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 S 600 insert

Attention: Rafael Sanchez

TESTED BY:

Services Polytests inc.

695-B Gaudette

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

TEST DATES: May 21st and 22nd 2019

REPORT DATE: June 4th 2019

Project number: PI-20196

Tested:

Maxime Martin

written by:

Danick Power, P. Eng

Verified by third party certifier (CSA):

SUMMARY

List of appendixes

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 21st and 22nd 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 S 600 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 S 600 Z/C,
- Free standing stove: Spartherm S 600 Module
- Wood insert: Spartherm S 600 insert

1.3 RESULTS

Emission results obtained

- Weighted Average Emissions Rate: 1.67 g/hr
- Weighted Average Overall Efficiency: 70.29 %

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 S 600 insert
Manufacturer	Spartherm
address	Maschweg 38 Melle 49324 Germany
appliance category	Wood heater
Usable Firebox Volume - ft3	0.95
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 21st and 22nd 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 S 600 insert		
Usable firebox Volume-ft3	0,95		
Convection Air Fan (No, Standard, Optional)	NO		
Test runs #	1,1	1,2	2.1
Date tested	May 21st 2019	May 21st 2019	May 22nd 2019
test run category (L, M, H)	H	L	M
average barometric pressure – in Hg	29,75	29,75	30,14
Max observe Ambient temp. °F	78,72	79,09	85,79
Min observe Ambient Temp °F	71,54	74,63	78,88
Max observe Filter temp °F	88,90	89,91	89,14
Run air settings			
Primary (measured up from minimum)	maximum	minimum	medium
Secondary (measured up from minimum)	maximum	minimum	medium
Convection air setting	none	none	none
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	15	15	15
Number of test fuel pieces	4	5	5
Test fuel Weight			
Kindling - as fired lb.	1,20	NA	NA
Kindling Wt. - as % of test fuel load	12,2%	NA	NA
Kindling Moisture % Db	9,0	NA	NA
Kindling Kg DB	0,50	NA	NA
SU Fuel Wt- as fired lb	2,50	NA	NA
SU Fuel wt. - as % of test fuel load	25,4%	NA	NA
SU Fuel moisture - % DB	20,0	NA	NA
SU fuel- Kg DB	0,94	NA	NA
Test Fuel Load - As Fired lb	9,84	11,59	11,57
Ave. Test Fuel Load MC % DB	19,45	19,49	19,57
Test Fuel Load - kg DB	3,74	4,40	4,39
Test fuel Loading density lb./ft3	10,36	12,20	12,18
Residual SU fuel wt. - as fired lb.	1	NA	NA
Residual SU fuel wt.- as % of test fuel load	10,2%	NA	NA
Test run duration - minutes	67	340	213
Test run duration - h	1,12	5,67	3,55
Test fuel load wt at the end of the test - as fired lb	1	0	0
total fuel burned kg Db	4,27	4,40	4,39
% test fuel load wt at end of the test	10,2%	0,0%	0,0%

2.4 TEST RUN RESULTS SUMMARY

Model name / number	Spartherm S 600 insert		
Usable Firebox volume	0,95		
Convection air Fan (no, Standard, option)	NO		
Test runs nu.	1,1	1,2	2,1
Date tested	May 21st 2019	May 21st 2019	May 22nd 2019
Test run category	H	L	M
Burn rate - Kg/hr DB	3,72	0,78	1,24
Burn rate as % of low to high Midpoint	NA	20,9%	33.3%
Burn duration - h	1,12	5,67	4
Heat output btu/hr	47 417	10 613	16 740
Average Dilution Tunnel Flow Rate - dscfm	321,6	340,0	333,7
Average Sample Flow Rates - dscfm			
Train 1	0,1916	0,1898	0,1913
train 2	0,1756	0,1848	0,1740
Total PM Emissions - g			
Train 1 g	4,40	3,80	5,13
train 2 g	4,99	3,72	4,90
Average	4,70	3,76	5,01
PM emission train precision %	6,34%	1,03%	2,31%
PM emission g/kg	1,10	0,85	1,14
PM emission rate g/h	4,21	0,66	1,41
Total Co Emission g	48,5	229,2	276,5
Co emission Rate g/h	56,0	40,5	77,9
1st hour emission rate g/h	3,5	3,6	3,1
Overall Efficiency - CSA B415,1			
% HHV Basis	65,05%	72,63%	70,56%
% LHV Basis	70,00%	78,15%	75,93%

2.5 WEIGHTED AVERAGE SUMMARY

Model name / number	Spartherm S 600 insert		
Usable Firebox volume	0,95		
Convection air Fan (no, Standard, option)	NO		
average for each test run category	L	M	H
burn rate kg/h DB	0,78	1,24	3,72
PM Emission rate - g/h	0,66	1,41	4,21
Co emission rate - g/h	40,45	77,88	56,00
Overall Efficiency - CSA B 415,1			
% HHV Basis	72,6%	70,6%	65,1%
% LHV Basis	78,1%	75,9%	70,0%
Heat output - Btu/hr	10613	16740	47417
Category weighting	0,4	0,4	0,2

2.6 WEIGHTED AVERAGE FINAL RESULTS

ASTM E 3053 Weighted averages			
PM Emission Rate - g/h	1,67		
CO Emission Rate g/h	58,5		
Overall Efficiency - CSA B415,1			
% HHV Basis	70,29%		
% LHV Basis	75,63%		
Heat output range - Btu/h	10 613	to	47417
Co Arithmetic average g/min	0,97		

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	81	80	29,80	29,71	26,1	36,7	0	0
2	88	85	30,12	30,15	24,3	22,1	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	67	321,62	586,05	12,837	11,765	2,70	2,80
Low fire test	340	339,98	550,40	64,540	62,838	2,20	2,10
medium fire test	213	333,71	560,60	40,745	37,072	3,10	2,70

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	1678,64	1831,50	4,40	4,99	6,34%
Low fire test	1791,02	1839,54	3,80	3,72	1,03%
medium fire test	1744,51	1917,36	5,13	4,90	2,31%

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 17.25 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: 17.25 in wide x 8.5 in. deep x 13.25 high
- Usable volume: 0.95 cuft
- Overall dimension: 22.25-inch-wide x 16.25-inch-deep x 22.25-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) cm2			OUTLET
Identification	Type	Imin	Imax	Controlled	(cm2)
A *	Primary	0	0	Yes	0
B *	Secondary (air wash and front holes)	4.5 (shared with tertiary)	56 (shared with tertiary)	Yes	35 + 3.7
C *	Tertiary (rear wall holes)	4.5 (shared with secondary)	56 (shared with secondary)	Yes	4.3

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

Legend
Identification: Tag name referred to on drawings in Appendix 14, section airflow pattern
Type: Characterization of air intake
Imin: Minimum air intake of a particular air channel
Imax: Maximum air intake of a particular air channel
Controlled: Determines if a provision for air control is present
Outlet: Total air outlet of a particular air channel

3.4 OPERATION DURING TEST

Run #1.1
This run was performed on May 21st 2019. It lasted 67 minutes and a maximum burn rate was obtained at 3.71 kg/hr & emission at 4.2 gr/hr. The air inlet damper was fully open.

Run #1.2
This run was performed on May 21st 2019 as a continuation of the maximum burn rate (run1.1). It lasted 340 minutes and a Minimum burn rate was obtained at 0.78kg/hr & emission at 0.66 gr/hr. The air inlet damper was at the minimum setting

Run #2

This run was performed on May 22nd 2019. It lasted 213 minutes and a medium burn rate was obtained at 1.24 kg/hr & emission at 1.41 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

POLYTESTS
TESTING THROUGH YOUR REALITY

Date: 2019-05-21 Manufacturer: Spartherm Model: 600

Project #: PI 20196 Run: 1 Tech: MM Reviewer: DP

- kindling 38 Lbs start Fire (1 min torch)
- close Door immediatly
- At 100 LBS insert load
- close Door immediatly
- At 200 LBS stop pump
- At 19 LBS insert load
- At 8 min close air inlet 1/2
At 15 min close air inlet Drill bit 5/16
TEST LOAD CONFIGURATION

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE / POST CHECKS

Date: 2019-05-21 Manufacturer: Spartherm Model: 600

Project #: PI 20196 Run: 1 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:	Equipment #	Time	12%	22%
	Lm. 191	7:30	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	2019.05.21	
Date Dilution Tunnel Cleaned	2019.05.21	
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		
	1st hour	Train 1	Train 2	1st hour	Train 1	Train 2
Probe	06	11	39	18	33	50
Filter Front	226	228	230	219	221	223
Filter Back	227	229	231	220	222	224
Filter Thermocouple	11	11	12	11	11	12
Filter (80°F ≥ <90°F)	ok	ok	ok	ok	ok	ok

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-21 Manufacturer: SpAnTherm Model: 600

Project #: PT 20196 Run: 1 Tech: MM Reviewer: DO

Leakage Checks Tunnel Samplers

High fire test	System 1st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	927620.65	928004.26	927620.89	928004.46	876 759.05 ~~876 758~~ 05	877140.19
Initial 1minute DGM (Liter)	927620.40	928004.17	927620.85	928004.36	876 758.85	877140.09
Change © (Liter)	0.25	0.09	0.04	0.10	0.20	0.10
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	OK	OK	OK	OK	OK	OK

Low medium fire test	System 1st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	928005.11	929950.95	928005.41	929951.04	877140.99	879193.49
Initial 1minute DGM (Liter)	928005.10	929950.90	928005.31	929951.01	877140.98	879193.48
Change © (Liter)	0.01	0.04	0.10	0.03	0.01	0.01
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	OK	OK	OK	OK	OK	OK

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-21 Manufacturer: SPARTHERM Model: 600

Project #: pf 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 (mml/min.)	0	0
Flow Rate (lpm)	1.5	1.5
Allowable (.02 x Sample Rate)	30	30
Check OK	ok	ok

Leakage Checks Pitot

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

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE-TEST SCALE AUDIT

Date: 2019-05-21 Manufacturer: Sartorius Model: 600

Project #: PT 20196 Run: 1 Tech: MM Reviewer: ND

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

LIMITS OF WEIGHT RANGES

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

Date: 2019-05-21 Manufacturer: Spantherm Model: 600

Project #: pI 20196 Run: 1 Tech: MM Reviewer: DP

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 100.9 (KPa.) Static pressure (P_q) 0,18 (inches w.c.)
Inside diameter: Port A _____ Port B _____.
Tunnel cross sectional area: .1963Ft^2
Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0064	67,61
B - Centroid	3.00	3.50	4	0063	6760
A-1	0.40	0.50	0.50	0052	6761
A-2	1.50	1.75	2	0066	6760
A-3	4.50	5.25	6	0071	6758
A-4	5.60	6.5	7.5	0070	6759
B-1	0.40	0.50	0.50	0058	6761
B-2	1.50	1.75	2	0073	6759
B-3	4.50	5.25	6	0055	6757
B-4	5.60	6.5	7.5	0051	6757
				AVERAGE	

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

Where,
C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.
Δ_p = manometer reading (inches H_2O)
T_s = average absolute dilution tunnel temperature (°F + 460)
P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$
P_q = static pressure $\frac{\text{in. } H_2O}{\{\ 13.6\ \}}$
M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)
K_p = 85.49 pitot tube constant, (conversion factor for English units)

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

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019-05-21 Manufacturer: SPANTHERM Model: 600

Project #: PT 20196 Run: 1 Tech: MM Reviewer: DP

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2.965	~~2.960~~ 3.00 ppm	1.004	1.050
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO_2	0	0	17.91	~~17.85~~ 18.00 ppm	9.76	10.00
Tolerance CO2		+/- 0.02		+/- 0.5		+/- 0.5
O_2 informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0	2.990	1.000	0	0.02	0.025	0.15	0.004	0.05	✓	
CO_2	0	17.85	9.80	0	0.02	0.06	0.5	0.04	0.5	✓	

POLYTESTS
TESTING THROUGH YOUR REALITY

TEST DATA LOG

Date: 2019-05-21 Manufacturer: Southern Model: G30

Project #: pI 20196 Run: 1 Tech: M M Reviewer: DP

RAW DRY GAS METER READINGS

		System 1	System 2	Blank
High fire test	Final (Liter)	928039	877139.60	591.96
	Initial (Liter)	927621.74	876759.85	575.45
Low medium fire test	Final (Liter)	929950.00	879192.55	673.71
	Initial (Liter)	928006.84	877742.48	591.96

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	109.9	100.6
Dry Bulb (F):	86.90	80.40
Humidity (%):	26.1	36.70

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-21 Manufacturer: SpAnther M Model: 600

Project #: pI 20196 Run: 1 Tech: M M Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

KINDLING AND START-UP LOAD

Piece Size	Weight	Meter Moisture Content (% dry)				
x x 12 in.	1,30 lbs.	9		9		9
x x ~~15~~ in.	lbs.					
x x in.	lbs.					
x x 12 in.	2,50 lbs.	20		20		20
x x 5 in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

HIGHFIRE TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)				
2,5 x 2,75 x 15 in.	2 24 lbs.	193		194		198
2,50 x 2,50 x 15 in.	2160 lbs.	190		193		198
2,00 x 2,00 x 15 in.	1534 lbs.	193		199		196
x x in.	lbs.					
3,50 x 3,50 x 15 in.	~~3,59~~ 3 90 lbs.	193		194		194
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-21 Manufacturer: Spanther M Model: 600

Project #: PT 20196 Run: 1 Tech: MM Reviewer: JP

FUEL DESCRIPTION:

Type of wood:

LOW OR MEDIUM TEST LOAD

Piece Size				Weight		Meter Moisture Content (% dry)					
2.50	x 2.50	x 15	in.	2 140	lbs.	19.9		20.0		20.1	
2.50	x 2.25	x 15	in.	1 912	lbs.	19.1		19.9		19.6	
2.50	x 3.75	x 15	in.	3 476	lbs.	19.9		19.7		19.6	
	x	x	in.		lbs.						
2.50	x 2.25	x 15	in.	1 798	lbs.	19.1		19.6		19.0	
3.00	x 2.75	x 15	in.	3 066	lbs.	19.0		19.1		19.2	
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						
	x	x	in.		lbs.						

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-16 Manufacturer: Spartherm Model: 600

Project #: PI 20126 Run: 1 Tech: MM Reviewer: DP

		HIGHFIRE TEST FILTERS								
		SYSTEM 1 – 1st hour				SYSTEM 1				
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	06	226	227	2	11	228	229	7	232
~~2019-05-16~~ 2019-05-17 MM	17:00	61,3744	0,0824	0,0839	35,4021	93,7217	0,0839	0,0819	34,3244	0,0819
2019-05-21	8:00	61,3745	0,0825	0,0840	35,4022	93,7217	0,0840	~~0,001~~ 0,0818 MM	34,3245	0,0818

		SYSTEM 1 – 1st hour				SYSTEM 1				
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	06	226	227	2	11	228	229	7	232
2019-05-21	13:00	61,3747	0,0844	0,0841	35,4027	93,7220	0,0842	0,0819	34,3258	0,0819
2019-05-28	8:00	61,3747	0,0843	0,0841	35,4022	93,7220	0,0842	0,0819	34,3245	0,0819
2019-05-29	8:00	61,3747	0,0843	0,0841	35,4022	93,720	0,0842	0,0819	34,3245	0,0819

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-16 Manufacturer: SPANTHERM Model: 600

Project #: PI 20196 Run: 1 Tech: MM Reviewer: DP

Pre-test Weight Record		HIGH FIRE TEST FILTERS / SYSTEM 2			
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	39	230	231	34
2019.05.16	17:00	110 2778	0.0843	0.0825	35 1299
2019.05.21	8:00	110 2777	0.0844	0.0826	35 1298

Post-test Weight Record		SYSTEM 2			
		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	39	230	231	34
2019.05.21	13:00	110 2778	0.0868	0.0829	35 1305
2019.05.28	8:00	110 2778	0.0868	0.0828	35 1299
2019.05.29	8:00	110 2778	0.0868	0.0828	35 1299

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-16 Manufacturer: SpAnther M Model: 600

Project #: pI 20196 Run: 1 Tech: MM Reviewer: DO

		LOW OR MEDIUM TEST FILTERS								
		SYSTEM 1 – 1st hour				SYSTEM 1				
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	18	219	220	11	33	221	222	33	225
2019 05 17	17:00	108 9483	0,0836	0,0850	34 6241	109 3632	0,0852	0,0857	34 6514	0,0843
2019 05 21	8:00	108 9484	0,0837	0,0851	34 6241	109 3633	0,0853	0,0850	34 6515	0,0844

		SYSTEM 1 – 1st hour				SYSTEM 1				
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	18	219	220	11	33	221	222	33	225
2019 05 21	17:00	108 9485	0,0855	0,0851	34 6252	109 3634	0,0854	0,0850	346526	0,0845
2019.05.28	8:00	108 9485	0,0855	0,0851	34 6242	109 3633	0,0854	0,0850	34 6516	0,0845
2019.05.29	8:00	108 9485	0,0855	0,0851	34 6242	109 3633	0,0854	0,0850	34 6516	0,0845

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-16 Manufacturer: Spartherm Model: 600

Project #: pT 20196 Run: 1 Tech: MM Reviewer:

		LOW OR MEDIUM FIRE TEST FILTERS			
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	50	223	224	35
2019-05-16	17h30	107,644	00819	00844	34,9026
2019-05-21	8h30	107,6467	00820	00845	34,9027

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	50	223	224	35
2019-05-28	17h00	107,6468	00839	00843	34,9033
2019-05-28	8h30	107,6468	00839	00843	~~34,9036~~ MM
2019-05-29	8h30	107,6468	00839	00843	34,9030
					34,9030

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	21-05-2019	
Technicien	M.M	
Project #	PI 20196	

Description de l'unité

Manufacturier	SPARTHERM	
Modèle	Spartherm S 600 insert	
Combustion system	Non-Cat	
Appliance type	INSERT	
Firebox volume	0,95	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 manfacturier
Targeted category	1	
Targeted output	n.a	BTU/h
Cp steel	n.a	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	1,010	Dimensionless
Equipment number (DGM #1):	EM 178	
Calibration Factor (DGM #2):	0,987	Dimensionless
Equipment number (DGM #2):	EM 179	
Calibration Factor (DGM #3):	0,996	
Equipment number (DGM #3):	EM 070	Dimensionless

Tunnel

Targeted tunnel flow rate	300	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	PI 20196
Date	21-05-2019
Technicien	m.m

Fuel data

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

Default Fuel Values

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

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

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

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

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	0,95	ft^3				
Total Nom. Load Wt. Target	9,50	lb				
Total Load Wt. Allowable Range	9,00	to	10,00	lb		
Core Target Wt. Allowable Range	4,30	to	6,20	lb		
Remainder Load Wt. Allowable Range	3,30	to	5,20	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1,40	to	2,40	lb		1,90
Remainder Load Pc. Wt. Allowable Range	1,00	to	5,20	lb		3,10
	Pc. #					
Core Load Piece Wt. Actual	1	2,25	lb	In Range		
	2	2,16	lb	In Range		
	3	1,53	lb	In Range		
Core Load Total. Wt. Actual		5,94	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3,90	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Tot. Wt. Act		3,90	lb	In Range		
Total Load Wt. Actual		9,84	lb	In Range		
Core % of Total Wt.		60%		In Range	45-65%	
Remainder % of Total Wt.		40%		In Range	35-55%	
Actual Load % of Nominal Target		104%		In Range	95-105%	
Actual Fuel Load Density		10,4	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		1,97	lb			
Actual Kindling Wt.		1,20	lb	In Range	12,2%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		2,95	lb			
Actual Start-up Fuel Wt.		2,50	lb	In Range	25,4%	
Allowable Residual Start-up Fuel Wt. Range	1,0	to	2,0	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1	lb	In Range		1,5
Total Wt. All Fuel Added (wet basis)		13,54	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	0,9	to	1,1	lb		1,0
Actual Fuel Load Ending Wt.		1,0	lb	In Range		

Load pieces Length in. 15 in.

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis	
19,3	19,4	19,8	19,5	In Range	1,88 lb	0,85 kg
19	19,3	19,8	19,4	In Range	1,81 lb	0,82 kg
19,3	19,9	19,9	19,7	In Range	1,28 lb	0,58 kg
19,3	19,4	19,4	19,4	In Range	3,27 lb	1,48 kg
			NA	NA	NA lb	NA kg
			NA	NA	NA lb	NA kg

Total Load Ave. MC (%-dry basis)	19,4	In Range	
Total Load Ave. MC % (wet basis)	16,3		
Total Test Load Weight (dry basis)			8,24 lb / 3,74 kg

Kindling Moisture (%-dry basis)

9	9	9	9,0	In Range	1,10 lb / 0,50 kg

Start-up Fuel Moisture Readings (%-dry basis)

20	20	20	20,0	In Range	2,08 lb / 0,94 kg

Total Wt. All Fuel Added (dry basis)	11,42 lb / 5,18 kg
Total Wt. All Fuel Burned (dry basis)	9,4 lb / 4,3 kg

Load high fire

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

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

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

Values to be input manually

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

Nominal Required Load Density (wet basis)	12	lb/ft^3					
Usable Firebox Volume	0,95	ft^3					
Total Nom. Load Wt. Target	11,4	lb					
Total Load Wt. Allowable Range	10,83	to	11,97	lb			
Core Target Wt. Allowable Range	5,13	to	7,41	lb			
Remainder Load Wt. Allowable Range	3,99	to	6,27	lb			
						Mid-Point	
Core Load Fuel Pc. Wt. Allowable Range	1,71	to	2,85	lb		2,28	
Remainder Load Pc. Wt. Allowable Range	1,14	to	3,42	lb		2,28	
	Pc. #						
Core Load Piece Wt. Actual	1	2,14	lb	In Range			
	2	1,91	lb	In Range			
	3	2,48	lb	In Range			
Core Load Total. Wt. Actual		6,53	lb	In Range			
	Pc. #						
Remainder Load Piece Wt.	1	2,00	lb	In Range			
(2 or 3 Pcs.)	2	3,07	lb	In Range			
	3		lb	NA			
Remainder Load Piece Weight Ratio - Small/Large		65%		In Range	≤ 67%		
Remainder Load Tot. Wt. Act		5,06	lb	In Range			
Total Load Wt. Actual		11,59	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		102%		In Range	95-105%		
Actual Fuel Load Density		12,2	lb/ft^3				
Allowable Charcoal Bed Wt. Range (lb)	1,2	to	2,3			Mid-Point	
Actual Charcoal Bed Wt.		2,0	lb	In Range		1,7	
Actual Fuel Load Ending Wt.		0,0	lb	Valid Test	≥ 90%		
Total Wt. of Fuel Burned During Test Run lb.		11,6	lb				
Load pieces Length in.		15	in.				

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis		
19,9	20	20,1	20,0	In Range	1,78 lb	0,81	kg
19,1	19,9	19,6	19,5	In Range	1,60 lb	0,73	kg
19,9	19,7	19,6	19,7	In Range	2,07 lb	0,94	kg
19,1	19,6	19	19,2	In Range	1,68 lb	0,76	kg
19	19,1	19,2	19,1	In Range	2,57 lb	1,17	kg
			NA	NA	NA lb	NA	kg

Total Load Ave. MC % (dry basis)	19,5	In Range		
Total Load Ave. MC % (wet basis)	16,3			
Total Test Load Weight (dry basis) →			9,70 lb	4,40 kg
Total Fuel Weight Burned During Test Run (dry basis)			9,7 lb	4,40 kg

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

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

Fuel Piece Moisture Reading (%-dry basis)

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

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

	Start	End
Barometer (kPa):	100,9	100,6
Barometer (in.Hg):	29,795759	29,70716882
Dry Bulb (F):	80,9	80,4
Humidity (%):	26,1	36,7
Air velocity (ft/min)	0	0

High fire test						
DGM #1	Final:	32772,151	cuft	Final:	928003,960	Liter
	Initial:	32758,653	cuft	Initial:	927621,740	Liter
DGM #2	Final:	30975,893	cuft	Final:	877139,600	Liter
	Initial:	30962,483	cuft	Initial:	876759,850	Liter
DGM room				Final:	591,960	cuft
				Initial:	575,450	cuft

min or med burnrate						
DGM #1	Final:	32840,875	cuft	Final:	929950,000	Liter
	Initial:	32772,253	cuft	Initial:	928006,840	Liter
DGM #2	Final:	31048,393	cuft	Final:	879192,550	Liter
	Initial:	30975,995	cuft	Initial:	877142,480	Liter
DGM room				Final:	673,710	cuft
				Initial:	591,960	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	137
Numéro de la ligne dans "Raw data" à partir duquel les données du highfire test commence	151
Numéro de la ligne dans "Raw data" à partir duquel les données du min ou medium fire test commence	208

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

Project nu.	PI 20196
Date	21-05-2019
Technicien	M.M

Filter set weight highfire

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	6	226	227	2	11	228	229	7	39	230	231	34	232		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	61,3744	0,0824	0,0839	35,4021	93,7217	0,0839	0,0819	34,3244	110,2778	0,0843	0,0825	35,1299	0,0819	2019-05-16	17:00
Before (6)	61,3745	0,0825	0,0840	35,4022	93,7217	0,0840	0,0818	34,3245	110,2777	0,0844	0,0826	35,1298	0,0818	2019-05-21	08:00
After (1)	61,3747	0,0844	0,0841	35,4027	93,7220	0,0842	0,0819	34,3258	110,2778	0,0868	0,0829	35,1305	0,0819	2019-05-21	13:00
After (2)	61,3747	0,0843	0,0841	35,4022	93,7220	0,0842	0,0819	34,3245	110,2778	0,0868	0,0828	35,1299	0,0819	2019-05-28	08:00
After (3)	61,3747	0,0843	0,0841	35,4022	93,7220	0,0842	0,0819	34,3245	110,2778	0,0868	0,0828	35,1299	0,0819	2019-05-29	08:00
After (4)															
After (5)															
After (6)	61,3747	0,0843	0,0841	35,4022	93,7220	0,0842	0,0819	34,3245	110,2778	0,0868	0,0828	35,1299	0,0819	2019-05-29	08:00
Difference	0,0002	0,0018	0,0001	0,0000	0,0003	0,0002	0,0001	0,0000	0,0001	0,0024	0,0002	0,0001	0,0001		
Total (mg)		2,1				2,7				2,8			0,1		
Total ajusté (mg)		**2,00**				**2,60**				**2,70**					

Project nu.	PI 20196
Date	21-05-2019
Technicien	M.M

Filter set weight Low/ medium fire

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	18	219	220	11	33	221	222	33	50	223	224	35	225		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108,9483	0,0836	0,0850	34,6241	109,3632	0,0852	0,0851	34,6514	107,6466	0,0819	0,0844	34,9026	0,0843	2019-05-16	17:00
Before (6)	108,9484	0,0837	0,0851	34,6241	109,3633	0,0853	0,0850	34,6515	107,6467	0,0820	0,0845	34,9027	0,0844	2019-05-21	08:00
After (1)	108,9485	0,0855	0,0851	34,6252	109,3634	0,0854	0,085	34,6526	107,6468	0,0839	0,0843	34,9033	0,0845	2019-05-21	17:00
After (2)	108,9485	0,0855	0,0851	34,6242	109,3633	0,0854	0,085	34,6516	107,6468	0,0839	0,0843	34,903	0,0845	2019-05-28	08:00
After (3)	108,9485	0,0855	0,0851	34,6242	109,3633	0,0854	0,085	34,6516	107,6468	0,0839	0,0843	34,903	0,0845	2019-05-29	08:00
After (4)															
After (5)															
After (6)	108,9485	0,0855	0,0851	34,6242	109,3633	0,0854	0,085	34,6516	107,6468	0,0839	0,0843	34,903	0,0845	2019-05-29	08:00
Difference	0,0001	0,0018	0,0000	0,0001	0,0000	0,0001	0,0000	0,0001	0,0001	0,0019	-0,0002	0,0003	0,0001		
Total (mg)		2				2,2				2,1			0,1		
Total ajusté (mg)		**1,90**				**2,10**				**2,00**					

Project nu.	PI 20196
Date	21-05-2019
Technicien	M.M

*		*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2	Tunnel Velo	Flue draft
Elapsed		Weight			Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp	Pressure	Pressure
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom									in wc	in wc
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF	in wc	in wc
0,00	137,00	3,8	0,0	0,1	71,3	71,7	75,1	71,5	68,3	69,8	72,2	70,3	0,12	71,89	71,90	83,33	0,09	72,14	72,11	83,38	0,07	0,00
1,0	138,0	3,2	0,0	0,1	125,6	71,5	78,2	71,9	68,3	69,8	72,4	70,1	0,19	72,67	71,70	82,75	0,18	72,68	71,70	82,41	0,07	0,02
2,0	139,0	3,6	0,0	1,1	203,4	71,8	80,0	72,2	68,4	69,9	72,5	70,3	0,19	73,02	71,73	82,26	0,18	72,83	71,72	81,87	0,07	0,04
3,0	140,0	3,5	0,0	3,3	347,1	71,9	87,1	72,9	68,5	70,1	72,7	69,9	0,19	73,23	71,75	81,83	0,18	72,97	71,74	81,46	0,07	0,07
4,0	141,0	3,3	0,1	5,4	483,7	72,1	95,9	74,5	68,7	70,2	72,9	70,3	0,19	73,37	71,79	81,45	0,18	73,10	71,77	81,16	0,07	0,08
5,0	142,0	3,1	0,1	8,0	588,0	72,2	103,9	77,5	68,9	70,4	73,1	70,5	0,19	73,57	71,84	81,09	0,18	73,26	71,84	80,96	0,06	0,09
6,0	143,0	2,8	0,2	9,9	647,0	72,3	110,2	83,6	69,2	70,7	73,4	70,7	0,19	73,68	71,91	81,29	0,18	73,41	71,90	81,32	0,06	0,09
7,0	144,0	2,6	0,2	11,0	681,0	72,5	114,8	94,4	69,6	71,2	73,9	70,7	0,19	73,86	71,97	82,73	0,18	73,57	71,96	83,86	0,06	0,09
8,0	145,0	2,3	0,2	11,8	704,9	72,5	119,3	109,8	70,1	71,8	74,5	70,8	0,19	74,12	72,07	82,48	0,18	73,76	72,07	84,32	0,06	0,09
9,0	146,0	2,0	0,3	12,2	747,5	72,6	124,1	129,6	70,9	72,7	75,4	71,2	0,19	74,31	72,14	82,16	0,18	73,97	72,16	84,17	0,06	0,10
10,0	147,0	1,8	0,4	14,7	793,6	72,9	128,4	153,8	72,0	74,0	76,4	71,4	0,19	74,49	72,26	81,94	0,18	74,17	72,27	83,96	0,06	0,10
11,0	148,0	1,5	0,4	15,7	790,2	73,1	130,4	182,5	73,4	75,5	77,8	71,5	0,19	74,79	72,37	81,78	0,18	74,44	72,40	83,78	0,06	0,10
12,0	149,0	1,2	0,3	15,1	775,6	73,5	130,7	213,6	75,1	77,4	79,6	71,4	0,19	75,11	72,50	81,66	0,18	74,67	72,55	83,64	0,06	0,10
13,0	150,0	1,0	0,3	14,2	755,6	73,5	130,1	247,1	77,2	79,6	81,8	71,8	0,19	75,42	72,64	81,59	0,18	74,95	72,68	83,53	0,06	0,10
14,0	151,0	10,7	0,2	13,1	617,7	73,8	130,4	276,8	79,7	82,4	84,7	72,4	0,19	75,78	72,77	81,53	0,18	75,20	72,80	83,53	0,06	0,09
15,0	152,0	10,5	0,5	4,7	601,0	73,6	122,1	300,8	82,4	85,7	88,0	72,2	0,19	75,95	72,89	81,49	0,18	75,40	72,94	83,40	0,06	0,09
16,0	153,0	10,3	0,4	5,9	680,4	73,9	124,5	315,7	85,4	88,6	91,1	71,9	0,19	76,01	72,99	81,52	0,18	75,58	73,08	83,34	0,06	0,10
17,0	154,0	10,1	0,2	10,0	771,6	74,1	131,2	326,4	88,6	91,1	93,9	72,2	0,19	76,11	73,14	81,56	0,18	75,76	73,21	83,39	0,06	0,10
18,0	155,0	9,8	0,1	13,6	792,0	74,2	134,1	337,3	91,9	93,5	96,6	72,3	0,19	76,28	73,26	81,68	0,18	75,95	73,34	83,49	0,06	0,10
19,0	156,0	9,6	0,1	13,6	810,4	74,1	135,9	349,5	95,7	95,8	99,3	72,9	0,19	76,50	73,41	81,78	0,18	76,18	73,47	83,62	0,06	0,10
20,0	157,0	9,3	0,1	13,9	837,3	74,2	139,3	365,8	99,4	98,3	102,2	72,7	0,19	76,66	73,52	81,87	0,18	76,36	73,60	83,77	0,06	0,10
21,0	158,0	9,0	0,2	15,6	815,3	74,5	139,4	383,5	103,5	100,8	105,3	73,0	0,19	76,91	73,68	82,03	0,18	76,59	73,80	83,88	0,06	0,10
22,0	159,0	8,8	0,2	14,2	799,5	74,7	138,6	400,8	107,6	103,6	108,8	72,8	0,19	77,21	73,81	82,21	0,18	76,83	73,93	84,05	0,06	0,10
23,0	160,0	8,5	0,2	13,3	789,9	75,0	138,2	416,7	111,7	106,4	112,5	73,2	0,19	77,47	73,96	82,42	0,18	77,07	74,09	84,25	0,06	0,10
24,0	161,0	8,3	0,2	12,9	786,1	75,0	137,0	431,4	115,6	109,5	116,6	74,3	0,19	77,70	74,11	82,59	0,18	77,31	74,26	84,40	0,06	0,10
25,0	162,0	8,1	0,2	12,8	780,8	75,1	137,4	444,3	119,3	112,3	120,9	74,3	0,19	77,93	74,28	82,78	0,18	77,53	74,40	84,64	0,06	0,10
26,0	163,0	7,9	0,1	12,6	775,1	75,4	137,7	455,1	122,7	115,5	125,2	73,4	0,19	78,15	74,42	83,00	0,18	77,73	74,57	84,82	0,06	0,10
27,0	164,0	7,7	0,1	12,4	769,5	75,6	136,7	464,5	126,7	118,4	129,7	73,6	0,19	78,30	74,54	83,21	0,18	77,89	74,71	85,01	0,06	0,10
28,0	165,0	7,4	0,1	12,1	761,8	75,7	135,8	471,5	130,4	121,3	134,2	74,1	0,19	78,46	74,70	83,43	0,18	78,09	74,86	85,21	0,06	0,10
29,0	166,0	7,3	0,1	11,8	757,3	75,8	135,5	476,2	133,7	124,2	138,0	74,5	0,19	78,66	74,84	83,64	0,18	78,28	75,03	85,39	0,06	0,10
30,0	167,0	7,0	0,1	11,7	755,8	76,1	135,7	480,3	137,0	126,9	142,1	74,8	0,19	78,89	74,97	83,82	0,18	78,47	75,15	85,56	0,06	0,10
31,0	168,0	6,8	0,1	11,9	753,9	76,1	135,6	484,2	139,5	130,0	146,1	74,1	0,19	79,05	75,13	84,05	0,18	78,66	75,32	85,79	0,06	0,10
32,0	169,0	6,7	0,1	11,7	750,4	76,1	134,7	487,7	141,7	132,6	150,1	74,3	0,19	79,15	75,23	84,27	0,18	78,81	75,44	85,97	0,06	0,10
33,0	170,0	6,5	0,1	11,7	747,5	76,2	135,1	489,9	145,3	135,2	153,6	74,4	0,19	79,25	75,38	84,48	0,18	78,93	75,57	86,16	0,06	0,10
34,0	171,0	6,3	0,1	11,6	742,6	76,3	134,5	492,4	148,2	137,5	157,2	75,1	0,19	79,34	75,47	84,65	0,18	79,07	75,69	86,33	0,06	0,10
35,0	172,0	6,0	0,1	11,4	740,3	76,5	133,5	492,8	150,4	140,2	160,7	76,7	0,19	79,45	75,59	84,82	0,18	79,19	75,83	86,51	0,07	0,10
36,0	173,0	5,9	0,1	11,3	738,6	76,3	133,4	493,1	151,2	142,8	164,4	75,4	0,19	79,56	75,71	84,98	0,18	79,32	75,96	86,67	0,06	0,10
37,0	174,0	5,7	0,1	11,4	739,3	77,0	133,8	493,4	154,4	145,2	167,5	75,1	0,19	79,72	75,83	85,20	0,18	79,46	76,08	86,83	0,06	0,10
38,0	175,0	5,5	0,1	11,5	733,1	76,8	132,9	494,0	157,2	147,7	170,7	75,0	0,19	79,90	75,95	85,41	0,18	79,61	76,21	86,99	0,06	0,10
39,0	176,0	5,4	0,1	11,2	730,0	77,0	132,8	493,5	158,4	150,2	174,0	75,1	0,19	80,05	76,10	85,60	0,18	79,76	76,34	87,16	0,06	0,10
40,0	177,0	5,4	0,1	10,9	721,1	76,9	131,8	492,5	160,8	152,4	176,6	75,8	0,19	80,16	76,21	85,76	0,18	79,89	76,47	87,30	0,06	0,10
41,0	178,0	5,0	0,1	10,3	710,1	77,1	131,3	490,7	161,9	154,7	179,9	128,7	0,19	80,28	76,35	85,87	0,18	80,06	76,61	87,41	0,06	0,10
42,0	179,0	4,9	0,1	9,5	701,9	77,2	130,3	488,1	164,5	157,0	182,8	131,6	0,19	80,39	76,46	85,98	0,18	80,17	76,70	87,51	0,06	0,10
43,0	180,0	4,8	0,1	9,1	695,6	77,1	129,7	483,3	165,6	159,1	185,2	134,5	0,19	80,51	76,59	86,16	0,18	80,30	76,86	87,63	0,06	0,10
44,0	181,0	4,6	0,1	9,1	692,3	77,2	129,1	478,7	168,0	160,5	187,7	137,2	0,19	80,55	76,71	86,24	0,18	80,39	76,99	87,74	0,06	0,10
45,0	182,0	4,5	0,1	9,1	688,8	77,2	129,0	473,2	170,1	162,2	189,5	140,1	0,19	80,59	76,81	86,38	0,18	80,47	77,07	87,86	0,06	0,09
46,0	183,0	4,4	0,1	9,1	685,7	77,5	128,7	467,5	170,4	163,9	191,4	142,8	0,19	80,69	76,92	86,51	0,18	80,55	77,17	87,96	0,06	0,09
47,0	184,0	4,2	0,1	9,2	684,0	77,5	128,9	462,5	172,7	165,3	193,0	145,7	0,19	80,79	77,06	86,65	0,18	80,64	77,30	88,05	0,06	0,10
48,0	185,0	4,1	0,1	9,2	682,3	77,5	128,3	456,5	174,4	166,5	194,5	148,5	0,19	80,87	77,15	86,75	0,18	80,75	77,40	88,11	0,06	0,09
49,0	186,0	4,0	0,1	9,3	680,9	77,7	128,0	451,8	174,6	167,6	196,0	151,0	0,19	80,95	77,27	86,88	0,18	80,84	77,51	88,18	0,07	0,09
50,0	187,0	3,8	0,1	9,4	680,4	77,5	127,4	448,6	177,4	168,7	197,4	154,0	0,19	81,05	77,37	86,97	0,18	80,93	77,64	88,24	0,06	0,10
51,0	188,0	3,7	0,1	9,4	679,5	77,7	127,4	444,1	178,6	169,5	198,8	156,7	0,19	81,11	77,47	87,03	0,18	81,02	77,73	88,31	0,06	0,09
52,0	189,0	3,6	0,1	9,4	680,2	77,5	127,0	441,6	179,9	170,3	199,8	159,5	0,19	81,19	77,56	87,12	0,18	81,11	77,85	88,38	0,06	0,09
53,0	190,0	3,4	0,1	9,5	682,4	77,7	127,5	439,4	182,1	171,2	201,5	162,4	0,19	81,24	77,67	87,15	0,18	81,14	77,95	88,42	0,06	0,10
54,0	191,0	3,3	0,1	9,6	683,9	77,7	127,7	438,2	184,3	171,9	203,0	165,3	0,19	81,33	77,77	87,22	0,18	81,24	78,04	88,45	0,07	0,10
55,0	192,0	3,2	0,1	9,7	685,9	77,8	127,8	436,6	184,8	172,8	204,5	168,0	0,19	81,43	77,86	87,29	0,18	81,32	78,11	88,50	0,07	0,09
56,0	193,0	3,1	0,1	9,9	685,8	77,4	127,2	436,8	187,9	173,1	205,1	170,9	0,19	81,57	77,94	87,31	0,18	81,42	78,23	88,53	0,07	0,10
57,0	194,0	2,9	0,1	9,9	686,5	77,8	127,4	437,4	189,5	173,6	206,4	173,5	0,19	81,63	78,04	87,32	0,18	81,51	78,30	88,51	0,07	0,10
58,0	195,0	2,8	0,1	10,0	685,1	77,8	127,6	438,7	190,3	174,9	208,1	175,9	0,19	81,81	78,13	87,41	0,18	81,60	78,41	88,55	0,06	0,10
59,0	196,0	2,7	0,1	10,1	682,6	78,2	126,8	439,4	193,1	175,4	209,0	178,7	0,19	81,88	78,23	87,47	0,18	81,66	78,50	88,60	0,06	0,10
60,0	197,0	2,6	0,1	9,6	676,4	78,3	126,8	441,3	195,4	176,4	210,3	181,3	0,19	82,04	78,34	87,15	0,18	81,75	78,60	88,65	0,07	0,09
61,0	198,0	2,5	0,0	9,0	669,5	78,2	126,1	441,8	196,4	177,4	211,8	183,9	0,19	82,20	78,40	87,12	0,18	81,84	78,70	88,68	0,06	0,09
62,0	199,0	2,4	0,1	8,6	664,5	78,6	126,2	440,5	199,0	178,4	213,1	186,5	0,19	82,33	78,48	87,04	0,18	81,96	78,80	88,74	0,06	0,09
63,0	200,0	2,3	0,1	8,4	659,2	78,2	124,9	438,9	201,9	179,1	213,9	189,2	0,19	82,42	78,59	86,98	0,18	82,05	78,88	88,78	0,06	0,09
64,0	201,0	2,3	0,1	8,0	650,8	78,3	124,5	437,2	204,6	179,6	214,8	192,0	0,19	82,45	78,66	86,88	0,18	82,11	78,95	88,83	0,06	0,09
65,0	202,0	2,2	0,1	7,7	642,3	78,3	124,0	431,7	205,6	180,3	215,7	194,9	0,19	82,48	78,72	86,73	0,18	82,13	79,02	88,85	0,07	0,09
66,0	203,0	2,1	0,1	7,4	633,6	78,5	123,1	426,6	207,2	181,2	217,1	197,6	0,19	82,57	78,80	86,57	0,18	82,19	79,10	88,89	0,07	0,09
67,0	204,0	2,0	0,1	7,0	625,4	78,7	122,7	421,5	209,2	182,4	218,5	199,9	0,19	82,68	78,89	86,48	0,18	82,27	79,21	88,90	0,06	0,09

