7. Install the chimney cap.

8. When a ventilated roof flashing is installed, precautions are to be taken not to caulk or seal the ventilating openings.

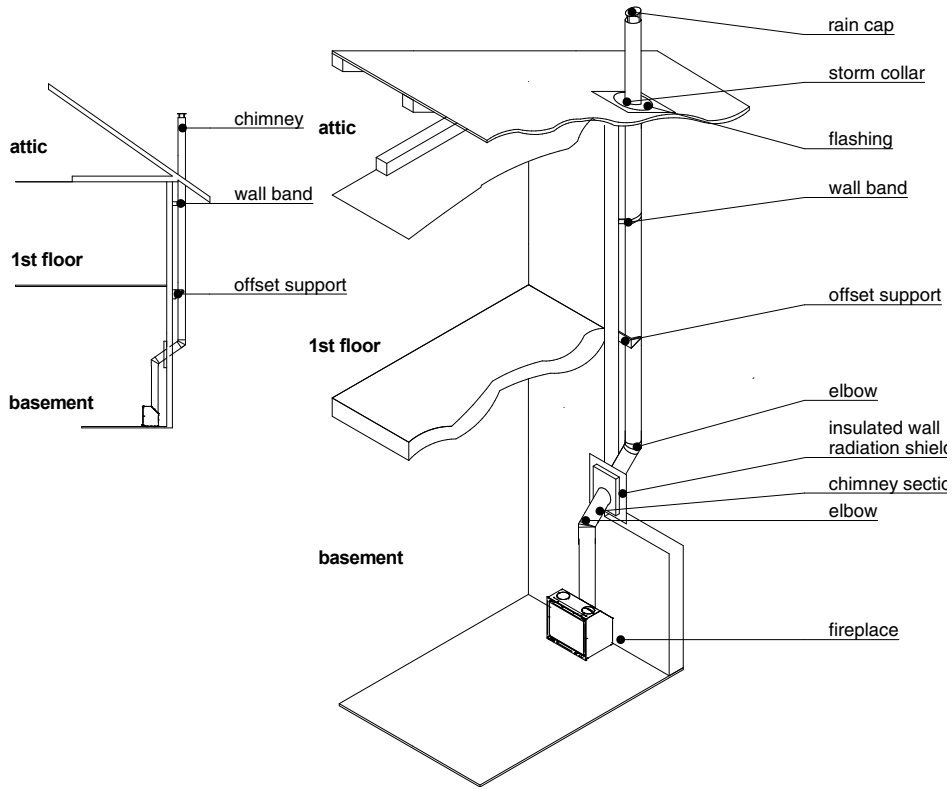
#### 4.5.4 EXAMPLES OF TYPICAL INSTALLATIONS



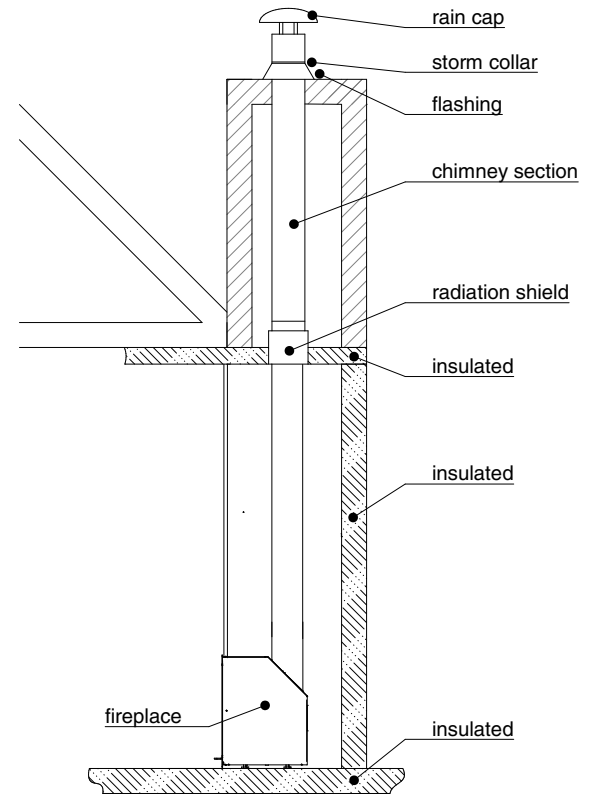
straight chimney installation



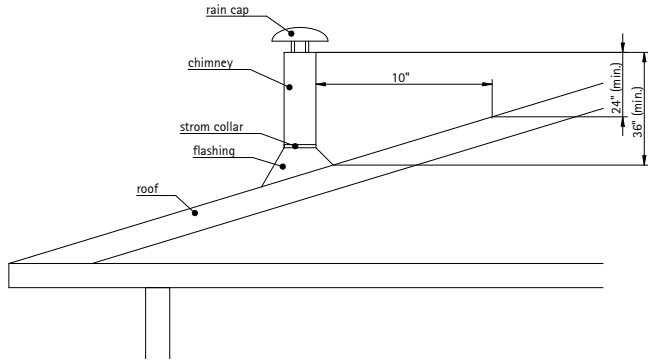
chimney with elbows installation



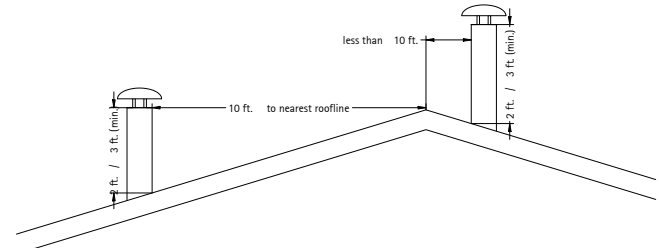
exterior chimney installation



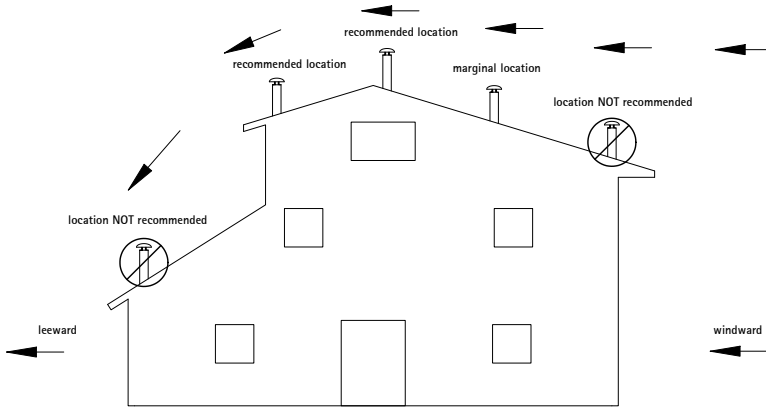
isolated chase chimney installation



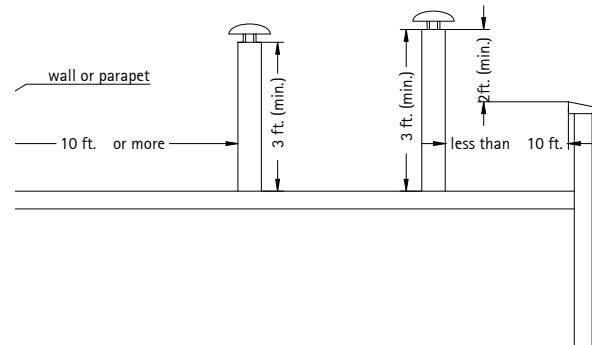
minimum chimney height



pitched roof



multi level roofs



flat roof

This appliance must be installed with a listed 6"(150 mm) chimney system approved under the following standards: CAN-ULC S629(IN CANADA) OR UL 103HT(IN U.S.).

MAINTAIN CLEARANCES TO COMBUSTIBLES AS SPECIFIED IN THE CHIMNEY MANUFACTURERS

INSTALLATION INSTRUCTIONS. YOU MUST FOLLOW THE CHIMNEY MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR INSTALLATION OF ALL CHIMNEY COMPONENTS.

USE APPROPRIATE SUPPORTS, CAPS, FLASHING AND SHIELDS IN ACCORDANCE WITH THE CHIMNEY MANUFACTURERS INSTALLATION INSTRUCTIONS.

CAUTION: THE STRUCTURAL INTEGRITY OF THE FLOOR, WALL AND CEILING/ROOF MUST BE MAINTAINED.

## 4.6 MASONRY

### 4.6.1 TYPICAL EXISTING MASONRY



DO NOT CONNECT THIS APPLIANCE TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE. DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.

You can install your appliance using your existing masonry chimney. To do so, follow the guidelines below. If you are using a masonry chimney, it is important that it be built in compliance with the specifications of the Building Code in your region. It must normally be lined with fire clay bricks, metal or clay tiles sealed together with fire cement. (Round flues are the most efficient).

Remove the fireplace damper or fasten it permanently open. We recommend the following method of sealing off the damper area around the liner:

Measure the throat of the fireplace and mark this shape on a piece of 24 gauge sheet metal (flue cover); cut a six-inch (6 3/4" / 171mm) hole to lie directly below the fireplace flue opening. Allow two inches of material for a flange on all sides and cut to these measurements. Bend down the flanges. If you have never done this before, it might be a good idea to make a cardboard pattern and test it first. Fasten this flue cover in position as high as possible with two masonry screws per side through the flanges into the fireplace.

In Canada: Install flexible stainless steel liner from the top of the chimney to the insert flue collar. Attach a stainless steel liner connector or elbow to

follow manufactures' instructions for maximum liner extension above chimney

masonry chimney must have structural integrity

damper plate removed or fastened in open position

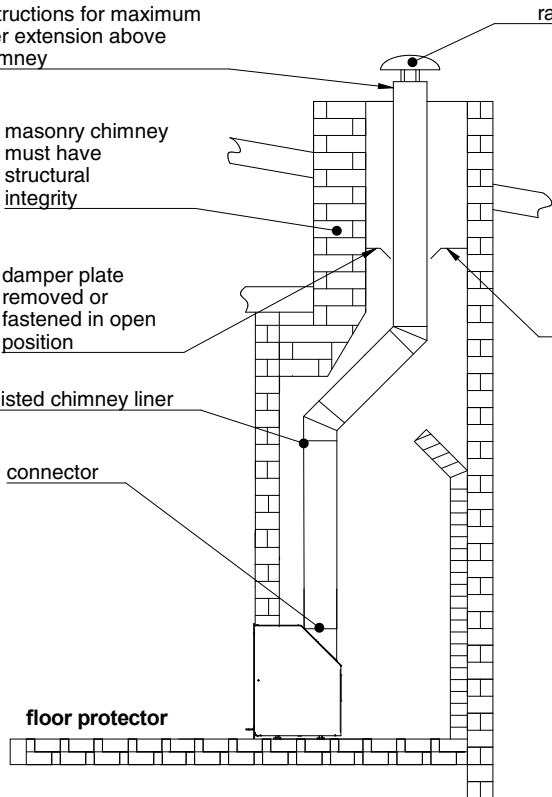
listed chimney liner

connector

floor protector

rain cap

flue cover (seal) with non-combustible material



the liner and insert onto the flue collar. Fasten with three screws. Secure the top of the liner to the chimney cap using a liner support and chimney flashing. Cap the top of the chimney liner assembly using an approved rain cap.

In the United States: While it is not required, it is recommended that a chimney liner be installed that is continuous from the insert to the top of the chimney, particularly when the insert is installed in a basement. For this type of connection, use the "In Canada" installation instructions above. If a continuous liner is not installed, a "direct flue connection" must be made. The direct flue connection requires a non-combustible connector that extends from the insert into the chimney flue liner and also that the installed flue cover be sealed below the entry point of the connector to prevent dilution of combustion products in the chimney flue with air from inside the house. Cap the top of the chimney using an approved rain cap.

#### 4.6.2 FACTORY BUILT FIREPLACE

The following installation requirements must be observed when installing solid fuel burning inserts into factory built fireplaces.

- A. The factory built fireplace must be listed per UL 127 or ULC S610.
- B. Clearances to any combustible material surrounding this insert as identified must be followed. These clearance requirements supersede any pre-existing facing material clearances listed for the factory built fireplace.
- C. Installation must include a full height listed chimney liner meeting HT requirements (2100°F/1149°C) as required in UL 1777 (U.S.) or ULC S635 (Canada). The liner must be securely attached to the insert flue collar and the chimney top.
- D. Means must be provided to prevent room air passage to the chimney

cavity of the fireplace. This may be accomplished by sealing the damper area around the chimney liner, or sealing the appliance front.

- E. The air flow within and around the appliance shall not be altered by the installation of the insert (i.e. no louvres or cooling air inlet or outlet ports are blocked), unless specifically tested as such for each factory built fireplace manufacturer and model line. NOTE: Using a louvered face plate (surround) complies with this requirement.
- F. Alteration of the appliance in any manner is not permitted with the following exceptions;
  - 1. External trim pieces which do not affect the operation of the appliance may be removed providing they can be stored on or within the fireplace for reassembly if the insert is removed.
  - 2. The chimney damper may be removed to install the chimney liner.
- G. Circulating air chambers (i.e. in a steel fireplace liner or metal heat circulator) shall not be blocked.
- H. Means must be provided for removal of the insert to clean the chimney flue.
- I. Inserts that project in front of the fireplace must be supplied with appropriate support means.
- J. A permanent metal warning label must be attached to the back of the fireplace stating that the fireplace must be restored to its original condition for safe use without the insert.

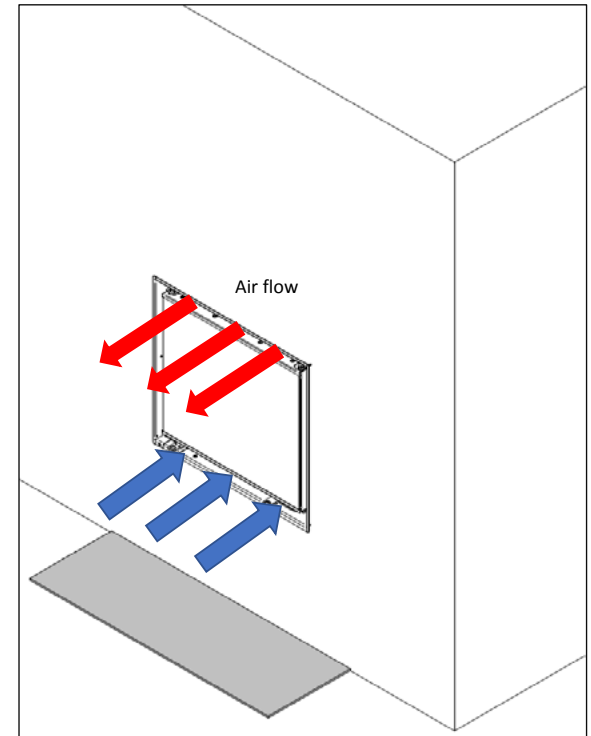
## 4.7 CONVECTION

Spartherm stoves are convection stoves. Convection means that there is a circulation of air, which ensures that the heat is distributed more evenly throughout the entire room (see drawing). The cold air (blue arrows) is drawn in at the base of the stove, then moved up through the convection channel, which runs along the stove's combustion chamber.

The heated air (red arrows) pours out at the top of the stove, which ensures a circulation of warm air throughout the room. Note, however, that all exterior surfaces become hot during use – so take extreme care. Use the insert optimally.

### Circulation of convection air

The convection air enters into the fireplace via the inlet at the base of the fireplace. The hot air for convection comes out of the fireplace via the front outlet.



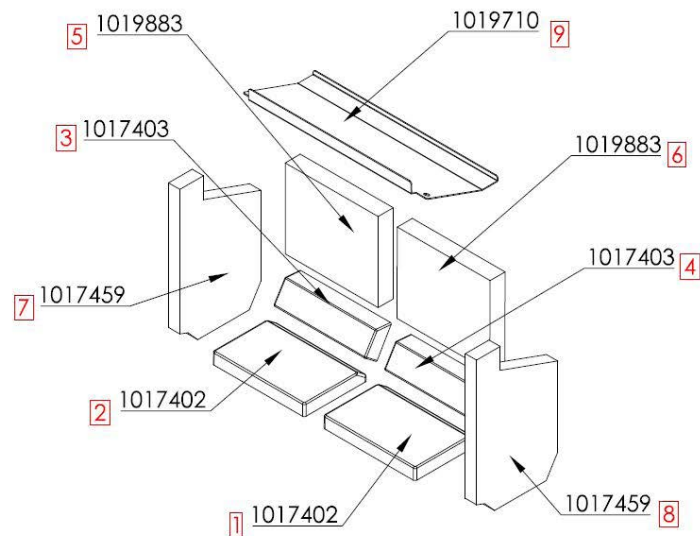
## 5. FINISHING

### 5.1 BRICKS AND BAFFELS INSTALLATION



OPERATION OF THE APPLIANCE WITHOUT THE BAFFLES CAN RESULT IN EXCESSIVE TEMPERATURES THAT COULD DAMAGE THE APPLIANCE, CHIMNEY AND THE SURROUNDING ENCLOSURE.

NOTE: DO NOT OPERATE IF BAFFLE AND MANIFOLD SHIELD ARE NOT IN POSITION.



article designation	assembly sequence	art. no.	quantity	price group
<b>briques individuelles</b>				
base brick, front	1+2	1017402	2	C
side wall brick	7+8	1017459	2	B
base brick, rear	3+4	1017403	2	B
rear wall brick	5+6	1019883	2	B
baffle plate	9	1019710	1	D
<b>complete set (without baffle plate)</b>				
set bottom	-	1017638	4	price list
wall set	-	1047756	4	price list
<b>Attention: Surcharge according to price list when ordering in eboris 1300 - black</b>				



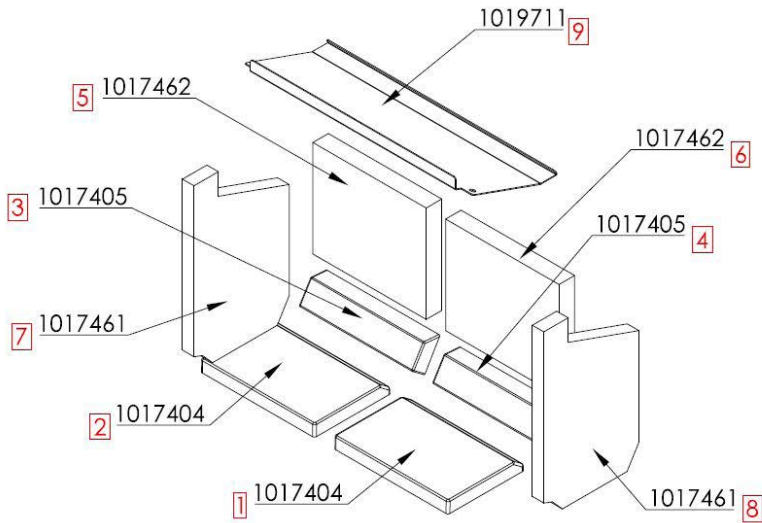
## 5.2 DOOR REMOVAL / INSTALLATION



BURNING YOUR APPLIANCE WITH THE DOORS OPEN OR AJAR CREATES A FIRE HAZARD THAT MAY RESULT IN A HOUSE AND/OR CHIMNEY FIRE.

DO NOT STRIKE OR SLAM DOOR.

NEVER REMOVE THE DOOR WHEN THE APPLIANCE IS HOT.



article designation	assembly sequence	art. no.	quantity	price group
<b>briques individuelles</b>				
base brick, front	1+2	1017404	2	D
side wall brick	7+8	1017461	2	B
base brick, rear	3+4	1017405	2	C
rear wall brick	5+6	1017462	2	D
baffle plate	9	1019711	1	D
<b>complete set (without baffle plate)</b>				
set bottom	-	1017639	4	price list
wall set	-	1047758	4	price list
<b>Attention: Surcharge according to price list when ordering in eboris 1300 - black</b>				

Please follow the following steps to dismantle / install the firebox door. Take care when carrying out these tasks as otherwise damage to the casing / door cannot be ruled out. We recommend protecting the casing / metal plates with an overlay.

### Dismantling:

1. Use a screwdriver or a similar tool to remove the safety clasp on the stopper side (hinge side) of the door.



2. Swing the door open. Then tighten the Allen screw on the lower hinge with a 3 mm Allen key.



3. Take hold of the door at the bottom. Raise the door a little with a light lifting movement so that the lower pin of the hinge is exposed.



4. In this position, pull the door a little forward at the bottom.



5. Now allow the door to drop down a little so that it comes away from the upper guidance pin and can be removed.

The door is now free and can be carefully placed to one side.



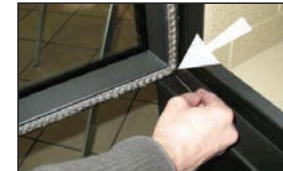
**INSTALLATION:** Installation is carried out in the reverse order:

1. Firstly guide the door in a slightly inclined position onto the fixture for the hinge side of the door. In the process, support the door from below so that the fireplace casing is not scratched.



2. Then swing the door inwards and set the lower pin into the lower fixture. To ensure the hexagonal socket can slide into the fixture, move the door a little (swivel the door).

3. Loosen the hexagonal socket on the lower hinge with a 3 mm Allen key.



4. Close the door and then push the safety clasp back onto the pin.

## 6. OPERATION

### WARNING

ALWAYS OPERATE THIS APPLIANCE WITH THE DOOR CLOSED AND LATCHED EXCEPT DURING START UP AND RE-FUELING. ALWAYS WEAR GLOVES TO PREVENT INJURY. DO NOT LEAVE THE FIRE UNATTENDED WHEN THE DOOR IS UNLATCHED AS UNSTABLE WOOD COULD FALL OUT OF THE FIRE CHAMBER CREATING A FIRE HAZARD TO YOUR HOME.

PLEASE USE THE GLOVE THAT IS SUPPLIED WHEN OPERATING THE INSERT.

NEVER EVER, NOT EVEN FOR A BRIEF MOMENT, LEAVE CHILDREN UNATTENDED WHEN THERE IS A FIRE BURNING IN THE APPLIANCE.

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

OBJECTS PLACED IN FRONT OF THE APPLIANCE SHOULD BE KEPT A MINIMUM OF 48" FROM THE FRONT FACE.

ANY MODIFICATION OF THE APPLIANCE THAT HAS NOT BEEN APPROVED IN WRITING BY THE TESTING AUTHORITY IS CONSIDERED BREACHING CSA B365 (CANADA) AND ANSI NFPA 211 (USA).

Open air control if adjustable and damper if fitted before opening firing door.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. WEAR SUITABLE GLOVES TO OPERATE YOUR APPLIANCE.

NEVER OPERATE THE STOVE WITH THE GRATE COVER REMOVED.

DO NOT POKE OR STIR THE LOGS WHILE THEY ARE BURNING. USE ONLY FIRELOGS THAT HAVE BEEN EVALUATED FOR THE APPLICATION IN FIRE-PLACE AND REFER TO FIRELOG WARNINGS AND CAUTION MARKINGS ON PACKAGING PRIOR TO USE."

### WARNING

AVOID BURN RISK. REMOVE OPERATIONAL TOOL AFTER USE!!!

### WARNING

THE USE OF THE PROTECTIVE GLOVE IS MANDATORY!!!

Your Spartherm product is designed with the most advanced technology. The appliance is extremely airtight. It has an exclusive direct outside air supply (optional kit), a safety feature designed to prevent spillage, and to keep your house free of carbon monoxide, in case of a down drafting chimney or an internal negative pressure.

The first fire(s) in your appliance will be difficult to get going and keep going with little amount of heat being generated. This is a result of the moisture being driven out of the fire brick. Allow 30 hours of hot fires (temperatures in excess of 500°F / 260°C - 600°F / 316°C) before your appliance will perform normally. During the break-in period (the first 2 or 3 fires) create only small, hot fires using kindling; this will allow the firebrick to cure. Do not be alarmed if small hairline cracks develop in the firebrick. This is a normal occurrence and does not pose a safety hazard. The paint may also smell for the first few fires as it cures and It is recommended to open a door or window to alleviate the smell.