*		*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2	Tunnel Velo	Flue draft
Elapsed		Weight			Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp	Pressure	Pressure
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom									in wc	in wc
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF	in wc	in wc
0,00	208,00	11,4	0,2	6,6	547,0	78,5	128,5	394,2	215,4	184,6	222,4	211,5	0,19	82,63	79,23	84,55	0,18	82,24	79,59	85,27	0,06	0,09
1,0	209,0	11,2	0,2	4,0	711,7	78,6	130,6	385,6	217,5	185,1	223,2	214,1	0,19	82,71	79,26	84,45	0,18	82,26	79,61	85,61	0,06	0,10
2,0	210,0	10,8	0,1	12,9	867,7	78,6	141,8	384,0	221,4	184,8	223,5	217,0	0,19	82,73	79,31	84,39	0,18	82,34	79,65	86,24	0,06	0,11
3,0	211,0	10,5	0,1	17,9	913,8	78,8	147,7	390,4	224,0	184,6	223,4	219,7	0,19	82,81	79,36	84,38	0,18	82,47	79,73	86,99	0,06	0,11
4,0	212,0	10,2	0,0	18,5	945,8	78,7	152,3	403,2	227,5	184,1	223,1	222,1	0,19	83,04	79,51	84,46	0,18	82,66	79,85	87,75	0,06	0,11
5,0	213,0	9,8	0,1	18,9	975,9	78,6	154,5	420,1	230,6	184,1	222,8	224,3	0,19	83,31	79,62	84,51	0,18	82,87	79,95	88,53	0,06	0,11
6,0	214,0	9,5	0,1	19,4	986,4	78,5	158,0	439,8	231,9	184,9	222,6	226,2	0,19	83,64	79,75	84,71	0,18	83,13	80,10	88,35	0,06	0,11
7,0	215,0	9,2	0,1	19,3	995,8	78,4	159,3	461,8	234,1	185,6	223,3	227,9	0,19	83,92	79,88	84,96	0,18	83,38	80,25	89,16	0,06	0,11
8,0	216,0	8,9	0,1	19,2	992,6	78,9	159,9	481,9	237,5	186,9	223,8	229,0	0,19	84,22	80,00	85,27	0,18	83,63	80,40	89,91	0,06	0,11
9,0	217,0	8,6	0,1	18,8	940,3	78,8	152,5	499,6	240,6	188,6	224,1	230,5	0,19	84,55	80,14	85,60	0,18	83,86	80,57	89,36	0,06	0,11
10,0	218,0	8,3	0,1	18,9	917,8	78,7	148,8	513,7	244,4	189,8	224,2	231,3	0,19	84,69	80,24	85,97	0,18	84,01	80,68	89,60	0,06	0,11
11,0	219,0	8,1	0,1	18,2	917,5	78,7	148,1	526,5	244,5	190,8	225,7	232,6	0,19	84,84	80,36	86,33	0,18	84,16	80,82	88,36	0,06	0,11
12,0	220,0	7,8	0,1	18,2	918,3	78,5	146,5	536,1	247,3	191,7	226,8	233,5	0,19	84,99	80,45	86,73	0,18	84,25	80,89	87,87	0,06	0,11
13,0	221,0	7,5	0,1	18,4	914,3	79,0	146,6	543,8	249,1	192,9	227,8	233,9	0,19	85,04	80,55	87,11	0,18	84,34	81,04	87,73	0,06	0,11
14,0	222,0	7,3	0,1	18,3	872,5	78,7	142,6	550,2	251,7	193,8	228,4	234,7	0,19	85,06	80,63	87,45	0,18	84,41	81,11	87,70	0,06	0,10
15,0	223,0	7,1	0,2	18,1	657,7	78,7	124,0	553,9	254,7	195,3	230,1	235,8	0,19	85,13	80,70	87,81	0,18	84,44	81,21	86,98	0,06	0,10
16,0	224,0	6,9	0,7	16,3	590,1	78,8	116,5	555,5	257,7	196,6	231,0	236,3	0,19	85,08	80,74	88,10	0,18	84,42	81,27	86,40	0,07	0,09
17,0	225,0	6,8	0,5	15,0	544,1	78,7	112,3	552,2	261,5	197,5	231,5	236,6	0,19	84,79	80,76	88,29	0,18	84,28	81,28	86,00	0,07	0,09
18,0	226,0	6,7	0,5	13,7	511,5	78,4	109,6	545,9	264,1	198,3	232,3	236,9	0,19	84,56	80,76	88,42	0,18	84,15	81,27	85,67	0,07	0,09
19,0	227,0	6,6	0,5	13,4	485,8	78,4	107,4	535,4	268,1	198,6	232,8	236,9	0,19	84,41	80,74	88,54	0,18	84,02	81,29	85,41	0,07	0,09
20,0	228,0	6,5	0,5	13,3	466,4	78,2	105,0	523,8	270,7	198,4	232,3	237,2	0,19	84,18	80,72	88,56	0,18	83,88	81,26	85,16	0,06	0,08
21,0	229,0	6,3	0,5	13,3	454,0	77,7	104,2	514,4	272,3	197,9	233,2	236,8	0,19	84,01	80,71	88,58	0,18	83,74	81,23	84,93	0,07	0,08
22,0	230,0	6,2	0,5	13,4	441,8	78,1	103,3	503,2	275,1	197,8	233,5	236,0	0,19	83,97	80,73	88,62	0,18	83,63	81,23	84,74	0,07	0,08
23,0	231,0	6,1	0,5	13,4	432,7	77,7	101,8	494,1	276,1	197,5	233,0	235,8	0,19	83,84	80,69	88,59	0,18	83,50	81,22	85,10	0,07	0,08
24,0	232,0	6,0	0,5	13,2	423,6	76,2	101,5	486,8	278,1	196,9	233,2	234,7	0,19	83,69	80,66	88,52	0,18	83,35	81,16	85,58	0,07	0,08
25,0	233,0	5,8	0,5	13,4	416,4	76,4	100,0	478,2	278,6	196,3	232,9	233,8	0,19	83,55	80,66	88,39	0,18	83,23	81,15	85,88	0,07	0,08
26,0	234,0	5,7	0,5	13,4	410,1	75,6	100,0	470,9	280,2	195,5	232,7	232,8	0,19	83,37	80,63	88,23	0,18	83,10	81,13	86,09	0,07	0,08
27,0	235,0	5,6	0,5	13,6	408,2	76,0	98,9	463,2	281,0	194,8	232,2	231,8	0,19	83,28	80,58	88,09	0,18	82,98	81,11	86,28	0,06	0,08
28,0	236,0	5,4	0,5	13,9	406,9	75,3	99,6	458,0	281,7	194,1	231,9	230,6	0,19	83,09	80,56	87,97	0,18	82,86	81,09	86,42	0,07	0,08
29,0	237,0	5,3	0,5	14,2	405,1	75,3	98,3	453,4	282,1	193,1	231,4	229,3	0,19	82,90	80,52	87,82	0,18	82,70	81,05	86,45	0,07	0,08
30,0	238,0	5,2	0,5	14,3	403,2	76,4	97,5	450,2	282,3	192,0	230,8	227,9	0,19	82,81	80,47	87,67	0,18	82,56	81,00	86,43	0,07	0,08
31,0	239,0	5,1	0,4	14,1	399,3	76,0	96,6	448,0	281,5	191,1	230,2	226,5	0,19	82,72	80,43	87,53	0,18	82,42	81,00	86,42	0,07	0,08
32,0	240,0	4,9	0,5	14,2	394,4	75,8	96,7	444,8	282,0	190,4	229,7	225,1	0,19	82,54	80,41	87,42	0,18	82,21	80,94	86,30	0,07	0,08
33,0	241,0	4,8	0,5	14,5	392,4	75,6	95,4	443,5	279,8	189,5	228,9	224,0	0,19	82,38	80,35	87,19	0,18	82,09	80,89	86,17	0,07	0,08
34,0	242,0	4,7	0,5	14,6	388,6	75,5	95,4	444,3	279,8	189,1	229,0	223,7	0,19	82,30	80,28	86,94	0,18	81,93	80,82	85,97	0,07	0,08
35,0	243,0	4,6	0,5	14,5	384,3	75,6	95,2	443,7	279,7	188,9	228,3	222,3	0,19	82,38	80,23	86,73	0,18	81,88	80,80	85,87	0,07	0,08
36,0	244,0	4,5	0,4	14,4	382,4	75,5	94,8	445,3	280,5	188,7	228,6	221,2	0,19	82,42	80,23	86,62	0,18	81,87	80,78	85,77	0,06	0,07
37,0	245,0	4,3	0,4	14,2	379,5	75,7	95,0	445,8	280,7	188,6	228,1	220,0	0,19	82,40	80,21	86,49	0,18	81,87	80,78	85,65	0,07	0,07
38,0	246,0	4,3	0,3	14,1	379,1	76,2	94,8	444,3	280,6	188,5	227,4	218,7	0,19	82,50	80,20	86,30	0,18	81,86	80,76	85,56	0,06	0,07
39,0	247,0	4,2	0,3	14,0	378,9	75,8	94,4	444,3	281,2	188,0	226,9	217,4	0,19	82,46	80,20	86,18	0,18	81,80	80,77	85,39	0,06	0,07
40,0	248,0	4,1	0,3	14,0	377,2	75,3	93,8	443,9	282,2	187,9	226,6	216,0	0,19	82,30	80,16	86,02	0,18	81,71	80,72	85,19	0,06	0,07
41,0	249,0	4,0	0,3	14,1	375,5	75,7	93,7	444,9	282,8	187,6	225,3	214,8	0,19	82,22	80,12	85,82	0,18	81,59	80,71	85,06	0,06	0,07
42,0	250,0	3,9	0,3	14,0	372,3	75,8	94,2	444,6	282,9	187,6	224,9	213,3	0,19	82,20	80,12	85,71	0,18	81,58	80,67	85,00	0,06	0,07
43,0	251,0	3,8	0,2	13,6	368,0	75,6	93,1	445,1	282,4	187,4	224,6	212,1	0,19	82,24	80,11	85,56	0,18	81,56	80,67	84,86	0,07	0,07
44,0	252,0	3,7	0,9	13,1	362,5	75,3	92,9	443,9	281,3	187,8	224,3	211,0	0,19	82,28	80,09	85,40	0,18	81,55	80,66	84,78	0,07	0,07
45,0	253,0	3,7	0,6	12,3	356,2	75,9	93,1	441,1	281,8	187,8	222,9	209,8	0,19	82,33	80,12	85,22	0,18	81,59	80,66	84,66	0,06	0,07
46,0	254,0	3,6	0,3	11,7	349,8	76,0	91,7	438,6	281,5	187,6	222,3	208,5	0,19	82,31	80,08	85,05	0,18	81,50	80,64	84,54	0,06	0,07
47,0	255,0	3,6	0,3	11,1	344,0	75,7	91,6	435,2	281,6	187,3	222,2	207,5	0,19	82,27	80,03	84,92	0,18	81,42	80,63	84,40	0,07	0,07
48,0	256,0	3,6	0,3	10,8	337,9	75,6	90,6	431,7	282,4	186,7	220,7	206,3	0,19	82,19	80,04	84,80	0,18	81,41	80,62	84,26	0,07	0,07
49,0	257,0	3,5	0,3	10,4	332,0	75,5	90,3	426,3	280,2	186,5	220,4	205,2	0,19	82,14	80,04	84,64	0,18	81,38	80,63	84,10	0,07	0,07
50,0	258,0	3,4	0,3	10,1	326,1	75,3	90,3	420,0	280,5	185,9	219,7	204,1	0,19	82,24	80,03	84,50	0,18	81,40	80,60	84,04	0,06	0,06
51,0	259,0	3,4	0,3	9,8	320,9	75,5	90,0	413,4	280,2	185,1	219,0	203,1	0,19	82,29	80,04	84,33	0,18	81,43	80,60	83,91	0,06	0,06
52,0	260,0	3,4	0,3	9,5	315,6	75,2	89,9	406,4	279,3	184,6	218,1	202,1	0,19	82,33	80,03	84,20	0,18	81,43	80,60	83,82	0,06	0,06
53,0	261,0	3,3	0,3	9,3	310,4	75,8	89,6	398,7	278,7	184,1	217,2	201,1	0,19	82,33	80,02	84,01	0,18	81,43	80,59	83,70	0,06	0,06
54,0	262,0	3,3	0,4	9,0	306,1	76,0	89,9	390,9	279,2	183,2	216,5	200,2	0,19	82,30	80,04	83,87	0,18	81,42	80,60	83,60	0,07	0,06
55,0	263,0	3,2	0,3	9,0	302,3	75,9	89,2	383,8	279,4	182,4	215,2	199,3	0,19	82,19	80,02	83,75	0,18	81,39	80,61	83,46	0,07	0,06
56,0	264,0	3,2	0,4	9,0	298,6	75,5	88,9	377,6	278,9	181,7	214,7	198,2	0,19	82,12	79,97	83,66	0,18	81,31	80,59	83,33	0,07	0,06
57,0	265,0	3,2	0,4	8,9	295,5	75,7	88,1	371,6	279,1	180,2	214,0	197,1	0,19	82,00	79,93	83,53	0,18	81,22	80,55	83,18	0,07	0,06
58,0	266,0	3,1	0,4	9,0	293,1	75,2	87,8	365,9	278,4	179,7	213,0	196,4	0,19	82,05	79,97	83,39	0,18	81,18	80,53	83,07	0,07	0,06
59,0	267,0	3,1	0,4	9,1	290,8	75,6	87,4	360,5	277,9	179,3	211,7	195,6	0,19	81,94	79,92	83,12	0,18	81,16	80,52	82,90	0,07	0,06
60,0	268,0	3,0	0,4	9,1	289,8	74,6	88,1	354,6	278,0	178,3	210,8	194,6	0,19	81,88	79,93	82,93	0,18	81,13	80,47	82,78	0,07	0,06
61,0	269,0	3,0	0,4	9,2	288,8	75,4	87,0	350,2	276,1	177,8	210,2	193,9	0,19	81,93	79,93	82,76	0,18	81,12	80,46	82,70	0,07	0,06
62,0	270,0	2,9	0,4	9,3	288,3	75,0	86,6	345,5	276,4	177,4	209,0	193,3	0,19	81,83	79,93	84,86	0,18	81,09	80,44	82,58	0,07	0,06
63,0	271,0	2,9	0,4	9,4	287,0	74,9	87,8	341,8	274,1	177,3	208,7	192,7	0,19	81,88	79,93	84,66	0,18	81,07	80,43	82,49	0,07	0,06
64,0	272,0	2,9	0,5	9,6	287,1	75,1	87,8	338,1	273,5	176,3	208,0	191,9	0,19	82,03	79,93	84,31	0,18	81,13	80,44	82,45	0,07	0,06
65,0	273,0	2,8	0,5	9,6	287,8	75,5	87,2	335,4	273,7	175,4	207,2	191,2	0,19	82,11	79,95	83,99	0,18	81,16	80,44	82,37	0,07	0,06
66,0	274,0	2,8	0,5	9,8	287,2	75,1	87,4	332,2	272,2	174,9	206,7	190,5	0,19	82,13	79,93	83,67	0,18	81,18	80,44	82,30	0,07	0,06
67,0	275,0	2,7	0,5	9,9	286,8	75,1	87,6	329,8	271,0	174,6	206,1	190,0	0,19	82,19	79,99	83,40	0,18	81,24	80,47	82,22	0,07	0,06
68,0	276,0	2,7	0,5	10,1	286,6	75,0	87,0	328,3	269,0	174,6	205,3	189,2	0,19	82,21	80,00	83,13	0,18	81,25	80,47	82,14	0,07	0,06
69,0	277,0	2,6	0,5	10,0	286,5	75,4	86,6	326,6	267,9	174,0	204,7	188,5	0,19	82,19	80,01	82,94	0,18	81,24	80,46	82,06	0,07	0,06
70,0	278,0	2,6	0,5	10,0	285,3	75,3	86,8	325,8	267,8	173,3	204,5	188,0	0,19	82,17	80,02	82,78	0,18	81,25	80,45	81,97	0,06	0,06
71,0	279,0	2,6	0,4	9,6	284,1	75,8	87,3	324,2	268,2	172,3	203,8	187,3	0,19	82,15	80,00	82,55	0,18	81,24	80,44	81,92	0,07	0,06
72,0	280,0	2,5	0,4	9,2	280,8	75,5	86,3	324,1	268,8	171,7	202,7	186,7	0,19	82,12	80,00	82,36	0,18	81,25	80,44	81,78	0,07	0,06
73,0	281,0	2,5	0,3	8,7	275,9	75,3	87,2	323,3	268,0	171,1	202,1	186,0	0,19	82,13	80,02	82,22	0,18	81,25	80,47	81,75	0,07	0,06
74,0	282,0	2,5	0,4	8,3	272,2	75,4	88,5	321,5	266,2	170,9	202,0	185,6	0,19	82,29	80,06	82,11	0,18	81,34	80,48	81,73	0,06	0,05
75,0	283,0	2,4	0,4	8,0	268,0	75,9	89,5	319,4	265,8	170,4	201,8	185,1	0,19	82,53	80,14	82,03	0,18	81,48	80,55	81,75	0,07	0,05
76,0	284,0	2,4	0,4	7,9	264,1	75,7	90,9	316,9	265,7	170,2	201,3	184,6	0,19	82,81	80,23	83,05	0,18	81,71	80,65	83,96	0,07	0,05
77,0	285,0	2,4	0,4	7,9	261,0	76,4	91,9	314,0	265,9	170,2	201,3	184,3	0,19	83,11	80,40	83,70	0,18	81,99	80,79	84,44	0,06	0,05
78,0	286,0	2,4	0,5	7,9	258,2	76,3	92,6	311,0	264,4	170,1	200,8	183,8	0,19	83,43	80,55	83,79	0,18	82,28	80,94	84,36	0,07	0,05
79,0	287,0	2,4	0,5	7,8	256,2	76,5	93,6	307,8	263,5	170,3	200,7	183,3	0,19	83,73	80,72	83,75	0,18	82,55	81,13	84,25	0,07	0,05
80,0	288,0	2,3	0,5	7,9	254,6	76,8	94,1	304,3	264,2	170,1	200,2	183,0	0,19	84,00	80,88	83,68	0,18	82,83	81,28	84,15	0,07	0,05
81,0	289,0	2,3	0,5	7,8	252,8	77,0	94,5	301,5	263,3	169,7	199,7	182,6	0,19	84,28	81,08	83,70	0,18	83,11	81,45	84,10	0,07	0,05
82,0	290,0	2,2	0,5	7,8	250,4	77,4	95,1	298,2	262,5	169,8	198,9	182,0	0,19	84,53	81,24	83,69	0,18	83,38	81,60	84,10	0,07	0,05
83,0	291,0	2,2	0,5	7,7	249,4	77,7	95,3	294,8	262,8	169,3	198,1	181,6	0,19	84,75	81,43	83,64	0,18	83,64	81,75	84,06	0,06	0,05
84,0	292,0	2,2	0,5	7,7	247,2	78,1	95,7	291,8	261,8	169,1	197,5	181,2	0,19	84,97	81,60	83,58	0,18	83,89	81,92	84,07	0,07	0,05
85,0	293,0	2,2	0,5	7,7	245,5	78,0	96,1	288,7	261,9	168,9	196,9	181,0	0,19	85,18	81,80	83,62	0,18	84,14	82,09	84,10	0,07	0,05
86,0	294,0	2,2	0,5	7,7	244,2	78,0	96,0	285,5	260,7	168,4	196,1	180,6	0,19	85,32	81,97	83,63	0,18	84,37	82,24	84,13	0,06	0,05
87,0	295,0	2,1	0,5	7,7	242,7	78,4	96,0	282,5	260,3	168,0	195,5	180,1	0,19	85,46	82,11	83,56	0,18	84,51	82,37	84,14	0,07	0,05
88,0	296,0	2,1	0,5	7,7	241,1	77,9	95,3	279,7	259,8	167,3	195,2	179,7	0,19	85,46	82,20	83,55	0,18	84,59	82,48	84,15	0,07	0,05

89,0	297,0	2,1	0,5	7,7	240,3	78,0	93,9	277,0	259,9	166,6	194,2	179,3	0,19	85,37	82,22	83,46	0,18	84,58	82,52	84,11	0,07	0,05
90,0	298,0	2,0	0,5	7,7	239,7	77,1	92,7	274,7	259,7	166,3	193,4	178,8	0,19	85,25	82,22	83,42	0,18	84,53	82,51	84,04	0,07	0,05
91,0	299,0	2,0	0,5	7,8	239,4	77,5	91,9	272,4	259,1	166,1	192,7	178,5	0,19	85,11	82,22	83,38	0,18	84,47	82,49	83,99	0,07	0,05
92,0	300,0	2,0	0,5	7,9	239,4	78,1	91,2	270,5	258,7	166,2	191,9	178,1	0,19	85,06	82,21	83,34	0,18	84,44	82,52	83,98	0,07	0,05
93,0	301,0	2,0	0,5	8,0	240,0	77,5	90,8	268,6	258,4	166,1	191,1	177,7	0,19	85,02	82,23	83,33	0,18	84,40	82,50	83,93	0,07	0,05
94,0	302,0	1,9	0,5	8,2	240,1	77,7	90,4	266,9	258,5	165,8	190,2	177,4	0,19	84,96	82,21	83,25	0,18	84,36	82,51	83,89	0,07	0,05
95,0	303,0	1,9	0,5	8,4	240,7	77,4	90,0	265,3	256,7	165,9	189,7	177,1	0,19	84,88	82,24	83,25	0,18	84,33	82,50	83,87	0,07	0,05
96,0	304,0	1,9	0,5	8,5	240,2	77,2	89,6	264,4	257,4	165,6	189,0	176,8	0,19	84,79	82,24	83,19	0,18	84,29	82,51	83,84	0,07	0,05
97,0	305,0	1,9	0,4	8,2	238,4	77,4	89,4	263,1	255,5	165,6	188,4	176,5	0,19	84,73	82,26	83,18	0,18	84,24	82,48	83,79	0,07	0,05
98,0	306,0	1,9	0,5	7,4	236,3	77,3	89,2	261,6	254,7	165,6	188,1	176,5	0,19	84,69	82,24	83,11	0,18	84,18	82,49	83,72	0,06	0,05
99,0	307,0	1,8	0,5	7,0	232,3	77,5	88,7	260,6	254,1	165,6	187,5	176,3	0,19	84,61	82,24	83,10	0,18	84,14	82,50	83,69	0,07	0,05
100,0	308,0	1,8	0,7	6,3	228,4	77,3	88,3	259,1	253,3	165,5	187,1	176,1	0,19	84,56	82,24	83,09	0,18	84,09	82,47	83,64	0,07	0,05
101,0	309,0	1,8	0,7	6,0	224,9	77,9	87,9	257,3	253,8	164,8	186,7	175,9	0,19	84,50	82,24	83,04	0,18	84,04	82,48	83,54	0,07	0,04
102,0	310,0	1,8	0,8	5,8	222,1	77,7	87,8	255,1	252,8	164,6	186,2	175,9	0,19	84,44	82,23	82,98	0,18	83,97	82,46	83,47	0,07	0,04
103,0	311,0	1,8	0,9	5,7	218,8	76,9	87,7	252,7	253,8	163,7	185,4	175,5	0,19	84,39	82,19	82,92	0,18	83,90	82,43	83,40	0,07	0,04
104,0	312,0	1,8	1,1	5,4	216,1	77,2	87,5	250,4	254,2	162,7	184,7	175,3	0,19	84,25	82,18	82,86	0,18	83,79	82,41	83,34	0,07	0,04
105,0	313,0	1,8	1,1	5,4	213,7	76,6	86,9	247,1	254,1	161,9	184,2	175,1	0,19	83,97	82,12	82,80	0,18	83,65	82,38	83,21	0,07	0,04
106,0	314,0	1,8	1,1	5,3	211,4	77,1	86,1	243,9	252,8	161,8	183,4	174,7	0,19	83,71	82,09	82,68	0,18	83,49	82,32	83,11	0,07	0,04
107,0	315,0	1,7	1,1	5,4	209,0	76,8	86,2	241,4	253,5	161,7	182,9	174,7	0,19	83,51	82,02	82,58	0,18	83,33	82,29	82,98	0,07	0,04
108,0	316,0	1,7	1,1	5,4	206,5	76,4	86,7	238,6	253,1	161,4	182,2	174,5	0,19	83,49	81,99	82,52	0,18	83,25	82,25	82,90	0,07	0,04
109,0	317,0	1,7	1,1	5,5	204,6	76,6	86,3	235,7	252,1	161,0	181,6	174,3	0,19	83,50	81,97	82,44	0,18	83,16	82,19	82,82	0,07	0,04
110,0	318,0	1,7	1,1	5,6	202,9	76,6	85,9	232,9	252,2	160,8	181,0	174,1	0,19	83,53	81,96	82,41	0,18	83,14	82,21	82,74	0,07	0,04
111,0	319,0	1,7	1,1	5,6	201,4	76,9	86,0	230,3	252,2	160,1	180,3	174,0	0,19	83,51	81,93	82,31	0,18	83,09	82,15	82,64	0,07	0,04
112,0	320,0	1,7	1,1	5,6	200,3	76,5	85,8	227,2	251,6	159,5	180,0	173,8	0,19	83,48	81,92	82,23	0,18	83,01	82,11	82,59	0,07	0,04
113,0	321,0	1,7	1,1	5,6	198,6	76,6	86,2	224,9	251,2	158,7	179,2	173,7	0,19	83,46	81,90	82,18	0,18	82,95	82,09	82,48	0,07	0,04
114,0	322,0	1,6	1,1	5,7	197,1	76,4	87,1	222,5	251,6	158,3	178,7	173,4	0,19	83,53	81,90	82,14	0,18	82,99	82,08	82,42	0,07	0,04
115,0	323,0	1,6	1,1	5,8	194,9	76,2	88,5	220,7	250,8	157,6	178,0	173,2	0,19	83,65	81,90	82,10	0,18	83,03	82,12	82,37	0,07	0,04
116,0	324,0	1,6	1,1	5,8	193,3	76,2	90,3	218,9	250,8	157,8	177,4	172,9	0,19	83,86	81,98	82,11	0,18	83,18	82,18	82,39	0,07	0,04
117,0	325,0	1,6	1,1	5,8	192,0	76,9	91,8	217,4	250,6	157,8	176,8	172,8	0,19	84,12	82,09	82,18	0,18	83,39	82,27	82,46	0,07	0,04
118,0	326,0	1,6	1,1	5,9	190,6	77,0	92,8	215,9	251,2	157,7	176,3	172,7	0,19	84,37	82,22	82,23	0,18	83,64	82,43	82,55	0,06	0,04
119,0	327,0	1,6	1,2	6,1	189,6	77,7	92,8	213,9	251,0	157,4	175,6	172,6	0,19	84,62	82,34	82,36	0,18	83,86	82,56	82,64	0,07	0,04
120,0	328,0	1,6	1,1	6,1	188,8	78,6	91,6	211,7	251,2	156,7	174,8	172,4	0,19	84,76	82,38	82,50	0,18	83,90	82,61	82,79	0,07	0,04
121,0	329,0	1,6	1,1	6,1	188,7	78,2	89,9	210,3	251,5	156,0	174,3	172,2	0,19	84,79	82,40	82,61	0,18	83,91	82,63	82,89	0,07	0,04
122,0	330,0	1,5	1,1	6,2	188,6	77,9	88,8	208,6	251,5	155,2	173,6	172,1	0,19	84,72	82,37	82,59	0,18	83,87	82,61	82,89	0,07	0,04
123,0	331,0	1,5	1,1	6,2	188,1	78,1	87,8	207,1	252,1	154,5	173,1	171,8	0,19	84,59	82,37	82,58	0,18	83,80	82,59	82,86	0,07	0,04
124,0	332,0	1,5	1,1	6,2	187,6	78,0	87,2	205,7	251,9	154,1	172,3	171,6	0,19	84,43	82,34	82,51	0,18	83,70	82,54	82,78	0,07	0,04
125,0	333,0	1,5	1,1	6,1	186,9	77,5	86,8	204,3	250,9	153,9	171,8	171,3	0,19	84,30	82,31	82,44	0,18	83,59	82,52	82,74	0,07	0,04
126,0	334,0	1,5	1,1	6,1	186,2	77,5	86,5	203,0	250,2	153,5	171,0	171,3	0,19	84,19	82,30	82,39	0,18	83,49	82,47	82,68	0,07	0,04
127,0	335,0	1,5	1,1	6,2	185,9	76,4	86,4	202,3	249,5	153,1	170,9	171,0	0,19	84,09	82,26	82,34	0,18	83,39	82,43	82,63	0,07	0,04
128,0	336,0	1,5	1,1	6,2	185,6	76,6	86,0	201,3	248,3	153,1	170,2	171,1	0,19	84,06	82,23	82,27	0,18	83,34	82,40	82,59	0,07	0,04
129,0	337,0	1,4	1,1	6,3	185,5	77,3	85,7	200,6	247,4	152,7	169,6	170,8	0,19	83,95	82,20	82,14	0,18	83,23	82,39	82,49	0,07	0,04
130,0	338,0	1,4	1,1	6,3	184,5	77,7	86,1	200,4	248,1	152,4	169,6	171,0	0,19	83,88	82,17	82,08	0,18	83,16	82,35	82,46	0,07	0,04
131,0	339,0	1,4	1,1	6,3	184,0	77,4	86,0	200,1	246,6	152,3	169,3	170,8	0,19	83,87	82,18	82,05	0,18	83,15	82,36	82,42	0,07	0,04
132,0	340,0	1,4	1,1	6,4	183,5	76,5	85,9	199,1	245,9	152,6	169,1	170,7	0,19	83,88	82,15	82,02	0,18	83,13	82,35	82,37	0,07	0,04
133,0	341,0	1,4	1,0	6,4	182,9	76,5	85,8	198,7	246,2	152,6	168,8	170,5	0,19	83,90	82,19	82,00	0,18	83,18	82,37	82,35	0,07	0,04
134,0	342,0	1,4	1,0	6,4	182,6	77,4	85,9	198,0	245,8	152,4	168,7	170,5	0,19	83,88	82,17	81,94	0,18	83,17	82,34	82,28	0,07	0,04
135,0	343,0	1,4	1,0	6,5	182,5	76,5	85,7	197,7	245,7	152,2	168,3	170,4	0,19	83,90	82,19	81,92	0,18	83,18	82,35	82,21	0,07	0,04
136,0	344,0	1,4	1,0	6,6	182,0	76,4	85,5	196,9	245,1	152,2	168,0	170,2	0,19	83,89	82,19	81,87	0,18	83,17	82,34	82,16	0,07	0,04
137,0	345,0	1,3	1,0	6,6	181,6	76,4	85,6	196,4	244,9	152,1	167,7	170,1	0,19	83,86	82,18	81,82	0,18	83,13	82,33	82,11	0,07	0,04
138,0	346,0	1,3	1,0	6,6	181,3	75,8	85,4	196,1	244,9	152,0	167,3	170,0	0,19	83,83	82,17	81,78	0,18	83,10	82,30	82,06	0,07	0,04
139,0	347,0	1,3	1,0	6,7	180,9	75,6	85,3	195,7	243,9	151,8	167,3	170,0	0,19	83,82	82,17	81,76	0,18	83,10	82,31	82,01	0,07	0,04
140,0	348,0	1,3	1,0	6,2	180,5	76,0	85,5	195,3	243,4	151,6	167,2	170,0	0,19	83,80	82,17	81,71	0,18	83,10	82,33	81,94	0,07	0,04
141,0	349,0	1,3	1,1	6,1	180,0	77,0	85,2	195,0	243,2	151,3	167,0	169,9	0,19	83,75	82,17	81,65	0,18	83,07	82,32	81,91	0,07	0,04
142,0	350,0	1,3	1,1	6,0	179,5	76,8	85,1	194,2	243,0	151,0	166,5	169,8	0,19	83,70	82,15	81,61	0,18	83,03	82,30	81,84	0,07	0,04
143,0	351,0	1,3	1,1	6,0	179,6	77,5	84,9	193,6	242,5	150,7	166,1	169,5	0,19	83,65	82,14	81,54	0,18	82,99	82,29	81,82	0,07	0,03
144,0	352,0	1,3	1,1	6,0	178,8	77,4	84,8	193,0	242,4	150,2	165,8	169,5	0,19	83,60	82,11	81,44	0,18	82,92	82,28	81,76	0,07	0,03
145,0	353,0	1,2	1,1	6,0	178,4	76,8	85,0	193,3	243,4	149,9	165,6	169,6	0,19	83,61	82,09	81,42	0,18	82,88	82,26	81,70	0,07	0,03
146,0	354,0	1,2	1,1	6,0	177,6	76,8	85,0	193,0	243,4	149,6	165,5	169,5	0,19	83,61	82,08	81,37	0,18	82,87	82,26	81,66	0,07	0,03
147,0	355,0	1,2	1,1	6,1	177,3	76,0	85,2	192,6	242,4	149,8	165,3	169,4	0,19	83,63	82,09	81,35	0,18	82,86	82,25	81,64	0,07	0,03
148,0	356,0	1,2	1,0	6,1	176,5	75,9	86,2	192,0	241,3	149,8	165,3	169,5	0,19	83,60	82,08	81,34	0,18	82,87	82,23	81,67	0,07	0,03
149,0	357,0	1,2	1,0	6,2	175,3	76,2	87,5	191,7	242,4	149,6	165,5	169,6	0,19	83,73	82,11	81,39	0,18	82,96	82,29	81,70	0,07	0,03
150,0	358,0	1,2	1,0	6,2	174,6	76,8	89,1	191,7	242,3	149,4	165,4	169,4	0,19	83,86	82,18	81,40	0,18	83,12	82,36	81,74	0,07	0,03
151,0	359,0	1,2	1,0	6,3	173,3	76,6	90,8	191,2	241,7	149,7	165,5	169,4	0,19	84,11	82,27	81,47	0,18	83,31	82,48	81,85	0,07	0,03
152,0	360,0	1,2	1,0	6,3	172,4	77,8	92,2	191,1	243,4	149,8	165,5	169,3	0,19	84,39	82,42	81,54	0,18	83,56	82,62	81,96	0,07	0,03
153,0	361,0	1,2	1,1	5,6	171,4	79,1	92,7	191,0	243,4	149,9	165,1	169,2	0,19	84,69	82,56	81,66	0,18	83,82	82,76	82,09	0,07	0,03
154,0	362,0	1,2	1,1	5,5	171,0	77,8	91,7	190,5	241,6	149,6	165,1	169,2	0,19	84,89	82,66	81,70	0,18	84,01	82,88	82,16	0,07	0,03
155,0	363,0	1,1	1,0	5,5	170,8	77,5	90,4	190,0	242,7	149,0	165,0	169,2	0,19	85,02	82,74	81,74	0,18	84,13	82,96	82,20	0,07	0,03
156,0	364,0	1,1	1,0	5,5	170,0	77,7	89,7	189,9	243,5	148,8	164,7	169,0	0,19	85,05	82,80	81,73	0,18	84,19	83,00	82,24	0,07	0,03
157,0	365,0	1,2	1,0	5,4	169,9	78,0	89,1	189,6	242,7	148,9	164,5	169,0	0,19	85,07	82,83	81,78	0,18	84,26	83,05	82,29	0,07	0,03
158,0	366,0	1,1	1,0	5,5	169,4	77,7	88,5	188,6	243,6	149,0	164,3	169,0	0,19	85,00	82,86	81,77	0,18	84,27	83,07	82,32	0,07	0,03
159,0	367,0	1,1	0,9	5,4	168,5	77,4	88,2	188,2	242,5	148,9	164,1	168,8	0,19	84,92	82,90	81,77	0,18	84,28	83,09	82,34	0,07	0,03
160,0	368,0	1,1	0,9	5,4	168,5	77,8	87,8	187,5	241,5	148,6	163,8	168,7	0,19	84,85	82,91	81,79	0,18	84,26	83,08	82,34	0,07	0,03
161,0	369,0	1,1	0,9	5,4	168,0	77,5	87,6	187,2	242,4	148,4	163,5	168,5	0,19	84,83	82,91	81,81	0,18	84,23	83,11	82,36	0,07	0,03
162,0	370,0	1,1	0,9	5,4	167,7	78,0	87,2	186,6	242,1	148,0	163,3	168,5	0,19	84,77	82,92	81,83	0,18	84,20	83,10	82,36	0,07	0,03
163,0	371,0	1,1	0,9	5,5	167,0	77,3	87,1	186,1	241,9	148,0	163,1	168,2	0,19	84,77	82,91	81,85	0,18	84,16	83,10	82,36	0,07	0,03
164,0	372,0	1,1	0,9	5,4	166,6	77,1	86,8	185,5	241,5	148,0	163,1	168,1	0,19	84,75	82,92	81,84	0,18	84,16	83,07	82,35	0,07	0,03
165,0	373,0	1,1	0,9	5,4	166,3	77,5	86,7	185,0	240,8	148,3	162,9	167,8	0,19	84,75	82,91	81,85	0,18	84,11	83,08	82,35	0,07	0,03
166,0	374,0	1,0	0,9	5,4	165,9	77,7	86,6	184,5	241,1	147,8	162,5	167,6	0,19	84,68	82,89	81,86	0,18	84,06	83,05	82,33	0,07	0,03
167,0	375,0	1,0	0,9	5,5	165,4	77,2	86,3	183,9	240,8	147,7	162,6	167,5	0,19	84,67	82,89	81,86	0,18	84,04	83,05	82,34	0,07	0,03
168,0	376,0	1,1	0,9	5,5	165,3	77,2	86,4	183,4	240,5	147,5	162,4	167,4	0,19	84,68	82,88	81,87	0,18	84,01	83,03	82,30	0,07	0,03
169,0	377,0	1,1	1,0	5,5	165,0	78,0	86,4	183,0	239,7	147,2	162,2	167,2	0,19	84,67	82,89	81,89	0,18	84,02	83,02	82,32	0,07	0,03
170,0	378,0	1,0	1,0	5,5	164,6	77,6	86,2	182,6	240,2	147,0	162,0	167,0	0,19	84,53	82,87	81,86	0,18	83,93	83,02	82,27	0,07	0,03
171,0	379,0	1,0	1,0	5,4	164,5	77,2	86,3	182,2	240,1	146,8	161,9	167,1	0,19	84,47	82,85	81,88	0,18	83,91	83,01	82,25	0,07	0,03
172,0	380,0	1,0	1,0	5,3	164,8	77,7	86,1	182,0	239,4	147,0	161,5	166,8	0,19	84,50	82,85	81,87	0,18	83,87	82,99	82,26	0,07	0,03
173,0	381,0	1,0	1,0	5,3	164,7	76,7	86,0	181,1	238,9	147,1	161,4	166,6	0,19	84,52	82,87	81,87	0,18	83,87	82,99	82,22	0,07	0,03
174,0	382,0	1,0	1,0	5,3	164,4	77,2	85,9	181,0	238,8	147,0	161,0	166,4	0,19	84,54	82,83	81,85	0,18	83,86	83,00	82,22	0,07	0,03
175,0	383,0	1,0	1,0	5,3	164,3	76,7	85,9	180,7	239,4	146,7	160,9	166,2	0,19	84,54	82,84	81,83	0,18	83,87	82,99	82,20	0,07	0,03
176,0	384,0	1,0	1,0	5,3	164,0	76,4	85,9	180,2	239,4	146,5	160,8	165,9	0,19	84,54	82,83	81,85	0,18	83,84	83,00	82,20	0,07	0,03
177,0	385,0	1,0	1,0	5,3	163,6	76,4	86,0	179,9	239,0	146,2	160,5	165,8	0,19	84,53	82,81	81,83	0,18	83,84	82,95	82,18	0,07	0,03
178,0	386,0	1,0	1,0	5,3	163,2	77,0	85,9	179,6	238,4	145,8	160,5	165,7	0,19	84,55	82,81	81,82	0,18	83,83	82,97	82,16	0,07	0,03
179,0	387,0	1,0	1,0	5,3	163,0	77,4	85,8	179,1	237,4	145,6	160,1	165,3	0,19	84,51	82,82	81,80	0,18	83,81	82,96	82,13	0,07	0,03
180,0	388,0	0,9	1,0	5,2	162,9	76,5	85,8	178,6	238,1	145,3	160,0	165,1	0,19	84,47	82,81	81,79	0,18	83,80	82,96	82,10	0,07	0,03
181,0	389,0	0,9	1,0	5,2	162,7	76,7	85,7	178,3	238,3	145,2	159,7	164,9	0,19	84,48	82,81	81,78	0,18	83,81	82,96	82,08	0,07	0,03