To start, a brisk fire is required. Place loosely crumpled paper on the floor of the appliance and cover with dry kindling. Light the paper and leave the door slightly ajar (one inch) until all kindling is burning. To maintain a brisk fire, a hot coal bed must be established and maintained.

Slowly add larger wood (2x4 size pieces). Lay the pieces lengthwise from side to side in the hot coal bed with a shallow trench between, so that the primary air can flow directly into this trench and ignite the fuel above. When the fire seems to be at its peak, medium sized logs may be added. Once these logs have caught fire, carefully close the door. (Closing the door too quickly after refuelling will reduce the firebox temperature and result in an unsatisfactory burn.) Remember it is more efficient to burn medium sized wood, briskly, and refuel frequently than to load the appliance with large logs that result in a smouldering, inefficient fire and dirty glass. As soon as the door is closed, you will observe a change in the flame pattern. The flames will get smaller and lazier because less oxygen is getting into the combustion chamber. The flames, however, are more efficient. The flames will remain lazy but become larger again as soon as the firebricks have been heated thoroughly and the chimney becomes heated and provides a good draft. At this point, the roaring fire that you see when the door is opened is wastefully drawing heated room air up the chimney -- certainly not desirable. Always operate with the door fully closed once the medium sized logs have caught fire.

You can now add larger pieces of wood and operate the appliance normally. Once the appliance is entirely hot, it will burn very efficiently with little smoke from the chimney. There will be a bed of orange coals in the firebox and secondary flames flickering just below the top firebrick. You can safely fill the firebox with wood up to the air inlet on the backside of the firebox or, if not present, up to 50% of the fireboxes backside height and will get best burns if you keep the appliance pipe temperatures between 250°F (120°C) and 450°F (270°C). A surface thermometer placed on the front top will help regulate this.

Without an appliance thermometer, you are working blindly and have no idea of how the appliance is operating! An appliance thermometer offers a guide to performance.

Can't get the fire going?

Use more kindling and paper. Assuming the chimney and vent are sized correctly and there is sufficient combustion air, the lack of sufficiently dry quantities of small kindling is the problem. Thumb size is a good gauge for small kindling diameter.

Can't get heat out of the appliance?

One of two things may have happened. The appliance door may have been closed prematurely and the appliance itself has not reached optimum temperature. Reopen the door and/or draft control to re-establish a brisk fire. The other problem may have been wet wood. The typical symptom is sizzling wood and moisture being driven from the wood.

#### ADJUSTING THE COMBUSTION AIR.

Spartherm Inserts are equipped with an air control System that is easy and effective to use. The air control system is designed to give you the ability to adjust the "COMBUSTION AIR" in such a way that you have a fire that burns clean and well.

It is important to ensure that the combustion air used to create a clean burning fire... as per the following INFORMATION.

Air Wash system:

This combustion air is designed to keep the glass clean and to feed the fire with combustion air to burn. The further the lever is to the right the more air is made available for the fire. As an example this setting would be used when you first light the fire or when you reload the fire. Depending on the type of fire that you require you would adjust the air to either slow down the fire – moving to the right-MIDWAY. – or to slow the fire even more as you move to the left past the midway mark. It is important not to "choke" the fire – do not starve the fire of air as it can create smoke and a dirty burn. It can also result in dirty glass and an inefficient fire.

Secondary Air system:

This air is used to burn off the gasses that are released when the fire burns. The secondary air is also linked to the lever and is adjusted as you adjust the fire.

Caution:

Never close the air lever of the air control completely or before the fire has started to burn efficiently as it will create smoke and the fire would be inefficient and the energy from the wood is wasted. The door should be closed during operation.

Please follow the instructions in the manual to get the best results from your insert.

WARNING!!!

HOT GLASS – WILL CAUSE BURNS.

DO NOT TOUCH GLASS UNTIL COOLED

NEVER!!! ALLOW CHILDREN TO TOUCH THE GLASS.

A - Air supply open:

(when lighting the fire or adding new wood). The control lever is pushed completely to the right. The firebox will now receive the maximum volume of combustion air and secondary air.

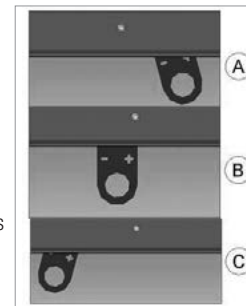
B - Controlled burning:

Control lever approx. 20 mm further than the closed air supply position. This ensures that the fire does not receive too much air and the wood does not burn too quickly. The secondary air flows over the panel ventilation system to the ceramic glass panel and prevents, as far as

possible, any sooting of the glass panel.

C - Air supply closed:

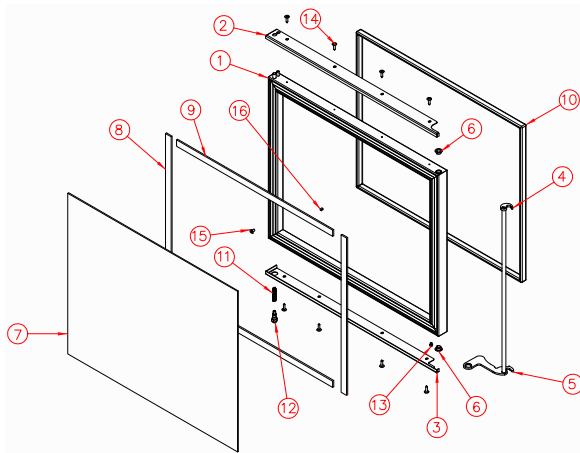
Control lever in the limit position of the 20 mm wide spacer. The firebox receives no combustion air in this setting.



 **WARNING**

The combustion-air damper should NOT be altered for increased firing for any reason!

door



- 1 door profile
- 2 glass strip, top
- 3 glass strip, bottom
- 4 lock
- 5 handle
- 6 bush
- 7 glass
- 8 seal / gasket
- 9 seal / gasket
- 10 seal / gasket
- 11 spring, left
- 12 door support, bottom
- 13 cheese head screw M4x5
- 14 fillister head screw
- 15 countersunk bolt M5x10
- 16 set screw M5x8

DOOR ASSEMBLY.-SPARE PARTS.

ROBAX 4MM CERAMIC GLASS.

USE ONLY AS PER MANUFACTURERS STANDARD AND SPARE PARTS. 7

Pos.	name	quantity	SAP
1	door profile	1	-
2	glass strip, top	1	-
3	glass strip, bottom	1	-
4	lock	1	-
5	handle	1	-
6	bush	2	-
7	glass	1	-
8	seal / gasket	2	-
9	seal / gasket	2	-
10	seal / gasket	1	-
11	spring, left	1	-
12	door support, bottom	1	-
13	cheese head screw M4x5	1	-
14	fillister head screw	8	-
15	countersunk bolt M5x10	1	-
16	set screw M5x8	1	-

## 6.1 FIRE EXTINGUISHERS / SMOKE DETECTORS

All homes with a solid fuel burning appliance should have at least one fire extinguisher in a central location, known to all, and at least one smoke detector in the room containing the appliance. If it sounds an alarm, correct the cause but do not de-activate or relocate the smoke detector.

## 6.2 FUEL



THIS APPLIANCE IS DESIGNED TO BURN NATURAL WOOD ONLY. DO NOT BURN TREATED WOOD, COAL, CHARCOAL, COLOURED PAPER, CARDBOARD, SOLVENTS OR GARBAGE. THIS APPLIANCE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE APPLIANCE.

HIGHER EFFICIENCIES AND LOWER EMISSIONS GENERALLY RESULT WHEN BURNING AIR DRIED SEASONED HARDWOODS, AS COMPARED TO SOFTWOODS OR TOO GREEN OR FRESHLY CUT HARDWOODS. DO NOT BURN GREEN OR FRESHLY CUT WOOD.

BURNING WET UNSEASONED WOOD CAN CAUSE EXCESSIVE CREOSOTE ACCUMULATION. WHEN IGNITED IT CAN CAUSE A CHIMNEY FIRE THAT MAY RESULT IN A SERIOUS HOUSE FIRE.

DO NOT STORE FUEL WITHIN THE CLEARANCE TO COMBUSTIBLES, OR IN THE SPACE REQUIRED FOR RE-FUELING AND ASH REMOVAL.

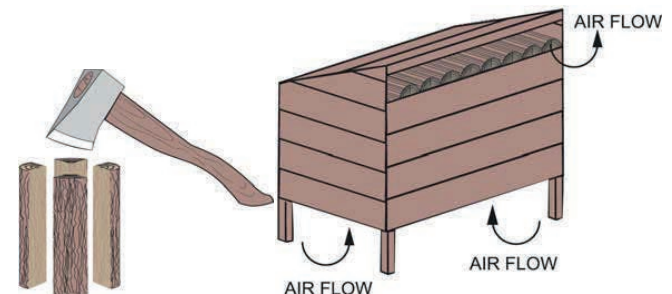
When loading the appliance, ensure that the upper fibre baffles are not forced out of position. For maximum efficiency, when the appliance is throughly hot, load it fully to the line of air inlet nozzles at the backside

of the firebox or, if not present, to 50% of the fireboxes backside height and burn at a medium low setting. The whiteness of the bricks and the cleanliness of the glass are good indicators of your operating efficiency. Not enough heat is produced when only a few pieces of wood are burned or the wood may not burn completely. Fuel for the appliance must not be stored closer than the required clearances to combustibles (heat sensitive material).

NEVER STORE WOOD IN THE ASH PAN COMPARTMENT (IF APPLICABLE).

NOTE: WHEN LOADING THE APPLIANCE, ENSURE TO KEEP FUEL BACK FROM THE GLASS. IF COALS ARE TO ACCUMULATE ON THE FRONT LIP, THERE IS A CHANCE THEY WILL FALL OUT WHEN THE DOOR IS OPENED.

Burn only dry, clean unpainted wood that has been seasoned. It produces more heat and less soot or creosote. Freshly cut wood contains about 50% moisture while after proper seasoning only about 20% of the water remains. As wood is burned, this water boils off consuming energy that should be used in heating. The wetter the wood, the less heat is given off and the more creosote is produced. Dry firewood has cracks in the end of the grain. Both hardwood and softwood burn equally well in this appliance but hardwood is denser, will weigh more per cord and burn a little slower and longer.



Firewood should be split, stacked in a manner that air can get to all parts of it and covered in early spring to be ready for burning that fall. Dry firewood has cracks in the end grain.

Cut the wood so that it will fit horizontally, front to back, making for easier loading and less of a likelihood that the wood will roll onto the glass.

Manufactured firelogs made by compressing 100% natural wood fibre can be safely used as fuel. Do not use manufactured firelogs if they contain additives such as paraffin, wax, binders etc. Never burn more than two manufactured firelogs at a time.

#### Do's

- Build a hot fire.
- Use only dry wood.
- Several pieces of medium sized wood are better than a few big pieces.
- Clean chimney regularly.
- Refuel frequently using medium sized wood.

#### Dont's

- Take ash out immediately. Let it accumulate to a depth of at least one inch. A good ash layer provides for a longer lasting and better burning fire.
- Burn wet wood
- Close the door too soon or damper down too quickly. Burn one large log rather than two or three smaller, more reasonably sized logs.
- Burn at continually "low setting", if glass door is constantly blackened. This means the Firebox temperature is too low and energy is wasted by incomplete combustion.

## 6.3 LIGHTING A FIRE

Lighting the fire in your fireplace cassette is very easy if you follow the instructions given below:

1. A fire may only be started in the fireplace cassette when the firebox lining has been correctly installed.
2. Turn off any air extraction ventilation (kitchen, bathroom, WC etc.). This will avoid low pressure building up in the installation room that can affect the extraction of flue gasses from the fireplace. Check the combustion air supply (if required, open the cover flap)!
3. Adjust the combustion air regulator to the far right, and open the firebox door (swing open).
4. Place chopped wood into the middle of the firebox using the funeral pyre method (use softwood).

Caution: The height of the wood pile must not exceed the lower marking on the deflector plate!

5. Place standard firelighter cubes under the wood pyre to help start the fire. (paper is not recommended because it burns too quickly and causes ash to circulate).
6. Never use methylated spirits, petrol, oil or other easily combustible liquids.
7. Light the fire using the firelighter cubes and, if required, leave the firebox door open by approx. 3-5 cm. The fire should now light, burning brightly and intensively.
8. When the kindling wood is burning well, add smaller hardwood logs or larger softwood logs using the funeral pyre method and close the door.
9. When the wooden logs are burning well, the air control lever can be set to a position in the middle.
10. You can find out more about the correct volume of wood to add to the fire in the section "Volume of wood to add per hour".

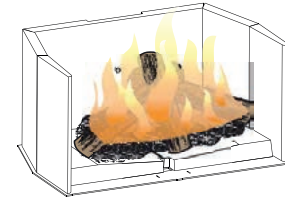


11. When the wood has been completely burnt and only embers are remaining from the initial wood added to the fire, new wood can now be added as required (hardwood is ideal).
12. Depending on the weather conditions, adjust the control lever towards the middle setting or a little over.  
The correct setting is always based on experience and the current local conditions.
13. Always open the firebox door slowly. This will ensure that you avoid sudden low pressure in the firebox and prevent exhaust gases leaking into the living room.
14. This will prevent any possible smoke leakage through the opened door when adding new wood during the ember phase.
15. Never consistently add more wood than the recommended amount.

Caution: The height of the wood pile must not exceed the lower marking on the deflector plate!

### 6.3.1 FLASH FIRE

A flash fire is a small fire burned quickly when you don't need much heat. After your kindling has "caught", load at least 3 pieces of wood, stacked loosely. Burn with the draft control fully open if adjustable or open the door upward with 1.5 inches for 3 minutes if required.



### 6.3.2 EXTENDED FIRE

Load your larger pieces of wood compactly, packed close enough to prevent the flames from penetrating it completely.

**DO NOT OVERFIRE THE APPLIANCE!**  
OVERFIRING CAN OCCUR BY:

- A. Burning large amounts of smaller wood pieces such as furniture scraps, skids or treated wood.
- B. Operating the appliance with a poor gasket seal on the main door.
- C. Overfilling your appliance. Go by the following specifications:

### 6.3.3 SMOKING

A properly installed appliance should not smoke. If yours does, check the following:

- Has the chimney had time to get hot?
- Is the smoke passage blocked anywhere in the appliance, chimney connector or chimney?
- Is the room too airtight and the air intake not connected to the outside? Try with a window partly open.
- Is the smoke flow impeded by too long a horizontal pipe or too many bends?
- Is it a weak draft perhaps caused by a leaky chimney, a cold outside chimney, too large a diameter of a chimney, too short a chimney, or a chimney too close to trees or a higher roof?
- Has a direct flue connection been used rather than a chimney liner continuous from cap to appliance flue collar.

Appliance	Wood consumed per hour
S 600	1,8 kg/hr
M 700	2,1 kg/hr

## 7. MAINTENANCE



APPLIANCE MAY BE HOT, DO NOT SERVICE UNTIL APPLIANCE HAS COOLED. DO NOT USE ABRASIVE CLEANERS.

Check your chimney and chimney connector for creosote and soot buildup weekly until a safe frequency for cleaning is established.

If accumulation is excessive, disconnect the appliance and clean both the chimney and the appliance. You may want to call a professional chimney sweep to clean them. Both have to be cleaned at least once a year or as often as necessary.

Remove fire baffles and clean above them once a year. Replace any broken bricks.

## 7.1 ASH REMOVAL PROCEDURES



IMPROPER DISPOSAL OF ASHES RESULTS IN FIRES. DO NOT DISCARD ASHES IN CARDBOARD BOXES. DUMP IN BACK YARDS, OR STORE IN GARAGES.

IF USING A VACUUM TO CLEAN UP ASHES, BE SURE THE ASHES ARE ENTIRELY COOLED. USING A VACUUM TO CLEAN UP WARM ASHES COULD CAUSE A FIRE INSIDE THE VACUUM.

NEVER OPERATE YOUR APPLIANCE WITH THE ASH PLUG (IF APPLICABLE) REMOVED.

FAILURE TO ACHIEVE A GOOD SEAL BETWEEN THE ASH OPENING, ASH PLUG OR ASH WELL DOOR WILL RESULT IN AN OVER FIRE CONDITION THAT COULD CAUSE DAMAGE TO THE APPLIANCE.

Allow the ashes in your firebox to accumulate to a depth of two or three inches; they tend to burn themselves up. When the fire has burned down and cooled, remove any excess ashes but leave an ash bed approximately 1" (25mm) deep on the firebox bottom to help maintain a hot charcoal bed.

Shovel some ashes out through the door into a metal container with a tight fitting lid. Leave an ash bed approximately 1" (25mm) deep on the firebox bottom to help maintain a hot charcoal bed. Keep the closed container on a noncombustible floor or ground, well away from all combustible materials. The ashes should be retained in the closed container until all cinders have thoroughly cooled. Cold wood ashes can be used on the garden or in the compost.

## 7.2 CREOSOTE FORMATION AND REMOVAL

When wood is burned too slow, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cooler chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire. The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

## 7.3 RUNAWAY OR CHIMNEY FIRE



A CHIMNEY FIRE CAN PERMANENTLY DAMAGE YOUR CHIMNEY SYSTEM. THIS DAMAGE CAN ONLY BE REPAIRED BY REPLACING THE DAMAGED COMPONENT PARTS. CHIMNEY FIRES ARE NOT COVERED BY THE WARRANTY.

CAUSES:

- Using incorrect fuel, or small fuel pieces which would normally be used as kindling.
- Leaving the door ajar too long and creating extreme temperatures as the air rushes in the open door.
- Improperly installed or worn gaskets.
- Creosote build up in chimney.

SOLUTIONS:

- Do not burn treated or processed wood, coal, charcoal, coloured paper or cardboard.

- Do not burn green or freshly cut wood.
- Be careful not to overfire the appliance by leaving the door open too long after the initial start-up. A thermometer on the chimney connector and/or appliance top helps.
- Replace worn, dried out (inflexible) gaskets.
- Have chimney regularly cleaned.

#### IN CASE OF A CHIMNEY FIRE:

- Have a well understood plan for evacuation and a place outside for everyone to meet. Prepare to evacuate to ensure everyone's safety.
- Close air control on appliance.
- Call local fire department. Have a fire extinguisher handy. Contact local authorities for further information on how to handle a chimney fire.
- After the chimney fire is out, clean and inspect the chimney or chimney liner for stress and cracks prior to lighting another fire. Also check combustibles around the chimney and the roof.

## 7.4 CHIMNEY CLEANING

Both the chimney and the appliance must be inspected and cleaned at least once a year.

For serious wood burners, chimney cleaning must be done as needed to avoid chimney fires; the venting systems for controlled combustion appliances may need cleaning as often as once a month. These rates, however, depend on the burning habits of the individual operating the appliance. For example, it is possible to clog a solid fuel appliance chimney in a few days if slow, smoldering fires are burned and the chimney is cold. NOTE: Appliances burned consistently without hot fires may result in significant creosote accumulations in the chimney.

Certain items and considerations are important in chimney cleaning:

- Proper tools should be used, including a brush specifically designed for chimney cleaning.
- The chimney connector and dampers as well as the chimney should be cleaned.
- The appliance's firebox and baffle system should be cleaned if needed.
- The chimney should be inspected and repairs made if needed, preferably by a qualified chimney sweep or mason.

## 7.5 GLASS REPLACEMENT



**WARNING**

DO NOT USE SUBSTITUTE MATERIALS

GLASS MAY BE HOT, DO NOT TOUCH GLASS UNTIL COOLED.

CARE MUST BE TAKEN WHEN REMOVING AND DISPOSING OF ANY BROKEN DOOR GLASS OR DAMAGED COMPONENTS. BE SURE TO VACUUM UP ANY BROKEN GLASS FROM INSIDE THE APPLIANCE BEFORE OPERATION.

DO NOT STRIKE, SLAM OR SCRATCH GLASS. DO NOT OPERATE APPLIANCE WITH GLASS REMOVED, CRACKED, BROKEN OR SCRATCHED.

Installation:

Remove the door from the stove and remove the glass retainer. Position the 4 mm ceramic Schott Robax glass in the door, make sure that the glass gasketing will properly seal your unit, and replace the retainer, it should rest on the gasket not the glass. Tighten securely, but do not wrench down on the glass as this may cause the glass to break. Replace-ment Glass Part as for unit.

## 7.6 CARE OF GLASS

If the glass is not kept clean permanent discolouration and / or blemishes may result. Normally a hot fire will clean the glass. The most common reasons for dirty glass include: not using sufficient fuel to get the appliance thoroughly hot, using green or wet wood, closing the draft so far that there is insufficient air for complete combustion.

If it is necessary to clean the glass, buff lightly with a clean dry cloth and non-abrasive cleaner.

**DO NOT CLEAN GLASS WHEN HOT!** Clean the glass after the first 10 hours of operation with a suitable stove glass cleaner. Thereafter clean as required.

The glass is very strong but do not let burning fuel rest or fall against it and always close the door gently. **NEVER FORCE IT SHUT!**

If the glass should ever crack or break while the fire is burning, do not open the door until the fire is out and do not operate the appliance again until the glass has been replaced, available from your Authorized dealer. **DO NOT USE SUBSTITUTE MATERIALS.**

### WARNING

HOT GLASS WILL  
CAUSE BURNS.

DO NOT TOUCH GLASS  
UNTIL COOLED.

NEVER ALLOW CHILDREN  
TO TOUCH GLASS.

## 7.7 CLEANING THE GLASS CERAMIC SHEET

### WARNING

THE GLASS CERAMIC SHEET MAY ONLY BE CLEANED WHEN COLD (FIRE-PLACE INSERT NOT BURNING AND COOLED DOWN; NO HOT ASH IN THE FIRE CHAMBER).

### WARNING

All Spartherm inserts are supplied with Robax glass in the door. Robax is a ceramic glass.

Do not use substitute glass and order replacement glass from Spartherm through your dealer.

## 7.8 CARE OF PLATED PARTS

If the appliance is equipped with plated parts, you must clean fingerprints or other marks from the plated surfaces before operating the appliance for the first time. Use a glass cleaner or vinegar and towel to clean. If not cleaned properly before operating for the first time, the marks can cause permanent blemishes on the plating. After the plating is cured, the fingerprints and oils will not affect the finish and little maintenance is required, just wipe clean as needed. Prolonged high temperature burning with the door ajar may cause discolouration on plated parts.

NOTE: The protective wrap on plated parts is best removed when the assembly is at room temperature but this can be improved if the assembly is warmed, using a hair dryer or similar heat source.

## 8. REPLACEMENTS

Contact your dealer or the factory for questions concerning prices and policies on replacement parts. Normally all parts can be ordered through your Authorized dealer / distributor. FOR WARRANTY REPLACEMENT PARTS, A PHOTOCOPY OF THE ORIGINAL INVOICE WILL BE REQUIRED TO HONOUR THE CLAIM. When ordering replacement parts always give the following information:

- Model & Serial Number of appliance
- Installation date of appliance
- Part number
- Description of part
- Finish

\* IDENTIFIES ITEMS WHICH ARE NOT ILLUSTRATED. FOR FURTHER INFORMATION, CONTACT YOUR AUTHORIZED DEALER.