182,0	390,0	0,9	0,9	5,2	162,5	76,7	85,6	177,9	237,3	145,2	159,4	164,5	0,19	84,48	82,81	81,79	0,18	83,79	82,97	82,08	0,07	0,03
183,0	391,0	0,9	0,9	5,2	161,8	76,5	85,6	177,5	236,7	144,8	159,2	164,2	0,19	84,44	82,82	81,74	0,18	83,78	82,96	82,06	0,07	0,03
184,0	392,0	0,9	0,9	5,1	161,5	77,6	85,6	177,0	235,2	144,8	159,2	164,0	0,19	84,43	82,82	81,74	0,18	83,77	82,94	82,04	0,07	0,03
185,0	393,0	0,9	1,0	5,1	161,3	76,9	85,5	176,6	235,3	144,8	158,8	163,8	0,19	84,44	82,80	81,72	0,18	83,75	82,94	82,01	0,07	0,03
186,0	394,0	0,9	1,0	5,1	161,1	77,3	85,6	176,1	234,9	144,3	158,6	163,5	0,19	84,43	82,82	81,70	0,18	83,75	82,94	81,99	0,07	0,03
187,0	395,0	0,9	1,0	5,1	160,9	76,7	85,4	175,8	234,4	144,2	158,4	163,3	0,19	84,39	82,78	81,70	0,18	83,71	82,93	81,98	0,07	0,03
188,0	396,0	0,9	1,0	5,1	160,4	76,9	85,4	175,6	235,0	144,1	158,2	163,0	0,19	84,40	82,78	81,69	0,18	83,71	82,94	81,94	0,07	0,03
189,0	397,0	0,9	1,0	5,1	160,1	77,4	85,3	175,1	234,4	143,7	157,9	162,8	0,19	84,34	82,79	81,65	0,18	83,67	82,93	81,91	0,07	0,03
190,0	398,0	0,9	1,0	5,1	159,6	76,7	85,4	175,0	234,5	143,6	157,8	162,6	0,19	84,33	82,76	81,64	0,18	83,65	82,92	81,91	0,07	0,03
191,0	399,0	0,9	1,0	5,1	159,5	77,3	85,3	174,5	234,7	143,5	157,3	162,2	0,19	84,32	82,76	81,63	0,18	83,63	82,90	81,89	0,07	0,03
192,0	400,0	0,9	0,9	5,1	159,3	76,7	85,4	174,4	233,9	143,4	157,2	162,0	0,19	84,33	82,76	81,63	0,18	83,63	82,90	81,89	0,07	0,03
193,0	401,0	0,8	1,0	5,1	159,1	77,1	85,4	173,9	232,9	143,3	157,0	161,6	0,19	84,36	82,78	81,62	0,18	83,64	82,90	81,84	0,07	0,03
194,0	402,0	0,9	1,0	5,0	158,8	76,6	85,3	173,7	233,7	143,2	156,9	161,4	0,19	84,35	82,76	81,58	0,18	83,65	82,90	81,83	0,07	0,03
195,0	403,0	0,9	1,0	5,0	158,8	76,4	85,2	173,7	233,0	143,0	156,6	161,1	0,19	84,36	82,74	81,57	0,18	83,64	82,90	81,80	0,07	0,03
196,0	404,0	0,8	1,0	5,0	158,5	76,5	85,4	173,3	233,1	142,7	156,5	161,0	0,19	84,37	82,77	81,57	0,18	83,66	82,90	81,82	0,07	0,03
197,0	405,0	0,8	1,0	5,0	158,1	75,8	85,2	172,8	232,8	142,5	156,3	160,7	0,19	84,36	82,75	81,55	0,18	83,64	82,89	81,80	0,07	0,03
198,0	406,0	0,8	1,0	4,9	158,3	76,6	85,2	172,7	232,2	142,2	156,2	160,5	0,19	84,33	82,74	81,54	0,18	83,63	82,89	81,76	0,07	0,03
199,0	407,0	0,8	1,0	5,0	158,1	75,9	85,4	172,4	231,4	141,8	156,0	160,2	0,19	84,31	82,74	81,52	0,18	83,60	82,88	81,76	0,07	0,03
200,0	408,0	0,8	1,0	4,9	157,9	76,5	85,3	172,0	231,1	141,5	155,8	159,9	0,19	84,32	82,74	81,50	0,18	83,61	82,89	81,76	0,07	0,03
201,0	409,0	0,8	1,0	4,9	157,6	76,5	85,2	171,6	231,3	141,4	155,7	159,6	0,19	84,29	82,73	81,52	0,18	83,60	82,88	81,74	0,07	0,03
202,0	410,0	0,7	1,0	4,8	157,3	76,6	85,2	171,4	231,8	141,3	155,5	159,2	0,19	84,31	82,73	81,50	0,18	83,60	82,86	81,73	0,07	0,03
203,0	411,0	0,8	1,0	4,8	156,7	77,0	85,3	171,0	231,8	141,0	155,3	159,0	0,19	84,32	82,73	81,51	0,18	83,60	82,88	81,75	0,07	0,03
204,0	412,0	0,7	1,0	4,7	156,6	77,0	85,0	170,7	231,4	140,9	155,0	158,7	0,19	84,32	82,71	81,51	0,18	83,57	82,88	81,72	0,07	0,03
205,0	413,0	0,8	1,0	4,8	156,2	76,5	85,1	170,4	230,4	140,7	154,8	158,6	0,19	84,32	82,72	81,48	0,18	83,58	82,88	81,72	0,07	0,03
206,0	414,0	0,7	1,0	4,7	155,9	76,4	85,1	170,1	230,6	140,5	154,5	158,3	0,19	84,32	82,72	81,48	0,18	83,57	82,87	81,70	0,07	0,03
207,0	415,0	0,7	1,0	4,7	155,8	76,8	84,8	169,8	230,4	140,2	154,3	158,0	0,19	84,37	82,75	81,47	0,18	83,58	82,89	81,67	0,07	0,03
208,0	416,0	0,7	1,0	4,7	155,2	76,4	84,9	169,5	229,5	140,1	154,0	157,8	0,19	84,36	82,70	81,48	0,18	83,58	82,88	81,68	0,07	0,03
209,0	417,0	0,7	1,0	4,7	155,1	77,1	84,7	169,2	229,3	139,8	153,9	157,6	0,19	84,28	82,71	81,45	0,18	83,55	82,90	81,67	0,07	0,03
210,0	418,0	0,7	1,0	4,6	154,7	76,7	84,8	169,0	229,4	139,6	153,7	157,2	0,19	84,24	82,70	81,43	0,18	83,53	82,88	81,64	0,07	0,03
211,0	419,0	0,7	1,0	4,6	154,5	76,0	84,9	168,6	229,9	139,5	153,4	157,0	0,19	84,24	82,72	81,45	0,18	83,52	82,88	81,67	0,07	0,03
212,0	420,0	0,7	1,0	4,6	154,2	76,5	85,0	168,4	228,7	139,3	152,9	156,7	0,19	84,26	82,70	81,46	0,18	83,53	82,89	81,66	0,07	0,03
213,0	421,0	0,7	1,0	4,6	153,9	76,4	84,9	168,3	228,0	139,0	152,8	156,3	0,19	84,26	82,68	81,43	0,18	83,51	82,88	81,66	0,07	0,03
214,0	422,0	0,7	1,0	4,5	153,6	77,0	84,9	167,9	228,3	138,9	152,6	156,0	0,19	84,28	82,69	81,43	0,18	83,49	82,88	81,64	0,07	0,03
215,0	423,0	0,7	1,0	4,5	153,0	76,0	84,9	167,3	228,3	138,6	152,4	155,7	0,19	84,27	82,67	81,40	0,18	83,46	82,86	81,64	0,07	0,03
216,0	424,0	0,7	1,0	4,5	152,9	76,4	85,1	167,2	227,9	138,6	152,2	155,5	0,19	84,27	82,65	81,39	0,18	83,45	82,83	81,64	0,07	0,03
217,0	425,0	0,7	1,0	4,4	152,4	76,8	85,0	166,8	227,7	138,3	152,0	155,2	0,19	84,26	82,66	81,36	0,18	83,46	82,83	81,61	0,07	0,03
218,0	426,0	0,7	1,0	4,4	151,9	77,0	84,7	166,4	227,5	138,2	151,7	155,0	0,19	84,26	82,65	81,37	0,18	83,45	82,82	81,58	0,07	0,03
219,0	427,0	0,6	1,0	4,4	152,0	77,5	84,7	166,0	227,0	138,1	151,4	154,8	0,19	84,25	82,64	81,35	0,18	83,44	82,81	81,59	0,07	0,03
220,0	428,0	0,6	1,0	4,4	151,7	77,3	84,8	165,7	226,8	137,9	151,2	154,5	0,19	84,23	82,63	81,33	0,18	83,43	82,80	81,58	0,07	0,03
221,0	429,0	0,6	1,0	4,4	151,2	76,4	84,8	165,4	226,2	137,7	151,0	154,3	0,19	84,24	82,64	81,30	0,18	83,44	82,80	81,56	0,07	0,03
222,0	430,0	0,6	1,0	4,4	150,9	76,5	84,7	164,9	225,9	137,3	150,8	154,0	0,19	84,16	82,61	81,31	0,18	83,38	82,78	81,53	0,07	0,03
223,0	431,0	0,6	1,0	4,3	150,5	76,5	84,8	164,8	226,4	137,0	150,7	153,8	0,19	84,17	82,61	81,30	0,18	83,40	82,77	81,53	0,07	0,03
224,0	432,0	0,6	1,0	4,3	149,9	76,7	84,9	164,5	225,8	137,0	150,3	153,5	0,19	84,21	82,61	81,31	0,18	83,39	82,80	81,53	0,07	0,03
225,0	433,0	0,6	1,0	4,3	149,8	75,8	85,2	164,3	225,1	136,8	150,0	153,3	0,19	84,24	82,60	81,29	0,18	83,38	82,77	81,52	0,07	0,03
226,0	434,0	0,6	1,0	4,3	149,3	76,5	84,9	163,7	224,7	136,9	149,6	152,9	0,19	84,31	82,61	81,27	0,18	83,41	82,79	81,51	0,07	0,03
227,0	435,0	0,6	1,0	4,2	149,2	76,8	84,8	163,5	225,6	136,7	149,3	152,5	0,19	84,36	82,61	81,23	0,18	83,45	82,79	81,49	0,07	0,03
228,0	436,0	0,6	0,9	4,2	149,2	76,0	84,7	163,1	224,9	136,5	149,0	152,3	0,19	84,36	82,63	81,23	0,18	83,48	82,82	81,45	0,07	0,03
229,0	437,0	0,5	0,9	4,2	148,7	76,2	84,7	162,7	224,2	136,0	148,9	152,0	0,19	84,36	82,64	81,22	0,18	83,46	82,83	81,47	0,07	0,03
230,0	438,0	0,5	0,9	4,2	148,5	76,2	84,8	162,4	223,6	135,7	148,6	151,6	0,19	84,37	82,65	81,20	0,18	83,48	82,85	81,45	0,07	0,03
231,0	439,0	0,6	0,9	4,2	148,4	77,2	84,9	162,2	223,4	135,6	148,2	151,3	0,19	84,34	82,64	81,16	0,18	83,49	82,85	81,43	0,07	0,03
232,0	440,0	0,6	0,9	4,2	148,0	76,8	84,9	161,7	223,0	135,4	148,0	151,0	0,19	84,29	82,65	81,16	0,18	83,48	82,87	81,41	0,07	0,03
233,0	441,0	0,6	0,9	4,2	147,6	76,3	84,9	161,3	222,8	135,3	147,7	150,8	0,19	84,22	82,65	81,11	0,18	83,48	82,87	81,39	0,07	0,03
234,0	442,0	0,6	0,9	4,1	147,3	77,7	84,9	161,1	222,9	135,1	147,4	150,6	0,19	84,21	82,66	81,11	0,18	83,48	82,87	81,37	0,07	0,03
235,0	443,0	0,5	0,9	4,1	146,9	77,4	84,6	160,6	222,1	134,8	147,3	150,4	0,19	84,24	82,67	81,09	0,18	83,46	82,88	81,35	0,07	0,03
236,0	444,0	0,5	0,9	4,1	146,7	76,7	84,8	160,2	221,6	134,7	147,0	150,0	0,19	84,29	82,64	81,11	0,18	83,44	82,84	81,38	0,07	0,03
237,0	445,0	0,5	0,9	4,1	146,4	77,9	84,6	160,1	222,1	134,5	146,7	149,8	0,19	84,29	82,64	81,07	0,18	83,46	82,85	81,38	0,07	0,03
238,0	446,0	0,5	0,9	4,0	145,9	77,5	84,7	159,7	222,8	134,1	146,4	149,6	0,19	84,23	82,63	81,11	0,18	83,41	82,84	81,35	0,07	0,03
239,0	447,0	0,5	0,9	4,0	145,7	76,9	84,5	159,3	221,6	134,0	146,1	149,4	0,19	84,17	82,63	81,08	0,18	83,38	82,83	81,36	0,07	0,03
240,0	448,0	0,5	0,9	4,0	145,4	76,7	84,6	159,0	221,2	133,9	146,0	149,2	0,19	84,17	82,60	81,08	0,18	83,37	82,79	81,34	0,07	0,03
241,0	449,0	0,5	0,8	4,0	145,0	77,6	84,5	158,7	221,1	133,7	145,7	148,9	0,19	84,19	82,61	81,09	0,18	83,37	82,80	81,33	0,07	0,03
242,0	450,0	0,5	0,8	3,9	144,9	76,0	84,4	158,3	220,7	133,5	145,3	148,7	0,19	84,17	82,59	81,10	0,18	83,37	82,80	81,33	0,07	0,03
243,0	451,0	0,5	0,8	3,9	144,8	76,5	84,4	158,1	221,5	133,2	145,1	148,5	0,19	84,20	82,59	81,08	0,18	83,39	82,79	81,32	0,07	0,03
244,0	452,0	0,5	0,8	3,9	144,4	76,0	84,3	157,7	220,4	133,1	144,9	148,2	0,19	84,23	82,61	81,10	0,18	83,38	82,79	81,34	0,07	0,03
245,0	453,0	0,5	0,8	3,9	144,0	77,1	84,4	157,3	220,4	133,0	144,5	148,0	0,19	84,25	82,60	81,10	0,18	83,37	82,79	81,31	0,07	0,03
246,0	454,0	0,5	0,8	3,9	143,7	76,4	84,3	157,3	220,9	132,7	144,2	147,6	0,19	84,27	82,57	81,10	0,18	83,36	82,77	81,31	0,07	0,03
247,0	455,0	0,5	0,8	3,8	143,6	76,8	84,4	156,8	220,6	132,6	144,1	147,4	0,19	84,27	82,57	81,08	0,18	83,36	82,77	81,29	0,07	0,03
248,0	456,0	0,5	0,8	3,8	143,2	76,5	84,2	156,4	220,4	132,3	143,8	147,2	0,19	84,28	82,57	81,05	0,18	83,38	82,76	81,26	0,07	0,03
249,0	457,0	0,5	0,8	3,8	142,8	75,9	84,3	156,3	221,1	132,0	143,6	146,8	0,19	84,30	82,55	81,05	0,18	83,36	82,76	81,26	0,07	0,03
250,0	458,0	0,5	0,8	3,8	142,5	76,8	84,2	156,0	219,9	132,1	143,4	146,4	0,19	84,29	82,55	81,05	0,18	83,35	82,74	81,25	0,07	0,03
251,0	459,0	0,5	0,8	3,8	142,4	76,3	84,1	155,6	220,1	132,0	143,0	146,1	0,19	84,29	82,57	81,04	0,18	83,38	82,75	81,21	0,07	0,03
252,0	460,0	0,5	0,8	3,8	142,1	75,6	84,1	155,4	219,9	131,6	143,0	145,9	0,19	84,29	82,57	81,04	0,18	83,38	82,74	81,22	0,07	0,03
253,0	461,0	0,5	0,8	3,8	141,8	75,8	84,0	154,9	219,5	131,5	142,7	145,7	0,19	84,26	82,56	81,02	0,18	83,38	82,75	81,20	0,07	0,03
254,0	462,0	0,4	0,8	3,7	141,7	75,9	83,9	154,6	218,6	131,4	142,6	145,5	0,19	84,20	82,54	80,99	0,18	83,33	82,74	81,21	0,07	0,03
255,0	463,0	0,5	0,8	3,7	141,7	77,0	84,0	154,3	218,6	131,2	142,5	145,2	0,19	84,20	82,53	81,00	0,18	83,33	82,72	81,19	0,07	0,03
256,0	464,0	0,4	0,9	3,8	141,7	75,8	83,8	154,0	217,5	131,1	142,3	145,0	0,19	84,19	82,52	81,00	0,18	83,31	82,71	81,17	0,07	0,03
257,0	465,0	0,4	0,9	3,8	141,5	77,0	83,9	153,7	218,3	130,9	142,0	144,7	0,19	84,17	82,50	80,96	0,18	83,29	82,70	81,12	0,07	0,03
258,0	466,0	0,4	0,9	3,8	141,3	77,1	83,7	153,4	217,7	130,3	141,5	144,5	0,19	84,13	82,48	80,93	0,18	83,25	82,68	81,12	0,07	0,03
259,0	467,0	0,4	0,9	3,8	141,2	76,9	83,5	153,0	217,5	129,9	141,5	144,2	0,19	83,98	82,44	80,91	0,18	83,13	82,65	81,08	0,07	0,03
260,0	468,0	0,4	0,9	3,8	140,9	77,3	83,3	152,8	217,9	129,5	141,1	143,9	0,19	83,83	82,39	80,88	0,18	83,05	82,64	81,03	0,07	0,03
261,0	469,0	0,4	0,9	3,7	140,6	76,6	83,2	152,3	217,3	129,2	140,7	143,7	0,19	83,72	82,33	80,83	0,18	82,95	82,60	80,99	0,07	0,03
262,0	470,0	0,4	0,9	3,6	140,5	76,8	83,3	152,0	217,0	129,0	140,5	143,4	0,19	83,67	82,33	80,79	0,18	82,91	82,56	80,94	0,07	0,03
263,0	471,0	0,4	0,9	3,6	139,8	76,3	83,3	151,7	216,0	129,0	140,2	143,1	0,19	83,74	82,31	80,74	0,18	82,91	82,56	80,90	0,07	0,03
264,0	472,0	0,4	0,9	3,6	139,8	77,2	83,4	151,5	216,1	129,0	139,8	142,9	0,19	83,77	82,30	80,72	0,18	82,89	82,54	80,86	0,07	0,03
265,0	473,0	0,4	0,9	3,5	139,4	76,0	83,3	151,1	215,6	128,7	139,7	142,7	0,19	83,79	82,27	80,68	0,18	82,85	82,50	80,85	0,07	0,03
266,0	474,0	0,4	0,9	3,5	139,1	77,2	83,4	150,9	214,7	128,5	139,6	142,4	0,19	83,81	82,27	80,63	0,18	82,86	82,49	80,82	0,07	0,02
267,0	475,0	0,4	0,9	3,5	138,7	77,1	83,3	150,3	215,2	128,2	139,3	142,1	0,19	83,84	82,26	80,63	0,18	82,86	82,48	80,78	0,07	0,03
268,0	476,0	0,4	0,9	3,5	138,7	77,0	83,1	150,1	215,0	128,0	139,1	141,9	0,19	83,70	82,22	80,59	0,18	82,80	82,46	80,77	0,07	0,03
269,0	477,0	0,4	0,9	3,5	138,5	76,5	82,8	149,9	213,6	127,7	139,0	141,6	0,19	83,56	82,18	80,55	0,18	82,70	82,45	80,68	0,07	0,02
270,0	478,0	0,4	0,9	3,4	138,3	76,7	82,9	149,6	214,8	127,5	138,8	141,5	0,19	83,47	82,14	80,48	0,18	82,64	82,40	80,65	0,07	0,02
271,0	479,0	0,4	0,9	3,4	137,8	76,2	82,9	149,3	213,9	127,4	138,6	141,3	0,19	83,40	82,12	80,45	0,18	82,61	82,37	80,63	0,07	0,02
272,0	480,0	0,3	0,9	3,4	137,4	75,9	82,9	149,1	214,2	127,2	138,5	141,1	0,19	83,43	82,11	80,44	0,18	82,59	82,36	80,60	0,07	0,02
273,0	481,0	0,4	0,9	3,5	136,9	75,6	84,3	148,9	214,4	127,2	138,1	141,0	0,19	83,56	82,11	80,42	0,18	82,62	82,34	80,60	0,07	0,02
274,0	482,0	0,3	0,9	3,5	136,5	76,2	86,0	148,5	214,0	126,5	137,9	140,6	0,19	83,74	82,11	81,38	0,18	82,68	82,37	83,55	0,07	0,02

275,0	483,0	0,4	0,9	3,5	136,0	76,3	87,8	148,2	214,1	126,2	137,6	140,4	0,19	83,93	82,15	83,24	0,18	82,81	82,41	85,05	0,07	0,02
276,0	484,0	0,3	0,9	3,5	135,5	76,6	89,6	148,2	213,0	126,2	137,5	140,2	0,19	84,12	82,21	83,56	0,18	82,95	82,44	84,99	0,07	0,02
277,0	485,0	0,4	0,9	3,5	134,9	76,9	90,4	148,1	213,1	126,3	137,3	140,0	0,19	84,29	82,29	83,52	0,18	83,11	82,52	84,79	0,07	0,02
278,0	486,0	0,3	0,9	3,5	134,4	78,2	89,8	147,8	212,4	126,2	137,1	139,8	0,19	84,52	82,39	83,42	0,18	83,32	82,64	84,60	0,07	0,02
279,0	487,0	0,3	0,9	3,5	134,4	77,9	89,1	147,7	212,1	126,1	137,0	139,7	0,19	84,72	82,47	83,27	0,18	83,44	82,71	84,42	0,07	0,02
280,0	488,0	0,3	0,9	3,5	134,2	76,9	88,1	147,5	212,4	126,1	136,9	139,5	0,19	84,88	82,52	83,19	0,18	83,56	82,75	84,26	0,07	0,02
281,0	489,0	0,3	0,9	3,4	134,0	76,6	87,3	147,1	211,9	125,9	136,7	139,3	0,19	84,98	82,56	83,07	0,18	83,65	82,81	84,10	0,07	0,02
282,0	490,0	0,3	0,9	3,4	133,8	77,4	86,4	146,7	212,2	125,7	136,5	139,0	0,19	84,92	82,57	82,99	0,18	83,69	82,84	83,92	0,07	0,02
283,0	491,0	0,3	0,9	3,4	134,1	77,5	85,8	146,4	212,4	125,2	136,0	138,8	0,19	84,84	82,57	82,88	0,18	83,66	82,86	83,76	0,07	0,02
284,0	492,0	0,3	0,9	3,4	133,9	77,5	85,3	146,1	212,4	125,0	135,8	138,6	0,19	84,73	82,59	82,76	0,18	83,62	82,85	83,59	0,07	0,02
285,0	493,0	0,3	0,9	3,4	133,6	77,4	85,1	145,8	211,8	124,8	135,6	138,4	0,19	84,63	82,56	82,68	0,18	83,57	82,81	83,44	0,07	0,02
286,0	494,0	0,3	0,9	3,4	133,4	76,8	85,1	145,7	211,6	124,8	135,4	138,2	0,19	84,58	82,55	82,58	0,18	83,54	82,81	83,33	0,07	0,02
287,0	495,0	0,3	0,9	3,4	133,2	76,7	84,9	145,3	211,4	124,5	135,2	138,0	0,19	84,54	82,54	82,50	0,18	83,52	82,79	83,20	0,07	0,02
288,0	496,0	0,3	0,9	3,3	133,0	77,4	84,6	144,8	211,2	124,2	134,9	137,8	0,19	84,51	82,54	82,43	0,18	83,49	82,78	83,04	0,07	0,02
289,0	497,0	0,3	0,9	3,3	132,9	77,6	84,4	144,7	210,6	124,1	134,5	137,5	0,19	84,43	82,53	82,35	0,18	83,45	82,76	82,95	0,07	0,02
290,0	498,0	0,3	0,8	3,3	132,7	77,3	84,2	144,5	210,6	123,7	134,3	137,2	0,19	84,33	82,50	82,24	0,18	83,36	82,73	82,79	0,07	0,02
291,0	499,0	0,2	0,8	3,3	132,6	77,0	83,9	144,1	210,7	123,3	134,1	137,0	0,19	84,16	82,47	82,15	0,18	83,26	82,70	82,67	0,07	0,02
292,0	500,0	0,2	0,8	3,3	132,0	76,7	83,9	143,8	210,3	123,3	133,9	136,9	0,19	84,08	82,46	82,09	0,18	83,20	82,67	82,55	0,07	0,02
293,0	501,0	0,2	0,9	3,3	131,8	76,3	83,9	143,5	209,4	123,3	133,8	136,7	0,19	84,08	82,43	81,98	0,18	83,14	82,63	82,45	0,07	0,02
294,0	502,0	0,3	0,8	3,3	131,5	76,3	83,9	143,4	209,8	123,2	133,5	136,5	0,19	84,12	82,41	81,92	0,18	83,13	82,60	82,35	0,07	0,02
295,0	503,0	0,2	0,8	3,3	131,5	76,4	83,7	143,0	209,8	122,9	133,3	136,3	0,19	84,10	82,41	81,86	0,18	83,08	82,59	82,27	0,07	0,02
296,0	504,0	0,2	0,8	3,3	131,4	76,5	83,5	142,6	210,4	122,6	132,9	136,1	0,19	84,03	82,38	81,77	0,18	83,05	82,55	82,15	0,07	0,02
297,0	505,0	0,3	0,8	3,3	131,1	76,1	83,2	142,4	209,9	122,4	132,6	135,8	0,19	83,93	82,32	81,68	0,18	82,99	82,52	82,03	0,07	0,02
298,0	506,0	0,2	0,8	3,3	131,0	75,9	83,3	142,1	209,3	122,1	132,5	135,6	0,19	83,91	82,31	81,57	0,18	82,91	82,49	81,92	0,07	0,02
299,0	507,0	0,2	0,8	3,3	130,5	75,8	83,4	142,0	209,6	122,0	132,2	135,5	0,19	83,91	82,30	81,53	0,18	82,88	82,46	81,82	0,07	0,02
300,0	508,0	0,2	0,8	3,4	130,1	76,1	83,3	141,7	208,2	122,0	132,1	135,3	0,19	83,93	82,27	81,47	0,18	82,86	82,44	81,75	0,07	0,02
301,0	509,0	0,2	0,8	3,4	130,0	76,4	83,2	141,5	208,8	121,8	131,9	135,1	0,19	83,96	82,25	81,39	0,18	82,86	82,43	81,70	0,07	0,02
302,0	510,0	0,2	0,8	3,4	130,0	76,3	83,2	141,2	209,0	121,7	131,7	134,9	0,19	83,95	82,23	81,33	0,18	82,84	82,41	81,59	0,07	0,02
303,0	511,0	0,2	0,8	3,4	129,8	77,3	83,1	140,8	208,9	121,4	131,4	134,5	0,19	83,92	82,23	81,26	0,18	82,81	82,40	81,51	0,07	0,02
304,0	512,0	0,2	0,8	3,4	129,6	76,5	82,9	140,7	208,6	121,2	131,2	134,5	0,19	83,80	82,19	81,21	0,18	82,77	82,38	81,41	0,07	0,02
305,0	513,0	0,2	0,8	3,4	129,3	75,8	83,0	140,5	208,6	121,0	131,2	134,4	0,19	83,74	82,17	81,16	0,18	82,73	82,37	81,33	0,07	0,02
306,0	514,0	0,2	0,8	3,4	129,1	75,9	83,2	140,5	207,9	121,0	131,1	134,3	0,19	83,75	82,14	81,09	0,18	82,70	82,33	81,29	0,07	0,02
307,0	515,0	0,2	0,8	3,5	128,9	75,8	83,2	140,3	208,4	120,8	130,8	134,0	0,19	83,81	82,13	81,04	0,18	82,70	82,31	81,21	0,07	0,02
308,0	516,0	0,2	0,9	3,5	128,7	75,8	83,0	140,0	207,5	120,5	130,7	133,8	0,19	83,83	82,11	80,99	0,18	82,69	82,30	81,18	0,07	0,02
309,0	517,0	0,2	0,9	3,5	128,7	76,3	82,9	139,9	208,2	120,3	130,4	133,6	0,19	83,81	82,12	80,94	0,18	82,66	82,30	81,09	0,07	0,02
310,0	518,0	0,2	0,9	3,5	128,9	75,7	82,8	139,7	208,0	120,2	130,2	133,4	0,19	83,72	82,09	80,87	0,18	82,63	82,28	81,03	0,07	0,02
311,0	519,0	0,2	0,9	3,5	128,5	75,9	82,8	139,4	207,7	120,2	130,1	133,3	0,19	83,63	82,06	80,81	0,18	82,59	82,27	80,99	0,07	0,02
312,0	520,0	0,1	0,9	3,5	128,5	75,9	82,8	139,4	207,3	120,2	129,9	133,1	0,19	83,58	82,06	80,75	0,18	82,58	82,25	80,88	0,07	0,02
313,0	521,0	0,2	0,8	3,6	128,4	75,8	82,8	139,1	207,6	120,0	129,8	133,1	0,19	83,61	82,02	80,71	0,18	82,58	82,22	80,84	0,07	0,02
314,0	522,0	0,2	0,8	3,6	128,1	75,9	82,7	138,9	207,6	119,9	129,6	132,9	0,19	83,66	82,05	80,67	0,18	82,59	82,23	80,80	0,07	0,02
315,0	523,0	0,1	0,8	3,6	128,1	75,9	82,7	138,9	207,3	119,7	129,5	132,7	0,19	83,66	82,00	80,62	0,18	82,54	82,20	80,75	0,07	0,02
316,0	524,0	0,2	0,8	3,6	128,0	75,9	82,6	138,9	207,3	119,4	129,3	132,6	0,19	83,61	81,98	80,52	0,18	82,51	82,19	80,70	0,07	0,02
317,0	525,0	0,2	0,8	3,6	128,0	75,4	82,4	138,7	207,0	119,1	129,2	132,4	0,19	83,55	81,94	80,50	0,18	82,47	82,18	80,63	0,07	0,02
318,0	526,0	0,1	0,8	3,6	127,9	75,2	82,5	138,2	207,6	119,0	129,0	132,3	0,19	83,49	81,92	80,43	0,18	82,44	82,17	80,55	0,07	0,02
319,0	527,0	0,1	0,8	3,7	127,7	75,6	82,6	138,2	205,9	119,1	129,0	132,2	0,19	83,46	81,93	80,40	0,18	82,44	82,13	80,54	0,07	0,02
320,0	528,0	0,1	0,8	3,7	127,6	75,8	82,7	138,0	205,4	119,0	129,1	132,0	0,19	83,52	81,91	80,38	0,18	82,43	82,12	80,50	0,07	0,02
321,0	529,0	0,1	0,8	3,7	127,6	75,7	82,9	138,0	205,7	119,0	128,8	131,8	0,19	83,57	81,89	80,31	0,18	82,40	82,11	80,49	0,07	0,02
322,0	530,0	0,1	0,8	3,8	127,5	75,2	84,7	137,9	206,6	119,0	128,8	131,8	0,19	83,53	81,86	80,29	0,18	82,38	82,09	80,47	0,07	0,02
323,0	531,0	0,1	0,8	3,8	127,0	76,4	87,0	137,7	205,7	118,9	128,9	131,8	0,19	83,65	81,89	80,28	0,18	82,47	82,11	80,53	0,07	0,02
324,0	532,0	0,1	0,8	3,8	126,9	76,0	89,1	137,9	205,5	118,8	128,9	131,6	0,19	83,82	81,94	80,28	0,18	82,61	82,16	80,63	0,07	0,02
325,0	533,0	0,1	0,9	3,8	126,6	75,2	90,0	138,0	205,9	118,5	128,8	131,6	0,19	84,03	82,05	80,28	0,18	82,82	82,26	80,72	0,07	0,02
326,0	534,0	0,1	0,9	3,8	126,2	75,7	91,6	138,2	206,3	118,2	128,8	131,6	0,19	84,37	82,18	80,30	0,18	83,11	82,41	80,85	0,07	0,02
327,0	535,0	0,1	1,0	3,8	126,1	75,8	90,5	138,0	205,8	118,2	128,9	131,5	0,19	84,67	82,32	80,32	0,18	83,35	82,55	80,94	0,07	0,02
328,0	536,0	0,1	1,0	3,9	126,3	76,1	89,5	138,0	205,5	118,2	128,6	131,4	0,19	84,76	82,38	80,34	0,18	83,46	82,63	81,01	0,07	0,02
329,0	537,0	0,1	1,0	3,9	126,4	76,9	88,4	138,0	205,4	118,2	128,8	131,3	0,19	84,80	82,44	80,36	0,18	83,55	82,68	81,05	0,07	0,02
330,0	538,0	0,1	1,0	3,9	126,6	76,4	87,4	138,0	204,5	118,1	128,7	131,2	0,19	84,73	82,45	80,36	0,18	83,55	82,72	81,05	0,07	0,02
331,0	539,0	0,1	1,0	3,9	127,0	76,8	86,9	137,8	204,0	117,9	128,7	131,0	0,19	84,58	82,41	80,37	0,18	83,51	82,71	81,04	0,07	0,02
332,0	540,0	0,1	1,0	3,9	127,2	76,2	86,6	137,9	204,9	117,7	128,6	131,0	0,19	84,37	82,42	80,35	0,18	83,41	82,68	81,04	0,07	0,02
333,0	541,0	0,1	1,0	3,9	127,2	76,4	86,1	137,8	206,0	117,7	128,4	130,9	0,19	84,31	82,42	80,35	0,18	83,40	82,69	81,05	0,07	0,02
334,0	542,0	0,1	0,9	4,0	127,2	76,4	85,6	137,7	205,2	117,4	128,3	130,8	0,19	84,29	82,41	80,35	0,18	83,39	82,68	81,07	0,07	0,02
335,0	543,0	0,1	0,9	3,9	127,2	76,6	85,1	137,6	205,2	117,4	128,2	130,6	0,19	84,33	82,41	80,34	0,18	83,36	82,67	81,05	0,07	0,02
336,0	544,0	0,1	0,9	3,9	127,2	76,4	84,7	137,5	205,2	117,4	128,2	130,6	0,19	84,26	82,40	80,38	0,18	83,30	82,66	81,06	0,07	0,02
337,0	545,0	0,1	0,9	3,9	127,3	76,3	84,3	137,6	205,1	117,3	128,2	130,5	0,19	84,18	82,36	80,34	0,18	83,26	82,63	81,04	0,07	0,02
338,0	546,0	0,1	0,9	3,9	127,3	76,7	84,2	137,5	205,6	117,2	128,0	130,5	0,19	84,13	82,35	80,35	0,18	83,19	82,61	81,03	0,07	0,02
339,0	547,0	0,1	0,9	4,0	127,3	76,6	84,2	137,5	207,0	117,1	128,1	130,4	0,19	84,08	82,32	80,36	0,18	83,17	82,60	80,99	0,07	0,02
340,0	548,0	0,0	0,9	3,9	127,4	76,8	84,3	137,5	206,6	117,2	128,0	130,4	0,19	84,10	82,32	80,35	0,18	83,16	82,58	80,99	0,07	0,02

Manufacturer: SPARTHERM
Model: ırtherm S 600 insert

Run: 1
Project #: PI 20196
Test Duration: 340 min

	HHV	LHV
Eff	65,05%	70,00%
Comb Eff	99,21%	99,21%
HT Eff	65,57%	70,56%
Output	49 986	kJ/h
Burn Rate	3,80	kg/h
Grams CO	49	g
Input	76 839	kJ/h
MC wet	16,28	

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

	Ultimate CO_2
$CO_{2\text{-}ult}$	19,86
	F_0
	1,050

Heat Output:	47 417	Btu/h	49 986	kJ/h
Heat Input:	72 890	Btu/h	76 839	kJ/h
Burn Duration:	0,87	h		
Burn Rate:	8,38	lb/h	3,803	kg/h
Stack Temp:	717,9	Deg. F	381,1	Deg. C

Overall Heating Efficiency:	65,05%
Combustion Efficiency:	99,21%
Heat Transfer Efficiency:	65,57%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	30,08
Dry Moles Exhaust Gas (N_r):	355,45
Air Fuel Ratio (A/F)	10,18

Manufacturer: SPARTHERM
Model: ırtherm S 600 insert

Run: 1
Project #: PI 20196
Test Duration: 340 min

	HHV	LHV
Eff	72,63%	78,15%
Comb Eff	96,41%	96,41%
HT Eff	75,33%	81,05%
Output	11 188	kJ/h
Burn Rate	0,76	kg/h
Grams CO	229	g
Input	15 404	kJ/h
MC wet	16,31	

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

Ultimate CO_2
$CO_{2\text{-ult}}$ 19,86
F_0
1,049

Heat Output:	10 613	Btu/h	11 188	kJ/h
Heat Input:	14 613	Btu/h	15 404	kJ/h
Burn Duration:	5,67	h		
Burn Rate:	1,68	lb/h	0,762	kg/h
Stack Temp:	230,2	Deg. F	110,1	Deg. C

Overall Heating Efficiency:	72,63%
Combustion Efficiency:	96,41%
Heat Transfer Efficiency:	75,33%

Air Fuel Ratio (A/F)	
Dry Molecular Weight (M_d)	29,60
Dry Moles Exhaust Gas (N_r):	485,82
Air Fuel Ratio (A/F)	13,87

POLYTESTS

TESTING THROUGH YOUR REALITY

Date: 2019-05-21 Manufacturer: Spartherm Model: 600

Project #: PI 20196 Run: 2 Tech: MM Reviewer: TB

At 3.7 LBS start fire (1 minute torche)
- close Door immedially
- At 1.00 LBS insert load (High)
- close Door immedially
- At 2.00 LBS insert load
- At 4 min close air inlet 1/2
- At 14 min close air inlet (7/16 Drill bit)

TEST LOAD CONFIGURATION

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE / POST CHECKS

Date: 2019-05-22 Manufacturer: Spanheat Model: 600

Project #: PI 20196 Run: 2 Tech: MM Reviewer: DP

Moisture Meter Calibration Check:

Equipment #	Time	12%	22%
EM-191	1100	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	ok NA
Picture	4 sides ok	ok
Wood Heater Conditions:		
Date Wood Heater Stack Cleaned	2019-05-21	
Date Dilution Tunnel Cleaned	2019-05-21	
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		
	1st hour	Train 1	Train 2	1st hour	Train 1	Train 2
Probe				16	32	43
Filter Front				213	214	216
Filter Back				213	215	217
Filter Thermocouple				11	11	12
Filter (80°F ≥ <90°F)				ok	ok	ok

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-22 Manufacturer: SpAnthern Model: 600

Project #: pI 4196 Run: 2 Tech: M M Reviewer: DO

Leakage Checks Tunnel Samplers

High fire test	System 1st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)						
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						

Low medium fire test	System 1st hour		System 1		System 2	
Unplugged Flow Rate = .25cfm	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)	Pre-Test ASTM (-15) CSA B415 (-5)	Post-Test (Max test)
Vacuum (inches Hg.)	-15	-15	-15	-15	-15	-15
Final 1minute DGM (Liter)	929951,63	931165,75	929951,90	931165,84	879194,69	880400,55
Initial 1minute DGM (Liter)	929951,58	931165,75	929951,90	931165,82	879194,69	880400,55
Change © (Liter)	0,05	0	0	0,04	0	0
Allowable leakage .04 x Sample rate or 0.28Lpm CSA B415 (0.56)						
Check OK	OK	OK	OK	OK	OK	OK

POLYTESTS
TESTING THROUGH YOUR REALITY

SAMPLING EQUIPMENT CHECK OUT

Date: 2019-05-22 Manufacturer: Southern Model: 600

Project #: PI 20196 Run: 2 Tech: M M Reviewer: NP

Leakage Checks Flue Gas Sampler

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

Leakage Checks Pitot

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

POLYTESTS
TESTING THROUGH YOUR REALITY

PRE-TEST SCALE AUDIT

Date: 2019-05-22 Manufacturer: Sartorius Model: 600

Project #: PT 2196 Run: 2 Tech: M M Reviewer: VP

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

LIMITS OF WEIGHT RANGES

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

Date: 2019-05-22 Manufacturer: spantherm Model: 600

Project #: pI 20196 Run: 2 Tech: MM Reviewer: DO

FOR TUNNELS < 12 in

Barometric pressure (P_{bar}) 1020 (KPa.) Static pressure (P_q) 0,20 (inches w.c.)
Inside diameter: Port A _____ Port B ____.
Tunnel cross sectional area: .1963Ft^2
Pitot tube type: Standard

Traverse Point	Position (inches)			Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)
	6 po	7 po	8 po		
A- Centroid	3.00	3.50	4	0,068	81,05
B - Centroid	3.00	3.50	4	0,068	80,61
A-1	0.40	0.50	0.50	0,055	80,94
A-2	1.50	1.75	2	0,067	80,94
A-3	4.50	5.25	6	0,074	80,90
A-4	5.60	6.5	7.5	0,071	80,26
B-1	0.40	0.50	0.50	0,063	80,88
B-2	1.50	1.75	2	0,077	80,88
B-3	4.50	5.25	6	0,059	80,92
B-4	5.60	6.5	7.5	0,056	80,94
				AVERAGE	

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

Where,
C_p = pitot tube coefficient, dimension less = 0.99 for standard pitot.
Δ_p = manometer reading (inches H_2O)
T_s = average absolute dilution tunnel temperature (°F + 460)
P_s = absolute dilution tunnel gas pressure or $P_{bar} + P_{qg}$
P_q = static pressure $\frac{\text{in. } H_2O}{\{\ 13.6\ \}}$
M_s = 28.56, wet molecular weight of stack gas (alternatively, it may be measured)
K_p = 85.49 pitot tube constant, (conversion factor for English units)

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

POLYTESTS
TESTING THROUGH YOUR REALITY

CONTINUOUS ANALYZERS

Date: 2019-05-22 Manufacturer: SpanTherm Model: 600

Project #: PI 20196 Run: 2 Tech: MM Reviewer: [illegible]

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO	0	0	2,970	3,000	1,009	1,000
Tolerance CO		+/- 0.02		+/- 0.15		+/- 0.05
CO_2	0	0	17,78	18,00	9,79	10,00
Tolerance CO2		+/- 0.02		+/- 0.5		+/- 0.5
O_2 informative CSA B415 calculated value	na	na	na	na	na	na
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Limit	Span Drift	Limit	Cal. Drift	Limit	OK?	Not OK*
CO	0	2,980	1,000	0	0.02	0,010	0.15	0,009	0.05	✓	
CO_2	0	17,90	9,78	0	0.02	0,12	0.5	0,04	0.5	✓	

POLYTESTS
TESTING THROUGH YOUR REALITY

TEST DATA LOG

Date: 2019-05-22 Manufacturer: SPANTherM Model: 600

Project #: PI 20196 Run: 2 Tech: M M Reviewer: DP

RAW DRY GAS METER READINGS

		System 1	System 2	Blank
High fire test	Final (Liter)			
	Initial (Liter)			
Low medium fire test	Final (Liter)	931164,78	880339,62	725,71
	Initial (Liter)	929952,52	879195,98	673,71

AMBIENT CONDITIONS

	Before	After
Barometer (kPa):	102,0	102,1
Dry Bulb (F):	87,8	85,3
Humidity (%):	24,3	22,1

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-24 Manufacturer: Spathcam Model: 600

Project #: PI 20196 Run: 2 Tech: M.M Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

KINDLING AND START-UP LOAD

Piece Size	Weight	Meter Moisture Content (% dry)				
x x 5 in.	1,30 lbs.	9		9		9
x x 12 in.	lbs.					
x x in.	lbs.					
x x 5 in.	2,50 lbs.	20		20		20
x x 12 in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

HIGHFIRE TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)				
3 1/2 x 3,00 x 15 in.	2,28 lbs.	200		200		191
3 1/2 x 3,00 x 15 in.	2 15 lbs.	196		193		192
2,00 x 2,50 x 15 in.	1 61 lbs.	199		197		193
x x in.	lbs.					
3,25 x 3,50 x 8,5 in.	367 lbs.	191		196		194
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

POLYTESTS
TESTING THROUGH YOUR REALITY

FUEL DATA

Date: 2019-05-22 Manufacturer: SPARTHERM Model: 600

Project #: PI 20196 Run: 2 Tech: MM Reviewer: DP

FUEL DESCRIPTION:

Type of wood:

LOW OR MEDIUM TEST LOAD

Piece Size	Weight	Meter Moisture Content (% dry)				
275 x 2,5 x 15 in.	2 436 lbs.	196		194		196
225 x 225 x 15 in.	2 24 lbs.	209		201		200
200 x 225 x 15 in.	1 91 lbs.	194		198		197
x x in.	lbs.					
300 x 225 x 15 in.	3 15 lbs.	192		194		193
280 x 225 x 15 in.	1 86 8 lbs.	194		196		193
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					
x x in.	lbs.					

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date:_____ Manufacturer:_____ Model:_____

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

		HIGHFIRE TEST FILTERS								
		SYSTEM 1 – 1st hour				SYSTEM 1				
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time									

		SYSTEM 1 – 1st hour				SYSTEM 1				
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time									

POLYTESTS
TESTING THROUGH YOUR REALITY

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				

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

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-21 Manufacturer: ~~SPARTH~~ SPARTHERM Model: 600

Project #: pI 20196 Run: 2 Tech: MM Reviewer: DP

		LOW OR MEDIUM TEST FILTERS								
		SYSTEM 1 – 1st hour				SYSTEM 1				
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	16	212	213	19	32	214	215	27	218
2019-05-21	17:15	108 7530	0,0878	0,0850	34 1390	110 1780	0,0830	0,0856	34 2501	0,0849
2019-05-22	8:30	108 7531	~~0,0889~~ 0,0877	0,0849	34 1390	110 1779	0,0831	0,0856	34 2502	0,0850

		SYSTEM 1 – 1st hour				SYSTEM 1				
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets	Blanck
Date	Time	16	212	213	19	32	214	215	27	218
2019-05-22	13:30	108 7532	0,0895	0,0849	34 1397	110 1780	0,0842	0,0859	34 2513	0,0855
2019-05-28	8:00	MM ~~108 7533~~ 108 7532	0,0895	0,0849	34 1390	110 1780	0,0842	0,0859	34 2502	0,0852
2019-05-29	8:00	108 7532	0,0894	0,0849	34 1390	110 1779	0,0841	0,0859	34 2503	0,0852

POLYTESTS
TESTING THROUGH YOUR REALITY

DILUTION TUNNEL PARTICULATE SAMPLER DATA

Date: 2019-05-21 Manufacturer: Spantherm Model: 600

Project #: PI 2019 Run: 2 Tech: MM Reviewer: DP

		LOW OR MEDIUM FIRE TEST FILTERS			
		SYSTEM 2			
Pre-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	43	216	217	32
2019-05-21	17:15	109,1650	0,0857	0,0853	35,1877
2019-05-28	8:30	109,1649	0,0857	0,0853	35,1877

		SYSTEM 2			
Post-test Weight Record		Probe & Housing Number	Front Filter Number	Back Filter Number	gaskets
Date	Time	43	216	217	32
2019-05-22	13:30	109,1651	~~0,0830~~ 0,0879 MM	0,0854	35,1883
2019-05-28	8:00	109,1650	0,0879	0,0854	35,1877
2019-05-29	8:00	109,1651	0,0880	0,0854	35,1878

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 #	2	
Date	22-05-2019	
Technicien	m.m	
Project #	pi 20196	

Description de l'unité

Manufacturier	spartherm	
Modèle	600	
Combustion system	Non-Cat	
Appliance type	insert	
Firebox volume	0,95	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 manfacturier
Targeted category	1	
Targeted output	n.a	BTU/h
Cp steel	n.a	BTU/lb-°F

Échantillonnage

Blank sampling rate	0,20	cuft/min
Internal probe diameter	0,18	in.
Calibration Factor (DGM #1):	1,010	Dimensionless
Equipment number (DGM #1):	em 178	
Calibration Factor (DGM #2):	0,987	Dimensionless
Equipment number (DGM #2):	em 179	
Calibration Factor (DGM #3):	0,996	
Equipment number (DGM #3):	em 070	Dimensionless

Tunnel

Targeted tunnel flow rate	300	scfm
Tunnel diameter	8	in.
Molecular weight	28,78	May be assumed to be 28,78 (EPA) Si B-415 = 29
Pitot tube type	Standard	
Pitot tube coefficient	0,99	Dimensionless

Project nu.	pi 20196
Date	22-05-2019
Technicien	m.m

Fuel data

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

Default Fuel Values

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

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

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

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

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	0,95	ft^3				
Total Nom. Load Wt. Target	9,50	lb				
Total Load Wt. Allowable Range	9,00	to	10,00	lb		
Core Target Wt. Allowable Range	4,30	to	6,20	lb		
Remainder Load Wt. Allowable Range	3,30	to	5,20	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1,40	to	2,40	lb		1,90
Remainder Load Pc. Wt. Allowable Range	1,00	to	5,20	lb		3,10
	Pc. #					
Core Load Piece Wt. Actual	1	2,28	lb	In Range		
	2	2,15	lb	In Range		
	3	1,61	lb	In Range		
Core Load Total. Wt. Actual		6,04	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3,67	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Tot. Wt. Act		3,67	lb	In Range		
Total Load Wt. Actual		9,71	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		102%		In Range	95-105%	
Actual Fuel Load Density		10,2	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		1,94	lb			
Actual Kindling Wt.		1,30	lb	In Range	13,4%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		2,91	lb			
Actual Start-up Fuel Wt.		2,50	lb	In Range	25,7%	
Allowable Residual Start-up Fuel Wt. Range	1,0	to	1,9	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1	lb	In Range		1,5
Total Wt. All Fuel Added (wet basis)		13,51	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	0,9	to	1,1	lb		1,0
Actual Fuel Load Ending Wt.		1,0	lb	In Range		

Load pieces Length in. 15 in.