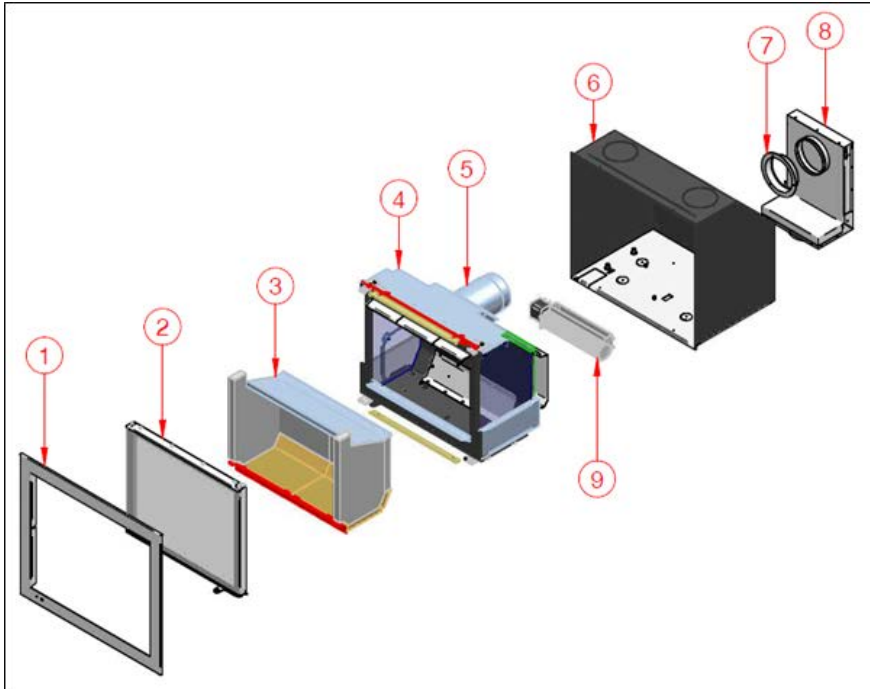


For chamotte replacement see chapter 5.1

## 8.1 EXPLODED VIEW

### NOTICE-

Please refer to the following drawing and specify the spare part number and WHICH UNIT SIZE YOU HAVE FOR REPLACEMENTS



1	Cassette frame 60, 80, 100
2	Firebox door with ceramic glass
3	Firebox lining
4	Firebox
5	Exhaust gas sockets, rotatable (vertically or horizontally)
6	Convection air jacket
7	Combustion air sockets, outlet to rear
8	Combustion air sockets, outlet below
9	Hot air blower (speed adjustable)

## 9. TROUBLESHOOTING



APPLIANCE MAY BE HOT, DO NOT SERVICE UNTIL APPLIANCE HAS COOLED.

DO NOT USE ABRASIVE CLEANERS.

Problem	Solution
Can't get the fire started.	<ul style="list-style-type: none"><li>• Not enough kindling / paper? Add more.</li><li>• Not enough air? Ensure air control is fully open. Also ensure that the air opening is not obstructed.</li><li>• Cold air blockage? Burn a piece of paper to establish a draft.</li><li>• Use dry seasoned wood.</li><li>• Flue blockage? Inspect chimney.</li></ul>
Smokes when door is open.	<ul style="list-style-type: none"><li>• Cold air blockage? Burn a piece of paper to establish a draft.</li><li>• Insufficient draft? Add more pipe.</li><li>• Let air stabilize before opening door.</li><li>• Ensure baffles are positioned correctly.</li><li>• Negative pressure? Open a window near the appliance.</li></ul>
Appliance emits odour.	<ul style="list-style-type: none"><li>• Paint curing. See "GENERAL INSTRUCTIONS" section.</li></ul>
Stove doesn't burn hot enough.	<ul style="list-style-type: none"><li>• Wood is too wet.</li><li>• Insufficient draft? Add more pipe.</li><li>• Not enough air? Ensure air control is fully open. Also ensure that the air opening is not obstructed.</li></ul>
Wood burns too fast.	<ul style="list-style-type: none"><li>• Air control may need to be adjusted down.</li><li>• Check to see ash plug is properly seated (if equipped).</li><li>• Check door gasket for adequate seal.</li><li>• Wood may be extremely dry.</li></ul>
Dirty glass.	<ul style="list-style-type: none"><li>• Air control may be closed too far. Open air control more.</li><li>• Burn hotter, smaller fires. Use well seasoned wood.</li></ul>

## 10. GENERAL WARRANTY TERMS AND CONDITIONS

### 10.1 GENERAL INFORMATION

This quality manufactured product is state of the art. The materials used were meticulously selected and are constantly checked, as is our entire production process.

Setting up or installing this product requires specialized knowledge. Our products may therefore only be installed and commissioned by specialized firms and in compliance with statutory regulations as amended.

### 10.2 WARRANTY PERIOD

The General Warranty Terms and Conditions apply only within the USA and Canada. The warranty period and scope of the warranty in accordance with these terms and conditions shall apply apart from the statutory guarantee, which remains unaffected.

Spartherm Feuerungstechnik GmbH gives a 5-year warranty on:

- Basic body fireplace inserts

Spartherm Feuerungstechnik GmbH gives a 24-month warranty on elevating mechanisms, operating devices such as handles, adjustment levers, shock absorbers, electronic and electrical components such as exhausters, governors, original spare parts, all purchased parts and safety devices.

Spartherm Feuerungstechnik GmbH gives a 6-month warranty on wearing parts around the fire, such as fireclay bricks, vermiculite, fire grates, seals and glass ceramics.



### 10.3 REQUIREMENT OF EFFECTIVENESS FOR THE WARRANTY

The warranty period starts on the date of delivery to the dealer / intermediary. This must be verified from a document such as an invoice with the dealer/intermediary's confirmation of delivery. The warranty certificate relating to the product must be produced by the claimant when making a warranty claim.

If such proof is not produced Spartherm Feuerungstechnik GmbH shall not be obliged to honour the warranty.

### 10.4 WARRANTY EXCLUSIONS

The warranty does not cover:

- wear and tear to the product
- Fireclay bricks/ vermiculite:

These are natural products subjected to expansion and contraction during the heating process. This may create cracks. For as long as the linings remain in position in the fire chamber and do not break up, they remain fully functional.

- the Surfaces:

Discoloration of the enamel or galvanized surfaces caused by thermal stress or overload.

- the elevating mechanism:

If the installation instructions are not correctly followed, resulting in overheating of the pulleys and bearings.

- the seals:

Reduced sealing due to thermal stress and hardening.

- the glass panesceramics:

Soiling caused by soot or burnt-in residues of burnt materials as well as visibly changed colour or other aspects due to thermal stress.

- improper transport and/or incorrect storage

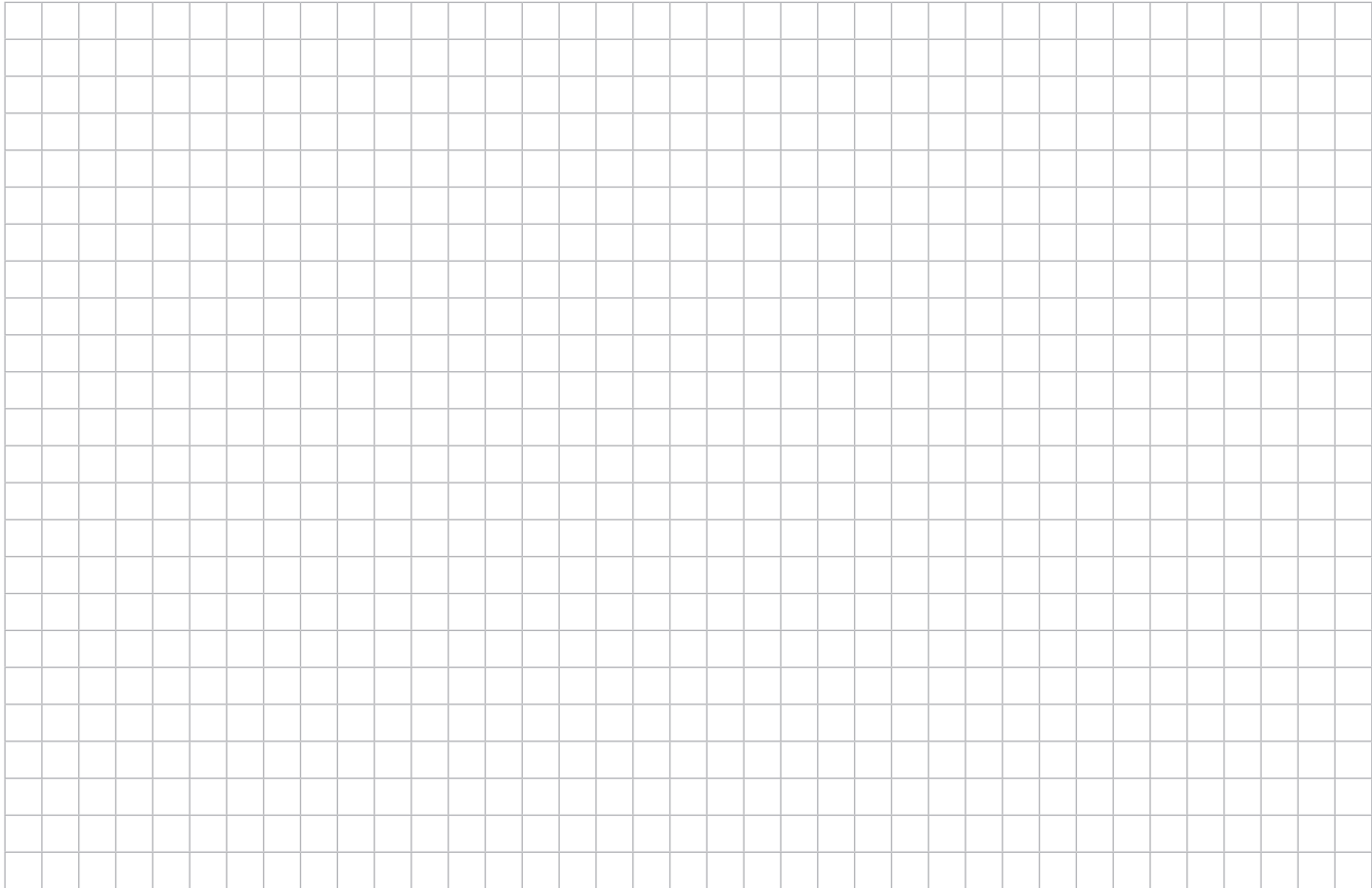
- improper handling of fragile components such as glass and ceramics
- improper handling and/or use
- lack of maintenance
- incorrect installation or connection of the unit
- Non-observance of the installation and operating instructions
- technical modifications to our the unit by third parties
- installation that does not comply with industry practice on installation instructions

### 10.5 NOTE

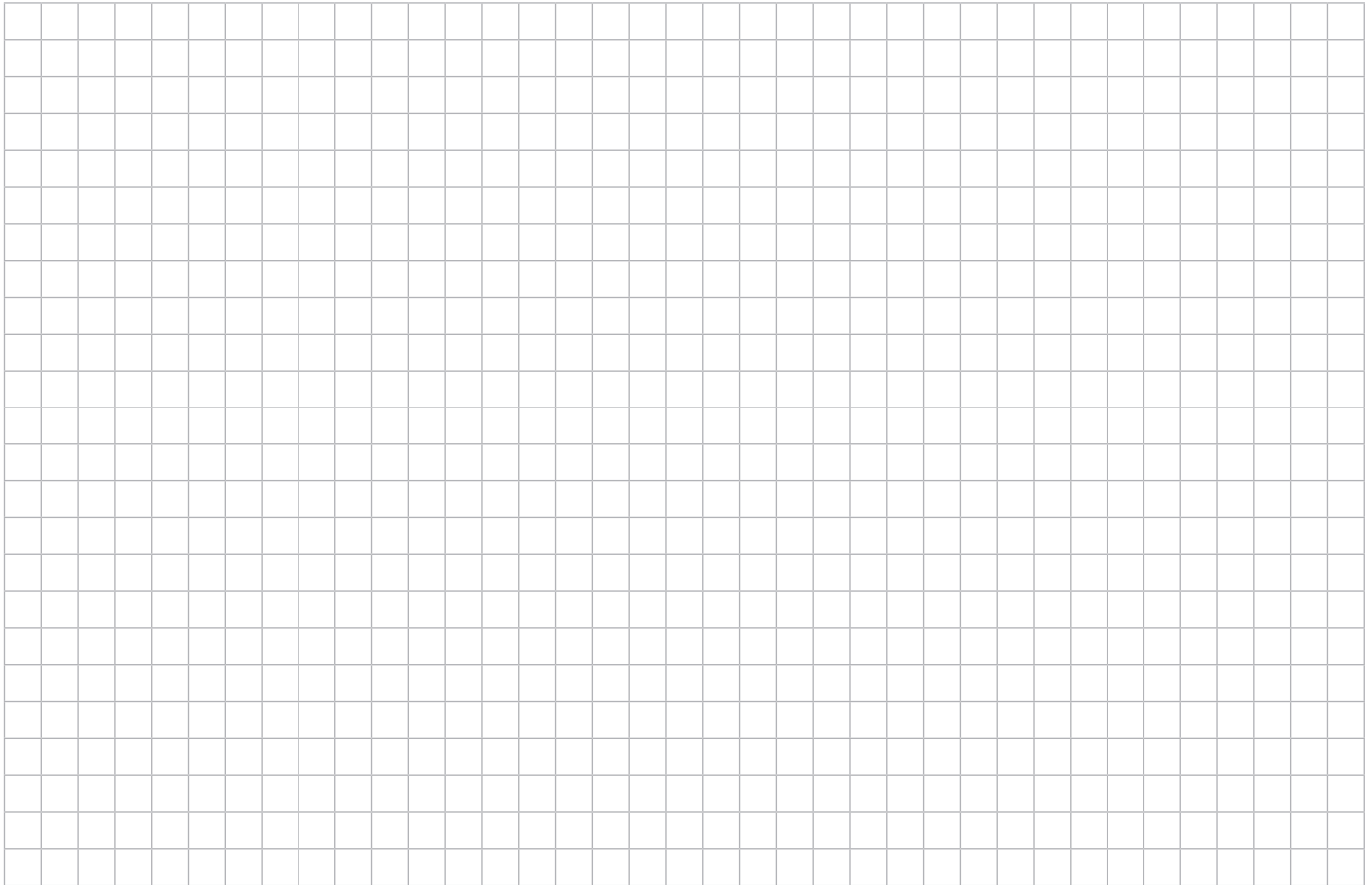
Your specialist dealer/contractor will gladly advise and assist you in matters not covered by our warranty terms and conditions and undertakings. We particularly advise you to have your fireplace insert/stove serviced regularly by a stove fitter.