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis		
20	20	19,1	19,7	In Range	1,90	lb	0,86 kg
19,6	19,3	19,2	19,4	In Range	1,80	lb	0,82 kg
19,9	19,7	19,3	19,6	In Range	1,35	lb	0,61 kg
19,1	19,6	19,4	19,4	In Range	3,07	lb	1,39 kg
			NA	NA	NA	lb	NA kg
			NA	NA	NA	lb	NA kg

Total Load Ave. MC (%-dry basis) 19,5 In Range

Total Load Ave. MC % (wet basis) 16,3

Total Test Load Weight (dry basis) 8,13 lb 3,69 kg

Kindling Moisture (%-dry basis)

9	9	9	9,0	In Range	1,19	lb 0,54 kg

Start-up Fuel Moisture Readings (%-dry basis)

20	20	20	20,0	In Range	2,08	lb 0,94 kg

Total Wt. All Fuel Added (dry basis) 11,40 lb 5,17 kg

Total Wt. All Fuel Burned (dry basis) 9,4 lb 4,3 kg

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

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

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

Values to be input manually

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

Nominal Required Load Density (wet basis)	12	lb/ft^3					
Usable Firebox Volume	0,95	ft^3					
Total Nom. Load Wt. Target	11,4	lb					
Total Load Wt. Allowable Range	10,83	to	11,97	lb			
Core Target Wt. Allowable Range	5,13	to	7,41	lb			
Remainder Load Wt. Allowable Range	3,99	to	6,27	lb			
						Mid-Point	
Core Load Fuel Pc. Wt. Allowable Range	1,71	to	2,85	lb		2,28	
Remainder Load Pc. Wt. Allowable Range	1,14	to	3,42	lb		2,28	
	Pc. #						
Core Load Piece Wt. Actual	1	2,44	lb	In Range			
	2	2,21	lb	In Range			
	3	1,91	lb	In Range			
Core Load Total. Wt. Actual		6,56	lb	In Range			
	Pc. #						
Remainder Load Piece Wt.	1	3,15	lb	In Range			
(2 or 3 Pcs.)	2	1,87	lb	In Range			
	3		lb	NA			
Remainder Load Piece Weight Ratio - Small/Large		59%		In Range	≤ 67%		
Remainder Load Tot. Wt. Act		5,02	lb	In Range			
Total Load Wt. Actual		11,57	lb	In Range			
Core % of Total Wt.		57%		In Range	45-65%		
Remainder % of Total Wt.		43%		In Range	35-55%		
Actual Load % of Nominal Target		102%		In Range	95-105%		
Actual Fuel Load Density		12,2	lb/ft^3				
Allowable Charcoal Bed Wt. Range (lb)	1,2	to	2,3			Mid-Point	
Actual Charcoal Bed Wt.		2,0	lb	In Range		1,7	
Actual Fuel Load Ending Wt.			lb	Valid Test	≥ 90%		
Total Wt. of Fuel Burned During Test Run lb.		11,6	lb				
Load pieces Length in.		15	in.				

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis		
19,6	19,4	19,6	19,5	In Range	2,04 lb	0,92	kg
20	20,1	20	20,0	In Range	1,84 lb	0,84	kg
19,4	19,8	19,7	19,6	In Range	1,60 lb	0,72	kg
19,2	19,4	19,3	19,3	In Range	2,64 lb	1,20	kg
19,4	19,6	19,3	19,4	In Range	1,56 lb	0,71	kg
			NA	NA	NA lb	NA	kg

Total Load Ave. MC % (dry basis)	19,6	In Range		
Total Load Ave. MC % (wet basis)	16,4			
Total Test Load Weight (dry basis) →			9,68 lb	4,39 kg
Total Fuel Weight Burned During Test Run (dry basis)			9,7 lb	4,39 kg

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

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

Fuel Piece Moisture Reading (%-dry basis)

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

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

	Start	End
Barometer (kPa):	102	102,1
Barometer (in.Hg):	30,120589	30,15011865
Dry Bulb (F):	87,8	85,3
Humidity (%):	24,3	22,1
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:	32883,775	cuft	Final:	931164,780	Liter
	Initial:	32840,964	cuft	Initial:	929952,520	Liter
DGM #2	Final:	31088,901	cuft	Final:	880339,620	Liter
	Initial:	31048,514	cuft	Initial:	879195,980	Liter
DGM room				Final:	725,710	cuft
				Initial:	673,710	cuft

Numéro de la ligne dans "Raw data" à partir duquel les données du test commence	100
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	100

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

Project nu.	pi 20196
Date	22-05-2019
Technicien	m.m

Filter set weight Low/ medium fire

	System 1 (g) 1st hour				System 1 (g)				System 2 (g)				Ambient blank (g)	Date	Heure
	probe	front	back	gasket	probe	front	back	gasket	probe	front	back	gasket	Filter		
Number	16	212	213	19	32	214	215	27	43	216	217	32	218		
Before (1)															
Before (2)															
Before (3)															
Before (4)															
Before (5)	108,7530	0,0878	0,0850	34,1390	110,1780	0,0830	0,0856	34,2501	109,1650	0,0857	0,0853	35,1877	0,0849	2019-05-21	17:15
Before (6)	108,7531	0,0877	0,0849	34,1390	110,1779	0,0831	0,0856	34,2502	109,1649	0,0857	0,0853	35,1877	0,0850	2019-05-22	08:30
After (1)	108,7532	0,0895	0,0849	34,1397	110,178	0,0842	0,0859	34,2513	109,1651	0,0879	0,0854	35,1883	0,0855	2019-05-22	13:30
After (2)	108,7532	0,0895	0,0849	34,139	110,178	0,0842	0,0859	34,2502	109,165	0,0879	0,0854	35,1877	0,0852	2019-05-28	08:00
After (3)	108,7532	0,0894	0,0849	34,139	110,1779	0,0841	0,0859	34,2502	109,1651	0,088	0,0854	35,1878	0,0852	2019-05-29	08:00
After (4)															
After (5)															
After (6)	108,7532	0,0894	0,0849	34,139	110,1779	0,0841	0,0859	34,2502	109,1651	0,088	0,0854	35,1878	0,0852	2019-05-29	08:00
Difference	0,0001	0,0017	0,0000	0,0000	0,0000	0,0010	0,0003	0,0000	0,0002	0,0023	0,0001	0,0001	0,0002		
Total (mg)		1,8				3,1				2,7			0,2		
Total ajusté (mg)		**1,60**				**2,90**				**2,50**					

Project nu.	pi 20196
Date	22-05-2019
Technicien	

*		*	*	*	*1	*2	*3	*4	*5	*6	*7	*8	Mass flow 1	DGM 1	DGM 1	Filter 1	Mass flow 2	DGM 2	DGM 2	Filter 2	Tunnel Velo	Flue draft
Elapsed		Weight			Flue	Room	Tunnel	Unit	Unit	Unit	Unit	Unit	Reading	Inlet T	Outlet T	Temp	Reading	Inlet T	Outlet T	Temp	Pressure	Pressure
Time	Raw data row	Remaining	CO	CO_2	Gas	Temp	Dry Bulb	Top	Back	R.Side	L.Side	Bottom									in wc	in wc
min		lbs	%	%	°F	°F	°F	°F	°F	°F	°F	°F	cuft/min	oF	oF	oF	cuft/min	oF	oF	oF	in wc	in wc
0,00	100,00	11,6	0,1	6,2	541,0	85,2	150,9	466,9	236,9	196,7	225,3	205,5	0,19	90,19	88,73	86,47	0,18	90,05	88,44	86,11	0,06	0,07
1,0	101,0	11,2	0,2	2,6	650,1	84,7	146,7	452,0	240,5	197,5	227,1	209,6	0,19	90,57	88,64	86,68	0,18	90,24	88,34	86,41	0,06	0,09
2,0	102,0	11,0	0,3	7,9	681,0	85,7	132,2	439,6	244,3	198,2	228,5	213,8	0,19	90,65	88,57	86,83	0,18	90,37	88,30	86,61	0,06	0,10
3,0	103,0	10,8	0,5	14,9	654,5	85,6	127,9	432,8	248,5	198,4	228,3	217,8	0,19	90,77	88,52	87,01	0,18	90,51	88,25	86,83	0,06	0,10
4,0	104,0	10,6	0,3	14,0	613,6	85,4	124,5	429,8	251,7	198,1	228,4	221,8	0,19	90,85	88,49	87,23	0,18	90,64	88,25	87,08	0,06	0,10
5,0	105,0	10,4	0,3	13,2	705,8	85,6	128,0	430,1	255,2	197,7	228,6	225,3	0,19	90,92	88,47	87,47	0,18	90,71	88,27	87,34	0,06	0,10
6,0	106,0	10,2	0,5	16,6	731,6	85,8	130,5	433,6	258,0	197,3	228,3	227,8	0,19	91,05	88,46	87,74	0,18	90,82	88,27	87,61	0,06	0,10
7,0	107,0	9,9	0,3	17,0	723,6	85,4	130,5	439,6	259,6	196,7	228,5	230,3	0,19	91,23	88,49	88,02	0,18	90,96	88,30	87,95	0,06	0,10
8,0	108,0	9,7	0,2	16,3	724,4	84,5	131,0	447,7	264,8	194,9	228,3	232,0	0,19	91,28	88,52	88,27	0,18	91,04	88,35	88,27	0,06	0,10
9,0	109,0	9,5	0,1	16,4	736,0	84,3	131,7	457,3	267,6	194,2	228,6	233,3	0,19	91,27	88,53	88,49	0,18	91,06	88,37	88,53	0,06	0,10
10,0	110,0	9,3	0,1	16,9	754,3	83,4	131,9	466,5	270,5	193,5	227,9	233,8	0,19	91,11	88,48	88,72	0,18	91,02	88,37	88,76	0,06	0,10
11,0	111,0	9,1	0,1	17,6	780,7	83,8	133,9	477,3	272,5	192,7	227,6	234,5	0,19	91,00	88,47	88,97	0,18	90,98	88,37	88,98	0,06	0,10
12,0	112,0	8,8	0,3	18,4	798,5	82,9	135,0	488,2	275,7	191,1	227,3	234,6	0,19	90,97	88,46	89,14	0,18	90,97	88,39	89,13	0,06	0,11
13,0	113,0	8,6	0,3	18,7	804,8	82,2	136,2	497,7	276,0	190,7	227,6	234,6	0,19	90,91	88,45	88,83	0,18	90,93	88,37	88,50	0,06	0,11
14,0	114,0	8,4	0,4	18,6	693,7	82,1	127,9	507,5	279,2	190,1	227,4	234,8	0,19	90,87	88,41	88,58	0,18	90,88	88,39	88,03	0,06	0,10
15,0	115,0	8,2	0,4	16,2	645,7	81,9	124,5	513,2	281,4	190,5	227,7	234,8	0,19	90,83	88,39	88,38	0,18	90,80	88,39	87,70	0,06	0,10
16,0	116,0	8,1	0,7	14,8	618,1	82,1	122,0	517,5	285,7	190,0	227,4	234,5	0,19	90,74	88,36	88,16	0,18	90,70	88,40	87,47	0,06	0,09
17,0	117,0	8,0	0,8	14,4	605,0	82,7	120,4	520,9	288,7	189,6	227,5	234,3	0,19	90,62	88,31	87,96	0,18	90,59	88,38	87,21	0,06	0,09
18,0	118,0	7,8	0,9	14,4	596,0	82,2	119,1	522,1	290,7	188,8	227,5	233,5	0,19	90,50	88,28	87,74	0,18	90,46	88,38	87,05	0,06	0,09
19,0	119,0	7,6	1,0	14,5	588,5	81,9	118,0	521,8	293,5	188,4	227,4	232,9	0,19	90,42	88,25	87,56	0,18	90,36	88,36	86,85	0,06	0,09
20,0	120,0	7,5	1,1	14,1	579,6	81,1	117,4	520,0	292,6	188,1	227,1	232,1	0,19	90,36	88,20	87,37	0,18	90,24	88,32	86,72	0,06	0,09
21,0	121,0	7,4	1,2	14,2	576,6	81,7	117,0	518,7	294,6	188,2	226,5	231,5	0,19	90,33	88,19	87,17	0,18	90,17	88,32	86,62	0,06	0,09
22,0	122,0	7,3	1,1	14,5	577,5	82,1	116,7	516,5	294,9	187,9	225,9	230,9	0,19	90,32	88,17	87,01	0,18	90,10	88,33	86,53	0,07	0,09
23,0	123,0	7,1	1,1	14,6	573,5	82,1	115,7	515,5	295,7	187,6	225,8	229,9	0,19	90,25	88,12	86,83	0,18	90,02	88,29	86,44	0,07	0,09
24,0	124,0	6,9	1,1	14,7	572,1	82,3	115,5	515,2	296,7	187,0	225,4	228,9	0,19	90,24	88,10	86,69	0,18	89,93	88,29	86,35	0,06	0,09
25,0	125,0	6,8	1,1	14,8	574,0	82,2	115,5	514,1	297,2	186,9	225,1	227,6	0,19	90,24	88,05	86,51	0,18	89,86	88,25	86,22	0,06	0,09
26,0	126,0	6,6	1,2	15,1	575,3	81,9	114,9	514,0	297,7	185,8	224,5	226,4	0,19	90,26	88,02	86,37	0,18	89,81	88,23	86,13	0,06	0,09
27,0	127,0	6,5	1,1	15,2	570,3	81,9	114,6	514,6	297,7	185,2	224,3	225,2	0,19	90,29	88,03	86,22	0,18	89,78	88,24	86,02	0,06	0,09
28,0	128,0	6,3	1,4	15,1	576,2	80,8	114,2	515,3	297,6	185,0	224,0	223,9	0,19	90,25	88,00	86,06	0,18	89,72	88,26	85,93	0,07	0,09
29,0	129,0	6,2	1,7	15,1	578,7	81,3	114,7	516,3	298,6	184,3	223,8	223,0	0,19	90,14	87,97	85,96	0,18	89,62	88,21	85,83	0,07	0,09
30,0	130,0	6,0	1,5	15,5	569,8	80,7	114,9	517,2	297,1	184,6	223,8	221,7	0,19	90,16	87,96	85,80	0,18	89,55	88,22	85,78	0,06	0,09
31,0	131,0	5,9	1,6	14,9	554,4	81,5	114,1	518,8	298,1	184,2	223,3	220,4	0,19	90,20	87,93	85,66	0,18	89,50	88,21	85,71	0,06	0,09
32,0	132,0	5,7	1,8	14,7	546,2	81,4	113,3	520,0	298,2	183,6	223,2	219,1	0,19	90,21	87,90	85,55	0,18	89,45	88,20	85,62	0,06	0,09
33,0	133,0	5,5	2,0	15,1	517,5	81,2	112,4	521,5	297,3	183,7	223,3	217,8	0,19	90,16	87,86	85,42	0,18	89,37	88,21	85,50	0,06	0,09
34,0	134,0	5,3	3,8	15,1	508,6	81,3	111,6	522,8	297,9	183,2	223,4	216,5	0,19	90,05	87,85	85,30	0,18	89,32	88,17	85,43	0,06	0,09
35,0	135,0	5,2	2,7	15,3	506,5	80,9	110,9	524,1	298,1	183,0	223,7	215,2	0,19	90,00	87,81	85,16	0,18	89,22	88,16	85,35	0,06	0,08
36,0	136,0	5,1	1,7	15,3	503,9	81,6	110,1	524,2	298,0	183,2	223,5	213,8	0,19	89,95	87,77	85,05	0,18	89,16	88,14	85,24	0,06	0,08
37,0	137,0	4,9	1,0	15,0	498,5	81,5	109,4	524,8	297,9	183,6	224,3	212,8	0,19	89,95	87,72	84,91	0,18	89,09	88,10	85,21	0,07	0,08
38,0	138,0	4,8	0,6	14,2	490,7	81,7	108,7	522,3	295,9	184,2	224,6	211,5	0,19	89,85	87,70	84,80	0,18	89,01	88,06	85,13	0,06	0,08
39,0	139,0	4,7	0,4	13,5	483,8	81,7	107,9	520,3	296,6	185,0	225,4	210,4	0,19	89,71	87,67	84,65	0,18	88,92	88,01	85,06	0,07	0,08
40,0	140,0	4,6	0,4	13,1	477,3	81,8	107,6	516,3	295,4	185,4	225,5	209,2	0,19	89,69	87,63	84,54	0,18	88,85	87,96	85,01	0,06	0,08
41,0	141,0	4,5	0,4	13,0	470,9	82,1	106,8	511,4	295,3	186,2	225,5	208,3	0,19	89,65	87,63	84,41	0,18	88,78	87,93	84,95	0,06	0,08
42,0	142,0	4,4	0,3	12,6	465,2	81,7	106,4	505,9	294,4	186,3	226,3	207,3	0,19	89,48	87,61	84,29	0,18	88,71	87,92	84,86	0,06	0,08
43,0	143,0	4,3	0,3	12,2	459,2	82,0	105,9	499,9	294,5	185,9	227,0	205,9	0,19	89,45	87,59	84,24	0,18	88,64	87,89	84,80	0,07	0,08
44,0	144,0	4,2	0,2	12,0	453,3	82,0	105,3	494,0	293,5	186,3	227,2	204,9	0,19	89,39	87,57	84,31	0,18	88,58	87,85	84,89	0,06	0,08
45,0	145,0	4,1	0,2	11,9	447,9	82,3	104,9	488,3	293,0	186,5	227,5	204,2	0,19	89,37	87,55	84,39	0,18	88,53	87,86	85,04	0,07	0,08
46,0	146,0	4,0	0,2	11,5	446,8	82,0	104,9	480,0	292,2	187,4	227,2	203,1	0,19	89,27	87,50	84,45	0,18	88,45	87,82	85,14	0,07	0,08
47,0	147,0	3,9	0,2	12,0	447,0	81,8	104,1	473,8	290,7	187,4	227,1	202,2	0,19	89,08	87,47	84,54	0,18	88,36	87,80	85,23	0,07	0,08
48,0	148,0	3,9	0,3	11,8	448,0	81,5	103,8	468,1	289,9	187,2	227,0	200,9	0,19	88,93	87,46	84,61	0,18	88,30	87,75	85,32	0,07	0,08
49,0	149,0	3,8	0,3	11,9	450,3	81,0	103,7	465,0	290,2	186,7	226,7	200,0	0,19	88,74	87,42	84,64	0,18	88,18	87,70	85,36	0,07	0,08
50,0	150,0	3,7	0,3	12,3	450,0	81,2	103,6	461,9	290,1	186,2	226,2	198,9	0,19	88,58	87,37	84,69	0,18	88,07	87,64	85,39	0,07	0,08
51,0	151,0	3,6	0,5	12,1	444,4	81,2	103,3	459,1	289,2	187,5	225,8	198,5	0,19	88,43	87,33	84,73	0,18	87,97	87,61	85,44	0,06	0,08
52,0	152,0	3,5	0,5	11,7	441,7	80,6	103,0	456,2	288,0	187,6	225,1	197,8	0,19	88,32	87,31	84,80	0,18	87,87	87,54	85,52	0,06	0,08
53,0	153,0	3,4	0,5	11,5	439,8	80,6	102,3	453,1	286,6	188,1	224,5	197,4	0,19	88,18	87,23	84,84	0,18	87,71	87,47	85,53	0,07	0,08
54,0	154,0	3,3	0,6	11,3	438,2	79,8	102,2	449,6	285,2	188,5	223,9	197,1	0,19	88,03	87,16	84,88	0,18	87,53	87,36	85,55	0,06	0,08
55,0	155,0	3,3	0,6	11,0	436,3	79,9	102,1	448,4	283,8	188,7	223,5	197,0	0,19	87,90	87,09	84,91	0,18	87,40	87,30	85,54	0,06	0,08
56,0	156,0	3,2	0,6	11,1	434,5	80,2	101,8	446,3	282,5	188,6	223,3	196,5	0,19	87,84	87,02	84,95	0,18	87,31	87,23	85,56	0,07	0,08
57,0	157,0	3,1	0,6	11,2	434,9	80,6	101,8	444,8	282,5	188,5	222,7	196,0	0,19	87,95	87,03	85,01	0,18	87,33	87,23	85,57	0,06	0,08
58,0	158,0	3,0	0,5	11,4	433,6	80,3	101,7	443,5	282,4	188,0	222,3	195,6	0,19	88,00	87,00	85,04	0,18	87,32	87,21	85,56	0,06	0,08
59,0	159,0	3,0	0,5	11,5	432,7	81,0	101,6	441,7	282,2	187,8	221,7	195,3	0,19	88,02	86,99	85,09	0,18	87,31	87,21	85,57	0,06	0,08
60,0	160,0	2,9	0,6	11,6	431,1	81,1	101,5	440,0	281,1	187,3	221,0	194,8	0,19	88,09	87,00	84,97	0,18	87,31	87,21	85,55	0,06	0,07
61,0	161,0	2,8	0,5	11,6	428,7	81,1	101,4	439,3	280,8	187,2	220,6	194,6	0,19	87,94	86,97	84,92	0,18	87,25	87,15	85,54	0,07	0,07
62,0	162,0	2,7	0,4	11,4	425,3	81,1	101,5	438,0	278,9	187,4	220,3	194,5	0,19	87,82	86,93	82,72	0,18	87,22	87,14	85,57	0,06	0,07
63,0	163,0	2,7	0,4	11,2	422,1	80,4	101,2	436,6	278,3	187,5	220,2	194,4	0,19	87,63	86,88	82,79	0,18	87,12	87,08	85,59	0,06	0,07
64,0	164,0	2,6	0,3	10,7	417,7	79,8	100,6	434,4	277,4	187,4	219,8	194,3	0,19	87,51	86,85	82,80	0,18	87,04	87,05	85,59	0,06	0,07
65,0	165,0	2,5	0,3	10,2	413,8	79,7	100,2	432,1	276,8	187,2	219,5	194,2	0,19	87,40	86,82	82,82	0,18	86,98	87,01	85,52	0,07	0,07
66,0	166,0	2,5	0,3	10,0	410,9	79,2	99,7	429,9	277,3	186,8	219,2	193,9	0,19	87,31	86,78	82,85	0,18	86,95	86,99	85,48	0,07	0,07
67,0	167,0	2,5	0,4	10,1	407,7	80,4	99,7	426,0	277,4	186,2	219,0	193,6	0,19	87,32	86,80	82,87	0,18	86,97	87,00	85,45	0,07	0,07
68,0	168,0	2,4	0,4	10,0	403,7	80,5	99,7	421,9	276,3	186,2	218,7	193,2	0,19	87,39	86,78	82,89	0,18	86,97	87,00	85,43	0,07	0,07
69,0	169,0	2,3	0,5	10,0	401,1	79,3	99,5	417,4	276,1	186,0	218,4	193,0	0,19	87,49	86,79	82,95	0,18	87,00	86,98	85,43	0,07	0,07
70,0	170,0	2,3	0,6	9,8	398,5	79,9	99,2	412,3	273,9	185,9	218,0	192,9	0,19	87,49	86,76	82,97	0,18	86,99	86,96	85,38	0,06	0,07
71,0	171,0	2,2	0,6	9,7	395,8	78,9	99,2	407,8	274,1	185,9	217,5	192,9	0,19	87,32	86,75	82,99	0,18	86,93	86,95	85,37	0,06	0,07
72,0	172,0	2,1	0,5	9,8	392,8	79,7	98,9	403,5	274,1	185,8	217,3	192,9	0,19	87,21	86,72	83,04	0,18	86,89	86,90	85,35	0,06	0,07
73,0	173,0	2,1	0,4	9,1	384,5	79,4	98,5	399,6	274,9	185,5	217,0	192,6	0,19	87,10	86,72	83,06	0,18	86,84	86,89	85,31	0,07	0,07
74,0	174,0	2,1	0,1	8,0	375,7	80,1	98,0	395,1	274,9	184,9	216,8	192,6	0,19	87,11	86,69	83,10	0,18	86,83	86,90	85,28	0,06	0,07
75,0	175,0	2,1	0,1	7,4	369,1	79,4	97,8	389,6	274,2	184,6	216,4	192,5	0,19	87,22	86,69	83,16	0,18	86,87	86,90	85,27	0,07	0,07
76,0	176,0	2,1	0,1	7,3	362,9	79,7	97,8	384,3	274,4	184,3	215,9	192,4	0,19	87,28	86,69	83,17	0,18	86,90	86,90	85,20	0,06	0,06
77,0	177,0	2,0	0,1	7,3	358,3	80,6	97,6	377,2	273,0	184,0	215,4	192,3	0,19	87,23	86,70	83,19	0,18	86,90	86,92	85,17	0,07	0,06
78,0	178,0	2,0	0,1	7,2	353,2	81,2	97,1	370,8	273,6	183,1	214,8	192,3	0,19	87,13	86,69	83,22	0,18	86,89	86,91	85,11	0,07	0,06
79,0	179,0	2,0	0,1	7,2	348,9	81,0	96,9	364,7	273,4	182,3	214,1	192,3	0,19	87,04	86,68	83,25	0,18	86,89	86,89	85,08	0,07	0,06
80,0	180,0	2,0	0,1	7,2	345,2	81,4	97,1	358,3	273,4	181,7	213,7	192,3	0,19	86,97	86,70	83,27	0,18	86,86	86,89	85,02	0,07	0,06
81,0	181,0	2,0	0,1	7,1	341,1	81,1	96,8	353,0	273,3	181,2	212,9	192,3	0,19	86,87	86,70	83,28	0,18	86,86	86,87	84,99	0,07	0,06
82,0	182,0	1,9	0,1	7,1	337,3	80,8	96,7	346,9	273,2	180,9	212,4	192,4	0,19	86,82	86,68	83,28	0,18	86,82	86,89	84,92	0,07	0,06
83,0	183,0	1,9	0,2	7,1	333,7	81,5	96,7	341,3	272,1	180,9	211,9	192,5	0,19	86,80	86,70	83,28	0,18	86,85	86,88	84,91	0,06	0,06
84,0	184,0	1,9	0,2	7,2	330,4	82,1	96,6	336,4	271,6	181,0	211,9	193,1	0,19	86,88	86,71	83,35	0,18	86,89	86,91	84,89	0,06	0,06
85,0	185,0	1,9	0,2	7,1	326,9	81,9	96,7	331,4	270,4	181,0	211,7	193,6	0,19	87,01	86,72	83,41	0,18	86,95	86,93	84,87	0,07	0,06
86,0	186,0	1,8	0,2	7,1	323,5	81,9	96,8	326,8	270,5	181,1	211,6	194,3	0,19	87,22	86,77	83,49	0,18	87,07	86,95	84,90	0,07	0,06
87,0	187,0	1,8	0,2	7,1	320,3	81,9	96,8	322,7	271,4	181,1	211,4	194,8	0,19	87,42	86,81	83,59	0,18	87,18	87,00	84,93	0,07	0,06
88,0	188,0	1,8	0,2	7,1	317,3	82,5	96,6	318,4	271,2	181,3	211,3	194,9	0,19	87,59	86,85	83,70	0,18	87,28	87,07	84,94	0,07	0,06

89,0	189,0	1,8	0,3	7,0	314,2	82,7	96,6	314,6	271,7	181,0	210,7	195,4	0,19	87,74	86,89	83,81	0,18	87,43	87,11	85,01	0,07	0,06
90,0	190,0	1,7	0,3	7,0	311,1	82,7	96,7	310,4	271,3	180,9	210,4	195,8	0,19	87,85	86,94	83,94	0,18	87,52	87,14	85,05	0,07	0,06
91,0	191,0	1,8	0,3	6,7	308,4	83,1	97,1	306,4	270,4	180,8	210,3	196,3	0,19	87,97	86,98	84,07	0,18	87,61	87,19	85,10	0,07	0,06
92,0	192,0	1,7	0,3	6,5	305,2	82,7	96,3	303,1	270,4	180,4	209,7	196,7	0,19	88,03	87,00	84,16	0,18	87,69	87,22	85,13	0,07	0,06
93,0	193,0	1,7	0,4	6,4	302,5	83,5	96,4	299,8	270,4	180,4	209,7	197,3	0,19	88,09	87,05	84,26	0,18	87,78	87,29	85,18	0,07	0,05
94,0	194,0	1,7	0,5	6,4	299,3	83,4	96,3	296,1	269,6	180,1	209,2	197,6	0,19	88,13	87,07	84,34	0,18	87,84	87,30	85,23	0,07	0,05
95,0	195,0	1,7	0,5	6,4	296,9	83,6	95,9	292,8	269,7	179,9	209,0	198,2	0,19	88,15	87,10	84,44	0,18	87,89	87,35	85,27	0,07	0,05
96,0	196,0	1,7	0,5	6,4	294,0	83,9	96,1	289,4	270,0	179,6	208,9	198,5	0,19	88,17	87,14	84,55	0,18	87,94	87,36	85,33	0,07	0,05
97,0	197,0	1,7	0,5	6,4	291,8	83,9	96,3	285,7	269,5	179,4	208,5	199,0	0,19	88,22	87,15	84,63	0,18	87,99	87,40	85,38	0,07	0,05
98,0	198,0	1,7	0,5	6,4	289,7	84,0	96,1	282,3	268,8	179,2	208,2	199,3	0,19	88,25	87,19	84,73	0,18	88,05	87,43	85,44	0,07	0,05
99,0	199,0	1,7	0,6	6,4	287,6	84,1	96,1	279,2	269,1	178,9	207,6	199,6	0,19	88,32	87,21	84,82	0,18	88,11	87,49	85,49	0,07	0,05
100,0	200,0	1,6	0,6	6,3	285,2	84,2	95,6	276,0	268,7	178,4	207,2	199,5	0,19	88,32	87,23	84,91	0,18	88,13	87,48	85,54	0,07	0,05
101,0	201,0	1,6	0,6	6,3	283,7	84,1	95,7	273,2	267,5	178,5	207,1	199,8	0,19	88,35	87,24	84,98	0,18	88,15	87,49	85,57	0,07	0,05
102,0	202,0	1,6	0,6	6,2	282,3	84,0	95,4	270,3	269,1	178,2	206,6	200,0	0,19	88,32	87,28	85,05	0,18	88,17	87,52	85,64	0,06	0,05
103,0	203,0	1,6	0,6	6,3	280,4	84,2	95,9	267,9	268,2	177,7	206,0	200,3	0,19	88,34	87,28	85,14	0,18	88,18	87,55	85,70	0,07	0,05
104,0	204,0	1,6	0,6	6,3	278,7	84,2	95,3	265,5	268,6	177,2	205,6	200,3	0,19	88,38	87,32	85,21	0,18	88,23	87,57	85,70	0,07	0,05
105,0	205,0	1,5	0,6	6,3	278,0	84,3	95,5	263,1	268,7	176,9	205,1	200,4	0,19	88,41	87,34	85,25	0,18	88,26	87,56	85,73	0,07	0,05
106,0	206,0	1,5	0,7	6,1	277,2	84,4	95,3	260,4	268,4	176,6	204,4	200,5	0,19	88,41	87,35	85,32	0,18	88,26	87,60	85,77	0,07	0,05
107,0	207,0	1,5	0,7	6,1	275,8	84,5	95,3	258,5	268,2	176,3	204,2	200,7	0,19	88,45	87,36	85,41	0,18	88,30	87,61	85,82	0,07	0,05
108,0	208,0	1,5	0,7	6,1	274,3	84,4	95,2	255,9	268,0	175,9	203,8	200,7	0,19	88,46	87,38	85,46	0,18	88,29	87,62	85,83	0,07	0,05
109,0	209,0	1,5	0,7	6,2	273,3	84,5	95,1	253,8	268,0	175,2	203,5	200,6	0,19	88,44	87,39	85,52	0,18	88,32	87,62	85,86	0,06	0,05
110,0	210,0	1,5	0,7	6,2	272,6	84,4	95,2	251,9	267,6	174,9	203,3	200,6	0,19	88,45	87,39	85,58	0,18	88,33	87,63	85,91	0,07	0,05
111,0	211,0	1,4	0,7	6,1	270,9	84,1	95,1	250,3	267,8	174,9	202,9	200,4	0,19	88,41	87,40	85,63	0,18	88,33	87,66	85,96	0,07	0,05
112,0	212,0	1,4	0,7	6,1	269,4	84,4	94,8	248,6	267,5	174,6	202,2	200,3	0,19	88,38	87,40	85,68	0,18	88,32	87,64	85,99	0,07	0,05
113,0	213,0	1,4	0,7	6,1	268,6	84,5	94,6	247,0	268,0	174,1	201,9	200,2	0,19	88,38	87,39	85,70	0,18	88,33	87,64	86,01	0,07	0,05
114,0	214,0	1,4	0,7	6,1	267,6	84,6	94,6	245,0	267,8	173,7	201,5	200,0	0,19	88,39	87,41	85,79	0,18	88,33	87,67	86,04	0,07	0,05
115,0	215,0	1,3	0,7	6,0	266,3	84,7	94,6	243,4	267,1	173,6	201,3	199,9	0,19	88,35	87,40	85,82	0,18	88,32	87,66	86,06	0,07	0,05
116,0	216,0	1,3	0,7	6,0	265,3	84,6	94,8	241,8	267,8	173,2	200,7	199,7	0,19	88,35	87,43	85,87	0,18	88,33	87,68	86,10	0,07	0,05
117,0	217,0	1,4	0,7	6,0	264,1	84,6	94,5	240,7	267,7	172,7	200,1	199,6	0,19	88,36	87,42	85,91	0,18	88,31	87,68	86,14	0,07	0,05
118,0	218,0	1,3	0,7	6,1	263,2	84,6	94,6	239,3	267,6	172,4	199,9	199,4	0,19	88,38	87,43	85,96	0,18	88,34	87,67	86,14	0,07	0,05
119,0	219,0	1,3	0,7	6,1	262,1	84,6	94,6	238,2	267,7	171,9	199,7	199,2	0,19	88,34	87,44	86,03	0,18	88,34	87,70	86,18	0,07	0,05
120,0	220,0	1,3	0,6	6,2	261,4	84,3	94,2	236,6	266,3	171,4	199,3	199,0	0,19	88,32	87,45	86,05	0,18	88,32	87,71	86,20	0,07	0,05
121,0	221,0	1,3	0,6	6,2	260,8	84,5	94,3	235,7	266,0	171,4	199,1	199,0	0,19	88,27	87,46	86,08	0,18	88,32	87,72	86,23	0,07	0,05
122,0	222,0	1,3	0,6	6,1	259,9	84,7	94,2	234,5	265,9	171,2	198,8	198,7	0,19	88,26	87,49	86,11	0,18	88,32	87,73	86,23	0,07	0,05
123,0	223,0	1,2	0,6	6,1	259,4	84,5	94,0	233,6	266,2	170,7	198,2	198,5	0,19	88,22	87,48	86,13	0,18	88,32	87,76	86,23	0,06	0,05
124,0	224,0	1,2	0,6	6,1	258,8	84,4	94,2	232,6	265,9	170,1	197,8	198,3	0,19	88,18	87,48	86,14	0,18	88,31	87,76	86,26	0,07	0,05
125,0	225,0	1,2	0,6	6,1	258,4	84,6	94,1	231,6	264,8	169,8	197,3	198,0	0,19	88,14	87,48	86,15	0,18	88,28	87,75	86,26	0,07	0,05
126,0	226,0	1,2	0,6	6,1	257,7	84,5	93,7	231,2	265,9	169,5	196,7	197,7	0,19	88,14	87,48	86,18	0,18	88,29	87,76	86,26	0,07	0,05
127,0	227,0	1,2	0,6	6,1	256,3	84,5	94,0	230,2	265,5	169,6	196,3	197,5	0,19	88,15	87,49	86,18	0,18	88,28	87,76	86,26	0,07	0,05
128,0	228,0	1,2	0,6	6,1	256,4	84,0	93,6	229,3	264,4	169,5	195,8	197,1	0,19	88,14	87,49	86,21	0,18	88,27	87,77	86,26	0,07	0,05
129,0	229,0	1,1	0,6	6,1	255,6	84,4	94,0	228,7	265,0	169,6	195,7	196,9	0,19	88,12	87,47	86,21	0,18	88,25	87,76	86,29	0,06	0,05
130,0	230,0	1,1	0,6	6,1	254,9	84,4	93,7	227,8	263,9	169,0	195,2	196,6	0,19	88,11	87,49	86,24	0,18	88,26	87,78	86,31	0,07	0,05
131,0	231,0	1,1	0,6	6,1	254,0	84,3	93,7	227,2	263,3	168,7	194,9	196,4	0,19	88,11	87,50	86,21	0,18	88,27	87,78	86,29	0,07	0,05
132,0	232,0	1,1	0,6	6,1	253,7	83,8	93,5	226,6	264,2	168,1	194,5	196,1	0,19	88,09	87,49	86,20	0,18	88,25	87,79	86,27	0,07	0,05
133,0	233,0	1,1	0,6	6,1	253,1	84,3	93,4	225,7	263,9	167,7	194,0	196,0	0,19	88,03	87,50	86,21	0,18	88,21	87,77	86,26	0,06	0,05
134,0	234,0	1,0	0,6	6,1	253,0	84,2	93,7	225,3	263,3	167,6	193,5	195,8	0,19	88,04	87,49	86,23	0,18	88,20	87,78	86,27	0,07	0,05
135,0	235,0	1,0	0,6	6,1	252,5	84,3	93,9	224,5	263,3	167,5	193,2	195,5	0,19	88,02	87,49	86,27	0,18	88,17	87,77	86,28	0,06	0,05
136,0	236,0	1,0	0,6	6,1	252,1	84,3	93,6	223,8	262,9	167,2	193,1	195,3	0,19	88,02	87,47	86,25	0,18	88,16	87,76	86,25	0,07	0,05
137,0	237,0	1,0	0,6	6,1	251,8	84,0	93,6	223,1	263,4	167,2	192,5	195,1	0,19	88,00	87,46	86,24	0,18	88,12	87,73	86,25	0,07	0,05
138,0	238,0	1,0	0,6	6,1	251,6	84,4	93,9	222,8	261,7	167,2	192,0	194,6	0,19	88,00	87,46	86,28	0,18	88,12	87,72	86,26	0,07	0,05
139,0	239,0	1,0	0,6	6,1	251,4	84,5	93,4	222,2	262,2	166,9	191,8	194,4	0,19	87,99	87,44	86,29	0,18	88,11	87,73	86,26	0,07	0,05
140,0	240,0	1,0	0,6	6,1	250,9	84,6	93,7	221,9	261,6	166,3	191,5	194,3	0,19	87,96	87,45	86,33	0,18	88,08	87,72	86,27	0,06	0,05
141,0	241,0	0,9	0,6	6,1	250,6	84,6	93,7	221,3	260,3	165,8	191,2	193,8	0,19	87,97	87,44	86,35	0,18	88,08	87,71	86,25	0,06	0,05
142,0	242,0	1,0	0,6	6,1	250,5	84,5	93,8	220,8	260,4	165,7	191,0	193,6	0,19	87,99	87,44	86,34	0,18	88,08	87,70	86,28	0,07	0,05
143,0	243,0	0,9	0,6	6,1	250,3	84,6	93,7	220,3	259,2	165,4	190,6	193,4	0,19	87,99	87,44	86,38	0,18	88,07	87,71	86,26	0,07	0,05
144,0	244,0	0,9	0,6	6,1	249,4	84,1	93,6	220,1	260,4	165,7	190,4	193,2	0,19	87,97	87,43	86,39	0,18	88,06	87,71	86,27	0,07	0,05
145,0	245,0	0,9	0,6	5,8	249,7	84,2	93,6	219,6	260,7	165,7	190,1	193,1	0,19	88,00	87,44	86,40	0,18	88,10	87,75	86,26	0,07	0,05
146,0	246,0	0,9	0,6	5,8	249,2	84,3	93,3	219,2	260,0	165,9	189,6	192,9	0,19	87,99	87,47	86,40	0,18	88,11	87,74	86,25	0,07	0,05
147,0	247,0	0,9	0,6	5,8	248,3	84,4	93,4	218,7	260,0	165,4	189,3	192,6	0,19	87,93	87,49	86,39	0,18	88,14	87,77	86,27	0,07	0,05
148,0	248,0	0,9	0,6	5,8	247,9	84,0	93,2	218,3	258,6	164,8	189,0	192,2	0,19	87,94	87,51	86,35	0,18	88,17	87,78	86,24	0,07	0,04
149,0	249,0	0,8	0,5	5,8	247,6	84,3	93,4	218,0	259,2	164,7	188,6	192,0	0,19	87,94	87,53	86,35	0,18	88,19	87,81	86,25	0,07	0,05
150,0	250,0	0,9	0,5	5,7	247,9	84,4	93,5	217,4	258,6	165,1	188,1	191,6	0,19	87,97	87,54	86,34	0,18	88,21	87,82	86,24	0,07	0,05
151,0	251,0	0,8	0,5	5,7	247,7	84,5	93,3	217,1	258,7	164,6	187,8	191,3	0,19	87,96	87,55	86,33	0,18	88,20	87,85	86,23	0,07	0,05
152,0	252,0	0,8	0,5	5,7	247,5	84,4	93,3	216,5	257,0	164,6	187,5	190,8	0,19	87,96	87,56	86,28	0,18	88,23	87,87	86,23	0,07	0,05
153,0	253,0	0,8	0,5	5,7	247,0	84,5	93,3	216,3	256,8	164,6	187,0	190,4	0,19	87,96	87,57	86,29	0,18	88,23	87,86	86,19	0,07	0,04
154,0	254,0	0,7	0,5	5,7	246,9	84,5	93,2	216,3	257,7	164,8	186,8	190,1	0,19	87,96	87,59	86,29	0,18	88,24	87,87	86,21	0,07	0,05
155,0	255,0	0,8	0,5	5,7	246,7	84,6	93,1	215,7	258,0	164,9	186,5	189,8	0,19	87,92	87,60	86,27	0,18	88,26	87,89	86,19	0,07	0,04
156,0	256,0	0,7	0,5	5,7	246,2	84,6	93,3	215,4	257,9	164,6	185,9	189,5	0,19	87,93	87,60	86,28	0,18	88,26	87,89	86,19	0,06	0,04
157,0	257,0	0,7	0,5	5,7	245,9	84,6	93,0	215,0	257,9	164,2	185,6	189,1	0,19	87,93	87,63	86,28	0,18	88,25	87,91	86,19	0,07	0,05
158,0	258,0	0,7	0,5	5,7	246,3	84,6	93,3	214,6	256,2	164,5	185,3	188,7	0,19	87,93	87,64	86,26	0,18	88,27	87,92	86,20	0,07	0,04
159,0	259,0	0,7	0,5	5,7	245,6	84,5	93,4	214,3	256,5	164,6	185,0	188,3	0,19	87,92	87,63	86,25	0,18	88,29	87,93	86,16	0,07	0,04
160,0	260,0	0,7	0,5	5,7	245,7	84,6	93,3	213,7	256,8	164,4	184,8	187,9	0,19	87,92	87,67	86,27	0,18	88,29	87,94	86,18	0,07	0,04
161,0	261,0	0,6	0,5	5,6	245,5	84,7	93,0	213,6	255,7	164,2	184,3	187,6	0,19	87,87	87,66	86,23	0,18	88,29	87,96	86,16	0,07	0,04
162,0	262,0	0,6	0,5	5,6	245,5	84,4	93,2	213,4	256,5	164,2	184,1	187,3	0,19	87,86	87,66	86,23	0,18	88,29	87,96	86,16	0,07	0,04
163,0	263,0	0,6	0,5	5,5	245,8	84,7	93,3	213,0	254,6	163,8	183,6	186,8	0,19	87,84	87,69	86,23	0,18	88,31	87,98	86,15	0,07	0,05
164,0	264,0	0,6	0,5	5,5	244,6	84,6	93,3	212,7	254,9	163,7	183,3	186,5	0,19	87,85	87,69	86,23	0,18	88,29	87,98	86,14	0,07	0,04
165,0	265,0	0,6	0,5	5,5	244,8	84,6	93,4	212,3	253,9	163,4	182,9	186,1	0,19	87,83	87,71	86,20	0,18	88,30	87,98	86,15	0,07	0,04
166,0	266,0	0,6	0,5	5,5	244,4	84,7	93,3	212,1	254,6	163,2	182,8	185,9	0,19	87,84	87,69	86,22	0,18	88,29	88,01	86,13	0,07	0,04
167,0	267,0	0,6	0,5	5,5	244,0	84,6	93,3	211,8	254,5	163,1	182,3	185,4	0,19	87,82	87,69	86,21	0,18	88,30	88,00	86,13	0,07	0,04
168,0	268,0	0,6	0,5	5,5	244,0	84,7	93,1	211,5	254,5	163,0	182,2	185,1	0,19	87,81	87,73	86,19	0,18	88,29	88,01	86,12	0,07	0,04
169,0	269,0	0,6	0,5	5,4	243,6	84,7	93,1	210,9	254,7	162,8	181,9	184,8	0,19	87,79	87,72	86,19	0,18	88,29	88,03	86,13	0,07	0,04
170,0	270,0	0,5	0,5	5,4	244,2	84,7	93,4	210,8	253,0	162,8	181,7	184,4	0,19	87,77	87,72	86,19	0,18	88,31	88,02	86,11	0,07	0,04
171,0	271,0	0,5	0,5	5,4	243,3	84,7	93,3	210,5	253,3	162,9	181,3	184,1	0,19	87,78	87,70	86,18	0,18	88,28	88,04	86,12	0,07	0,04
172,0	272,0	0,5	0,5	5,4	242,9	84,7	93,3	209,9	253,1	162,4	181,2	183,8	0,19	87,77	87,72	86,20	0,18	88,30	88,05	86,10	0,07	0,04
173,0	273,0	0,5	0,5	5,4	242,3	84,7	93,3	209,8	253,6	162,2	180,9	183,7	0,19	87,78	87,74	86,18	0,18	88,31	88,06	86,11	0,07	0,04
174,0	274,0	0,5	0,5	5,4	242,1	84,7	93,2	209,5	253,1	161,7	180,7	183,4	0,19	87,74	87,74	86,18	0,18	88,28	88,07	86,09	0,07	0,04
175,0	275,0	0,5	0,5	5,4	241,7	84,4	93,0	209,0	252,2	161,6	180,3	183,1	0,19	87,76	87,74	86,16	0,18	88,28	88,09	86,11	0,07	0,04
176,0	276,0	0,5	0,5	5,3	241,5	84,6	93,1	208,8	251,8	161,5	180,3	182,8	0,19	87,76	87,75	86,14	0,18	88,29	88,08	86,08	0,07	0,04
177,0	277,0	0,4	0,5	5,3	240,6	84,6	93,3	208,5	251,7	161,5	180,0	182,5	0,19	87,78	87,73	86,14	0,18	88,29	88,08	86,08	0,07	0,04
178,0	278,0	0,4	0,5	5,0	240,5	84,7	93,3	208,0	251,6	161,4	179,7	182,2	0,19	87,78	87,74	86,15	0,18	88,29	88,09	86,07	0,07	0,04
179,0	279,0	0,4	0,5	5,0	239,6	84,7	93,1	207,5	251,8	161,0	179,4	182,0	0,19	87,78	87,77	86,16	0,18	88,27	88,10	86,07	0,07	0,04
180,0	280,0	0,4	0,5	5,0	239,2	84,7	93,1	207,1	250,8	160,7	179,2	181,6	0,19	87,77	87,74	86,15	0,18	88,25	88,08	86,08	0,07	0,04
181,0	281,0	0,4	0,5	5,0	238,8	84,5	92,9	206,3	251,5	160,5	178,9	181,5	0,19	87,73	87,73	86,14	0,18	88,25	88,09	86,07	0,07	0,04