Technical data subject to change errors and omissions excepted.

## 10.6 FOR YOUR INFORMATION



## 10.6 FOR YOUR INFORMATION





# SPARTHERM

THE GLOBAL BRAND FOR YOUR LIVING ROOM

Your specialist dealer

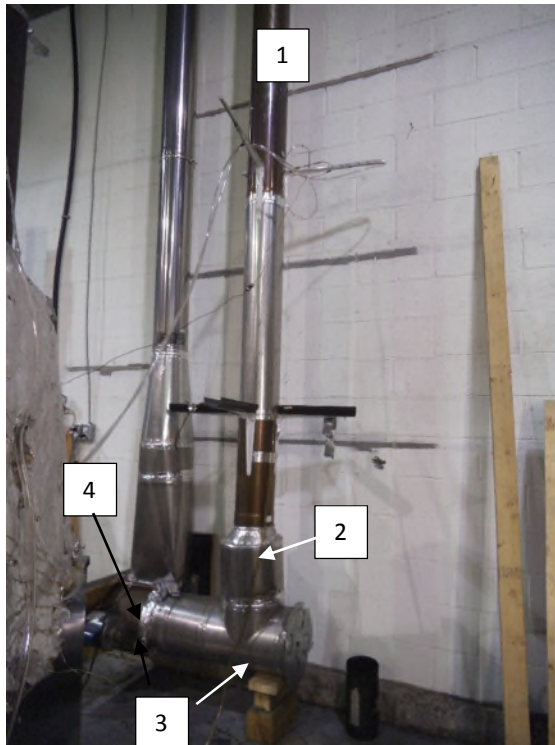


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## APPENDIX 8: Photographs of test set up

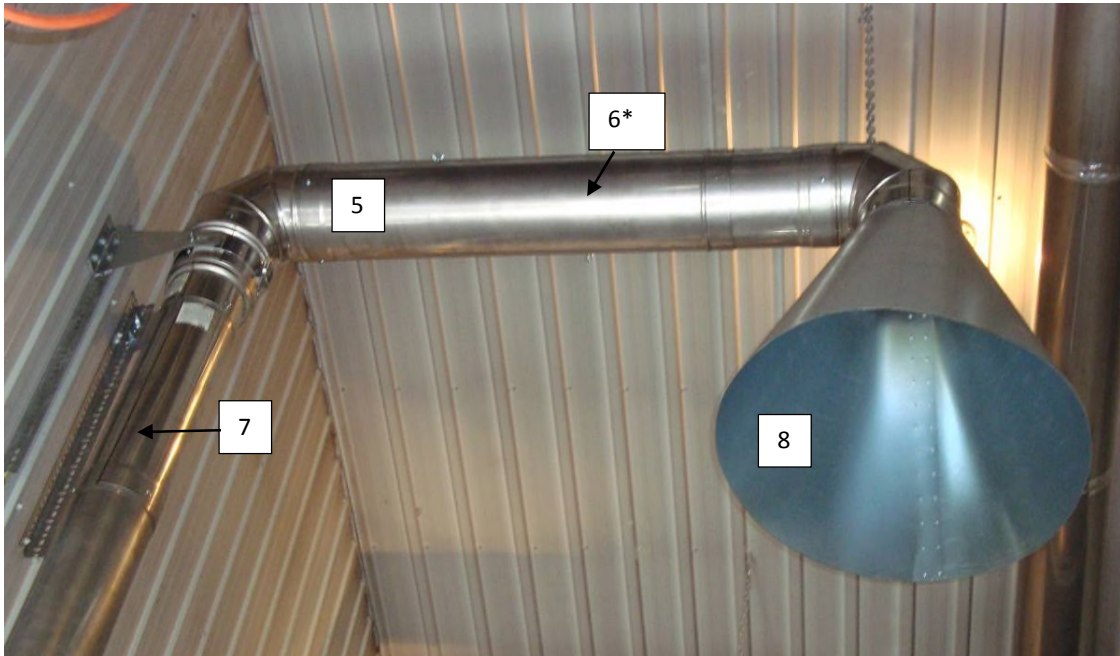
Dilution picture Dia 8

Picture 1: Sampling system



- 1 : 8 in dia Stainless steel pipe
- 2 : 16 in. Between sampling probe and lower elbow
- 3 : Air intake with damper to adjust flow rate
- 4 : Exhaust blower

Picture 2: Hood and mixing baffle



\*The arrow point the deflectors inside of the pipe

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

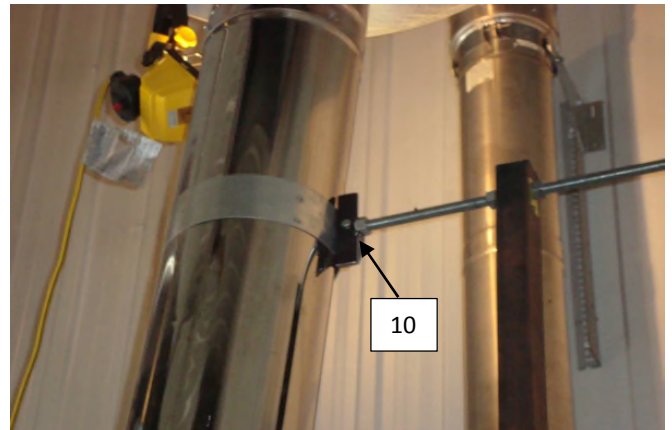
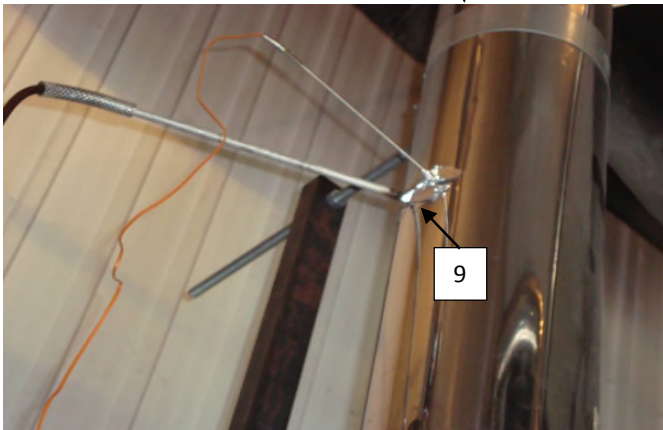