182,0	282,0	0,4	0,5	5,0	238,3	84,6	92,9	205,9	251,0	160,2	178,8	181,2	0,19	87,78	87,73	86,13	0,18	88,26	88,09	86,09	0,07	0,04
183,0	283,0	0,4	0,5	5,0	237,5	84,2	93,1	205,6	250,9	160,1	178,6	181,0	0,19	87,77	87,73	86,10	0,18	88,27	88,09	86,07	0,07	0,04
184,0	284,0	0,3	0,5	4,9	237,0	84,4	93,2	205,3	251,1	159,8	178,5	180,7	0,19	87,80	87,73	86,11	0,18	88,27	88,08	86,09	0,07	0,04
185,0	285,0	0,4	0,5	4,9	236,6	84,0	93,1	204,7	250,5	159,1	178,0	180,2	0,19	87,78	87,72	86,08	0,18	88,26	88,10	86,06	0,07	0,04
186,0	286,0	0,3	0,5	4,9	235,9	83,8	93,0	203,9	250,9	158,6	177,9	180,0	0,19	87,73	87,71	86,06	0,18	88,22	88,09	86,02	0,07	0,04
187,0	287,0	0,3	0,5	4,9	235,5	83,7	92,9	203,7	251,0	158,4	177,5	179,7	0,19	87,69	87,71	86,03	0,18	88,19	88,10	85,99	0,07	0,04
188,0	288,0	0,3	0,5	4,8	235,6	83,9	93,1	203,0	250,3	157,6	177,1	179,4	0,19	87,67	87,74	86,00	0,18	88,19	88,10	85,99	0,07	0,04
189,0	289,0	0,3	0,5	4,8	234,9	83,7	92,8	202,6	250,0	156,9	176,8	179,2	0,19	87,60	87,72	85,97	0,18	88,15	88,07	85,98	0,07	0,04
190,0	290,0	0,3	0,5	4,8	234,5	83,5	92,7	201,8	249,4	156,5	176,6	178,8	0,19	87,55	87,69	85,92	0,18	88,11	88,07	85,92	0,06	0,04
191,0	291,0	0,3	0,5	4,8	234,0	83,5	92,9	201,4	249,7	156,5	176,2	178,5	0,19	87,53	87,67	85,88	0,18	88,06	88,06	85,89	0,07	0,04
192,0	292,0	0,3	0,5	4,8	233,6	83,7	92,8	201,0	248,8	156,1	175,9	178,2	0,19	87,50	87,67	85,86	0,18	88,05	88,05	85,84	0,07	0,04
193,0	293,0	0,2	0,5	4,8	232,9	83,3	92,9	200,3	248,9	155,6	175,5	177,9	0,19	87,53	87,66	85,83	0,18	88,02	88,07	85,83	0,07	0,04
194,0	294,0	0,2	0,5	4,7	232,4	83,5	92,8	200,0	248,3	155,4	175,3	177,5	0,19	87,52	87,63	85,80	0,18	88,01	88,04	85,78	0,07	0,04
195,0	295,0	0,2	0,5	4,7	232,2	83,6	92,8	199,4	248,4	155,2	174,9	177,1	0,19	87,50	87,65	85,75	0,18	88,00	88,03	85,76	0,07	0,04
196,0	296,0	0,2	0,5	4,7	231,5	83,5	92,7	198,8	248,0	154,8	174,5	176,7	0,19	87,47	87,63	85,70	0,18	87,98	88,01	85,69	0,07	0,04
197,0	297,0	0,2	0,5	4,7	230,8	83,4	92,8	198,1	247,6	154,4	174,1	176,4	0,19	87,42	87,61	85,68	0,18	87,94	88,01	85,64	0,07	0,04
198,0	298,0	0,1	0,5	4,7	230,9	83,3	92,7	197,4	247,2	154,3	173,9	176,1	0,19	87,39	87,61	85,64	0,18	87,91	88,00	85,63	0,07	0,04
199,0	299,0	0,2	0,5	4,6	230,3	83,4	92,6	196,9	247,2	153,8	173,4	175,8	0,19	87,36	87,60	85,63	0,18	87,89	87,99	85,60	0,07	0,04
200,0	300,0	0,1	0,5	4,6	229,2	82,9	92,5	196,1	247,3	153,7	173,2	175,5	0,19	87,31	87,56	85,57	0,18	87,86	87,99	85,55	0,07	0,04
201,0	301,0	0,1	0,5	4,6	229,5	82,3	92,2	195,7	246,9	153,4	172,8	175,1	0,19	87,21	87,57	85,53	0,18	87,80	87,96	85,52	0,07	0,04
202,0	302,0	0,1	0,5	4,6	228,6	82,3	92,2	195,4	246,5	153,2	172,5	174,8	0,19	87,14	87,52	85,48	0,18	87,75	87,96	85,46	0,07	0,04
203,0	303,0	0,2	0,5	4,6	228,2	82,6	92,3	194,9	247,0	153,2	172,5	174,6	0,19	87,05	87,51	85,43	0,18	87,67	87,92	85,42	0,07	0,04
204,0	304,0	0,1	0,5	4,6	228,1	82,8	92,3	194,3	245,6	153,0	172,5	174,3	0,19	86,98	87,49	85,44	0,18	87,63	87,90	85,40	0,07	0,04
205,0	305,0	0,1	0,5	4,6	227,0	82,9	92,5	194,3	244,7	152,9	172,3	174,1	0,19	87,01	87,48	85,42	0,18	87,60	87,87	85,38	0,07	0,04
206,0	306,0	0,1	0,5	4,6	226,4	83,2	92,6	193,9	244,3	153,4	172,1	173,8	0,19	87,09	87,48	85,38	0,18	87,62	87,87	85,39	0,06	0,04
207,0	307,0	0,1	0,5	4,6	226,5	83,3	92,5	193,6	245,3	153,2	171,8	173,5	0,19	87,16	87,47	85,43	0,18	87,64	87,87	85,42	0,07	0,04
208,0	308,0	0,1	0,5	4,5	225,8	83,3	92,4	193,5	244,5	153,0	171,6	173,3	0,19	87,20	87,45	85,43	0,18	87,65	87,86	85,40	0,07	0,04
209,0	309,0	0,1	0,5	4,5	225,4	83,3	92,3	192,8	244,4	152,5	171,6	173,3	0,19	87,26	87,47	85,42	0,18	87,67	87,88	85,40	0,07	0,04
210,0	310,0	0,1	0,5	4,5	225,0	83,5	92,4	192,3	244,5	152,3	171,5	173,2	0,19	87,30	87,48	85,44	0,18	87,70	87,87	85,41	0,07	0,04
211,0	311,0	0,1	0,5	4,5	224,6	83,6	92,5	192,1	244,8	152,2	171,0	172,8	0,19	87,37	87,47	85,42	0,18	87,73	87,88	85,42	0,07	0,04
212,0	312,0	0,1	0,5	4,5	223,9	83,7	92,4	191,7	243,5	152,2	170,8	172,3	0,19	87,38	87,45	85,41	0,18	87,75	87,87	85,42	0,07	0,04
213,0	313,0	0,0	0,5	4,5	223,9	83,5	92,6	191,5	243,0	152,1	170,6	172,2	0,19	87,40	87,46	85,43	0,18	87,74	87,87	85,43	0,07	0,04

Manufacturer: spartherm
Model: 600

Run: 2
Project #: pi 20196
Test Duration: 213 min

	HHV	LHV
Eff	70,56%	75,93%
Comb Eff	95,72%	95,72%
HT Eff	73,72%	79,32%
Output	17 647	kJ/h
Burn Rate	1,24	kg/h
Grams CO	276	g
Input	25 009	kJ/h
MC wet	16,36	

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

	Ultimate CO_2
$CO_{2\text{-}ult}$	19,86
	F_0
	1,050

Overall Heating Efficiency:	70,56%	Air Fuel Ratio (A/F)		
Combustion Efficiency:	95,72%	Dry Molecular Weight (M_d)	29,80	
Heat Transfer Efficiency:	73,72%	Dry Moles Exhaust Gas (N_r):	416,64	
		Air Fuel Ratio (A/F)	11,91	

Heat Output:	16 740	Btu/h	17 647	kJ/h
Heat Input:	23 723	Btu/h	25 009	kJ/h
Burn Duration:	3,55	h		
Burn Rate:	2,73	lb/h	1,238	kg/h
Stack Temp:	354,2	Deg. F	179,0	Deg. C

APPENDIX 2: Proportionality results

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	97,20	103,78	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
17,375	531,9	532,1			0,121	0,092	0	0,2626044
17,115	532,2	532,2	91,69	98,02	0,153	0,135	1	0,2579432
17,545	532,4	532,3	89,80	95,67	0,185	0,177	2	0,2639696
17,199	532,5	532,4	92,71	98,85	0,185	0,177	3	0,2570763
17,343	532,6	532,4	93,47	99,71	0,185	0,177	4	0,2571706
17,229	532,7	532,5	95,40	101,92	0,185	0,177	5	0,2536615
17,255	532,8	532,7	96,35	102,66	0,185	0,177	6	0,2526493
17,215	532,9	532,8	97,29	103,93	0,185	0,177	7	0,2510485
17,372	533,1	532,9	97,00	103,68	0,185	0,177	8	0,2523565
17,365	533,2	533,1	98,06	104,62	0,185	0,177	9	0,2512232
17,288	533,4	533,2	99,04	105,71	0,185	0,177	10	0,2491744
17,360	533,6	533,4	98,97	105,67	0,185	0,176	11	0,2497884
17,629	533,8	533,6	97,57	103,91	0,185	0,176	12	0,2535972
17,385	534,0	533,8	98,70	105,17	0,185	0,176	13	0,2502323
17,558	534,3	534,0	97,52	104,49	0,184	0,176	14	0,2526504
17,476	534,4	534,2	96,73	103,27	0,184	0,176	15	0,2532566
17,343	534,5	534,3	97,80	104,55	0,184	0,176	16	0,2508157
17,328	534,6	534,5	99,04	105,81	0,184	0,176	17	0,2491683
17,414	534,8	534,6	99,17	105,74	0,184	0,176	18	0,2497905
17,340	535,0	534,8	99,79	106,87	0,184	0,176	19	0,2483491
17,618	535,1	535,0	98,80	105,53	0,184	0,176	20	0,2516316
17,217	535,3	535,2	101,02	107,86	0,184	0,176	21	0,2458592
17,609	535,5	535,4	98,60	105,30	0,184	0,176	22	0,2516324
17,770	535,7	535,6	97,57	104,46	0,184	0,176	23	0,2540308
17,356	535,9	535,8	99,81	106,44	0,184	0,176	24	0,2483505
17,390	536,1	536,0	99,65	106,28	0,184	0,176	25	0,2487596
17,264	536,3	536,1	100,32	107,25	0,184	0,176	26	0,2469012
17,542	536,4	536,3	98,58	105,21	0,184	0,176	27	0,2510739
17,568	536,6	536,5	98,14	104,81	0,184	0,176	28	0,2516498
17,334	536,7	536,7	99,48	106,09	0,184	0,176	29	0,2483528
17,608	536,9	536,8	97,85	104,26	0,184	0,175	30	0,252243
17,029	537,1	537,0	101,19	107,97	0,183	0,175	31	0,2439564
17,495	537,2	537,1	98,46	105,04	0,184	0,175	32	0,2508199
17,500	537,3	537,2	98,41	105,02	0,184	0,176	33	0,2508177
17,548	537,4	537,4	97,90	104,81	0,183	0,176	34	0,2516355
17,914	537,5	537,5	95,93	102,20	0,183	0,176	35	0,2570806
17,532	537,6	537,6	97,85	104,67	0,183	0,175	36	0,2516362
17,651	537,8	537,8	97,30	104,00	0,183	0,176	37	0,2532612
17,596	537,9	537,9	97,52	103,79	0,183	0,175	38	0,2526541
17,525	538,1	538,0	97,78	104,69	0,183	0,175	39	0,2516515
17,505	538,2	538,2	97,79	104,32	0,183	0,176	40	0,2515932
17,671	538,3	538,3	96,52	103,13	0,183	0,175	41	0,2540721
17,624	538,4	538,4	96,70	103,23	0,183	0,175	42	0,2536113
17,647	538,6	538,6	96,49	102,93	0,183	0,175	43	0,2540706
17,469	538,6	538,7	97,60	103,99	0,183	0,175	44	0,2516377
17,538	538,7	538,8	96,95	103,40	0,183	0,175	45	0,2526551
17,604	538,8	538,9	96,63	103,33	0,183	0,175	46	0,25367
17,635	538,9	539,0	96,33	102,71	0,183	0,175	47	0,2540741
17,286	539,0	539,1	97,96	104,82	0,183	0,175	48	0,2491808
17,719	539,1	539,2	95,79	102,17	0,183	0,175	49	0,2554826
17,345	539,2	539,3	97,79	104,31	0,183	0,175	50	0,2502084
17,345	539,3	539,4	97,72	104,19	0,183	0,175	51	0,2502097
17,340	539,4	539,5	97,73	104,36	0,183	0,175	52	0,2502295
17,389	539,5	539,5	97,43	104,09	0,183	0,175	53	0,2508247
17,785	539,5	539,6	95,21	101,77	0,183	0,175	54	0,2564869
17,709	539,6	539,7	95,79	102,35	0,183	0,175	55	0,2553664

17,707	539,8	539,8	95,84	102,23	0,183	0,175	56	0,2554854
17,708	539,8	539,9	95,84	102,20	0,183	0,175	57	0,255443
17,490	540,0	540,0	96,87	103,52	0,183	0,175	58	0,2522513
17,408	540,1	540,1	97,31	103,81	0,183	0,175	59	0,2512375
17,702	540,2	540,2	95,55	102,03	0,183	0,175	60	0,2554857
17,538	540,3	540,3	96,45	103,05	0,183	0,175	61	0,2532739
17,498	540,4	540,4	96,61	103,30	0,183	0,175	62	0,252681
17,450	540,5	540,5	96,73	103,33	0,183	0,175	63	0,252253
17,570	540,6	540,5	96,03	102,47	0,183	0,175	64	0,2540764
17,717	540,6	540,6	94,85	101,45	0,183	0,175	65	0,2563274
17,618	540,7	540,6	95,38	101,93	0,183	0,175	66	0,255085
17,415	540,8	540,7	96,37	102,88	0,183	0,175	67	0,2522529

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,51	99,04	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
17,531	540,9	540,9			0,183	0,175	0	0,2526606
17,633	541,0	540,9	104,11	104,61	0,183	0,175	1	0,2536742
17,599	541,0	541,0	106,20	106,83	0,183	0,175	2	0,2508272
17,410	541,1	541,1	108,45	108,97	0,183	0,175	3	0,2469119
17,881	541,3	541,3	106,44	106,82	0,183	0,175	4	0,2526512
17,566	541,5	541,4	108,76	109,12	0,183	0,175	5	0,2477405
17,864	541,7	541,6	107,28	107,75	0,182	0,174	6	0,2512354
17,709	541,9	541,8	108,45	109,07	0,182	0,174	7	0,2487874
17,816	542,1	542,0	107,96	108,66	0,182	0,175	8	0,2501861
17,580	542,3	542,2	108,08	108,60	0,182	0,175	9	0,2483608
17,702	542,5	542,3	106,53	107,16	0,182	0,174	10	0,2508272
17,749	542,6	542,5	106,35	106,76	0,182	0,174	11	0,2516396
17,625	542,7	542,6	106,73	107,49	0,182	0,175	12	0,2502115
17,841	542,8	542,7	105,60	105,90	0,182	0,175	13	0,2532693
17,624	542,8	542,8	106,04	106,73	0,182	0,175	14	0,2510215
17,561	542,9	542,8	103,29	103,54	0,182	0,174	15	0,2540735
17,546	542,9	542,8	102,00	102,49	0,183	0,174	16	0,2554879
17,454	542,8	542,8	101,60	102,16	0,182	0,174	17	0,2550831
17,549	542,7	542,7	100,67	101,09	0,182	0,174	18	0,2570906
17,406	542,6	542,7	101,09	101,59	0,182	0,174	19	0,2554898
17,232	542,4	542,6	101,75	102,24	0,182	0,174	20	0,253458
17,561	542,4	542,5	99,62	100,31	0,182	0,175	21	0,258484
17,801	542,3	542,4	98,21	98,77	0,182	0,175	22	0,2622296
17,524	542,3	542,4	99,60	100,25	0,183	0,175	23	0,2584847
17,485	542,2	542,3	99,89	99,95	0,183	0,175	24	0,2579884
17,400	542,1	542,2	99,93	100,59	0,183	0,175	25	0,2570928
17,402	542,0	542,1	100,01	100,53	0,183	0,175	26	0,2570915
17,181	541,9	542,0	101,06	101,68	0,183	0,175	27	0,2540804
17,425	541,8	542,0	99,92	100,10	0,183	0,175	28	0,2575344
17,428	541,7	541,9	99,59	100,06	0,183	0,175	29	0,2578882
17,363	541,6	541,8	99,85	100,29	0,183	0,175	30	0,257092
17,348	541,6	541,7	99,88	100,06	0,183	0,175	31	0,2570922
17,215	541,5	541,6	100,74	100,97	0,183	0,175	32	0,2550895
17,270	541,4	541,5	100,02	100,48	0,183	0,175	33	0,2562174
17,194	541,3	541,4	100,53	101,03	0,183	0,175	34	0,2550734
17,192	541,3	541,3	100,55	100,98	0,183	0,175	35	0,255088
17,089	541,3	541,3	100,90	101,27	0,183	0,175	36	0,2536753
17,604	541,3	541,3	97,96	98,65	0,183	0,175	37	0,2612469
17,089	541,3	541,3	100,88	101,69	0,183	0,175	38	0,253674
17,135	541,3	541,3	100,52	101,15	0,183	0,175	39	0,2544408
16,883	541,2	541,2	102,07	102,49	0,183	0,175	40	0,2508293
16,977	541,2	541,2	101,55	102,04	0,183	0,175	41	0,2522571
17,120	541,2	541,1	100,70	101,05	0,183	0,175	42	0,2542569
17,210	541,2	541,1	99,95	100,42	0,183	0,175	43	0,2558599
17,183	541,2	541,1	100,26	100,55	0,183	0,175	44	0,2554901
16,899	541,2	541,1	101,69	102,26	0,183	0,175	45	0,2512376
16,974	541,2	541,1	101,13	101,78	0,183	0,175	46	0,2526642
17,230	541,2	541,0	99,76	100,16	0,183	0,175	47	0,2564931
17,119	541,1	541,0	100,05	100,48	0,183	0,175	48	0,2550887
17,250	541,1	541,0	99,32	99,63	0,183	0,175	49	0,2570896
17,047	541,1	541,0	100,37	100,88	0,183	0,175	50	0,2540835
17,043	541,2	541,0	100,60	100,96	0,183	0,175	51	0,2540812
16,988	541,2	541,0	100,71	101,29	0,183	0,175	52	0,2532747
16,984	541,2	541,0	100,72	101,30	0,183	0,175	53	0,2532969
17,270	541,2	541,0	99,17	99,72	0,183	0,175	54	0,2574916
17,193	541,1	541,0	99,41	99,88	0,183	0,175	55	0,2564933
17,255	541,0	540,9	98,98	99,53	0,183	0,175	56	0,2574941

17,086	541,0	540,9	99,91	100,38	0,183	0,175	57	0,2551627
17,237	541,0	540,9	99,01	99,54	0,183	0,175	58	0,2574919
17,204	540,9	540,8	99,13	99,73	0,183	0,175	59	0,2570916
17,175	540,9	540,8	99,40	99,82	0,183	0,175	60	0,2564941
17,086	540,9	540,8	99,71	100,03	0,183	0,175	61	0,255431
17,125	540,9	540,8	99,44	100,18	0,183	0,175	62	0,2560918
17,076	540,9	540,8	99,91	100,20	0,183	0,175	63	0,2550891
17,211	541,0	540,8	99,23	99,67	0,183	0,175	64	0,2570917
17,135	541,0	540,8	99,54	99,93	0,183	0,175	65	0,2560931
17,070	541,0	540,8	99,85	100,09	0,183	0,175	66	0,2550898
17,208	541,1	540,9	99,11	99,40	0,183	0,175	67	0,2570934
17,198	541,1	540,9	98,98	99,54	0,183	0,175	68	0,2570925
17,085	541,1	540,8	99,70	100,14	0,183	0,175	69	0,2554936
16,940	541,1	540,9	100,34	101,20	0,183	0,175	70	0,2532728
17,158	541,1	540,8	99,14	99,93	0,183	0,175	71	0,2564329
17,187	541,1	540,8	98,95	99,43	0,183	0,175	72	0,2570929
17,094	541,1	540,9	99,57	100,04	0,183	0,175	73	0,2554916
16,992	541,2	540,9	100,34	101,12	0,183	0,175	74	0,2536777
17,171	541,3	541,0	99,53	100,08	0,183	0,175	75	0,2561005
17,218	541,5	541,2	99,54	100,30	0,183	0,175	76	0,256494
17,018	541,8	541,4	100,77	101,36	0,183	0,175	77	0,253274
17,246	542,0	541,6	99,55	100,15	0,183	0,175	78	0,2564938
17,167	542,2	541,8	100,19	100,86	0,183	0,175	79	0,2550898
17,202	542,4	542,1	100,01	100,34	0,183	0,175	80	0,2554927
17,181	542,7	542,3	100,23	100,75	0,183	0,175	81	0,2550909
17,325	542,9	542,5	99,29	100,08	0,182	0,175	82	0,2570952
17,071	543,1	542,7	100,83	101,40	0,182	0,175	83	0,2532761
17,200	543,3	542,9	100,06	100,55	0,182	0,174	84	0,2550924
17,273	543,5	543,1	99,65	100,45	0,182	0,174	85	0,2560963
17,107	543,6	543,3	100,58	101,38	0,182	0,175	86	0,2536538
17,272	543,8	543,4	99,83	100,21	0,182	0,174	87	0,2560963
17,355	543,8	543,5	99,22	99,71	0,182	0,174	88	0,2574963
17,653	543,8	543,5	97,10	97,56	0,182	0,174	89	0,2622357
17,153	543,7	543,5	99,80	100,42	0,182	0,174	90	0,2550942
17,278	543,7	543,5	99,03	99,57	0,182	0,174	91	0,2571387
17,224	543,6	543,5	99,20	99,67	0,182	0,174	92	0,2564995
17,147	543,6	543,4	99,63	100,00	0,182	0,174	93	0,2554484
17,277	543,6	543,4	98,80	99,35	0,182	0,174	94	0,257479
17,392	543,6	543,4	97,99	98,66	0,182	0,175	95	0,2592843
17,239	543,5	543,4	98,85	99,31	0,182	0,174	96	0,2570984
17,163	543,5	543,4	99,25	99,70	0,182	0,174	97	0,2560077
17,030	543,5	543,3	100,11	100,58	0,182	0,174	98	0,2540879
17,319	543,4	543,3	98,27	98,89	0,182	0,175	99	0,2584919
17,246	543,4	543,3	98,85	99,17	0,183	0,175	100	0,2574989
17,213	543,4	543,3	98,66	99,18	0,182	0,174	101	0,2570993
17,331	543,3	543,2	98,26	98,71	0,182	0,175	102	0,2588904
17,249	543,3	543,2	98,59	99,39	0,183	0,175	103	0,2576831
17,325	543,2	543,1	98,11	98,79	0,183	0,175	104	0,2588778
17,289	543,0	543,0	98,24	98,90	0,183	0,175	105	0,2584926
17,185	542,9	542,9	98,78	99,42	0,183	0,175	106	0,257099
17,185	542,8	542,8	98,78	99,08	0,183	0,175	107	0,2570992
17,154	542,7	542,7	99,06	99,43	0,183	0,175	108	0,2565
17,080	542,7	542,7	99,32	99,96	0,183	0,175	109	0,2554968
17,486	542,7	542,7	97,10	97,47	0,183	0,175	110	0,2616511
17,552	542,7	542,6	96,54	97,04	0,183	0,175	111	0,2626222
17,140	542,7	542,6	98,95	99,17	0,183	0,174	112	0,2565008
17,332	542,7	542,5	97,95	98,43	0,183	0,175	113	0,2592909
17,346	542,7	542,5	98,01	98,54	0,183	0,175	114	0,2592842
17,369	542,8	542,6	98,11	98,61	0,183	0,175	115	0,2592854
17,250	542,9	542,7	99,10	99,82	0,183	0,175	116	0,2570993
17,139	543,1	542,8	99,94	100,31	0,183	0,175	117	0,2550965
16,991	543,3	543,0	101,00	101,65	0,182	0,175	118	0,2526728

17,289	543,5	543,2	99,28	99,63	0,182	0,175	119	0,2571
17,228	543,6	543,3	99,30	99,95	0,182	0,175	120	0,2564685
17,589	543,6	543,3	96,96	97,59	0,182	0,175	121	0,2622412
17,432	543,5	543,2	97,81	98,22	0,182	0,175	122	0,2601721
17,233	543,5	543,2	98,72	99,15	0,183	0,175	123	0,2574325
17,202	543,4	543,1	98,86	99,05	0,183	0,174	124	0,2570988
17,474	543,3	543,1	97,08	97,56	0,183	0,174	125	0,2612578
17,285	543,2	543,0	98,13	98,62	0,182	0,175	126	0,2585118
17,467	543,2	542,9	96,93	97,70	0,182	0,175	127	0,2612545
17,237	543,1	542,9	98,41	98,81	0,182	0,175	128	0,2578973
17,456	543,1	542,8	97,08	97,71	0,183	0,175	129	0,2612583
17,191	543,0	542,8	98,66	98,98	0,183	0,175	130	0,2572083
17,236	543,0	542,8	98,28	98,95	0,182	0,175	131	0,2578959
17,208	543,0	542,7	98,41	98,99	0,182	0,175	132	0,2574993
17,185	543,0	542,8	98,57	99,19	0,182	0,175	133	0,257194
17,366	543,0	542,8	97,63	97,99	0,183	0,175	134	0,2598774
17,298	543,0	542,8	97,87	98,39	0,182	0,175	135	0,2588915
17,156	543,0	542,8	98,63	99,07	0,182	0,174	136	0,2568172
17,137	543,0	542,7	98,96	99,30	0,183	0,174	137	0,2564991
17,199	543,0	542,7	98,44	99,08	0,183	0,175	138	0,2574995
17,291	543,0	542,7	97,96	98,54	0,183	0,175	139	0,2588909
17,361	543,0	542,7	97,69	98,14	0,183	0,175	140	0,2598795
17,197	543,0	542,7	98,41	98,81	0,183	0,175	141	0,2574952
17,315	542,9	542,7	97,78	98,31	0,183	0,175	142	0,2592869
17,192	542,9	542,6	98,44	98,86	0,183	0,175	143	0,2574984
17,534	542,9	542,6	96,61	97,00	0,183	0,175	144	0,2626296
17,471	542,9	542,6	96,96	97,43	0,183	0,175	145	0,261651
17,261	542,8	542,6	97,91	98,80	0,183	0,175	146	0,2584928
17,355	542,9	542,6	97,67	98,22	0,183	0,175	147	0,259879
17,212	542,8	542,6	98,61	99,23	0,183	0,175	148	0,257499
17,485	542,9	542,6	97,30	98,02	0,183	0,175	149	0,2612585
17,159	543,0	542,7	99,56	99,85	0,183	0,175	150	0,2560224
17,379	543,2	542,9	98,40	98,84	0,183	0,175	151	0,2589074
17,281	543,4	543,1	99,14	99,80	0,182	0,175	152	0,2571002
17,190	543,6	543,3	99,87	100,34	0,182	0,175	153	0,2556379
17,273	543,8	543,4	98,96	99,76	0,182	0,175	154	0,2571024
17,212	543,9	543,5	99,23	99,59	0,182	0,175	155	0,2565012
17,296	543,9	543,6	98,55	99,12	0,182	0,174	156	0,2579112
17,378	543,9	543,7	98,02	98,47	0,182	0,174	157	0,2592867
17,315	543,9	543,7	98,30	98,76	0,182	0,174	158	0,2584951
17,652	543,9	543,7	96,32	97,15	0,182	0,175	159	0,2636055
17,304	543,9	543,7	98,24	98,54	0,182	0,175	160	0,2584943
17,669	543,9	543,7	96,05	96,54	0,182	0,174	161	0,2639953
17,348	543,8	543,7	97,96	98,58	0,182	0,175	162	0,2592874
17,413	543,8	543,6	97,56	98,12	0,183	0,175	163	0,2602752
17,381	543,8	543,6	97,57	98,21	0,182	0,175	164	0,2598799
17,340	543,8	543,6	97,86	98,23	0,182	0,175	165	0,2592866
17,218	543,8	543,6	98,55	99,29	0,182	0,175	166	0,2575013
17,369	543,8	543,5	97,64	98,27	0,182	0,175	167	0,2598059
17,739	543,8	543,5	95,66	96,06	0,183	0,175	168	0,2653383
17,466	543,8	543,5	97,22	97,80	0,183	0,175	169	0,2612598
17,333	543,7	543,5	97,85	98,27	0,183	0,175	170	0,2592875
17,265	543,7	543,5	98,42	98,77	0,183	0,175	171	0,2582633
17,330	543,7	543,4	97,73	98,36	0,183	0,175	172	0,2592785
17,553	543,7	543,4	96,46	97,35	0,182	0,175	173	0,2626305
17,328	543,7	543,4	97,93	98,07	0,183	0,175	174	0,2592874
17,677	543,7	543,4	95,93	96,25	0,183	0,174	175	0,2645138
17,485	543,7	543,4	96,92	97,24	0,183	0,174	176	0,2616471
17,369	543,7	543,4	97,57	98,01	0,182	0,174	177	0,2598821
17,485	543,7	543,4	96,89	97,23	0,182	0,174	178	0,2616521
17,299	543,7	543,4	97,83	98,28	0,182	0,174	179	0,2588939
17,112	543,6	543,4	99,26	99,44	0,183	0,174	180	0,2561023

17,271	543,6	543,4	98,18	98,66	0,183	0,175	181	0,2584954
17,519	543,6	543,4	96,63	97,37	0,183	0,175	182	0,2622209
17,232	543,6	543,4	98,14	98,80	0,182	0,175	183	0,257939
17,480	543,6	543,4	96,81	97,52	0,182	0,175	184	0,2616519
17,325	543,6	543,3	97,71	98,22	0,182	0,175	185	0,2593436
17,478	543,6	543,3	96,91	97,51	0,182	0,175	186	0,261606
17,582	543,6	543,3	96,32	96,74	0,183	0,175	187	0,263216
17,203	543,6	543,3	98,64	98,84	0,183	0,175	188	0,2575267
17,383	543,6	543,3	97,46	97,96	0,183	0,175	189	0,2602481
17,228	543,5	543,3	98,25	98,97	0,183	0,175	190	0,2579
17,358	543,5	543,3	97,53	97,89	0,182	0,175	191	0,259881
17,522	543,5	543,3	96,59	97,18	0,182	0,175	192	0,2623092
17,582	543,6	543,3	96,54	96,95	0,183	0,175	193	0,2632317
17,383	543,6	543,3	97,29	97,99	0,183	0,175	194	0,2602754
17,579	543,6	543,3	96,28	96,89	0,182	0,175	195	0,2632163
17,213	543,6	543,3	98,42	98,94	0,183	0,175	196	0,2576979
17,263	543,6	543,3	98,17	98,67	0,183	0,175	197	0,2584947
17,290	543,5	543,3	97,97	98,34	0,183	0,175	198	0,2588919
17,320	543,5	543,2	97,81	98,44	0,183	0,175	199	0,2592869
17,516	543,5	543,3	96,77	97,33	0,183	0,175	200	0,26224
17,317	543,5	543,2	97,87	98,11	0,183	0,175	201	0,2592871
17,218	543,5	543,2	98,24	98,88	0,183	0,175	202	0,2578179
17,526	543,5	543,2	96,56	97,32	0,182	0,175	203	0,2624031
17,261	543,5	543,2	97,97	98,45	0,182	0,175	204	0,2585044
17,168	543,5	543,2	98,61	99,02	0,182	0,175	205	0,2571006
17,588	543,5	543,2	96,31	96,67	0,183	0,175	206	0,2633855
17,573	543,6	543,2	96,24	96,94	0,183	0,175	207	0,2632172
17,626	543,5	543,2	96,03	96,69	0,183	0,175	208	0,263995
17,441	543,5	543,2	96,99	97,52	0,183	0,175	209	0,2612585
17,295	543,5	543,2	97,98	98,54	0,183	0,175	210	0,2590551
17,535	543,5	543,2	96,32	96,89	0,183	0,175	211	0,2626268
17,287	543,5	543,2	98,10	98,53	0,183	0,175	212	0,2588918
17,351	543,5	543,2	97,41	97,93	0,183	0,175	213	0,2598807
17,653	543,5	543,2	95,87	96,44	0,182	0,175	214	0,2643893
17,664	543,5	543,2	95,88	96,19	0,183	0,175	215	0,264576
17,472	543,5	543,1	96,95	97,41	0,183	0,175	216	0,2616514
17,470	543,5	543,1	96,89	97,42	0,183	0,175	217	0,2616518
17,349	543,5	543,1	97,54	97,95	0,183	0,175	218	0,2598902
17,466	543,4	543,1	96,73	97,43	0,182	0,175	219	0,2616518
17,334	543,4	543,1	97,61	98,21	0,182	0,175	220	0,259659
17,440	543,4	543,1	97,00	97,40	0,183	0,175	221	0,261234
17,374	543,4	543,1	97,31	97,75	0,183	0,175	222	0,260275
17,624	543,4	543,1	95,97	96,66	0,182	0,175	223	0,2639957
17,308	543,4	543,1	97,65	98,30	0,182	0,175	224	0,2592513
17,198	543,4	543,1	98,35	99,05	0,182	0,175	225	0,2575241
17,443	543,5	543,1	97,03	97,59	0,182	0,175	226	0,2612594
17,310	543,5	543,1	97,81	98,50	0,183	0,175	227	0,2593056
17,164	543,5	543,1	98,62	98,93	0,183	0,175	228	0,2571251
17,505	543,5	543,1	96,62	97,11	0,183	0,175	229	0,262238
17,511	543,5	543,2	96,58	97,15	0,183	0,175	230	0,2622932
17,377	543,5	543,2	97,31	97,88	0,182	0,175	231	0,2602674
17,284	543,5	543,2	97,84	98,46	0,182	0,175	232	0,2588878
17,259	543,4	543,2	98,17	98,67	0,183	0,175	233	0,2584939
17,377	543,4	543,2	97,45	97,79	0,183	0,175	234	0,2602754
17,352	543,5	543,2	97,44	98,16	0,183	0,175	235	0,2599578
17,508	543,5	543,1	96,61	96,96	0,182	0,175	236	0,2622369
17,465	543,5	543,2	96,76	97,18	0,182	0,174	237	0,2616518
17,364	543,4	543,1	97,45	98,19	0,183	0,175	238	0,2601297
17,304	543,4	543,1	97,87	98,39	0,183	0,175	239	0,2592831
17,465	543,4	543,1	96,90	97,57	0,183	0,175	240	0,2616515
17,593	543,4	543,1	96,26	97,37	0,183	0,176	241	0,2636063
17,159	543,4	543,1	98,38	99,20	0,183	0,176	242	0,2571393

17,708	543,4	543,1	95,38	96,25	0,182	0,175	243	0,2653538
17,525	543,4	543,1	96,38	97,17	0,182	0,175	244	0,262631
17,369	543,4	543,1	97,41	98,06	0,183	0,175	245	0,2602745
17,448	543,4	543,1	96,85	97,64	0,183	0,175	246	0,2614796
17,526	543,4	543,1	96,49	97,10	0,183	0,175	247	0,2626305
17,432	543,4	543,1	97,08	98,01	0,183	0,175	248	0,2612588
17,341	543,4	543,1	97,37	98,17	0,183	0,175	249	0,2598719
17,367	543,4	543,0	97,50	97,88	0,183	0,175	250	0,2602754
17,430	543,4	543,1	96,86	97,72	0,183	0,175	251	0,261259
17,559	543,4	543,1	96,19	96,88	0,182	0,175	252	0,2631811
17,426	543,4	543,1	97,16	97,53	0,183	0,175	253	0,2612206
17,361	543,4	543,0	97,37	98,14	0,183	0,175	254	0,2602742
17,271	543,4	543,0	97,73	98,30	0,183	0,175	255	0,2588904
17,762	543,4	543,0	95,20	95,73	0,183	0,175	256	0,2663133
17,431	543,3	543,0	96,97	97,45	0,183	0,175	257	0,2613003
17,646	543,3	543,0	95,70	96,34	0,183	0,175	258	0,2645767
17,262	543,2	542,9	97,84	98,49	0,183	0,175	259	0,2588914
17,264	543,1	542,8	97,85	98,36	0,183	0,175	260	0,2589501
17,442	543,0	542,8	96,76	97,29	0,183	0,175	261	0,2616501
17,417	543,0	542,7	96,95	97,62	0,183	0,175	262	0,2612585
17,334	543,0	542,7	97,48	97,82	0,183	0,175	263	0,2599956
17,234	543,0	542,7	97,97	98,06	0,183	0,174	264	0,2584938
17,233	543,0	542,7	98,07	98,51	0,183	0,174	265	0,2584942
17,397	543,0	542,7	97,04	97,52	0,183	0,175	266	0,2609149
17,442	543,0	542,7	96,88	97,18	0,183	0,175	267	0,261636
17,256	543,0	542,6	97,73	98,29	0,183	0,175	268	0,2588905
17,475	542,9	542,6	96,68	97,22	0,183	0,175	269	0,2622388
17,254	542,8	542,5	97,76	98,39	0,183	0,175	270	0,2588911
17,279	542,8	542,5	97,65	98,18	0,183	0,175	271	0,259284
17,503	542,8	542,5	96,36	97,02	0,183	0,175	272	0,2626297
17,275	542,8	542,5	97,89	98,49	0,183	0,175	273	0,2588904
17,393	542,9	542,5	97,45	97,91	0,183	0,175	274	0,2602461
17,210	543,0	542,6	98,92	99,23	0,183	0,175	275	0,2570991
17,267	543,2	542,7	98,87	99,56	0,183	0,175	276	0,2574995
17,559	543,3	542,8	97,25	97,67	0,182	0,175	277	0,2616777
17,269	543,5	543,0	98,89	99,58	0,182	0,175	278	0,2574975
17,509	543,6	543,1	97,43	98,09	0,183	0,175	279	0,2612582
17,556	543,7	543,2	96,89	97,51	0,183	0,175	280	0,2621645
17,322	543,8	543,2	98,12	98,63	0,182	0,175	281	0,2588945
17,599	543,7	543,3	96,47	97,03	0,183	0,175	282	0,2632153
17,365	543,7	543,3	97,55	97,95	0,183	0,175	283	0,2598812
17,172	543,7	543,2	98,65	99,05	0,183	0,175	284	0,257101
17,538	543,6	543,2	96,58	97,10	0,183	0,175	285	0,2626308
17,473	543,6	543,2	96,89	97,57	0,183	0,175	286	0,2616516
17,311	543,5	543,2	97,56	98,22	0,182	0,175	287	0,2592872
17,409	543,5	543,1	97,13	97,90	0,182	0,175	288	0,2608258
17,303	543,5	543,1	97,77	98,47	0,183	0,175	289	0,2592889
17,300	543,4	543,0	97,68	98,44	0,183	0,175	290	0,2592866
17,295	543,3	543,0	97,61	98,03	0,183	0,175	291	0,2592872
17,556	543,3	542,9	96,24	97,06	0,183	0,175	292	0,2631939
17,335	543,3	542,9	97,59	98,10	0,183	0,175	293	0,2598829
17,427	543,3	542,9	96,98	97,64	0,183	0,175	294	0,2612597
17,423	543,3	542,8	96,99	97,31	0,183	0,175	295	0,2612563
17,421	543,2	542,8	97,00	97,79	0,183	0,175	296	0,2612596
17,416	543,1	542,8	96,88	97,59	0,183	0,175	297	0,2612591
17,484	543,1	542,7	96,71	97,02	0,183	0,175	298	0,2622393
17,508	543,1	542,7	96,56	96,95	0,183	0,175	299	0,2625987
17,549	543,1	542,7	96,25	96,67	0,183	0,175	300	0,2632149
17,482	543,1	542,6	96,80	97,08	0,183	0,175	301	0,2622387
17,704	543,1	542,6	95,26	96,04	0,183	0,175	302	0,265588
17,636	543,1	542,6	95,73	96,24	0,183	0,175	303	0,2645845
17,412	543,0	542,6	97,05	97,37	0,183	0,175	304	0,2612582

17,281	543,0	542,6	97,70	98,31	0,183	0,175	305	0,2592866
17,600	542,9	542,5	96,13	96,53	0,183	0,175	306	0,264012
17,572	543,0	542,5	96,29	96,57	0,183	0,175	307	0,2636044
17,135	543,0	542,5	98,55	98,79	0,183	0,175	308	0,2571014
17,167	543,0	542,5	98,49	98,98	0,183	0,175	309	0,2575927
17,626	542,9	542,5	95,96	96,12	0,183	0,175	310	0,2645169
17,344	542,8	542,4	97,30	97,72	0,183	0,175	311	0,2602743
17,565	542,8	542,4	96,07	96,79	0,183	0,175	312	0,2636053
17,406	542,8	542,4	96,96	97,59	0,183	0,175	313	0,2612118
17,343	542,9	542,4	97,31	97,77	0,183	0,175	314	0,2602758
17,342	542,8	542,4	97,22	97,92	0,183	0,175	315	0,260274
17,588	542,8	542,4	95,88	96,65	0,183	0,175	316	0,2639822
17,338	542,7	542,3	97,40	97,76	0,183	0,175	317	0,260271
17,274	542,7	542,3	97,68	98,12	0,183	0,175	318	0,2592876
17,433	542,7	542,3	96,80	97,51	0,183	0,175	319	0,2616504
17,472	542,7	542,3	96,64	97,06	0,183	0,175	320	0,2622316
17,227	542,7	542,3	98,09	98,52	0,183	0,175	321	0,2584932
17,282	542,7	542,2	98,02	98,76	0,183	0,175	322	0,2588907
17,495	542,8	542,3	97,23	97,71	0,183	0,175	323	0,261525
17,352	542,9	542,4	98,20	99,04	0,183	0,175	324	0,2588903
17,551	543,0	542,5	97,31	97,91	0,182	0,175	325	0,2616497
17,373	543,3	542,8	98,69	99,18	0,183	0,175	326	0,2586253
17,461	543,5	543,0	97,88	98,39	0,183	0,175	327	0,2601989
17,385	543,6	543,0	98,12	98,79	0,182	0,175	328	0,2592859
17,220	543,6	543,1	98,84	99,37	0,182	0,175	329	0,2571007
17,480	543,6	543,1	97,12	98,01	0,182	0,175	330	0,2612189
17,502	543,5	543,1	96,91	97,70	0,182	0,175	331	0,2616509
17,311	543,4	543,0	98,13	98,64	0,183	0,175	332	0,2588912
17,371	543,4	543,0	97,54	98,26	0,183	0,175	333	0,2598926
17,613	543,3	543,0	96,25	96,94	0,183	0,175	334	0,263619
17,447	543,4	543,0	97,13	97,57	0,183	0,175	335	0,2612591
17,488	543,3	543,0	96,78	97,27	0,183	0,175	336	0,2619748
17,580	543,3	542,9	96,13	96,67	0,183	0,175	337	0,2634505
17,207	543,2	542,9	98,27	98,67	0,183	0,175	338	0,2578989
17,497	543,2	542,9	96,64	97,37	0,183	0,175	339	0,2622389
17,498	543,2	542,9	96,67	97,24	0,183	0,175	340	0,2622391

	Outlet	Outlet	Average	Average	#1	#2		
Tunnel	Temp.	Temp.	98,05	105,50	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
17,359	549,5	549,2			0,183	0,175	0	0,2487871
17,299	549,6	549,3	104,84	112,74	0,183	0,175	1	0,248788
17,259	549,6	549,3	102,53	110,31	0,183	0,175	2	0,2512495
17,029	549,6	549,4	103,13	111,17	0,183	0,176	3	0,2487892
17,244	549,7	549,4	101,34	109,06	0,183	0,176	4	0,2526766
17,102	549,7	549,5	102,64	110,67	0,183	0,176	5	0,2498426
17,206	549,8	549,5	102,73	110,59	0,183	0,176	6	0,2508325
17,165	549,9	549,6	103,01	110,73	0,184	0,176	7	0,2502297
17,023	549,9	549,7	103,80	111,77	0,184	0,176	8	0,248059
17,225	549,9	549,7	102,68	110,56	0,183	0,176	9	0,2508445
17,256	549,8	549,7	102,43	110,37	0,183	0,176	10	0,2512529
17,025	549,7	549,7	104,18	111,98	0,183	0,175	11	0,2474689
17,272	549,7	549,7	102,89	110,69	0,183	0,175	12	0,2508442
17,556	549,7	549,7	101,30	109,43	0,183	0,176	13	0,2547003
17,197	549,6	549,6	102,25	110,09	0,183	0,176	14	0,2512522
17,164	549,6	549,6	101,76	109,49	0,183	0,176	15	0,2514899
17,083	549,6	549,6	101,79	109,38	0,183	0,175	16	0,2508452
17,183	549,5	549,5	100,84	108,62	0,183	0,175	17	0,2526783
17,067	549,4	549,4	101,50	109,12	0,183	0,175	18	0,2512528
17,080	549,3	549,4	101,01	109,10	0,183	0,176	19	0,2516614
17,140	549,3	549,3	100,70	108,44	0,183	0,176	20	0,2526787
17,134	549,3	549,2	100,78	108,37	0,183	0,176	21	0,2526792
17,362	549,2	549,2	99,09	106,64	0,183	0,175	22	0,2561067
17,468	549,2	549,2	98,54	106,09	0,183	0,175	23	0,2579041
17,210	549,2	549,1	99,93	107,66	0,183	0,176	24	0,2541458
17,084	549,1	549,1	100,78	108,61	0,183	0,176	25	0,2522719
17,079	549,1	549,0	100,61	108,31	0,183	0,176	26	0,2523301
17,097	549,2	549,0	100,57	108,14	0,183	0,176	27	0,2526782
17,486	549,1	549,0	98,05	105,70	0,183	0,176	28	0,2585008
17,334	549,1	548,9	99,09	106,66	0,183	0,176	29	0,2561366
17,000	549,1	548,9	101,02	108,86	0,183	0,176	30	0,251178
17,187	549,1	548,9	99,83	107,63	0,183	0,176	31	0,2540953
17,148	549,1	548,8	99,92	107,60	0,183	0,176	32	0,2536898
17,134	549,0	548,8	99,94	107,44	0,183	0,175	33	0,2536941
16,984	548,9	548,7	100,59	108,32	0,183	0,176	34	0,2516602
16,877	548,9	548,7	101,07	108,85	0,183	0,176	35	0,2502291
16,768	548,9	548,7	101,79	109,22	0,184	0,175	36	0,2487887
17,373	548,8	548,6	97,96	105,67	0,184	0,176	37	0,2579034
17,146	548,8	548,5	99,18	106,91	0,183	0,176	38	0,2546998
17,249	548,7	548,5	98,50	105,96	0,184	0,176	39	0,2564144
17,129	548,7	548,4	99,18	106,72	0,184	0,176	40	0,254699
16,858	548,6	548,4	100,80	108,28	0,184	0,176	41	0,2508426
17,044	548,5	548,3	99,50	107,04	0,184	0,176	42	0,25369
17,198	548,5	548,3	98,62	105,76	0,184	0,176	43	0,2561059
17,027	548,5	548,2	99,31	107,04	0,184	0,176	44	0,2536893
17,267	548,5	548,2	97,87	105,50	0,184	0,176	45	0,2573441
17,207	548,4	548,1	98,13	105,66	0,183	0,176	46	0,2564765
17,197	548,3	548,1	98,25	105,68	0,184	0,176	47	0,256506
17,233	548,2	548,0	98,05	105,54	0,184	0,176	48	0,2571049
17,286	548,1	547,9	97,60	105,13	0,184	0,176	49	0,2579018
17,283	548,0	547,9	97,60	105,14	0,184	0,176	50	0,2579017
16,929	547,9	547,8	99,76	107,08	0,184	0,176	51	0,252676
16,992	547,8	547,7	99,40	106,83	0,184	0,176	52	0,2536996
17,144	547,7	547,6	98,34	105,90	0,184	0,176	53	0,2561051
16,886	547,6	547,4	99,90	107,43	0,184	0,176	54	0,2522695
16,884	547,5	547,3	99,86	107,42	0,184	0,176	55	0,2522689
17,203	547,4	547,3	97,74	105,37	0,184	0,176	56	0,2571039

16,972	547,5	547,3	99,34	107,04	0,184	0,176	57	0,2536438
17,039	547,5	547,3	98,66	106,40	0,184	0,176	58	0,2546881
16,876	547,5	547,3	99,60	107,34	0,184	0,176	59	0,2522688
17,040	547,5	547,3	98,77	106,37	0,184	0,176	60	0,2547435
17,091	547,5	547,2	98,49	105,92	0,184	0,176	61	0,2555302
17,036	547,4	547,2	98,81	106,31	0,184	0,176	62	0,2546943
16,938	547,3	547,1	99,34	106,89	0,184	0,176	63	0,2532828
16,960	547,2	547,0	99,16	106,72	0,184	0,176	64	0,2537481
17,139	547,1	547,0	98,05	105,49	0,184	0,176	65	0,2565038
17,170	547,0	547,0	97,76	105,40	0,184	0,176	66	0,2571017
17,125	547,1	547,0	97,98	105,49	0,184	0,176	67	0,2564293
17,197	547,1	547,0	97,55	105,19	0,184	0,176	68	0,2575016
17,221	547,1	547,0	97,40	104,84	0,184	0,176	69	0,2578996
17,001	547,1	547,0	98,65	106,37	0,184	0,176	70	0,2546805
17,001	547,0	546,9	98,69	106,08	0,184	0,176	71	0,2546854
16,903	547,0	546,9	99,09	106,66	0,184	0,176	72	0,2532815
17,183	546,9	546,9	97,43	104,93	0,184	0,176	73	0,257565
16,728	546,9	546,9	100,13	107,68	0,184	0,176	74	0,2508456
17,019	547,0	546,9	98,25	105,89	0,184	0,176	75	0,2552662
16,993	547,0	546,9	98,44	106,16	0,184	0,176	76	0,2548781
17,004	547,0	546,9	98,21	105,97	0,184	0,176	77	0,2550983
17,158	546,9	546,9	97,30	104,68	0,184	0,176	78	0,2575012
17,055	546,9	546,9	98,05	105,27	0,184	0,176	79	0,2560213
16,996	546,8	546,9	98,33	105,73	0,184	0,176	80	0,255099
17,086	546,8	546,9	97,71	105,36	0,184	0,176	81	0,2565032
17,084	546,7	546,9	97,77	104,88	0,184	0,176	82	0,2565031
16,926	546,8	546,9	98,79	106,29	0,184	0,176	83	0,2541286
16,962	546,8	546,9	98,49	106,00	0,184	0,176	84	0,2546969
17,119	546,9	546,9	97,61	104,89	0,184	0,176	85	0,2570248
17,179	547,0	547,0	97,23	104,55	0,184	0,176	86	0,2578991
17,179	547,1	547,1	97,25	104,44	0,184	0,176	87	0,2579004
17,215	547,2	547,2	96,85	104,19	0,184	0,176	88	0,2584957
17,177	547,3	547,3	97,08	104,47	0,184	0,176	89	0,2579029
16,990	547,4	547,3	98,15	105,52	0,184	0,176	90	0,2551043
17,183	547,5	547,4	97,15	104,52	0,184	0,176	91	0,2578994
17,250	547,5	547,5	96,52	103,89	0,184	0,176	92	0,2590884
17,304	547,6	547,5	96,35	103,89	0,184	0,176	93	0,2598805
17,118	547,6	547,6	97,36	104,81	0,184	0,176	94	0,2571027
17,060	547,6	547,6	97,64	105,19	0,184	0,176	95	0,2563182
17,115	547,7	547,6	97,45	104,79	0,184	0,176	96	0,2571009
17,079	547,7	547,7	97,84	104,93	0,184	0,176	97	0,256505
17,207	547,7	547,7	96,98	103,99	0,184	0,176	98	0,2584973
17,168	547,8	547,8	97,12	104,43	0,184	0,176	99	0,2579007
17,228	547,8	547,8	96,74	103,98	0,184	0,176	100	0,2589134
17,068	547,8	547,8	97,54	104,82	0,184	0,176	101	0,2564903
16,916	547,8	547,8	98,44	105,76	0,184	0,176	102	0,2542712
17,046	547,8	547,9	97,76	105,28	0,184	0,176	103	0,2561042
17,315	547,9	547,9	96,08	103,47	0,184	0,176	104	0,2602787
17,141	547,9	547,9	97,10	104,68	0,184	0,176	105	0,2576213
17,196	547,9	547,9	96,65	104,21	0,184	0,176	106	0,2584982
17,287	547,9	548,0	96,38	103,58	0,184	0,176	107	0,2598849
17,286	547,9	548,0	96,17	103,52	0,184	0,176	108	0,2598853
16,894	547,9	548,0	98,61	106,00	0,184	0,176	109	0,2540168
17,128	547,9	548,0	97,15	104,58	0,184	0,176	110	0,2575048
17,126	547,9	548,0	97,14	104,83	0,184	0,176	111	0,257505
17,122	547,9	548,0	97,32	104,53	0,184	0,176	112	0,2575046
17,053	547,9	548,0	97,46	104,96	0,184	0,176	113	0,2565068
17,146	547,9	548,0	97,09	104,41	0,184	0,176	114	0,2579026
17,174	547,9	548,0	96,83	104,20	0,184	0,176	115	0,258346
17,027	547,9	548,0	97,61	105,06	0,184	0,176	116	0,2560951
16,958	547,9	548,0	98,00	105,29	0,184	0,176	117	0,2551015
17,303	547,9	548,0	96,15	103,40	0,184	0,176	118	0,2602796

17,145	547,9	548,0	97,16	104,37	0,184	0,176	119	0,2579025
17,113	547,9	548,0	97,12	104,47	0,184	0,176	120	0,2575057
17,151	547,9	548,0	96,83	104,22	0,184	0,176	121	0,258075
17,191	547,9	548,0	96,67	103,91	0,184	0,176	122	0,2586815
16,923	547,9	548,0	98,24	105,92	0,184	0,176	123	0,2546987
17,139	547,8	548,0	96,88	104,23	0,184	0,176	124	0,2579036
17,103	547,8	548,0	97,07	104,33	0,184	0,176	125	0,2573973
17,131	547,8	548,0	96,96	104,15	0,184	0,176	126	0,2579056
17,109	547,8	548,0	97,04	104,39	0,184	0,176	127	0,2575055
17,130	547,8	548,0	96,92	103,99	0,184	0,176	128	0,2579034
16,879	547,8	548,0	98,47	105,92	0,184	0,176	129	0,2540454
17,012	547,8	548,0	97,44	105,02	0,184	0,176	130	0,2561067
17,263	547,8	548,0	96,08	103,45	0,184	0,176	131	0,2598868
17,129	547,8	548,0	97,03	104,08	0,184	0,176	132	0,2579038
16,874	547,8	548,0	98,37	105,62	0,184	0,176	133	0,2540977
17,079	547,8	548,0	97,22	104,46	0,184	0,176	134	0,2571063
16,841	547,8	548,0	98,66	106,04	0,184	0,176	135	0,253502
17,130	547,7	548,0	96,80	104,30	0,184	0,176	136	0,257904
17,223	547,7	547,9	96,35	103,58	0,184	0,176	137	0,2592936
17,174	547,7	547,9	96,76	104,13	0,184	0,176	138	0,2585003
17,506	547,7	547,9	94,76	101,90	0,184	0,176	139	0,2636212
16,852	547,7	547,9	98,59	105,99	0,184	0,176	140	0,2536915
16,924	547,7	547,9	98,15	105,50	0,184	0,176	141	0,2547953
17,357	547,7	547,9	95,65	103,14	0,184	0,176	142	0,2612855
17,354	547,7	547,9	95,69	102,77	0,184	0,176	143	0,261266
17,261	547,7	547,9	96,22	103,48	0,184	0,176	144	0,2598873
17,129	547,7	547,9	96,89	104,14	0,184	0,176	145	0,2579041
17,126	547,7	547,9	96,80	104,14	0,184	0,176	146	0,2579212
17,193	547,7	548,0	96,39	103,69	0,184	0,176	147	0,2588966
16,952	547,7	548,0	97,81	105,18	0,184	0,176	148	0,2553047
17,074	547,7	548,0	97,22	104,82	0,184	0,176	149	0,2571076
17,035	547,8	548,0	97,50	104,73	0,184	0,176	150	0,2564972
17,125	547,8	548,0	96,98	104,36	0,184	0,176	151	0,2579036
17,257	547,8	548,0	96,10	103,39	0,184	0,176	152	0,2598867
17,280	547,8	548,0	96,03	103,24	0,184	0,176	153	0,2602481
17,335	547,8	548,1	95,79	103,01	0,184	0,176	154	0,2610858
17,123	547,8	548,1	96,75	104,23	0,184	0,176	155	0,2579044
16,872	547,8	548,1	98,38	105,92	0,184	0,176	156	0,254097
17,068	547,8	548,1	97,15	104,37	0,184	0,176	157	0,2571077
17,218	547,8	548,1	96,37	103,83	0,184	0,176	158	0,2592935
17,166	547,8	548,1	96,66	103,98	0,184	0,176	159	0,2584983
17,217	547,8	548,1	96,37	103,64	0,184	0,176	160	0,2592943
17,160	547,8	548,1	96,76	103,92	0,184	0,176	161	0,2585012
17,438	547,8	548,1	95,13	102,07	0,184	0,176	162	0,2626382
17,072	547,8	548,1	97,29	104,50	0,184	0,176	163	0,2571078
17,192	547,8	548,1	96,51	103,77	0,184	0,176	164	0,2588992
17,126	547,8	548,1	96,90	104,45	0,184	0,176	165	0,2579047
17,032	547,8	548,1	97,50	104,66	0,184	0,176	166	0,2565088
17,191	547,8	548,2	96,55	103,96	0,184	0,176	167	0,2588983
17,122	547,8	548,2	96,96	104,26	0,184	0,176	168	0,2579039
17,164	547,8	548,2	96,63	104,13	0,184	0,176	169	0,2585293
17,166	547,7	548,2	96,66	103,94	0,184	0,176	170	0,258501
17,165	547,7	548,2	96,62	104,00	0,184	0,176	171	0,2585011
17,109	547,7	548,2	96,98	104,33	0,184	0,176	172	0,2576587
17,217	547,8	548,2	96,39	103,72	0,184	0,176	173	0,2592935
17,347	547,7	548,2	95,56	102,95	0,184	0,176	174	0,2612671
17,028	547,8	548,2	97,45	104,67	0,184	0,176	175	0,2565102
17,162	547,8	548,2	96,59	103,76	0,184	0,176	176	0,2584997
17,072	547,8	548,2	97,18	104,62	0,184	0,176	177	0,2571079
17,164	547,8	548,2	96,69	103,93	0,184	0,176	178	0,258501
17,122	547,8	548,2	96,86	104,30	0,184	0,176	179	0,2579053
17,232	547,8	548,2	96,35	103,44	0,184	0,176	180	0,2595529

17,065	547,7	548,2	97,13	104,77	0,184	0,176	181	0,257108
17,437	547,8	548,2	95,03	102,20	0,184	0,176	182	0,2627022
17,162	547,7	548,2	96,68	104,08	0,184	0,176	183	0,2585012
17,124	547,8	548,2	96,85	104,27	0,184	0,176	184	0,2579056
17,069	547,8	548,2	97,19	104,61	0,184	0,176	185	0,257107
17,094	547,7	548,2	97,04	104,36	0,184	0,176	186	0,2575078
17,159	547,7	548,1	96,72	103,85	0,184	0,176	187	0,258501
17,121	547,7	548,1	96,78	104,21	0,184	0,176	188	0,2579053
17,209	547,7	548,1	96,29	103,46	0,184	0,176	189	0,259295
16,858	547,6	548,1	98,42	105,55	0,184	0,176	190	0,2540071
17,120	547,6	548,1	96,66	104,24	0,184	0,176	191	0,2579053
17,092	547,6	548,1	97,08	104,41	0,184	0,176	192	0,2575084
17,273	547,6	548,0	95,92	103,43	0,184	0,176	193	0,2602321
17,063	547,6	548,0	97,15	104,59	0,184	0,176	194	0,2570686
17,249	547,6	548,0	95,93	103,25	0,184	0,176	195	0,2598882
17,090	547,6	548,0	97,00	104,23	0,184	0,176	196	0,2575085
17,209	547,5	548,0	96,48	103,65	0,184	0,176	197	0,2592951
17,208	547,5	548,0	96,39	103,55	0,184	0,176	198	0,2592949
17,114	547,5	547,9	96,85	103,98	0,184	0,176	199	0,2579059
17,113	547,4	547,9	96,93	104,32	0,184	0,176	200	0,2579059
17,146	547,4	547,9	96,64	103,89	0,184	0,176	201	0,258464
17,108	547,3	547,9	96,87	104,33	0,184	0,176	202	0,2579056
17,149	547,3	547,8	96,70	104,34	0,184	0,177	203	0,2585013
17,148	547,2	547,8	96,78	104,08	0,184	0,177	204	0,2584979
17,205	547,2	547,7	96,46	103,76	0,184	0,176	205	0,2592958
16,835	547,3	547,7	98,44	105,97	0,184	0,176	206	0,2536926
17,207	547,3	547,8	96,43	103,72	0,184	0,176	207	0,2593189
17,112	547,3	547,8	96,96	104,34	0,184	0,176	208	0,2579056
17,202	547,4	547,8	96,27	103,59	0,184	0,176	209	0,2592948
17,203	547,4	547,8	96,51	103,82	0,184	0,176	210	0,2592952
17,273	547,4	547,8	95,94	103,28	0,184	0,176	211	0,2603089
17,112	547,4	547,8	96,84	104,03	0,184	0,176	212	0,257905
17,089	547,4	547,8	97,33	104,29	0,184	0,176	213	0,2575249

APPENDIX 3: Calibration data

APPENDIX 4: Unit pre burn

Temps acquisition de données	Flue temp °F	Room temp °F	scale lbs	Right °F	Back °F	bottom °F	Top °F	Left °F
0	82,23	78,03	55,04	75,22	73,67	72,19	77,92	74,78
10	587,46	78,87	5,10	80,52	76,39	72,64	131,84	78,25
20	387,99	79,11	4,10	97,96	99,59	73,48	272,08	98,40
30	417,57	79,75	3,00	114,81	124,49	74,37	355,23	120,62
40	405,69	79,04	2,10	133,15	147,55	75,12	407,84	142,91
50	331,79	79,08	1,60	148,73	171,73	76,50	376,60	159,10
60	286,55	79,38	1,30	157,35	194,35	77,34	317,04	167,79
70	245,43	78,85	3,90	159,31	214,90	78,30	271,36	170,01
80	351,96	79,31	2,90	157,53	225,35	78,81	267,20	166,45
90	362,46	79,79	2,00	162,64	233,05	80,01	343,56	170,72
100	309,25	79,35	1,60	168,20	241,46	80,70	341,13	176,92
110	265,74	79,64	11,30	166,62	249,19	81,18	284,00	177,24
120	378,21	78,89	10,50	158,53	249,05	80,58	235,20	168,68
130	529,65	79,94	9,00	156,68	233,28	81,35	334,92	167,75
140	523,97	80,56	7,60	167,08	231,72	82,06	428,61	177,91
150	530,67	81,13	6,40	177,13	234,72	82,55	454,73	187,66
160	505,00	81,51	5,20	185,66	240,17	83,13	469,32	197,12
170	463,74	80,98	4,40	190,68	246,55	83,38	431,98	202,71
180	436,86	81,10	3,70	192,91	253,09	83,45	400,72	204,82
190	392,88	80,85	3,10	192,57	260,65	84,07	363,00	205,65
200	341,80	80,64	2,80	191,69	268,36	82,93	316,84	205,62
210	309,17	80,62	2,60	187,69	271,12	84,64	274,18	202,87
220	295,11	80,09	2,30	183,23	269,38	83,43	247,75	198,69
230	284,36	79,97	2,10	179,96	267,84	82,87	233,90	194,39
240	275,99	79,57	2,00	176,71	265,45	84,72	223,63	190,77
250	271,25	79,44	1,80	174,15	262,33	83,24	217,15	187,79
260	262,74	79,42	1,60	171,56	261,96	82,83	211,83	183,80
270	254,61	79,26	1,50	168,49	259,15	84,01	204,54	178,59
280	247,04	78,90	1,40	164,77	256,31	82,85	197,48	173,59
290	241,34	78,85	1,20	161,12	252,57	82,68	191,34	169,35
300	235,75	78,73	1,10	157,55	249,14	81,73	186,21	165,27
310	230,53	78,34	1,00	153,74	245,35	82,51	181,12	161,92
320	227,59	78,34	0,90	150,18	241,29	81,73	176,93	159,07
330	225,08	78,18	0,80	147,21	238,34	81,71	173,76	156,65
340	219,94	77,91	0,70	144,46	234,83	81,23	170,44	154,47
350	214,04	77,75	0,60	141,97	232,84	81,57	166,76	151,61
360	209,29	77,62	0,50	139,58	231,36	80,53	162,81	148,84
370	203,93	77,61	0,40	137,15	228,75	80,41	159,30	145,94
380	196,49	77,33	0,40	134,98	225,66	80,44	155,33	143,09
390	187,50	77,21	0,30	132,50	222,50	80,22	150,94	139,78
400	178,66	77,10	0,30	129,84	217,81	81,14	146,01	136,47
410	169,14	76,96	0,20	127,10	211,80	79,89	140,82	132,75
420	160,88	76,61	0,20	124,30	205,61	79,42	135,88	129,18
430	153,55	76,46	0,20	121,45	200,25	79,04	131,21	125,80
440	145,86	76,60	0,20	118,59	192,13	78,82	127,11	122,62
450	138,52	76,67	0,20	115,97	187,32	78,36	123,47	119,80
460	78,26	75,11	0,20	75,86	77,77	72,77	77,05	75,42
470	478,35	76,59	55,04	77,03	77,27	72,53	92,22	76,71
480	274,82	76,10	6,20	85,43	87,90	73,19	164,13	86,84
490	338,41	76,21	5,40	94,71	102,29	73,72	209,38	96,62
500	410,28	77,01	4,20	108,38	116,97	74,42	316,57	110,87
510	426,03	77,27	3,10	125,71	136,00	75,29	401,58	130,91
520	397,15	77,61	2,20	140,89	157,46	76,19	423,41	148,74
530	332,13	77,46	1,80	152,14	179,23	77,09	378,71	161,97
540	271,51	77,08	1,60	157,50	201,46	78,04	313,44	171,59
550	242,67	77,62	1,40	158,60	218,63	78,91	262,10	172,00
560	228,47	78,25	1,20	158,13	229,59	79,22	233,75	169,95
570	215,03	78,70	1,10	156,31	236,71	80,16	217,47	167,33
580	191,13	##########	0,60	149,56	243,85	80,75	191,99	160,96
590	384,40	##########	6,10	145,25	234,22	81,10	188,19	156,06
600	429,98	##########	4,80	149,32	225,90	81,13	319,17	161,07
610	350,09	##########	4,00	161,71	243,41	81,64	389,43	173,50
620	319,40	##########	3,40	167,78	254,64	81,98	383,14	180,24
630	281,59	##########	3,00	170,07	263,32	81,85	347,72	184,46
640	240,51	##########	2,80	169,15	270,31	82,37	301,44	184,31
650	218,35	##########	2,60	164,08	271,53	77,99	256,22	179,00
660	322,15	##########	11,30	155,99	261,93	76,33	227,04	170,35
670	337,42	##########	10,40	148,84	256,60	75,28	241,48	163,89
680	385,67	##########	9,40	148,83	247,59	77,09	325,18	164,21
690	412,95	##########	8,30	152,26	245,10	75,78	397,29	167,74
700	413,15	##########	7,20	156,48	243,45	75,57	432,57	172,99
710	389,82	##########	6,20	159,67	243,77	75,30	436,90	178,18
720	356,97	##########	5,50	160,98	245,23	74,89	406,54	182,49
730	317,25	##########	5,00	162,97	247,99	74,19	362,23	183,62
740	284,57	##########	4,60	164,44	249,98	75,21	318,51	181,55
750	253,72	##########	4,30	165,63	250,84	77,98	281,94	177,75
760	229,08	##########	4,10	165,18	251,70	78,66	249,69	174,25
770	216,43	##########	3,90	161,41	251,80	78,81	226,86	169,50
780	208,78	##########	3,80	157,88	252,54	78,97	213,48	165,64
790	204,38	##########	3,60	156,10	256,23	80,16	207,45	164,49
800	202,15	##########	3,50	155,15	257,49	80,75	204,04	164,01
810	198,35	##########	3,40	154,37	258,91	81,35	201,70	163,95
820	194,63	##########	3,30	153,31	261,07	81,45	198,59	162,18
830	194,35	##########	3,20	151,88	259,30	82,18	196,52	162,04
840	193,07	##########	3,10	150,53	258,24	81,61	196,07	161,62
850	190,89	##########	3,00	149,12	255,99	81,38	193,67	160,22
860	187,57	##########	2,90	145,94	252,66	79,80	189,30	156,95
870	184,15	##########	2,80	143,30	249,05	79,45	184,58	154,08
880	180,10	##########	2,70	141,31	248,08	79,58	180,94	151,35
890	177,26	##########	2,60	139,81	245,32	79,49	177,75	149,15

900	268,13	##########	9,70	137,84	235,46	79,40	168,92	143,71
910	330,47	##########	8,80	134,23	230,48	79,22	196,33	140,95
920	380,94	##########	7,70	138,33	226,96	79,61	297,12	145,56
930	382,29	##########	6,80	145,16	230,01	79,59	352,54	153,75
940	371,32	##########	5,90	152,03	235,64	79,02	361,88	161,54
950	356,63	##########	5,10	156,21	241,36	78,52	360,42	166,90
960	323,48	##########	4,60	160,38	247,16	79,08	341,28	171,99
970	301,48	##########	4,20	163,71	252,81	79,57	316,79	176,41
980	268,69	##########	4,00	165,66	258,92	80,63	295,76	180,41
990	250,48	##########	3,80	165,74	263,68	81,21	270,44	181,91
1000	239,23	##########	3,60	164,64	264,78	81,56	253,62	181,38
1010	228,54	##########	3,40	163,00	263,10	81,10	239,61	179,85
1020	219,41	##########	3,30	160,82	260,08	81,24	227,14	177,44
1030	212,27	##########	3,20	158,18	256,14	81,16	216,95	174,34
1040	207,20	##########	3,00	155,18	252,07	82,42	208,42	171,07
1050	188,99	##########	10,00	152,66	248,29	81,75	197,42	168,21
1060	176,25	##########	9,50	146,69	242,29	81,77	177,31	160,14
1070	246,80	##########	8,80	141,01	231,54	81,70	172,71	154,93
1080	377,29	##########	7,90	139,07	219,75	81,57	253,37	160,91
1090	379,97	##########	6,90	144,39	219,07	82,61	363,76	172,24
1100	369,12	##########	6,10	152,20	224,04	82,24	373,54	178,18
1110	357,83	##########	5,40	159,24	231,32	82,33	371,87	181,94
1120	323,24	##########	4,80	164,99	239,32	82,29	359,85	184,53
1130	296,76	##########	4,50	167,73	246,06	82,78	326,33	186,01
1140	271,86	##########	4,20	168,04	250,71	82,21	296,04	186,10
1150	251,64	##########	4,00	167,32	253,35	82,23	270,89	184,47
1160	239,22	##########	3,80	165,64	253,94	81,90	250,89	182,49
1170	231,11	##########	3,70	163,71	253,03	81,79	238,13	180,40
1180	223,48	##########	3,50	161,90	252,06	82,17	228,09	177,65
1190	219,47	##########	3,40	160,26	250,93	81,62	220,91	174,94
1200	215,77	##########	3,20	158,81	250,35	81,90	215,83	172,27
1210	212,17	##########	3,10	157,67	248,79	81,61	211,52	169,60
1220	209,08	##########	3,00	156,54	247,76	81,82	207,42	167,36
1230	204,66	##########	2,80	154,68	247,39	81,43	203,11	164,87
1240	197,88	##########	2,70	152,71	245,89	81,58	196,73	161,62
1250	192,23	##########	2,60	149,39	244,27	81,84	189,85	158,17
1260	186,85	##########	2,50	146,20	240,98	81,04	184,12	154,60
1270	183,08	##########	2,50	143,54	237,82	80,70	179,14	151,39
1280	180,60	##########	2,40	141,18	234,97	81,05	175,36	148,72
1290	178,38	##########	2,30	139,21	230,97	80,32	172,60	146,05
1300	175,53	##########	2,20	137,52	227,59	80,00	170,12	143,91
1310	171,59	##########	2,10	135,91	225,39	79,89	167,06	141,72
1320	165,08	##########	2,10	134,41	222,49	80,52	163,70	139,45
1330	160,37	##########	2,00	132,30	219,79	80,22	159,21	137,12
1340	155,12	##########	2,00	129,91	216,08	79,70	154,51	134,22
1350	149,74	##########	1,90	127,17	212,11	79,69	149,60	131,29
1360	143,51	##########	1,90	124,54	207,12	79,38	144,72	128,45
1370	137,74	##########	1,90	121,73	203,19	79,17	139,91	125,39
1380	131,94	##########	1,90	119,38	198,81	79,32	136,24	122,99
1390	369,79	##########	6,60	78,49	81,24	75,54	82,28	78,36
1400	246,78	##########	6,00	82,97	85,30	75,51	128,23	84,82
1410	237,41	##########	5,60	90,38	95,70	76,07	170,66	93,08
1420	245,07	##########	5,20	97,67	105,76	76,16	182,69	98,64
1430	378,80	##########	4,30	104,82	114,03	76,82	232,96	104,98
1440	388,18	##########	3,30	118,02	128,01	77,70	355,89	123,48
1450	307,88	##########	2,90	133,46	147,99	78,17	351,61	141,70
1460	262,96	##########	2,70	139,69	168,81	76,85	286,58	148,63
1470	232,13	##########	2,50	140,15	185,46	76,32	243,51	149,29
1480	212,90	##########	2,40	138,95	196,70	76,91	215,22	147,71
1490	199,27	##########	2,20	136,91	202,89	76,46	196,85	145,36
1500	188,05	##########	2,10	134,82	204,95	76,81	184,11	142,83
1510	178,10	##########	2,00	132,00	205,38	76,60	173,35	139,61
1520	169,86	##########	2,00	128,31	204,48	76,06	164,56	136,29
1530	199,73	##########	8,30	125,26	200,99	75,79	157,41	132,35
1540	656,82	##########	6,90	119,67	177,03	77,13	183,87	126,92
1550	372,85	##########	5,90	129,37	189,52	77,39	322,79	139,01
1560	359,25	##########	5,20	137,81	205,37	77,68	333,43	150,62
1570	354,51	##########	4,40	144,90	216,51	77,58	344,42	159,29
1580	338,72	##########	3,90	150,70	226,83	78,07	347,23	164,40
1590	308,01	##########	3,40	154,24	237,65	77,97	329,62	165,54
1600	276,02	##########	3,20	155,37	244,58	78,08	291,89	164,33
1610	256,81	##########	2,90	154,02	249,09	77,96	259,43	162,20
1620	225,47	##########	2,80	151,72	252,22	78,19	234,04	159,30
1630	207,80	##########	2,60	147,75	253,46	78,15	209,72	155,05
1640	196,79	##########	2,50	144,21	252,00	78,67	194,94	151,76
1650	187,78	##########	2,50	140,64	249,61	78,14	183,50	147,67
1660	179,95	##########	2,40	137,61	245,88	78,44	175,26	144,11
1670	174,15	##########	2,30	134,28	243,43	78,57	168,12	140,23
1680	167,81	##########	2,20	131,17	240,00	77,86	162,13	136,13
1690	162,10	##########	2,20	128,63	234,49	77,45	156,66	132,93
1700	157,36	##########	2,10	126,27	231,70	77,32	152,23	129,48
1710	153,41	##########	2,10	124,53	225,05	77,43	148,36	127,31
1720	149,48	##########	2,00	122,37	220,32	77,53	144,66	124,73
1730	144,48	##########	2,00	121,05	215,22	77,11	141,45	122,72
1740	141,07	##########	1,90	118,02	211,94	76,53	137,81	118,74
1750	138,85	##########	1,90	116,67	205,51	77,08	135,60	117,56
1760	297,15	##########	5,10	103,61	149,88	77,88	122,18	102,94
1770	176,04	##########	4,90	105,42	153,36	77,75	143,45	107,32
1780	157,07	##########	4,60	107,12	160,15	78,25	141,03	110,83
1790	147,93	##########	4,40	107,10	165,55	77,91	136,14	111,12
1800	143,67	##########	4,20	107,66	167,78	78,79	133,64	112,21
1810	140,94	##########	4,00	108,08	170,69	79,15	132,71	112,79
1820	136,94	##########	3,80	108,44	172,89	79,56	131,67	112,93

1830	191,76	##########	6,80	108,71	171,47	80,32	130,22	112,26
1840	612,58	##########	5,40	109,08	155,78	81,66	188,42	113,08
1850	545,67	##########	7,40	126,34	168,25	82,12	302,06	131,01
1860	536,95	##########	6,10	144,26	191,77	83,59	380,58	153,06
1870	462,81	##########	11,00	155,77	222,88	83,87	412,64	174,09
1880	431,68	##########	9,60	161,06	247,60	83,85	435,76	186,26
1890	415,61	##########	8,40	165,49	256,86	84,51	436,86	191,51
1900	399,86	##########	7,40	169,42	259,83	84,82	440,56	193,94
1910	387,93	##########	6,40	172,57	261,28	84,89	428,36	197,24
1920	375,38	##########	5,60	173,65	263,45	85,00	424,31	205,02
1930	356,06	##########	5,00	174,50	266,65	85,01	418,20	210,94
1940	311,96	##########	4,60	175,84	271,55	85,05	375,80	212,29
1950	273,41	##########	4,30	176,17	274,52	84,28	328,73	207,56
1960	248,55	##########	4,10	174,74	276,41	84,00	283,88	200,15
1970	236,29	##########	3,90	172,59	276,33	84,12	257,94	193,08
1980	228,56	##########	3,80	170,57	275,37	83,86	242,59	187,16
1990	222,34	##########	3,60	168,74	275,12	83,94	232,67	182,30
2000	218,13	##########	3,40	166,89	274,83	83,44	225,44	177,97
2010	214,67	##########	3,30	165,12	274,57	83,98	219,92	174,09
2020	208,98	##########	3,20	163,65	275,15	83,60	215,24	171,05
2030	205,56	##########	3,10	161,83	274,18	83,67	210,09	168,46
2040	203,17	##########	3,00	160,04	272,91	83,91	205,76	166,02
2050	202,33	##########	2,80	158,72	270,75	83,74	202,93	163,15
2060	199,41	##########	2,70	158,08	267,63	83,66	201,62	161,04
2070	195,19	##########	2,60	156,82	263,67	83,56	197,99	159,01
2080	192,42	##########	2,50	155,14	259,57	83,27	193,68	156,85
2090	188,24	##########	2,40	152,94	257,25	83,03	189,85	154,26
2100	182,89	##########	2,40	150,34	254,94	82,69	184,96	151,80
2110	178,83	##########	2,30	147,40	252,27	82,40	179,48	149,08
2120	173,34	##########	2,20	143,86	247,27	82,22	174,33	145,52
2130	167,80	##########	2,10	141,57	242,96	81,85	169,67	142,95
2140	163,13	##########	2,00	137,91	238,20	80,96	164,14	139,15
2150	159,58	##########	2,00	135,70	234,56	79,48	159,74	136,47
2160	540,28	##########	12,89	130,95	218,69	81,05	155,50	131,20
2170	356,65	##########	11,79	133,36	216,06	81,48	199,69	131,44
2180	386,41	##########	10,80	140,66	218,62	82,06	293,96	134,95
2190	396,88	##########	9,70	150,12	224,10	82,18	357,41	144,77
2200	408,16	##########	8,60	157,92	227,86	82,08	387,83	157,17
2210	402,86	##########	7,40	164,85	231,54	82,34	396,51	166,48
2220	386,59	##########	6,30	171,82	236,48	82,36	395,56	175,16
2230	354,77	##########	5,70	176,08	245,34	82,14	385,54	179,01
2240	325,58	##########	5,10	177,05	255,13	82,33	357,24	180,66
2250	297,26	##########	4,70	176,74	262,12	82,28	323,00	180,79
2260	277,15	##########	4,40	175,15	266,03	81,70	290,88	179,62
2270	253,60	##########	4,20	172,61	265,52	81,87	269,30	178,84
2280	233,56	##########	4,00	169,05	265,27	81,65	244,01	175,18
2290	223,56	##########	3,80	165,35	263,66	81,76	226,27	170,25
2300	216,99	##########	3,70	162,16	261,15	81,07	215,41	166,30
2310	212,30	##########	3,50	159,36	260,99	80,56	208,28	162,41
2320	207,59	##########	3,40	156,56	258,95	81,24	203,04	159,70
2330	203,22	##########	3,30	154,21	257,08	80,61	197,90	157,00
2340	199,47	##########	3,20	151,81	255,24	80,48	193,28	154,86
2350	196,60	##########	3,10	149,77	252,81	79,82	189,45	152,72
2360	193,72	##########	3,00	147,81	250,24	80,03	186,46	150,98
2370	190,84	##########	2,90	145,87	247,22	79,33	183,54	149,11
2380	186,78	##########	2,80	144,09	245,29	79,32	179,82	148,04
2390	182,45	##########	2,80	141,67	244,19	79,62	176,47	146,81
2400	178,65	##########	2,70	139,57	241,35	79,74	173,46	145,42
2410	175,77	##########	2,60	138,18	236,62	79,34	169,79	144,03
2420	174,28	##########	2,50	137,65	232,32	80,08	167,60	143,45
2430	171,47	##########	2,50	135,97	229,37	79,98	164,79	141,21
2440	167,37	##########	2,40	133,67	226,37	79,91	161,79	138,44
2450	162,66	##########	2,30	131,81	224,13	78,33	157,47	135,65
2460	157,46	##########	2,30	128,87	220,36	78,72	153,28	134,01
2470	153,99	##########	2,20	126,58	215,75	78,92	149,57	132,02
2480	151,02	##########	2,20	126,40	212,15	78,95	147,38	130,62
2490	149,15	##########	2,20	125,57	207,76	78,96	145,02	129,19
2500	145,40	##########	2,10	123,75	204,51	78,71	142,27	126,55
2510	141,60	##########	2,10	122,22	201,16	78,31	139,17	124,47
2520	138,44	##########	2,00	120,33	198,41	77,78	136,49	123,04
2530	134,21	##########	2,00	118,49	193,92	77,94	133,74	121,49
2540	132,92	##########	1,90	117,60	190,53	78,06	131,76	120,39
2550	89,67	##########	1,70	93,36	133,44	75,63	97,25	94,35
2560	369,20	##########	7,10	93,62	124,67	76,59	108,82	94,31
2570	241,78	##########	6,60	94,98	126,06	76,39	149,84	104,38
2580	329,19	##########	5,90	98,82	129,87	76,66	197,76	114,07
2590	379,81	##########	5,00	106,97	137,71	77,12	295,08	128,30
2600	399,83	##########	4,00	120,51	149,90	78,57	377,59	144,82
2610	366,66	##########	3,40	137,02	167,71	78,34	408,27	159,67
2620	300,54	##########	3,00	144,23	186,83	77,32	346,89	162,01
2630	254,62	##########	2,90	145,94	203,10	76,89	285,05	162,35
2640	342,75	##########	8,30	143,04	215,06	77,91	262,67	162,23
2650	721,87	##########	6,52	143,35	208,78	80,35	399,35	165,21
2660	656,27	##########	5,30	160,40	211,30	80,43	478,01	182,87
2670	595,53	##########	4,40	171,18	221,97	80,03	416,30	193,83
2680	558,40	##########	3,70	175,59	236,20	80,24	362,59	199,11
2690	297,96	##########	1,30	169,46	264,30	78,81	303,00	201,87
2700	93,21	##########	1,70	96,15	140,19	76,35	100,81	96,90
2710	91,74	##########	1,70	94,87	137,63	75,93	99,15	95,80
2720	90,37	##########	1,70	93,75	134,27	75,62	97,80	94,74
2731	71,42	68,60	3,67	67,77	66,80	66,89	68,32	66,85
2732	126,68	68,73	2,27	67,89	66,81	66,91	68,49	66,93
2733	177,50	68,63	3,57	68,01	66,84	66,95	68,74	67,02