Picture 3: Stack sampling



Picture 3.1: Gas analysis and temperature probe

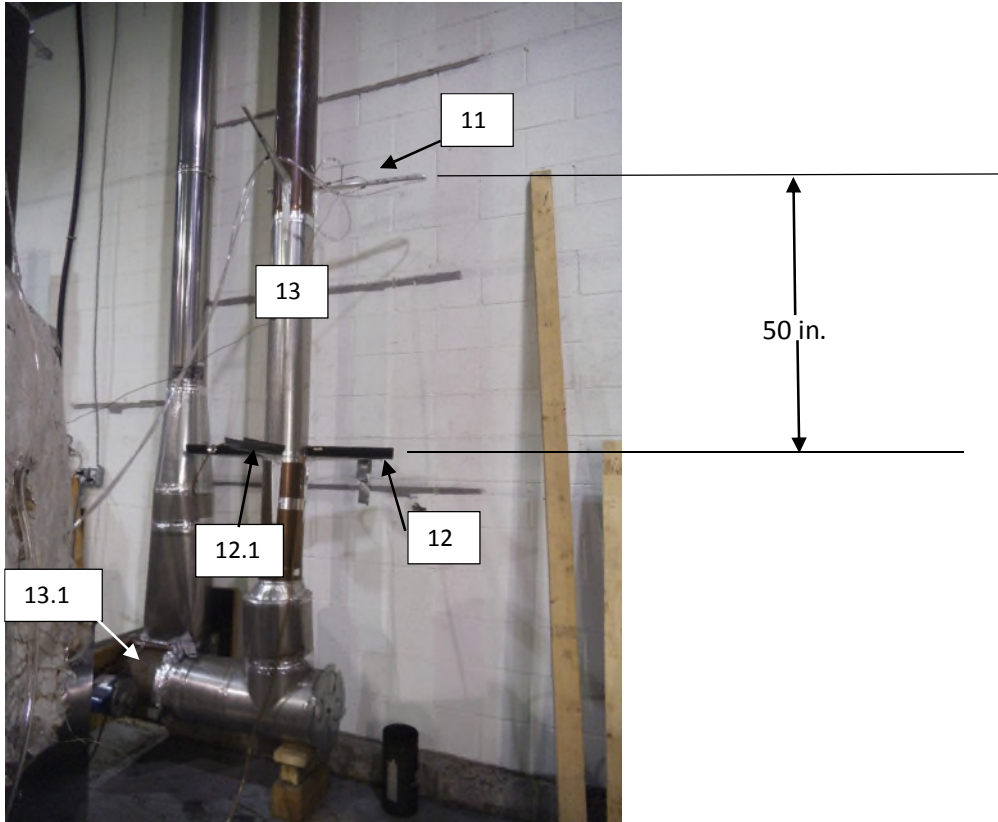
Picture 3.2: chimney support



9 : Temperature and gas analyser sampling ports located 9 feet above platform

10 : Exhaust system support bracket

Picture 4: Tunnel flow measurement and sampling probe



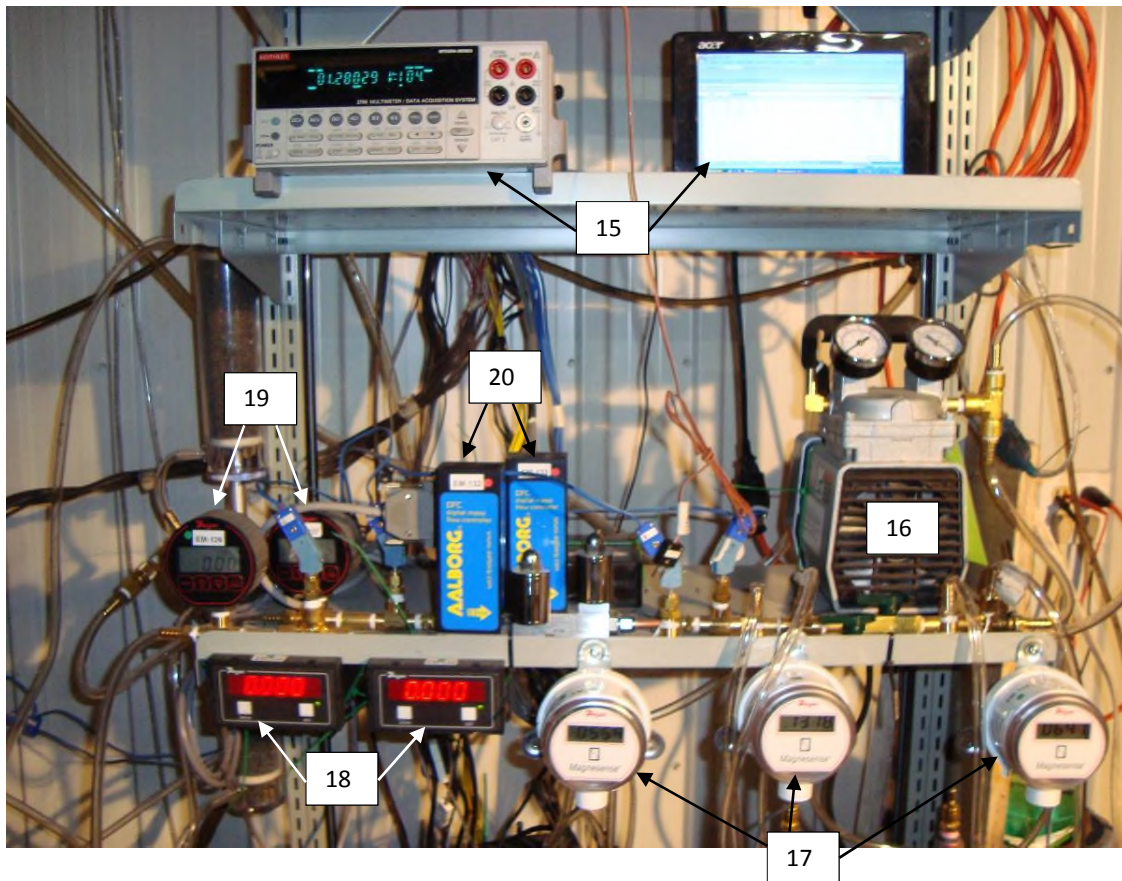
- 11 : Velocity port
- 12 : Sampling port, 2 sampling probes with 2x48 mm. dia.filter each. Filter used: Millipore AP4004700
- 12.1 : Sampling port, sampling probes with 2x48 mm. dia.filter each. Filter used: Millipore AP4004700, for first hour sampling
- 13 : 18 feet long dilution tunnel
- 13.1 : Extraction blower

Picture 5: Draft sampling



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

Picture 6: Equipments

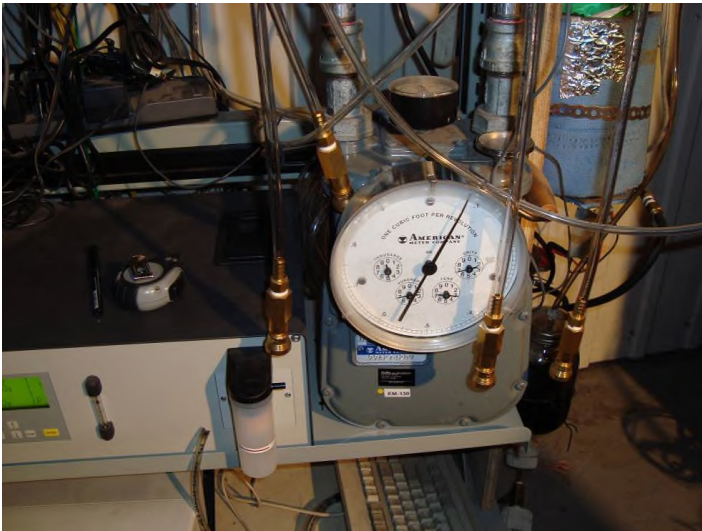


- 15 : Acquisition system
- 16 : Vacuum pump
- 17 : Digital manometer
- 18 : Digital read out for mass flow meter
- 19 : Digital vacuum gage
- 20 : Mass flow meter

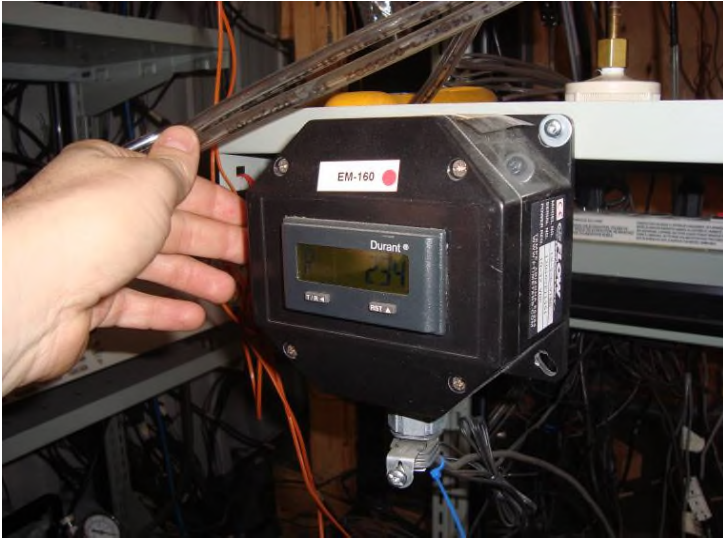
Picture 7: Gaz analyser



Picture 8: Reference dry gas meter



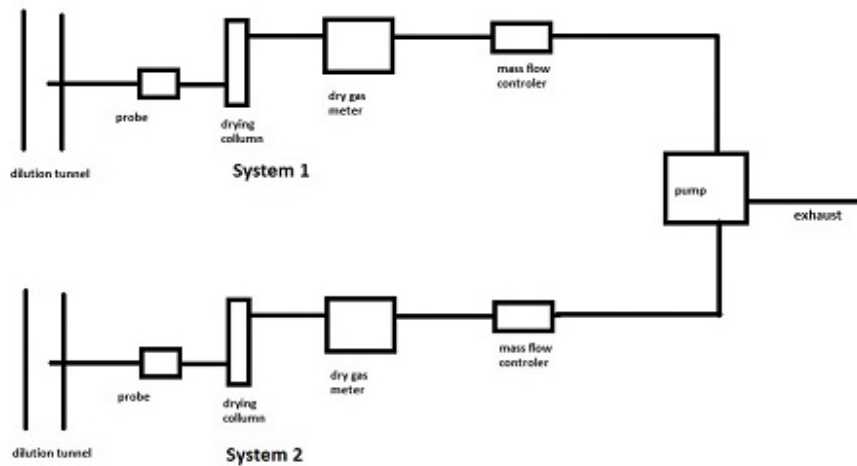
Picture 10: Water flow meter



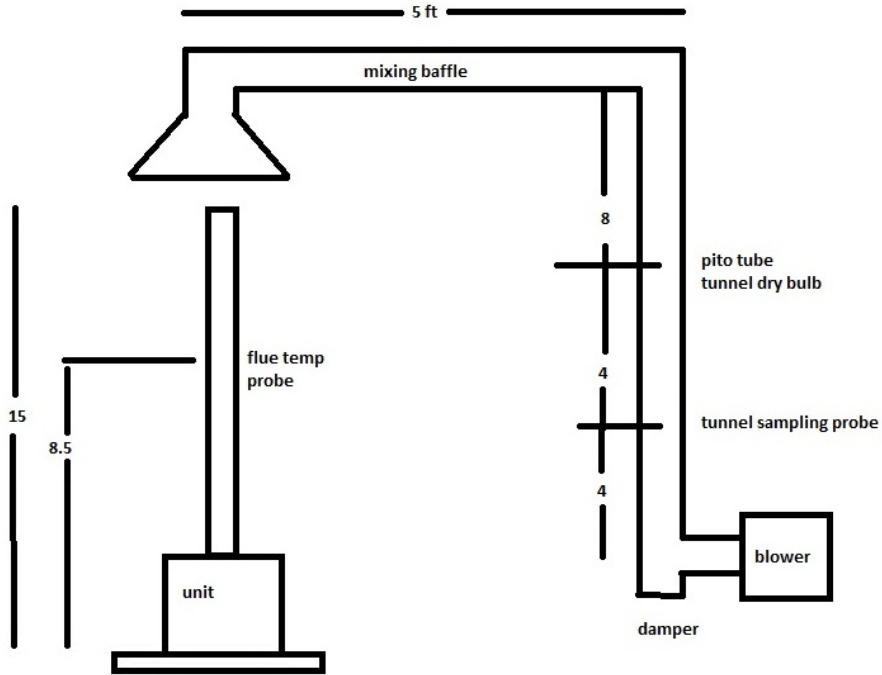
Picture 11: Dry gas meter



Picture 12 : Dilution tunnel sample system



Picture 13: Dilution tunnel



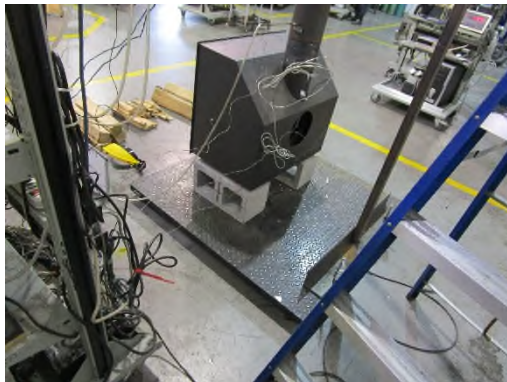


## APPENDIX 9: Test load photographs

**Run 1.1**



Run 1.2



Run 2.1





## APPENDIX 12: Volume calculations

## APPENDIX 13: Operating instruction



**Operating instruction for High burn rate Cord wood method ALT-125, ASTM E3053**

- Start the fire with approximately 4.25 lbs. of startup fuel, 1.5 lbs. of kindling.
- Close the Door immediately
- When left approximately 1.8 lbs. from the startup load, the high burn rate load can be inserted.
- The high burn rate load can be up to 16.6 lbs, open the door, load the stove with high burn load.
- Close the door immediately.

**Operating instruction for Medium burn rate Cord wood method ALT-125, ASTM E3053**

- From the high burn rate coal bed, when 2.9 lbs. left, the load can be inserted in the firebox.
- open the door
- Insert the 19.5 lbs. load in the firebox
- Keep the door slightly open for 2 minutes
- At minute 15 air setting should be at the medium setting (drill bit 7/16)

**Operating instruction for Low burn rate Cord wood method ALT-125, ASTM E3053**

- From the high burn rate coal bed, when 3.0 lbs. left, the load can be inserted in the firebox.
- open the door
- Insert the 19.6 lbs. load in the firebox
- Door can be close immediately.
- At minute 15 air setting should be at the minimum setting



## APPENDIX 14: Drawing Air flow pattern

## APPENDIX 15: Application for wood stove program

**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)**  
**2015 Standards of Performance for New Residential Wood Heaters, New Residential**  
**Hydronic Heaters and Forced-Air Furnaces Application**  
**40 CFR PART 60 SUBPARTS AAA AND QQQQ**

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to 40 CFR PART 60 Subparts AAA AND QQQQ, Sections 60.533(b), 60.5475(b), and Appendix A-8. This document may be revised periodically without public notice. If you have additional questions, please contact Rafael Sanchez at 202-564-7028 or via email at sanchez.rafael@epa.gov.