2734	268,61	68,67	3,47	68,15	66,88	66,99	69,31	67,14
2735	368,33	68,69	3,38	68,24	66,93	67,01	70,72	67,29
2736	439,32	68,45	3,18	68,35	67,02	67,04	73,32	67,51
2737	514,56	68,30	2,87	68,46	67,15	67,11	78,19	67,81
2738	541,68	68,46	2,73	68,69	67,33	67,17	86,97	68,28
2739	547,30	68,96	2,58	69,04	67,70	67,26	98,70	68,86
2740	580,47	68,69	2,27	69,53	68,16	67,37	112,35	69,66
2741	631,29	68,94	2,07	70,16	68,85	67,54	129,92	70,62
2742	674,73	69,69	1,69	71,03	69,78	67,78	150,34	71,78
2743	690,96	68,98	1,47	72,11	70,91	68,14	173,75	73,32
2744	699,64	69,51	1,18	73,46	72,32	68,62	202,55	75,10
2745	693,12	69,76	0,99	75,09	73,99	69,28	233,67	77,15
2746	600,50	68,47	10,56	77,02	75,94	70,21	264,39	80,08
2747	580,57	69,67	10,46	79,74	78,46	71,50	291,16	83,13
2748	603,77	69,48	10,27	82,38	81,18	73,06	308,25	86,09
2749	630,98	69,41	10,05	84,96	84,29	74,81	319,81	88,86
2750	641,46	69,87	9,86	87,32	87,40	76,76	331,27	91,76
2751	646,24	70,44	9,66	89,65	90,69	78,79	341,19	94,54
2752	647,14	69,93	9,57	91,94	94,16	81,00	351,22	97,19
2753	649,74	69,77	9,37	94,32	97,37	83,24	361,41	99,93
2754	650,69	69,84	9,16	96,68	100,98	85,66	369,91	102,60
2755	662,39	69,75	8,96	99,21	104,54	88,09	378,73	105,25
2756	671,01	69,69	8,67	101,89	107,62	90,54	387,19	107,74
2757	682,04	69,76	8,58	104,33	110,94	93,21	396,10	110,77
2758	693,75	71,06	8,36	106,99	114,57	95,85	406,19	113,37
2759	703,84	70,70	8,16	109,32	118,17	98,58	416,83	116,29
2760	709,38	69,61	7,87	111,95	120,53	101,29	428,52	119,19
2761	712,45	70,46	7,66	114,65	124,05	104,10	440,07	121,97
2762	715,07	69,31	7,47	117,36	126,96	106,82	450,22	124,47
2763	718,66	70,80	7,27	120,03	129,49	109,67	461,82	127,20
2764	720,22	69,88	7,07	122,48	131,74	112,64	472,33	130,30
2765	722,26	70,08	6,86	125,40	135,19	115,66	481,58	133,02
2766	725,26	70,07	6,67	127,52	137,10	118,72	492,32	136,25
2767	730,09	70,78	6,47	130,43	140,12	121,78	500,34	138,59
2768	734,37	71,79	6,16	133,01	143,00	125,03	508,47	141,30
2769	732,96	72,33	5,97	135,87	145,49	128,09	517,45	144,24
2770	726,93	71,67	5,87	138,13	148,89	131,24	526,29	146,60
2771	719,58	71,58	5,68	140,40	150,80	134,50	533,79	149,58
2772	707,58	71,51	5,48	143,22	152,76	137,80	540,24	152,39
2773	697,17	72,08	5,27	145,59	155,90	141,23	543,21	155,39
2774	686,59	73,17	5,07	148,33	157,68	144,47	545,64	157,68
2775	675,68	72,09	4,98	150,73	160,58	147,79	545,48	160,29
2776	651,53	71,10	4,88	152,82	161,55	151,29	541,61	163,44
2777	628,76	71,99	4,68	155,33	164,31	154,59	532,59	166,10
2778	609,95	71,18	4,57	157,44	165,93	157,80	520,80	168,72
2779	595,22	71,83	4,47	159,84	169,16	160,90	507,00	170,67
2780	584,06	72,00	4,37	161,86	171,20	164,00	490,85	172,41
2781	575,06	71,91	4,33	163,87	171,92	167,03	474,89	174,27
2782	569,03	70,72	4,18	165,53	172,38	170,05	459,97	177,20
2783	563,71	71,51	4,18	166,58	173,56	172,96	445,13	179,27
2784	560,19	71,27	3,98	168,13	175,61	175,60	432,89	180,14
2785	558,52	71,56	3,89	168,80	176,82	178,50	420,42	181,74
2786	555,53	70,11	3,77	169,96	178,71	180,66	409,75	182,18
2787	554,11	71,26	3,67	170,88	180,95	182,97	400,39	183,09
2788	554,34	71,48	3,57	172,10	183,30	184,89	392,31	182,76
2789	555,51	70,87	3,48	173,07	183,34	186,89	385,04	183,10
2790	557,24	71,27	3,38	173,09	184,39	188,88	379,78	183,71
2791	559,69	71,21	3,28	173,93	186,08	190,58	374,85	184,19
2792	562,11	71,19	3,07	174,71	186,91	192,40	371,29	184,95
2793	561,80	71,15	2,97	175,31	187,62	194,27	368,61	186,56
2794	560,69	71,35	2,87	176,19	190,34	195,84	366,64	186,94
2795	557,27	70,73	2,78	176,96	191,00	197,42	365,82	187,65
2796	548,65	70,77	2,78	177,56	192,26	199,01	364,11	188,38
2797	537,27	71,35	2,68	178,16	192,78	200,72	362,40	189,22
2798	530,57	71,22	2,58	178,94	194,46	202,16	359,67	189,76
2799	523,27	71,24	2,58	179,61	196,43	203,69	356,82	190,04
2800	515,04	69,85	2,48	179,53	197,01	205,65	351,95	191,00
2801	508,64	70,50	2,39	179,50	198,13	207,11	347,76	191,48
2802	505,98	70,06	2,39	180,49	201,10	208,34	343,19	190,54
2803	500,02	69,84	2,27	181,45	201,33	209,79	338,17	190,48
2804	493,88	70,67	2,27	181,91	202,44	211,24	332,99	190,89
2805	488,13	70,51	2,17	182,19	203,47	212,88	327,79	190,97
2806	484,53	71,46	2,08	182,13	204,99	213,85	322,70	190,66
2807	478,23	70,73	2,07	182,23	207,13	214,63	317,94	189,86
2808	472,20	71,06	2,07	181,77	207,97	215,80	311,58	189,59
2809	397,37	70,02	7,84	181,85	212,20	217,15	306,19	190,20
2810	343,99	69,73	11,55	182,39	214,65	220,07	299,45	192,73
2811	316,18	69,62	0,09	182,53	218,21	223,01	292,25	193,30
2812	328,39	70,41	-0,01	181,17	222,42	223,68	284,67	191,37
2813	348,46	69,94	-0,01	179,46	221,79	223,59	275,34	189,61
2814	355,99	69,98	-0,01	177,08	222,47	222,99	265,58	187,64
2815	359,08	70,26	-0,01	175,14	223,01	222,03	257,56	185,56
2816	359,19	69,84	-0,01	172,87	222,14	221,07	249,04	184,62
2817	342,56	70,25	-0,01	171,81	224,49	220,11	242,07	183,44
2818	358,01	70,29	-0,01	169,98	225,54	218,73	236,06	180,79
2819	360,83	69,51	-0,01	169,11	225,61	217,37	230,58	178,71
2820	359,50	69,42	-0,01	167,63	226,76	216,14	225,58	177,28
2821	329,73	69,95	9,47	166,87	226,74	215,55	220,92	177,19
2822	309,72	69,38	11,26	166,11	228,70	215,19	217,52	176,57
2823	330,16	70,30	11,16	164,84	226,58	214,45	213,50	175,81
2824	388,22	70,09	11,06	163,72	228,14	213,32	209,97	173,65
2825	510,97	70,03	10,85	162,52	225,60	212,36	207,27	172,47
2826	615,69	70,04	10,55	160,86	225,14	211,50	208,45	171,14

2827	649,02	69,59	10,26	159,89	225,76	210,64	215,20	170,25
2828	663,75	70,19	10,05	159,07	225,26	209,71	227,10	169,31
2829	674,72	71,55	9,76	159,11	222,55	209,20	244,79	169,65
2830	681,27	70,68	9,56	159,26	225,75	208,15	266,06	168,86
2831	692,28	71,21	9,32	159,16	225,95	207,41	289,98	167,89
2832	707,75	70,84	9,06	159,62	225,98	206,83	314,63	168,56
2833	721,91	68,28	8,76	157,28	225,28	205,39	339,48	169,45
2834	743,75	68,54	8,57	158,64	225,49	204,79	364,66	170,02
2835	763,17	69,97	8,26	159,73	227,42	204,55	389,12	170,40
2836	677,21	70,28	8,07	160,34	228,48	204,42	413,46	171,96
2837	573,55	70,00	7,97	163,03	229,73	204,82	433,80	175,26
2838	520,11	70,29	7,87	164,59	232,89	204,93	447,50	177,09
2839	484,36	70,08	7,78	166,32	234,63	205,01	456,82	178,55
2840	457,88	70,06	7,66	168,41	237,68	204,90	459,85	179,84
2841	439,86	70,05	7,56	169,72	239,07	205,04	460,65	181,43
2842	427,81	70,76	7,46	170,47	238,99	205,40	457,26	183,93
2843	418,64	70,02	7,27	169,65	241,85	205,33	452,48	184,42
2844	411,26	67,80	7,27	166,54	245,32	203,61	448,10	184,91
2845	408,39	65,73	7,17	164,42	247,73	201,43	443,97	185,59
2846	406,79	66,15	7,07	164,84	248,82	199,88	439,14	185,60
2847	404,65	67,11	6,95	166,67	246,15	199,23	435,28	185,60
2848	397,56	67,99	6,76	167,48	246,49	198,63	431,45	186,09
2849	390,85	67,69	6,66	168,13	246,75	197,82	430,56	186,46
2850	386,88	68,43	6,57	169,29	245,86	197,85	428,48	186,68
2851	386,33	69,49	6,47	168,97	245,62	197,58	426,79	187,13
2852	385,71	69,72	6,37	169,98	245,54	197,24	424,47	187,71
2853	384,39	70,27	6,27	170,77	247,04	197,31	424,85	188,45
2854	383,37	70,53	6,16	171,31	247,43	197,03	424,74	189,18
2855	380,84	71,12	5,96	171,83	250,55	196,80	425,76	189,93
2856	378,60	71,96	5,87	171,95	250,05	195,93	427,66	190,23
2857	377,40	71,80	5,79	172,83	248,22	195,50	428,82	190,66
2858	375,69	71,53	5,67	172,83	247,61	194,70	429,97	190,90
2859	373,65	71,96	5,57	172,45	247,49	194,34	430,33	191,22
2860	371,18	71,70	5,48	172,99	246,66	193,48	431,73	191,46
2861	367,55	72,32	5,36	172,34	246,76	192,70	431,29	192,04
2862	363,52	71,54	5,26	171,01	247,02	191,68	430,38	192,12
2863	360,97	72,21	5,26	171,43	246,18	190,87	429,61	192,24
2864	356,54	72,05	5,08	170,91	247,18	190,01	426,96	191,87
2865	356,93	70,98	5,07	170,46	247,91	189,02	424,65	191,63
2866	357,24	71,13	4,97	170,19	247,21	188,02	422,19	191,86
2867	359,23	71,34	4,87	169,60	246,40	187,22	420,40	191,96
2868	360,37	71,83	4,78	170,00	246,18	186,42	417,91	192,04
2869	361,48	70,90	4,68	169,00	246,55	185,49	416,18	192,11
2870	361,71	71,06	4,56	168,75	245,55	184,90	415,86	191,71
2871	361,43	70,99	4,47	168,43	245,54	184,16	415,74	191,80
2872	360,37	70,57	4,37	168,12	246,34	183,44	416,75	191,28
2873	358,95	70,89	4,37	167,43	244,64	183,08	418,33	192,86
2874	356,41	70,61	4,27	167,80	244,00	182,45	419,13	193,46
2875	352,04	70,45	4,17	166,83	244,97	181,60	418,36	193,02
2876	347,75	70,31	4,17	166,62	243,40	181,31	416,39	192,98
2877	342,82	70,29	4,08	165,85	243,42	180,66	413,52	192,74
2878	339,06	69,98	3,98	165,73	242,93	180,35	410,20	193,36
2879	334,10	70,08	3,98	165,32	243,06	179,85	406,59	193,21
2880	330,90	70,34	3,88	164,46	244,17	179,12	402,47	192,10
2881	328,06	69,96	3,88	164,19	243,25	178,77	397,74	192,02
2882	325,37	70,51	3,76	163,57	242,50	178,55	394,54	191,98
2883	323,08	70,34	3,67	163,93	242,76	178,17	390,13	191,67
2884	321,26	70,27	3,67	163,02	243,75	177,67	386,66	190,31
2885	318,57	70,30	3,57	162,07	244,10	177,08	382,89	189,34
2886	316,26	70,02	3,57	161,90	243,44	176,65	378,80	188,73
2887	314,63	70,02	3,47	161,75	244,10	176,10	374,88	188,01
2888	313,96	69,64	3,47	161,18	242,85	175,57	371,85	188,33
2889	312,45	70,04	3,37	161,80	242,09	175,14	368,93	187,27
2890	311,04	70,48	3,38	161,88	241,83	174,94	365,42	187,37
2891	309,64	69,75	3,28	161,24	242,18	174,68	362,88	187,30
2892	309,09	70,36	3,18	161,10	239,93	174,71	359,94	187,56
2893	307,45	70,14	3,18	160,80	240,87	174,42	357,07	186,83
2894	306,23	70,47	3,06	161,49	239,71	174,18	355,18	186,67
2895	304,16	70,32	2,97	161,58	239,69	173,95	352,79	186,03
2896	301,77	70,92	2,97	161,84	239,13	173,91	350,42	186,03
2897	300,19	70,52	2,97	162,04	238,65	173,66	347,89	185,57
2898	298,45	70,44	2,87	161,75	238,58	173,53	345,35	185,78
2899	296,73	69,66	2,77	161,27	239,68	172,89	342,40	184,73
2900	294,53	70,76	2,77	161,66	240,28	172,51	340,47	184,47
2901	292,52	70,47	2,77	160,96	239,77	172,21	337,66	184,04
2902	291,13	69,76	2,67	160,50	239,60	171,79	334,06	182,94
2903	288,88	70,12	2,67	159,39	239,87	171,39	332,00	182,26
2904	286,50	69,44	2,58	158,75	239,51	170,99	329,57	182,27
2905	284,72	69,74	2,58	159,10	239,53	170,65	327,62	181,90
2906	284,16	70,37	2,48	158,84	238,72	170,38	324,98	181,69
2907	282,49	69,39	2,48	158,95	238,68	170,17	322,69	181,49
2908	280,70	69,93	2,38	158,27	237,84	170,04	320,24	181,51
2909	279,22	70,07	2,38	159,14	237,35	169,89	317,68	181,33
2910	277,60	70,15	2,38	159,03	238,01	169,69	315,61	181,12
2911	276,32	70,53	2,27	158,82	238,33	169,52	314,21	180,63
2912	274,23	69,87	2,27	158,05	238,03	169,37	311,93	180,47
2913	273,80	70,31	2,27	158,44	236,18	169,30	309,59	180,20
2914	273,18	70,24	2,17	158,99	236,93	169,27	308,53	179,86
2915	273,87	70,38	2,17	159,35	236,11	169,35	306,96	179,65
2916	273,08	69,85	2,07	158,89	235,96	169,27	304,97	179,33
2917	269,86	69,38	2,07	158,34	236,33	169,02	303,46	178,51
2918	265,82	69,46	2,07	158,68	236,67	168,83	301,88	178,32
2919	261,24	69,49	2,07	158,77	236,80	168,72	300,89	178,22

2920	257,64	69,61	1,97	159,13	235,81	169,05	298,58	178,78
2921	253,50	69,61	2,07	159,04	237,16	168,89	295,96	178,85
2922	250,05	70,03	1,97	158,98	236,17	168,76	292,59	178,70
2923	246,95	70,35	1,97	158,60	236,33	168,77	289,04	178,35
2924	244,27	69,77	1,87	158,09	236,52	168,51	285,77	177,56
2925	241,44	70,21	1,97	158,20	236,84	168,47	281,82	177,34
2926	238,76	70,26	1,88	157,95	236,87	168,47	277,70	177,25
2927	236,89	69,68	1,88	157,55	236,21	168,61	274,13	177,14
2928	234,75	69,82	1,88	157,04	236,57	168,71	270,58	177,12
2929	233,09	69,56	1,88	156,86	237,19	168,65	267,20	176,91
2930	231,16	69,67	1,88	156,29	236,34	168,65	263,05	176,42
2931	229,54	69,93	1,88	156,04	236,51	168,60	259,91	175,99
2932	228,73	69,12	1,78	155,48	236,66	168,42	256,80	175,11
2933	227,02	70,30	1,78	155,60	236,14	168,60	253,96	174,76
2934	225,44	70,06	1,78	155,22	236,32	168,56	251,43	174,10
2935	224,17	68,94	1,78	154,98	236,27	168,46	248,76	173,11
2936	222,97	69,37	1,78	154,26	236,86	168,48	246,33	172,51
2937	221,68	69,47	1,78	154,36	238,44	168,07	243,86	171,71
2938	220,60	69,55	1,78	153,85	237,63	168,13	241,26	171,26
2939	218,80	69,94	1,68	153,18	237,89	167,94	239,32	170,77
2940	217,90	69,33	1,68	152,45	237,88	167,90	237,28	170,51
2941	216,60	69,66	1,68	152,23	237,67	167,81	235,43	170,22
2942	215,92	68,93	1,68	151,86	237,43	167,77	233,31	170,23
2943	215,15	69,03	1,68	150,69	237,32	167,82	231,53	169,97
2944	214,30	69,83	1,58	151,21	238,61	167,75	230,14	169,52
2945	213,41	69,32	1,58	151,09	236,75	167,94	228,37	169,25
2946	212,86	69,51	1,58	151,01	237,19	167,98	227,16	168,74
2947	212,23	69,45	1,58	151,04	236,60	168,01	225,62	168,06
2948	211,35	69,14	1,47	150,52	236,92	168,05	224,08	167,90
2949	210,72	69,58	1,58	149,60	237,63	168,12	222,83	167,75
2950	210,04	69,80	1,47	149,65	236,91	168,18	221,55	167,61
2951	209,35	69,85	1,47	149,58	236,74	168,34	220,31	167,74
2952	208,27	69,73	1,47	149,54	236,50	168,47	219,00	167,26
2953	207,73	69,58	1,47	149,37	237,94	168,30	218,40	166,77
2954	207,49	69,62	1,47	149,29	236,86	168,52	217,55	166,51
2955	206,83	69,45	1,47	148,97	236,82	168,60	216,45	166,25
2956	206,39	69,18	1,47	148,71	237,34	168,53	215,52	165,67
2957	206,00	69,61	1,47	148,75	236,93	168,61	214,63	165,24
2958	205,54	70,24	1,37	148,23	237,32	168,49	213,74	164,53
2959	205,25	69,26	1,37	147,69	237,47	168,60	212,82	164,36
2960	205,04	68,93	1,37	147,88	238,84	168,47	212,12	164,30
2961	203,90	69,18	1,37	147,41	238,55	168,45	211,56	163,85
2962	202,82	69,45	1,37	147,20	237,29	168,75	210,63	164,00
2963	202,51	69,32	1,27	147,28	237,65	168,83	209,77	163,71
2964	202,38	69,09	1,27	146,98	237,20	168,97	209,02	163,30
2965	202,29	69,21	1,27	147,28	237,29	169,22	208,94	163,16
2966	202,04	69,60	1,27	146,98	237,30	169,30	208,37	163,01
2967	201,27	68,80	1,27	146,95	238,12	169,34	207,84	162,67
2968	201,64	69,14	1,27	146,94	237,43	169,53	207,11	162,45
2969	201,48	69,35	1,17	146,84	238,00	169,69	205,77	162,28
2970	200,17	68,70	1,27	146,72	237,96	169,86	205,59	161,96
2971	198,68	68,93	1,17	146,31	239,25	169,64	205,07	161,46
2972	197,36	69,25	1,17	146,56	237,97	169,91	204,30	161,62
2973	196,55	69,49	1,17	146,66	239,90	169,78	204,19	161,01
2974	195,56	68,65	1,17	146,40	238,88	169,85	203,54	160,89
2975	194,97	69,44	1,17	146,08	238,77	170,00	202,95	161,12
2976	193,72	68,70	1,17	145,86	239,47	170,09	202,45	160,90
2977	193,39	68,94	1,17	146,01	239,76	170,15	202,27	160,92
2978	192,21	68,89	1,17	145,21	240,44	170,12	201,57	160,80
2979	191,46	68,40	1,17	145,30	239,97	170,12	201,12	160,83
2980	190,82	69,08	1,17	145,08	240,52	170,08	200,81	160,75
2981	190,55	68,65	1,08	144,81	240,03	170,28	199,63	160,77
2982	190,15	68,44	1,17	144,63	240,00	170,37	199,25	160,62
2983	189,26	68,59	1,08	144,63	240,12	170,52	198,75	160,27
2984	188,46	69,60	1,08	144,44	241,81	170,35	198,17	159,92
2985	187,65	68,11	1,08	144,04	242,54	170,37	197,54	159,14
2986	187,16	68,23	1,08	143,80	240,59	170,72	197,18	159,79
2987	186,51	68,38	1,08	143,59	240,45	170,73	196,32	159,70
2988	185,67	69,21	1,08	143,30	241,39	170,43	196,00	158,92
2989	185,00	68,31	1,08	143,23	242,93	170,24	195,33	158,22
2990	184,43	68,47	0,98	142,80	240,81	170,19	194,17	157,84
2991	184,20	68,54	0,98	142,60	241,33	170,17	193,76	158,00
2992	183,27	69,09	0,98	142,42	241,61	169,87	192,73	157,54
2993	182,26	69,56	0,98	142,29	242,25	169,82	192,41	157,44
2994	181,37	68,99	0,98	141,72	241,42	169,75	191,70	157,06
2995	181,03	69,05	0,98	141,65	241,22	169,68	191,43	156,89
2996	180,17	69,11	0,98	140,94	241,74	169,41	190,98	156,39
2997	179,50	69,77	0,98	140,78	240,54	169,44	190,05	156,09
2998	179,10	68,60	0,98	140,65	240,46	169,22	189,22	155,58
2999	178,35	68,34	0,98	140,00	241,33	168,94	188,62	155,35
3000	177,87	68,82	0,88	139,74	239,60	169,04	188,09	155,17
3001	177,57	69,14	0,88	139,89	238,97	169,01	187,51	155,83
3002	176,79	69,22	0,88	139,80	239,89	169,16	187,22	156,20
3003	176,00	69,28	0,88	139,66	237,46	169,33	186,61	156,06
3004	175,40	69,68	0,88	139,32	236,87	169,38	186,28	156,02
3005	175,16	70,11	0,88	139,02	237,99	169,08	185,60	155,89
3006	174,60	70,32	0,88	138,74	238,45	168,72	185,03	155,59
3007	173,75	70,33	0,88	138,74	238,55	168,62	184,35	155,29
3008	173,34	71,29	0,88	138,83	239,02	168,36	183,88	154,92
3009	173,00	70,91	0,88	138,64	238,24	168,03	183,38	154,13
3010	173,07	70,56	0,79	138,17	236,98	168,22	182,37	154,23
3011	172,69	69,96	0,79	137,72	235,86	168,13	181,47	154,15
3012	172,22	69,98	0,79	137,21	235,14	168,15	180,77	154,34

3013	171,75	69,94	0,79	137,14	235,22	168,00	180,04	154,11
3014	171,47	69,77	0,79	136,27	235,00	167,83	179,21	153,71
3015	171,02	69,58	0,79	136,15	233,96	167,70	178,57	153,50
3016	170,76	69,23	0,79	136,01	233,65	167,64	177,90	153,55
3017	170,52	69,52	0,79	135,70	232,81	167,54	177,17	153,20
3018	170,37	69,63	0,67	135,74	232,38	167,24	177,25	152,72
3019	170,09	69,52	0,67	135,21	232,88	167,15	176,67	152,48
3020	169,90	69,45	0,72	134,75	232,97	166,74	175,82	151,85
3021	169,66	69,82	0,67	134,50	231,67	166,53	175,48	151,80

APPENDIX 5: Participants

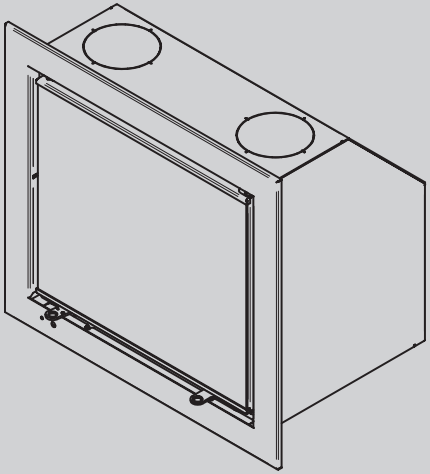
Danick Power ing.
v-p operation
Services Polytests inc.
450.741.3636
www.polytests.com

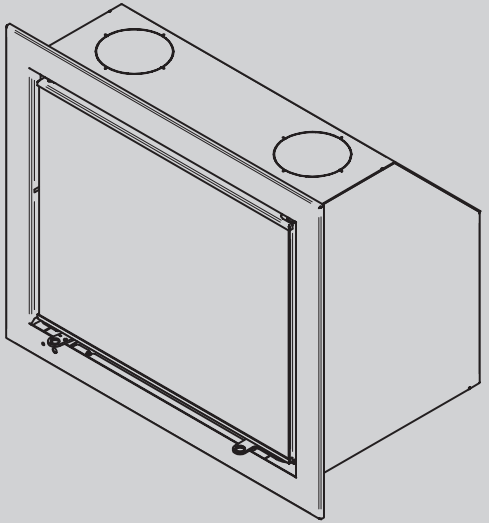
Sébastien Boulais
Technicien
Services Polytests inc.
450.741.3636
www.polytests.com

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

APPENDIX 6: Drawings and specifications

APPENDIX 7: Operator's manual





Installation and Operating Instructions

Wood Fireplace

S 600 INSERT

M 700 INSERT

Keep this insruction for future use.

SPARTHERM®
The Fire Company

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

INDRODUCTION 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.

FAILIOUR 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 WARRENTY.

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

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 TOWARRANTY 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 oft 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.

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.

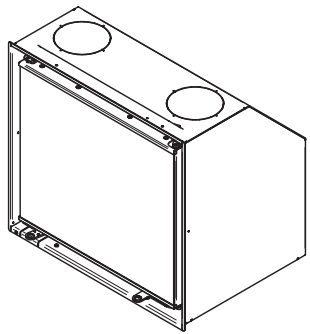
600=10,613 – 47,417 btu/hr 4kg of wood burned in 52minutes efficiency 65.5%

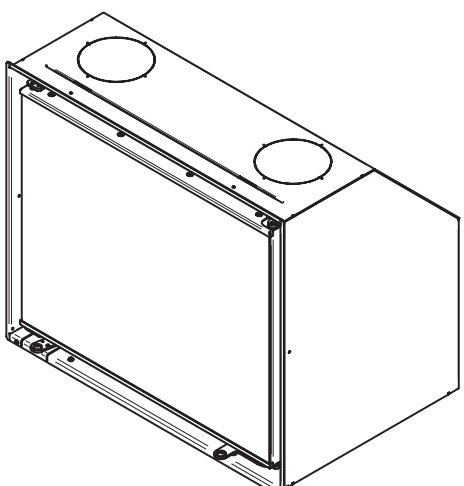
700=13,129 - 29,452 btu/hr 6.39kg of wood burned in 125 minutes efficiency 59%

Specifications Cassette 600 Insert / 700 Insert:

	Spartherm Cassette Insert	
	600 Insert	700 Insert
Weight of Insert Weight of Insert	lbs (kg) lbs (kg)	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 m²/ sq. ft	App m²/ sq. ft
Recommended amoint 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. Failiure 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

C SP US

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/ Tested aux Normes:
UL-127-11, ULC-S610 M87,
U.S. Enviroment Protection Agency: Certified to comply with 1.67 g/hr
Particulate emission standards using cord wood

Model: Spartherm Cassette 600 Insert
Date of Manufacture / Date de Fabrication:
Month/Year / Mois/Année: 01/2018
Serial Number / No de Serie: S 600 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 ULC-S604, 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. Do not use a fireplace insert or other products not specified for use with this product. CAUTION: Gas logs shall be certified for the application. This unit is not certified to operate with gas log sets.

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.

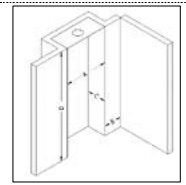
POUR EVITER LES INCENDIES DOMESTIQUES:
Contactez les Autorités des bâtiments et les pompiers pour obtenir des instructions concernant les restrictions et inspections d´installation dans votre région. Installez et utilisez cet appareil uniquement en respectant les instructions d´installation et d´utilisation du fabriquant. 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 fabriquant 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 fréquement selon les instructions du fabriquant. 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. Etablissez le feu de bois directement dans l´âtre. L´installation doit être faite exclusivement avec le cheminée listé selon la norue ULC-S604, ULC-S610 ou UL-103 HT de diamète 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 combustibtes que le bois.

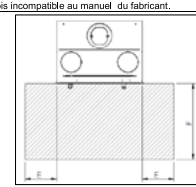
ATTENTION: N'utilisez le poêle que lorsque les portes sont complétement fermées. Remplacer la vitre uniquement avec du verre Robax céramique de 4 mm.Il faut que les zones du foyer vitré qui portent les canaux d'alimentation d'air chaud et froid soient conformes à l'instruction de montage du fabricant. L'approvisionnement en revêtement fait de matériaux ininflammables devant l'ouverture du foyer vitré doit être installé conforme a 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 carée (90,3 centimètres carée) 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 carée (101.6mm). Un manque d'air d'appoint pourrait priver les autres apparells de combustion d'une alimentation d'air adéquate. Ne pas obstruer les entrés et sorties d'air en aucun cas. Les composantes utilisées dans l'appareil doivent être répertoriées. 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 effectivement aérer l'appareillage. La certification des bûchettes décoratives selon la norme ansi 221.60/csa2.26-2017 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.

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 dispositons 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 protector.



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** - 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.

ECARTEMENT MINIMUM AUX MATERIAUX COMBUSTIBLES
A.
B.
C.
D.
E.
F.
DEVANT L'APPAREIL *

* **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.

C A U T I O N:
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 INTALLATION.
DO NOT OVERFIRE – IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING.

A T T E N T I O N:
CHAUD PENDANT LE FONCTIONNEMENT – NE PAS TOUCHER.
TENIR ÉLOIGNÉS 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 À DISTANCE DE L´APPAREIL.
NE PAS INSTALLER DANS UNE MAISON MOBILE.
EVITER DE SURCHAUFFER – SI LE FEU OU LA CHEMINÉE DEVIENT ROUGE, VOUS SURCHAUFFEZ.

Spartherm – v2.1, 11. Apr. 2018

DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ETIQUETTE

Safety Information / Informations Sur La Sécurité

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

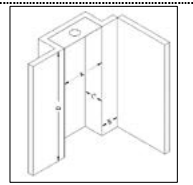
Manufactured by / Fabriqué par:
Spartherm Feuerungstechnik GmbH
Maschweg 38
D – 49324 Melle, Germany
info@spartherm.com

Solid Fuel Room Heater – For Use with Solid Wood Fuel only /
Appareil de Chauffage a combustion solides
Tested to Standards/ Tested aux Normes:
UL-127-11, ULC-S610 M87,
U.S. Enviroment Protection Agency: Certified to comply with 1.14 g/hr
Particulate emission standards using cord wood

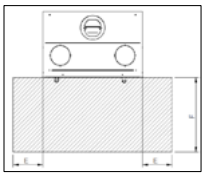
Model: Spartherm Cassette 700 Insert
Date of Manufacture / Date de Fabrication:
Month/Year / Mois/Année: 01/2018
Serial Number / No de Serie: M 700 Insert

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 ULC-S604,
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. Do not use a fireplace insert or other products not 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 fabriquant. 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 fabriquant 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 fréquement selon les instructions du fabriquant. 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. Etablissez le feu de bois directement dans l'âtre. L'installation doit être faite exclusivement avec le cheminée listé selon la norue ULC-S604, ULC-S610 ou UL-103 HT de diamète 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 le poêle que 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 revêtement fait de matériaux ininflammables devant l'ouverture du foyer vitré doit être installé conforme a 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 carée (90,3 centimètres carée) 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 carée (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 entrés et sorties d'air en aucun cas. Les composantes utilisées dans l'appareil doivent être répertoriées. 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 effectivement aérer l'appareillage. La certification des bûchettes décoratives selon la norme ansi 221.60/csa2.26-2017 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.
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 dispositons 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 protector.



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** - 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.

ECARTEMENT MINIMUM AUX MATERIAUX COMBUSTIBLES
A.
B.
C.
D.
E.
F.
DEVANT L'APPAREIL *

* **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.

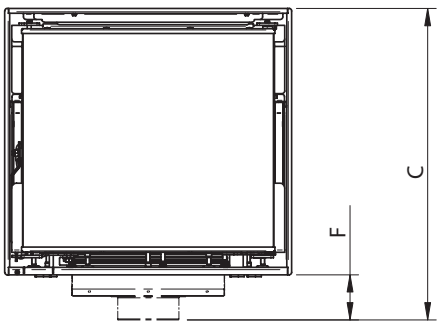
CAUTION:
HOT WHILE IN OPERATION. DO NOT TOUCH.
KEEP CHILDREN AND CLOTHING AWAY.
CONTACT MAY CAUSE SKIN BURNS. SEE NAME PLATE AND INSTRUCTIONS. KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM THE APPLIANCE.
NOT SUITABLE FOR MOBILE HOME INTALLATION.
DO NOT OVERFIRE –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

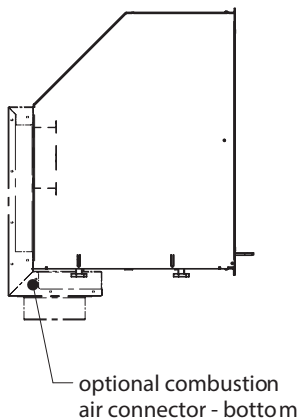
ATTENTION:
CHAUD PENDANT LE FONCTIONNEMENT – NE PAS TOUCHER.
TENIR ÉLOIGNÉS LES ENFANTS ET LES VÊTEMENTS – LE CONTACT PEU CAUSER DES BRULURES. CONSULTEZ LA PLAQUE D'IMMATRICULATION ET LES INSTRUCTIONS. TENIR LES FOURNITURES ET AUTRES MATIERES COMBUSTIBLES À DISTANCE DE L'APPAREIL.
NE PAS INSTALLER DANS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

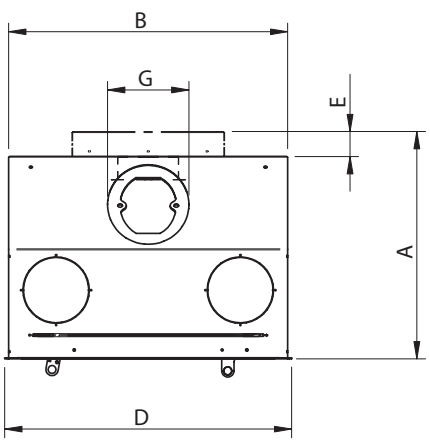
Spartherm – v2.1, 11. Apr. 2018

DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ETIQUETTE

2.2 DIMENSIONS



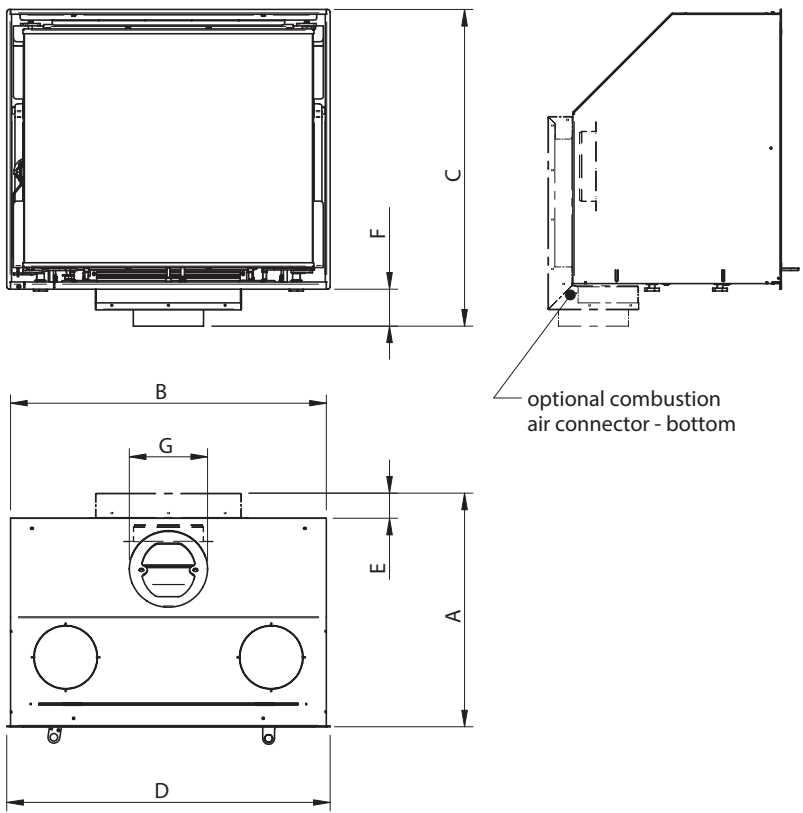




	S 600 Insert
A	18 1/7" / 461mm
B	22 2/7" / 566mm
C	24 7/8" / 632mm
D	23" / 582mm
E	2" / 50mm
F	3 5/8" / 92mm
G	6"

Example shown: S 600

2.2.2 DIMENSIONS SINGLE FACED



Example shown: M 700

	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"

2.3 SPECIFICATION

	Fire chamber volume	Minimum Power	Maximum power	Efficiency*	Chimney type	Unit weight	ideal fuel size
S 600 Insert	0,95 ft^3	10 613 BTU/h	47 417 BTU/h	70.29 %	6"	lbs	17"
M 700 Insert	1,58 ft^3	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:

$1m^3 = 35.314\ ft^3$

2.4 GENERAL INSTRUCTIONS

⚠ WARNING

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 THROUGHLY 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 bring 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.

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We suggest that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

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.

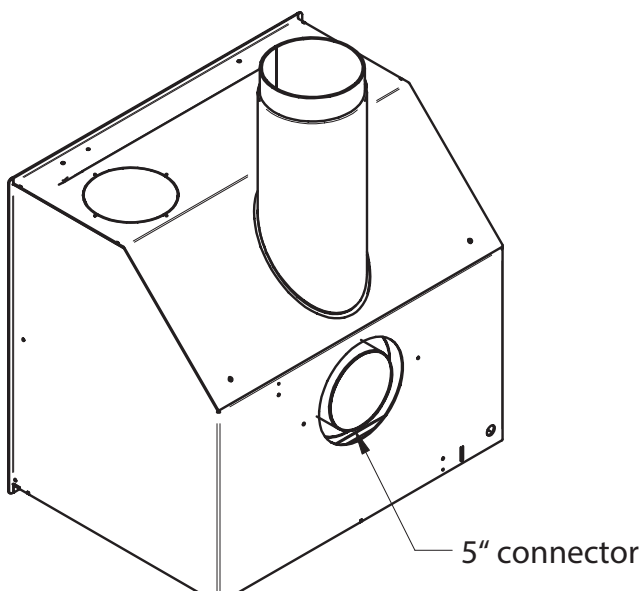
CALIFORNIA PROP 65 WARNING:
Use of this product may produce smoke which contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

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.

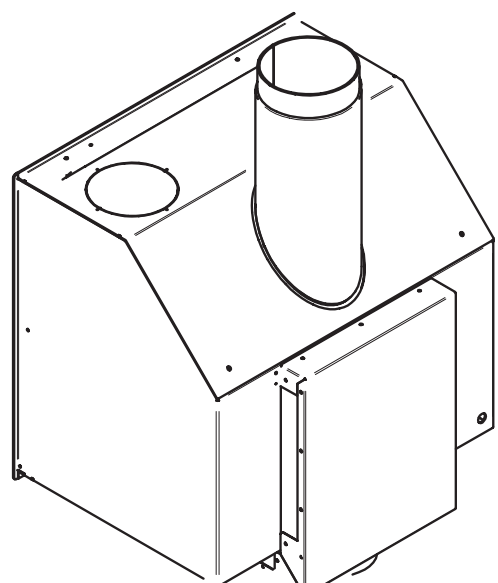
2.6 AIR SYSTEM

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.