**Contents**

<b>Application for us epa wood heater certification pursuant to 40 cfr PART 60 Subparts AAA and QQQQ .....</b>	<b>1</b>
<b>Application for A Certificate of Compliance pursuant to 40 cfr PART 60 Subparts AAA and QQQQ .....</b>	<b>2</b>
<b>2015 Standards of Performance for New Residential Wood Heaters, new residential hydronic heaters and forced-air furnaces.....</b>	<b>2</b>
General Information.....	2
Manufacturer’s Authorized Representative INFORMATION.....	2
EPA-Approved Test Laboratory .....	3
Compliance Statements and Acknowledgements – Sections 60.533(b) and 60.5475(b).....	4
Instructions: Please read the below statements and affirmations and address accordingly.....	4
For emissions data summary tables see attachments.....	4
<b>Wood Burning Heaters.....</b>	<b>6</b>
I. Test Method 28R for Certification and Auditing of Wood Heaters.....	6
A. <i>Summary Results – Adjustable Wood Burning Heaters</i> .....	6
Weighted average summary.....	6
Weighted average Final results.....	6

**APPLICATION FOR A CERTIFICATE OF COMPLIANCE PURSUANT TO 40 CFR  
PART 60 SUBPARTS AAA AND QQQQ  
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW  
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

**GENERAL INFORMATION**

**Manufacturer's Name:** Spartherm

<b>Heater Type (Circle One):</b>	Adjustable Burn Rate Wood Heater	Pellet Stove	Single Burn Rate Heater	Hydronic Heater	Forced Air Furnace	Other:
<b>Hydronic Heater Type (Circle One):</b>	Traditional	Full Storage	Partial Storage	Indoor/Outdoor	Other:	
<b>Forced-Air Furnace Type (Circle One):</b>	Small (less than 65,000 BTU/hr heat output)		Large (greater than 65,000 BTU/hr heat output)		Other:	
<b>Fuel Tested:</b>	Crib	Pellet	Cordwood	Wood Chips	Other:	

**Test Method(s):** ALT-125 ; AMSTE3053 ; ASTME2515      **Catalyst:** no

**Model Name and Design Number (The model name and design number must clearly distinguish one model from another. The name and design number cannot include the EPA symbol or logo or name or derivatives such as "EPA):** Spartherm M 700 Z/C, Spartherm M 700 Module, Spartherm M 700 insert

<b>Physical Address (Street number and Address, not P.O. Box):</b> <b>38 Maschweg</b>	<b>Mailing Address:</b> <b>38 Maschweg</b> <b>Melle</b> <b>Germany</b> <b>D-49324</b>
--	---

<b>City:</b> Melle	<b>State:</b>	<b>ZIP Code:</b> D-49324
<b>Phone:</b> 004915222644162	<b>Email:</b> m.aumann@spartherm.com	<b>Website:</b> www.spartherm-america.com

**EPA Submission Date of 30 day Notice:** 12.04.2019

**MANUFACTURER'S AUTHORIZED REPRESENTATIVE INFORMATION**

<b>Name:</b> Markus Aumann		
<b>Position/Title:</b> Sales manager North America		
<b>Address:</b> 38 Maschweg		
<b>City:</b> Melle	<b>State:</b>	<b>ZIP Code:</b> D-49324
<b>Phone:</b> 0049-15222644162	<b>E-mail:</b> m.aumann@spartherm.com	<b>Website:</b> www.spartherm-america.com

**Remarks:**

**APPLICATION FOR A CERTIFICATE OF COMPLIANCE PURSUANT TO 40 CFR  
PART 60 SUBPARTS AAA AND QQQQ  
2015 STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW  
RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES**

**EPA-APPROVED TEST LABORATORY**

**Name of Test Laboratory:**  
Polytests Services inc.

**Name of Person Authorized or Responsible for Conducting Compliance Test:** Danick Power

**Position/Title:** VP operation

**Address:** 695-B Gaudette,

**City:** St-Jean-sur-Richelieu

**State:** Quebec, Canada

**ZIP Code:** J3B 7S7

**Phone:** 450 741-3636

**Email:** dpower@polytests.com

**Website:** www.polytests.com

**Remarks:**

**EPA-Approved Third Party Certifier**

**Name of Certifier Entity:** CSA Group

**Name of Person Authorized or Responsible for Reviewing Test Report and/or Issuing Certification of Conformity:**  
Ryan Beard

**Position/Title:** Project Manager

**Address:** 178 Rexdale Blvd

**City:** Toronto

**State:** Ontario

**ZIP Code:** M9W 1R3

**Phone:** 416-747-2630

**Email:**  
Ryan.beard@csagroup.org

**Website:**  
www.csagroup.org

**Remarks:**


**COMPLIANCE STATEMENTS AND ACKNOWLEDGEMENTS – SECTIONS 60.533(B) AND 60.5475(B)**

**INSTRUCTIONS: PLEASE READ THE BELOW STATEMENTS AND AFFIRMATIONS AND ADDRESS ACCORDINGLY.**

**FOR EMISSIONS DATA SUMMARY TABLES SEE ATTACHMENTS**

**1. Engineering Drawings Statement**

Engineering drawings and specifications of components that may affect emissions (including specifications for each component listed in paragraphs (k)(2), (3) and (4) of 60.533(b) and 60.5475(b). Manufacturers may use assembly or design drawings that have been prepared for other purposes, but must designate on the drawings the dimensions of each component listed in paragraph (k) of this section. Manufacturers must identify tolerances of components listed in paragraph (k)(2) of 60.533(b) and 60.5475(b) that are different from those specified in that paragraph, and show that such tolerances cannot reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits. The drawings must identify how the emission-critical parts, such as air tubes and catalyst, can be readily inspected and replaced.

**All components include dimensions and production tolerances which meet or exceed the prescribed requirements and facilitate inspection. Replacement procedures are clearly documented in service kits.**

**2. Firebox Statement Requirement**

A statement whether the firebox or any firebox component (including the materials listed in paragraph (k)(3) of 60.533(b) and 60.5475(b) will be composed of material different from the material used for the firebox or firebox component in the wood heater on which certification testing was performed, a description of any such differences and demonstration that any such differences may not reasonably be anticipated to adversely affect emissions or efficiency.

**No – the firebox and any firebox component will not be made of different materials than what was used in the certification testing.**

**3. CBI**

Clear identification of any claimed confidential business information (CBI). Submit such information under separate cover to the EPA CBI Office; Attn: Residential Wood Heater Compliance Program Lead, 1200 Pennsylvania Ave., NW, Room 7138, MS:2227A, Washington, DC 20460. **Note that all emissions data, including all information necessary to determine emission rates in the format of the standard, cannot be claimed as CBI.**

**CBI was sent to EPA Testing Laboratory Polytest INC.**

**4. Valid Certification Statement**

All documentation pertaining to a valid certification test, including the complete test report and, for all test runs: Raw data sheets, laboratory technician notes, calculations and test results. Documentation must include the items specified in the applicable test methods. Documentation must include discussion of each test run and its appropriateness and validity, and must include detailed discussion of all anomalies, whether all burn rate categories were achieved, any data not used in the calculations and, for any test runs not completed, the data collected during the test run and the reason(s) that the test run was not completed and why. The burn rate for the low burn rate category must be no greater than the rate that an operator can achieve in home use and no greater than is advertised by the manufacturer or retailer. The test report must include a summary table that clearly presents the individual and overall emission rates, efficiencies and heat outputs. Submit the test report and all associated required information, according to the procedures for electronic reporting specified in § 60.537(f) and 60.5475(f).

**Yes all requirements in the above section is covered as per the requirements in the test report.**

**5. Warranties**

A copy of the warranties for the model line, which must include a statement that the warranties are void if the unit is used to burn materials for which the unit is not certified by the EPA and void if not operated according to the owner's manual.

**All warranty data is included in the manual and includes the necessary statements as per this section.**

**6. Q/A Statement**

A statement that the manufacturer will conduct a quality assurance program for the model line that satisfies the requirements of paragraph (m) of this section.

**Yes, included with the report is on quality assurance inspection program.**

**7. Laboratory Sealing of Unit**

A statement describing how the tested unit was sealed by the laboratory after the completion of certification testing and asserting that such unit will be stored by the manufacturer in the sealed state until 5 years after the certification test.

**The unit has been sealed at the testing facility by the technicians performing the test. There is metal banding encasing the unit preventing the door from being opened and modifications made. The unit is clearly permanently labeled as the EPA test unit.**

**8. Statements that the wood heaters manufactured under this certificate will be—**

- (i) Similar in all material respects that would affect emissions as defined in § 60.531 to the wood heater submitted for certification testing, and labeled as prescribed in § 60.536 and 60.5478.
- (ii) Accompanied by an owner's manual that meets the requirements in § 60.536 and 60.5478. In addition, a copy of the owner's manual must be submitted to the Administrator and be available to the public on the manufacturer's web site.

**Yes, the wood heater manufactured will be of similar material to the wood heater tested. Each unit will be accompanied by its owner's manual and will be available on the websites.**

**9. Third Party Certification Statement**

A statement that the manufacturer has entered into contracts with an approved laboratory and an approved third-party certifier that satisfy the requirements of paragraph (f) of this section.

**10. Approved laboratory/third party Statement**

A statement that the approved laboratory and approved third-party certifier are allowed to submit information on behalf of the manufacturer, including any claimed to be CBI.

**Yes, both the approved laboratory and third party certifier have been given permission to submit information on behalf**

**11. Manufacturer's Website Certification Test Reports Availability Statement**

A statement that the manufacturer will place a copy of the certification test report and summary on the manufacturer's web site available to the public within 30 days after the Administrator issues a certificate of compliance.

**We will place a copy of the certification test and summary on the websites within 30 days of the certificate.**

**12. Transferability Acknowledgement Statement**

A statement of acknowledgment that the certificate of compliance cannot be transferred to another manufacturer or model line without written approval by the Administrator.

**We acknowledge that the certificate of compliance cannot be transferred to another manufacturer or model line without notification and written approval by the administrator.**

**13. Statement about Selling Wood Heaters without an EPA Certificate**

A statement acknowledging that it is unlawful to sell, distribute or offer to sell or distribute an affected wood heater without a valid certificate of compliance.

**We acknowledge that we cannot sell, distribute or offer to sell the wood heater without a valid certificate of compliance.**

  
Print Name and Title: M. Aumann

Sales Manager

Date:

11/7/2019

Signature of responsible representative of the manufacturer certifying the accuracy of the above statements:

The authorized or responsible party whose signature is above is certifying that the manufacturer has complied with and will continue to comply with all requirements of the 2015 NSPS for compliance certification and that the manufacturer remains responsible for compliance regardless of any error by the test laboratory or third-party certifier.

**Attachments**

**Instructions:** Please complete the section applicable to your certification request. You may substitute your own data tables in lieu of the ones shown below provided that all the information is captured.

**WOOD BURNING HEATERS**

**I. Test Method 28R for Certification and Auditing of Wood Heaters**

**A. SUMMARY RESULTS – ADJUSTABLE WOOD BURNING HEATERS**

**WEIGHTED AVERAGE SUMMARY**

Model name / number	Spartherm M 700 insert		
Usable Firebox volume	1.58		
Convection air Fan (no, Standard, option)	no		
average for each test run category	L	M	H
burn rate kg/h DB	0,99	1,22	2,46
PM Emission rate - g/h	0,95	0,88	2,07
Co emission rate - g/h	133,96	110,06	59,38
Overall Efficiency - CSA B 415,1			
% HHV Basis	69,7%	69,8%	59,9%
% LHV Basis	75,0%	75,1%	64,4%
Heat output - Btu/hr	13129	16108	29452
Category weighting	0,4	0,4	0,2

**WEIGHTED AVERAGE FINAL RESULTS**

ASTM E 3053 Weighted averages		
PM Emission Rate - g/h	1,14	
CO Emission Rate g/h	109,5	
Overall Efficiency - CSA B415,1		
% HHV Basis	67,77%	
% LHV Basis	72,92%	
Heat output range - Btu/h	13 129	to 29452
Co Arithmetic average g/min	1,69	





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
RESEARCH TRIANGLE PARK, NC 27711

FEB 28 2018

Mr. Justin White  
Hearthstone QHPP, Inc.  
#17 Stafford Ave.  
Morrisville, VT 05661

OFFICE OF  
AIR QUALITY PLANNING  
AND STANDARDS

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:

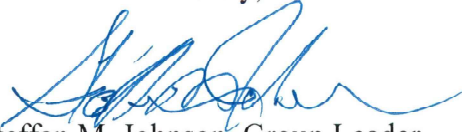
1. The filter temperature must be maintained between 80 and 90 degrees F during testing.
2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.
3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 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](mailto: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