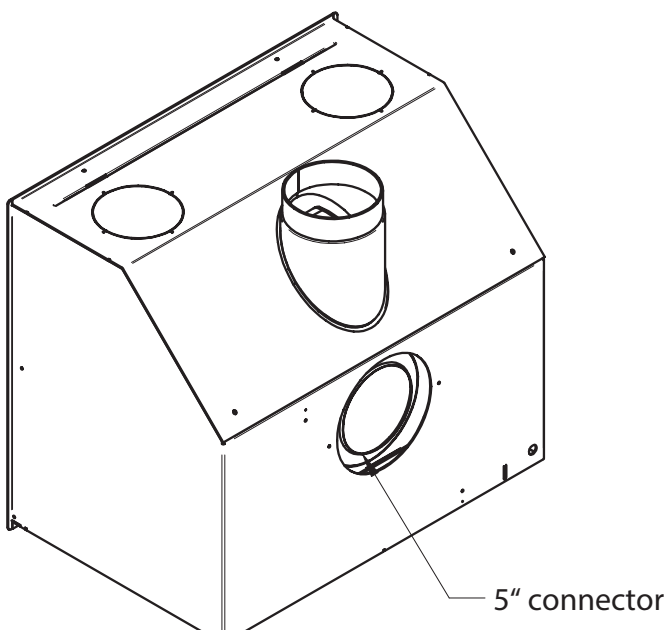
S 600 - backside air intake



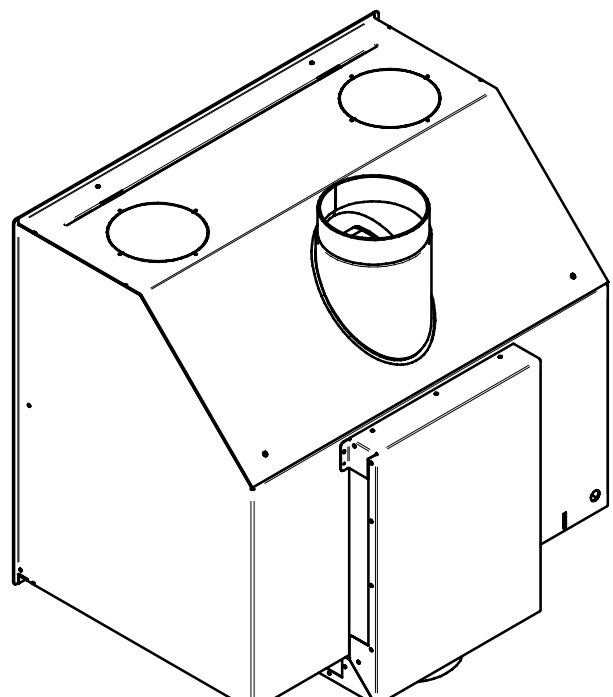
S 600 - groundside air intake



M 700 - backside air intake

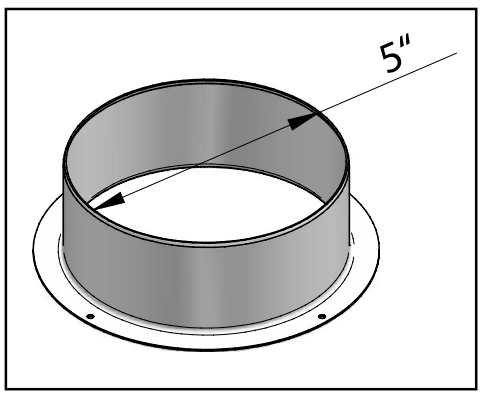


M 700 - groundside air intake



2.6.1 CONNECTION DIRECTLY TO THE UNIT

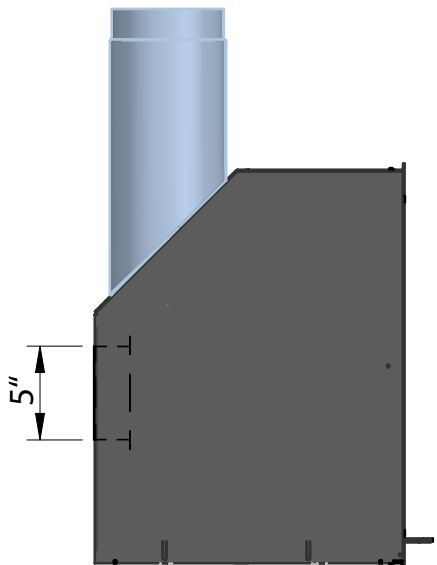
To connect the separate combustion air directly to the unit you need to have the right separate combustion air connector Ø 5/6". Fix the connector directly to the unit. It can be oriented to the left side, right side or to the back.



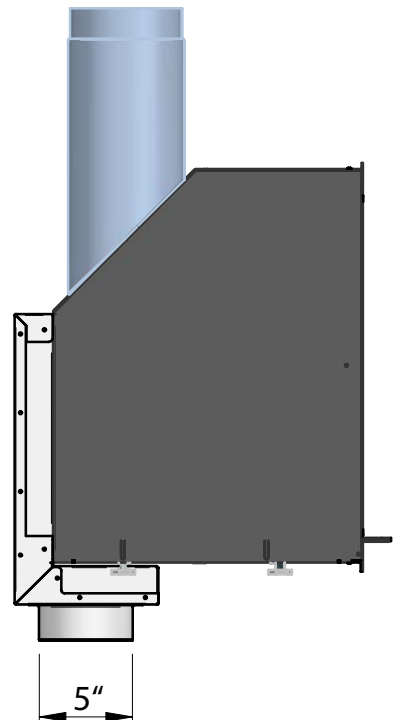
Fresh air ducts
The ducts providing the outside combustion air should be as
short as possible to prevent pressure loss and to prevent making the house cold.

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.

⚠ WARNING

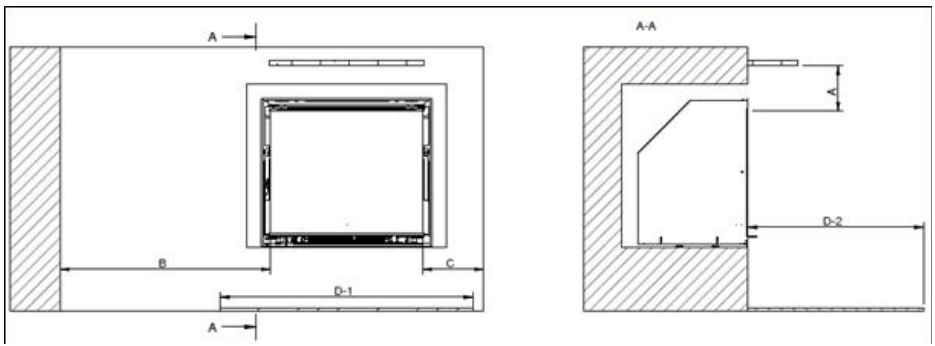
WEAR GLOVES AND SAFETY GLASSES FOR PROTECTION. CAREFULLY FOLLOW THE INSTRUCTIONS FOR ASSEMBLY OF THE PIPE AND OTHER PARTS NEEDED TO INSTALL THE APPLIANCE. FAILURE TO DO SO MAY RESULT IN A FIRE, ESPECIALLY IF COMBUSTIBLES ARE TOO CLOSE TO THE APPLIANCE OR CHIMNEY AND AIR SPACES ARE BLOCKED, PREVENTING 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.

Clearence requirements to cumbustible 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:

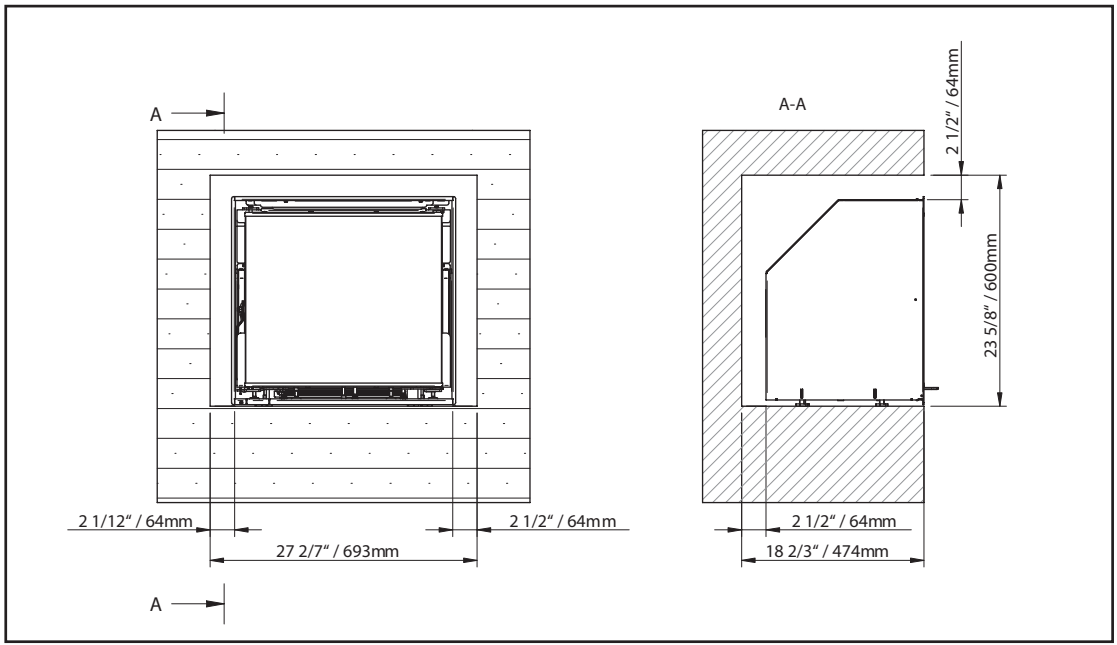
Acid Protection

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

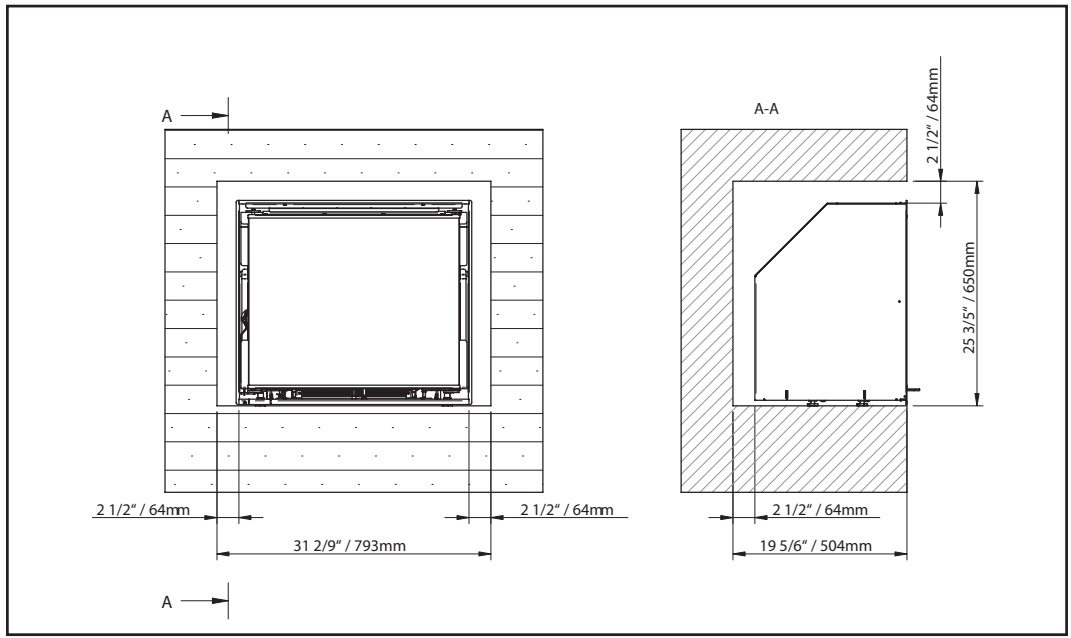


3.3 FLANGES AND ANCHOR PLATE

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".



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4. INSTALLATION

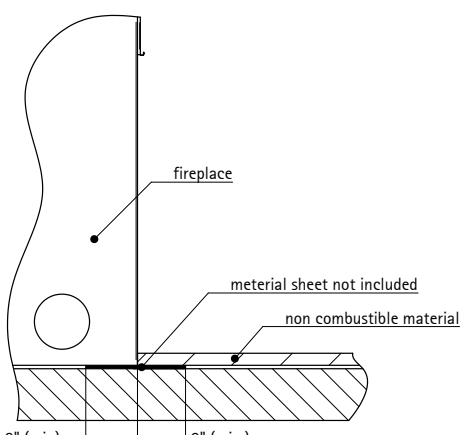
4.1 HEARTH EXTENSION

WARNING

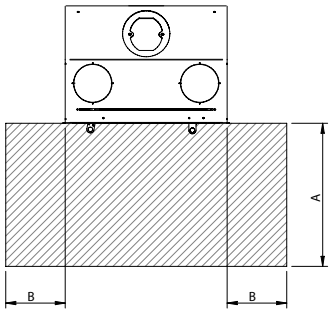
INSTALL THE HEARTH EXTENSION ONLY AS ILLUSTRATED!

A 20” x 12” (500mm x 300mm) 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

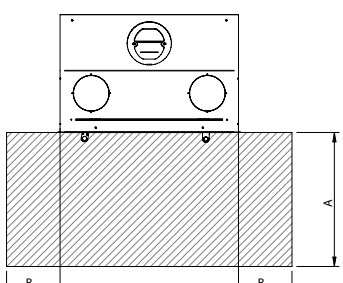


4.1.1 S 600



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

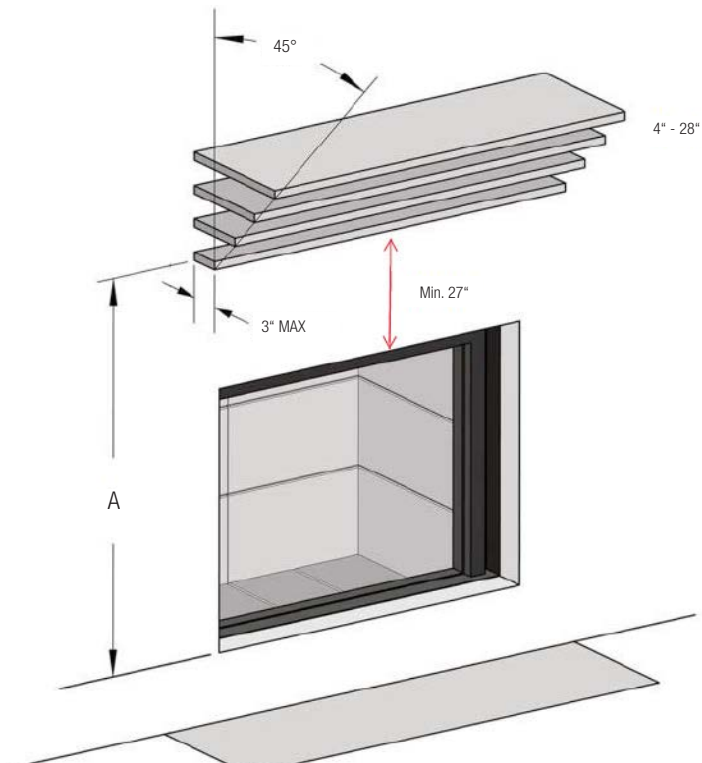
4.1.2 M 700



	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.

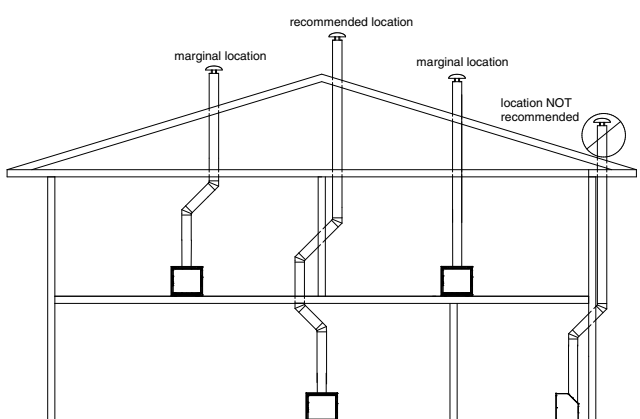
The anchor plate is not included with the unit. Use only a chimney certified as UL 103HT or ULC S-629

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“ (51mm) 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:

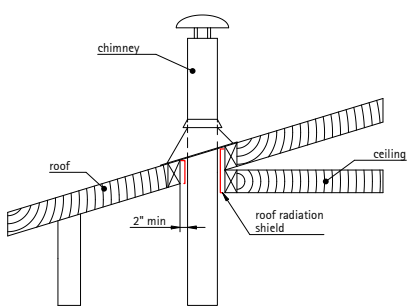
chimney	number of elbows	minimum height
straight installation	-	15' (4.6 m)
1 - 15° offset	2 - 15° elbows	15' (4.6 m)
2 - 15° offset	4 - 15° elbows	18' (5.5 m)
1 - 30° offset	2 - 30° elbows	15' (4.6 m)
2 - 30° offset	4 - 30° elbows	20' (6.1 m)
* 1 - 45° offset	* 2 - 45° elbows	16' (4.9 m)
* 2 - 45° offset	* 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 enbelope or refer tot he 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 he 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.

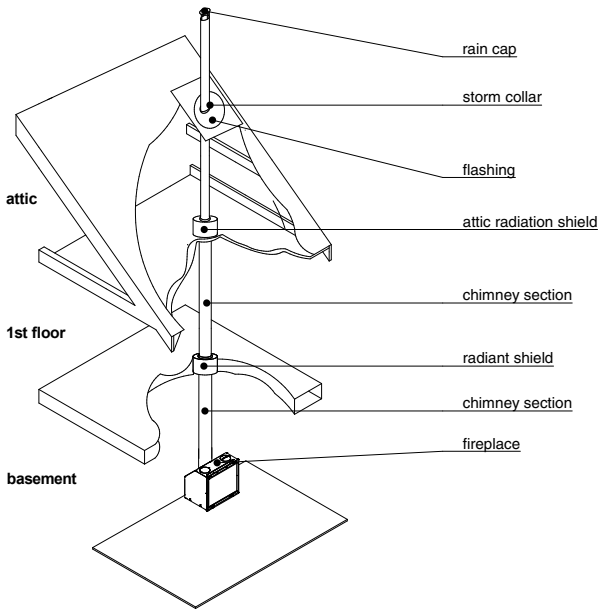
5. Then, put the roof flashing in place and seal the joint between the roof and the flashing with roofing pitch (see figures 24). For sloping roofs, place the flashing under the upper shingles and on top of the lower shingles. Nail the flashing to the roof, using roofing nails.

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.

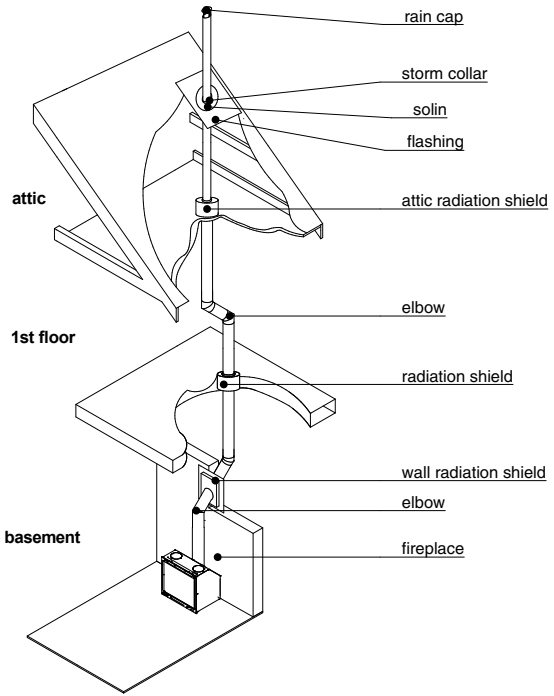
7. Install the chimney cap.

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

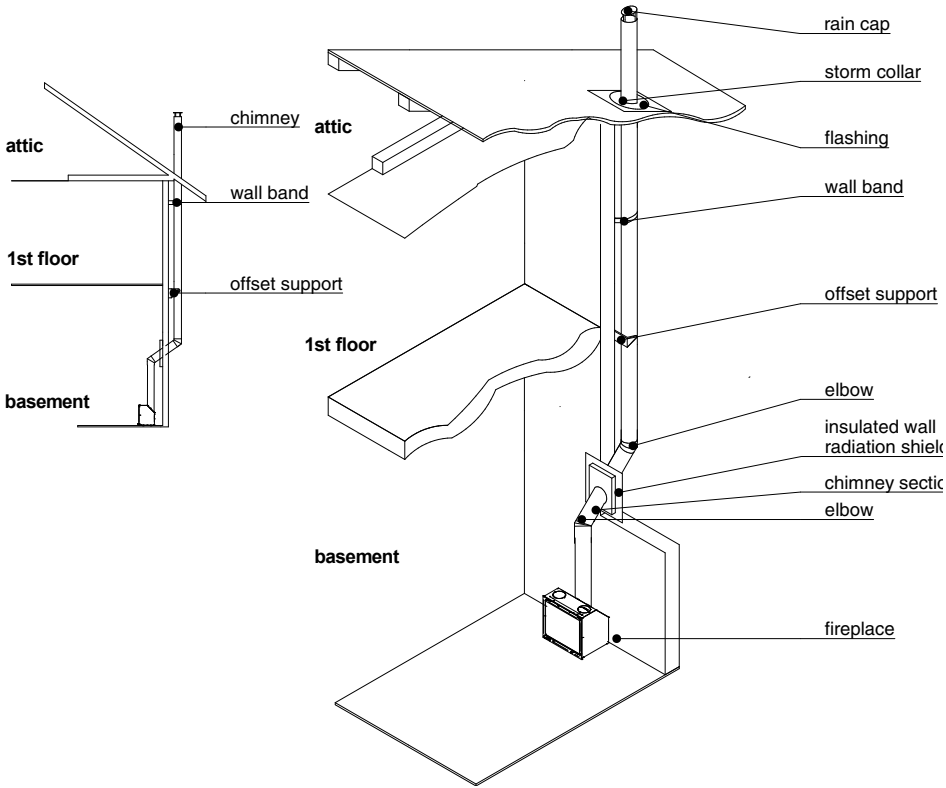
4.5.4 EXAMPLES OF TYPICAL INSTALLATIONS



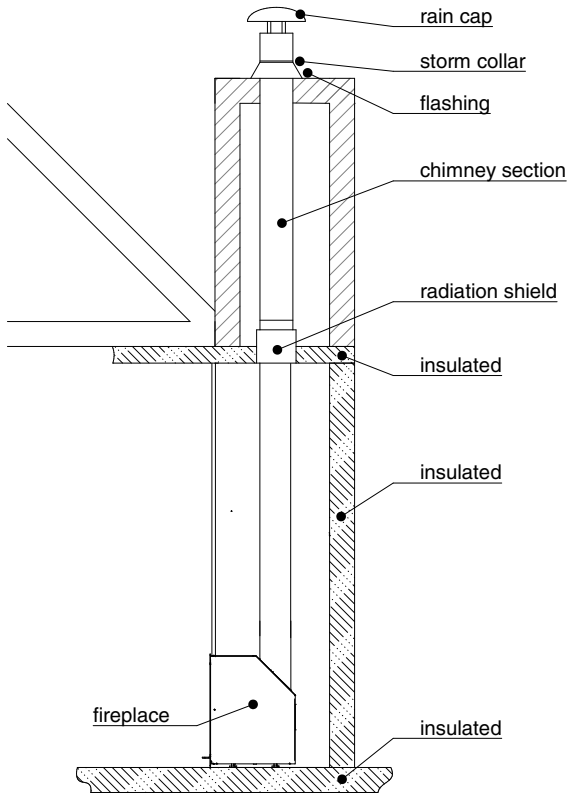
straight chimney installation



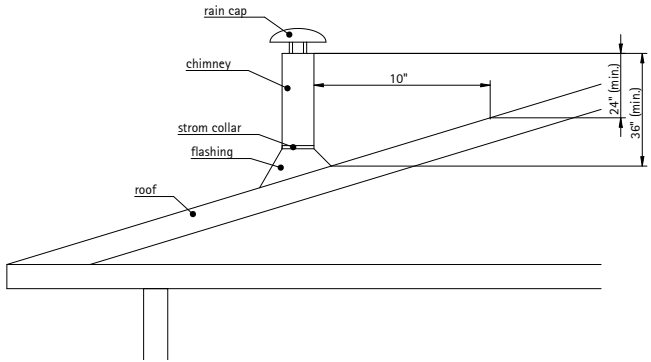
chimney with elbows installation



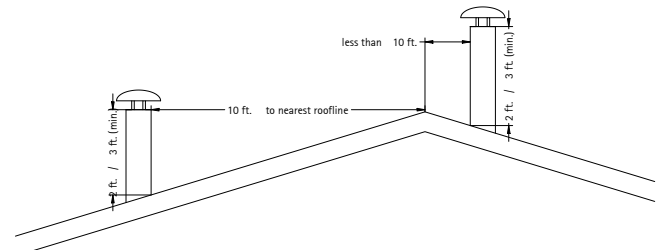
exterior chimney installation



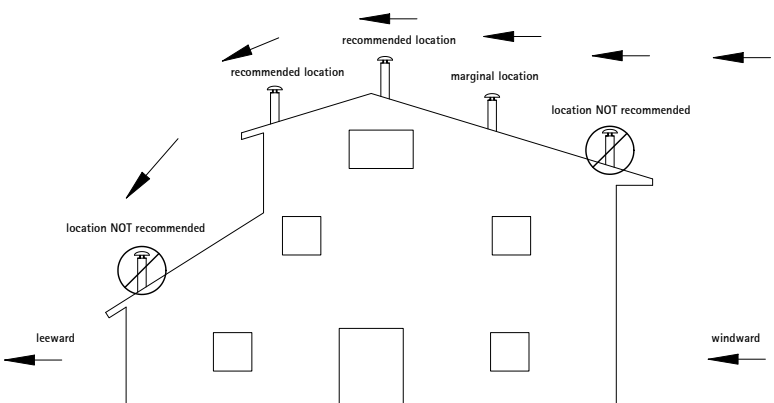
isolated chase chimney installation



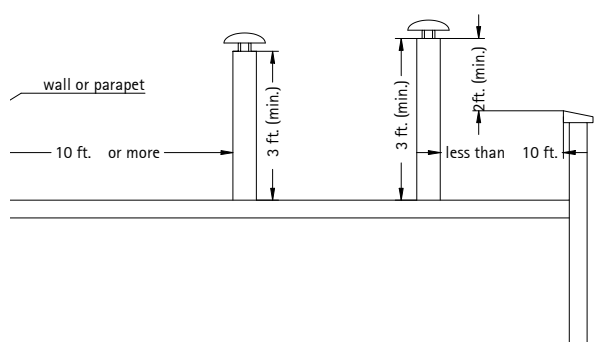
minimum chimney height



pitched roof



multi level roots



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

4.6 MASONRY

4.6.1 TYPICAL EXISTING MASONRY

⚠ WARNING

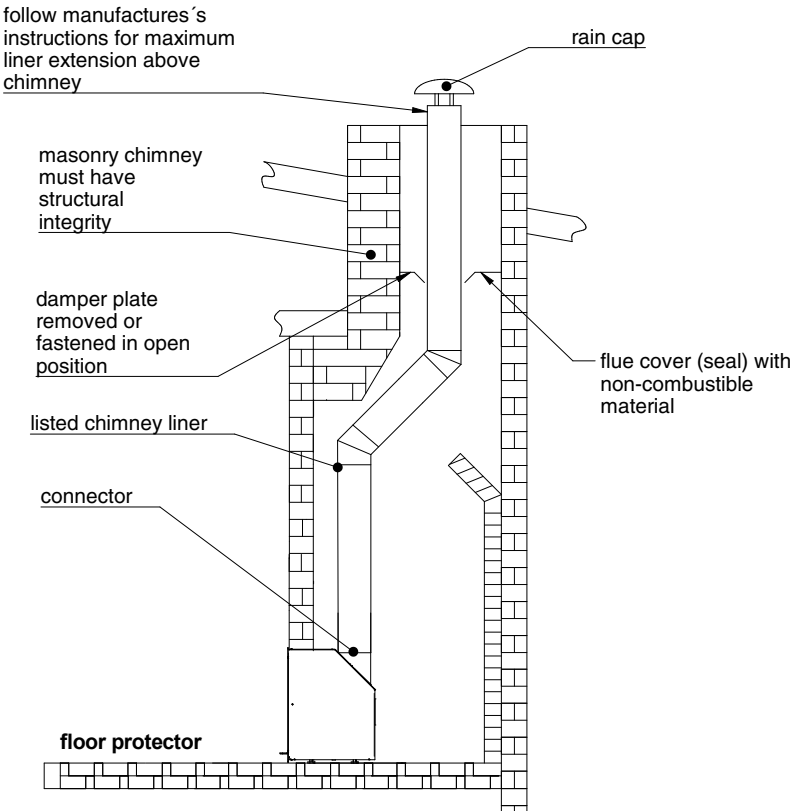
DO NOT CONNECT THIS APPLIANCE TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE. DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.

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



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.

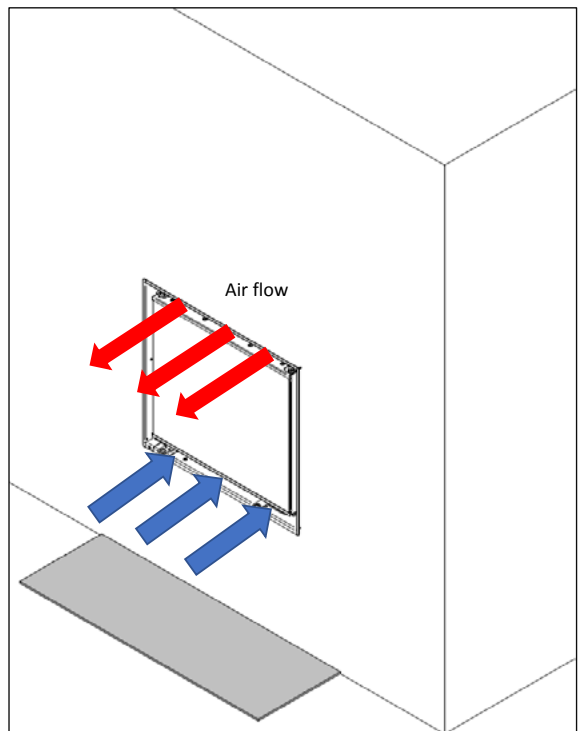
4.7 CONVECTION

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.



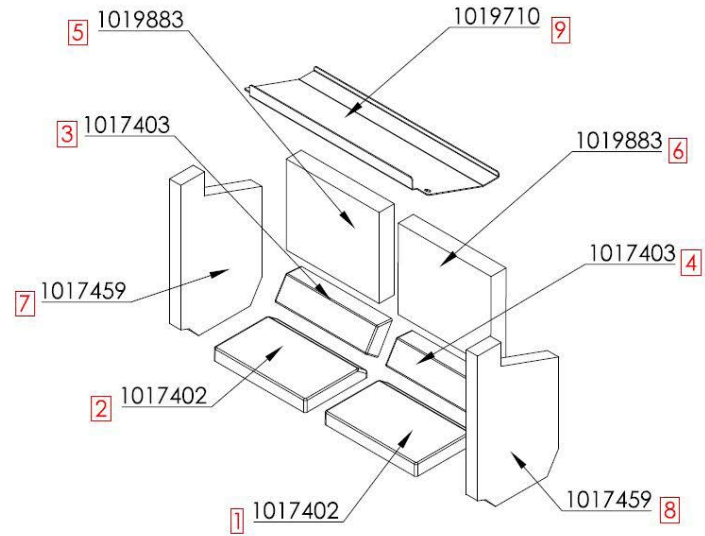
5. FINISHING

5.1 BRICKS AND BAFFELS INSTALLATION

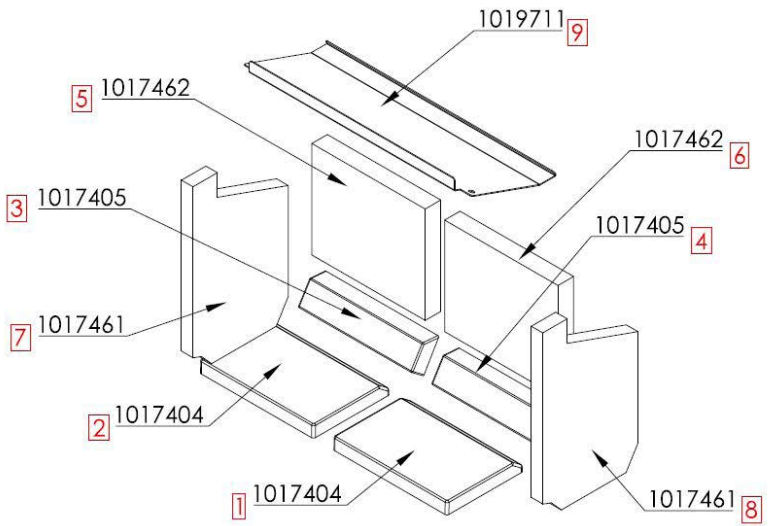
WARNING

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
briques individuelles				
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
complete set (without baffle plate)				
set bottom	-	1017638	4	price list
wall set	-	1047756	4	price list
Attention: Surcharge according to price list when ordering in eboris 1300 - black				



article designation	assembly sequence	art. no.	quantity	price group
briques individuelles				
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
complete set (without baffle plate)				
set bottom	-	1017639	4	price list
wall set	-	1047758	4	price list
Attention: Surcharge according to price list when ordering in eboris 1300 - black				

5.2 DOOR REMOVAL / INSTALLATION

⚠ WARNING

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.

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.

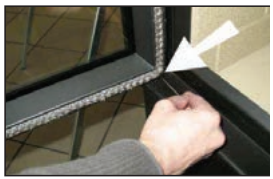
The door is now free and can be carefully placed to one side.

INSTALLATION: Installation is carried out in the reverse order:

1. Firstly guide the door in a slightly inclined position onto the fixture for th 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 doo 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 FIREPLACE 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 MANDITORY!!!

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 "COMBSUTION 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.

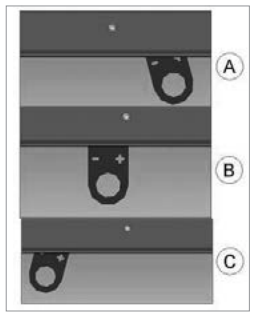
WARNING!!!

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.

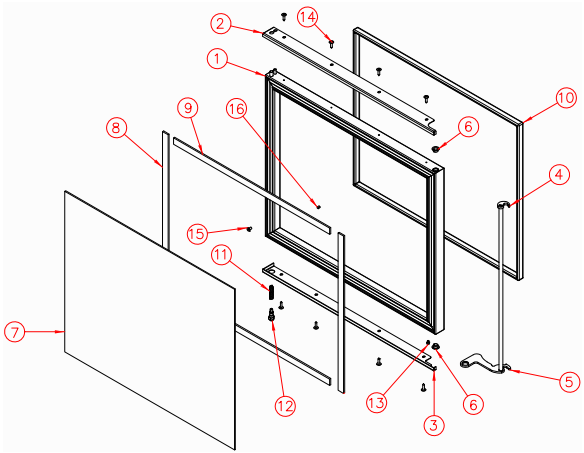
C - Air supply closed:
Control lever in the limit position of the 20 mm wide spacer. The firebox receives no combustion air in this setting.

! WARNING

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

SPARTHERM
The Fire Company

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

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	-

DOOR ASSEMBLY.-SPARE PARTS.

ROBAX 4MM CERAMIC GLASS.

USE ONLY AS PER MANUFACTURERS STANDARD AND SPARE PARTS. 7

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

⚠ WARNING

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.

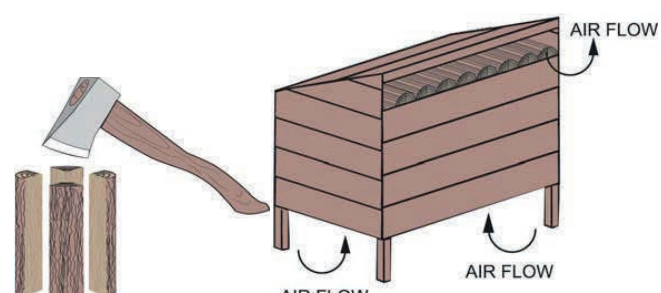
DO NOT STORE FUEL WITHIN THE CLEARANCE TO COMBUSTIBLES, OR IN THE SPACE REQUIRED FOR RE-FUELING AND ASH REMOVAL.

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	Dont's
• Build a hot fire.	• 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.
• Use only dry wood.	• Burn wet wood
• Several pieces of medium sized wood are better than a few big pieces.	• Close the door too soon or damper down too quickly. Burn one large log rather than two or three smaller, more reasonably sized logs.
• Clean chimney regularly.	• 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.
• Refuel frequently using medium sized wood.	

6.3 LIGHTING A FIRE

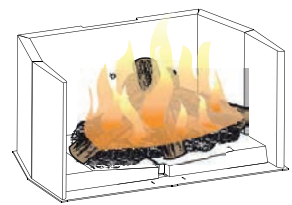
Lighting the fire in your fireplace cassette is very easy if you follow the instructions given below:
1. A fire may only be started in the fireplace cassette when the firebox lining has been correctly installed.
2. Turn off any air extraction ventilation (kitchen, bathroom, WC etc.). This will avoid 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:

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

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.

7. MAINTENANCE

⚠ WARNING

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

WARNING

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

WARNING

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

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. Replacement 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.

WARNING

HOT GLASS WILL CAUSE BURNS.

DO NOT TOUCH GLASS UNTIL COOLED.

NEVER ALLOW CHILDREN TO TOUCH GLASS.

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.

7.7 CLEANING THE GLASS CERAMIC SHEET

WARNING

THE GLASS CERAMIC SHEET MAY ONLY BE CLEANED WHEN COLD (FIREPLACE 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.

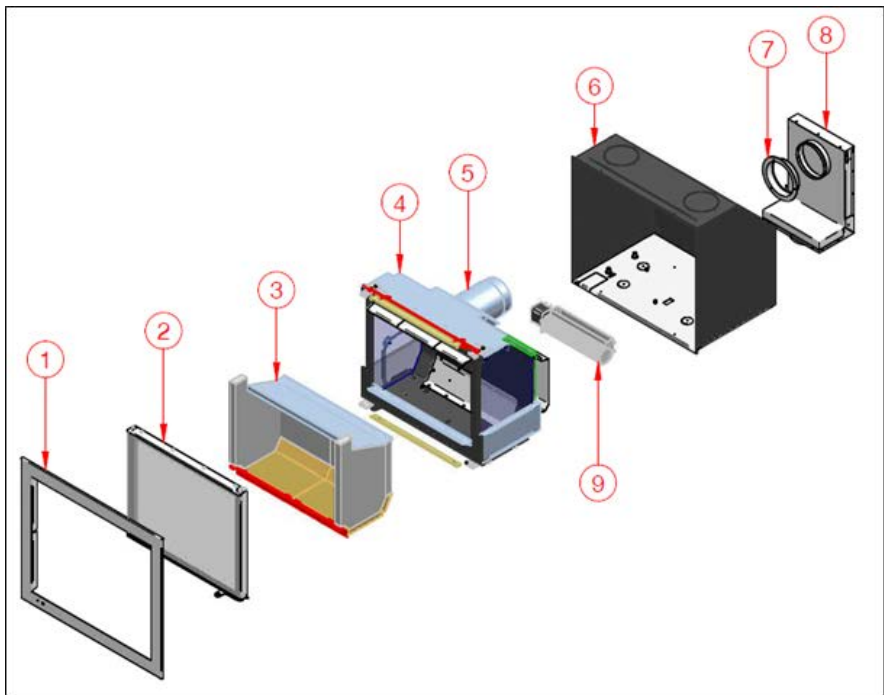
⚠ WARNING

FAILURE TO POSITION THE PARTS IN ACCORDANCE WITH THIS MANUAL OR FAILURE TO USE ONLY PARTS SPECIFICALLY APPROVED WITH THIS APPLIANCE MAY RESULT IN PROPERTY DAMAGE OR PERSONAL INJURY.

For chamotte replacement see chapter 5.1

8.1 EXPLODED VIEW

NOTICE-
Please refer to the following drawing and speficy 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, oulet below
9	Hot air blower (speed adjustable)

9. TROUBLESHOOTING

⚠ WARNING

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

DO NOT USE ABRASIVE CLEANERS.

Problem	Solution
Can't get the fire started.	• Not enough kindling / paper? Add more. • Not enough air? Ensure air control is fully open. Also ensure that the air opening is not obstructed. • Cold air blockage? Burn a piece of paper to establish a draft. • Use dry seasoned wood. • Flue blockage? Inspect chimney.
Smokes when door is open.	• Cold air blockage? Burn a piece of paper to establish a draft. • Insufficient draft? Add more pipe. • Let air stabilize before opening door. • Ensure baffles are positioned correctly. • Negative pressure? Open a window near the appliance.
Appliance emits odour.	• Paint curing. See "GENERAL INSTRUCTIONS" section.
Stove doesn't burn hot enough.	• Wood is too wet. • Insufficient draft? Add more pipe. • Not enough air? Ensure air control is fully open. Also ensure that the air opening is not obstructed.
Wood burns too fast.	• Air control may need to be adjusted down. • Check to see ash plug is properly seated (if equipped). • Check door gasket for adequate seal. • Wood may be extremely dry.
Dirty glass.	• Air control may be closed too far. Open air control more. • Burn hotter, smaller fires. Use well seasoned wood.

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.

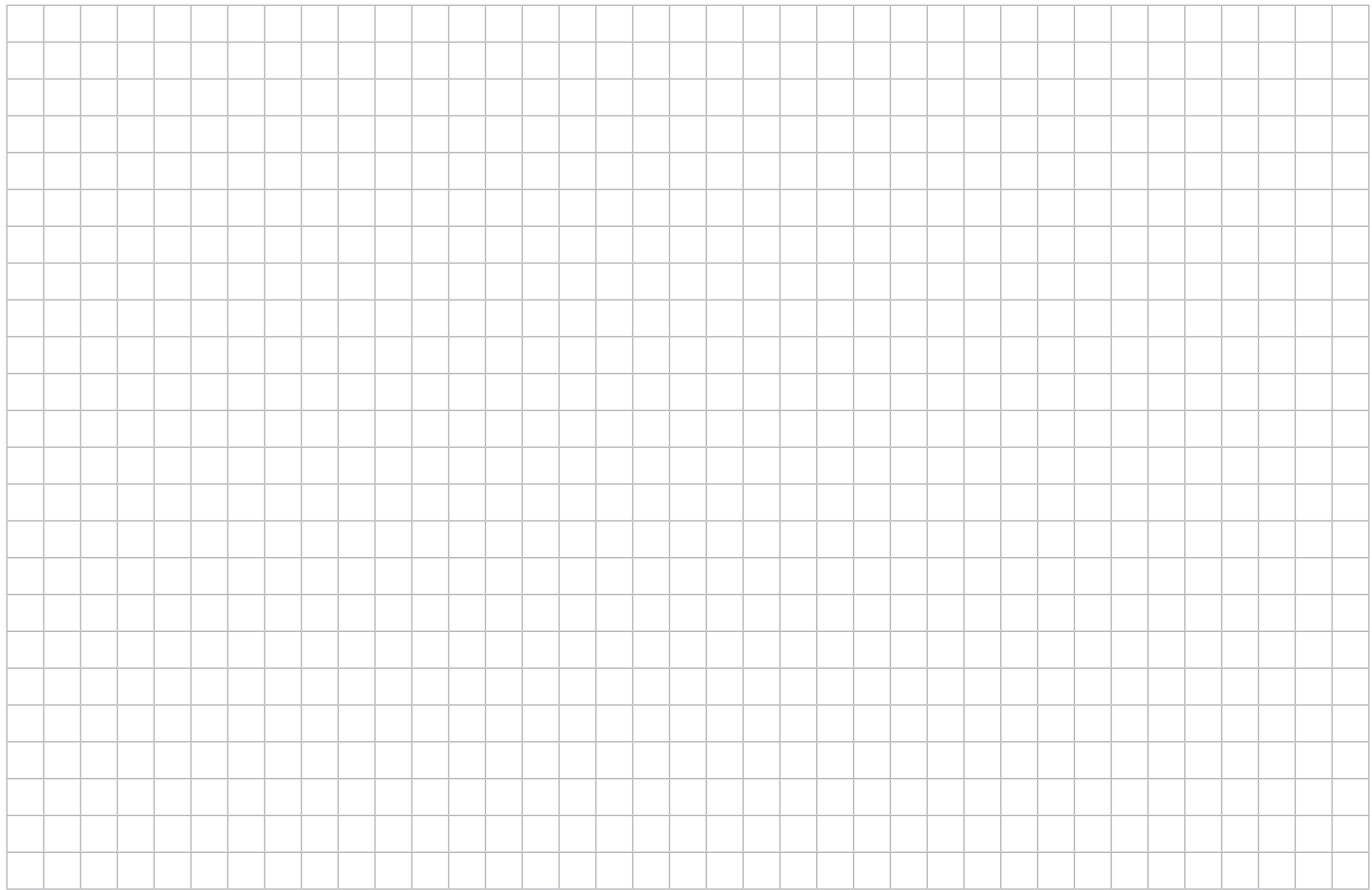
- improper transport and/or incorrect storage
- improper handling of fragile components such as glass and ceramics
- improper handling and/or use
- lack of maintenance
- incorrect installation or connection of the unit
- Non-observance of the installation and operating instructions
- technical modifications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

10.5 NOTE

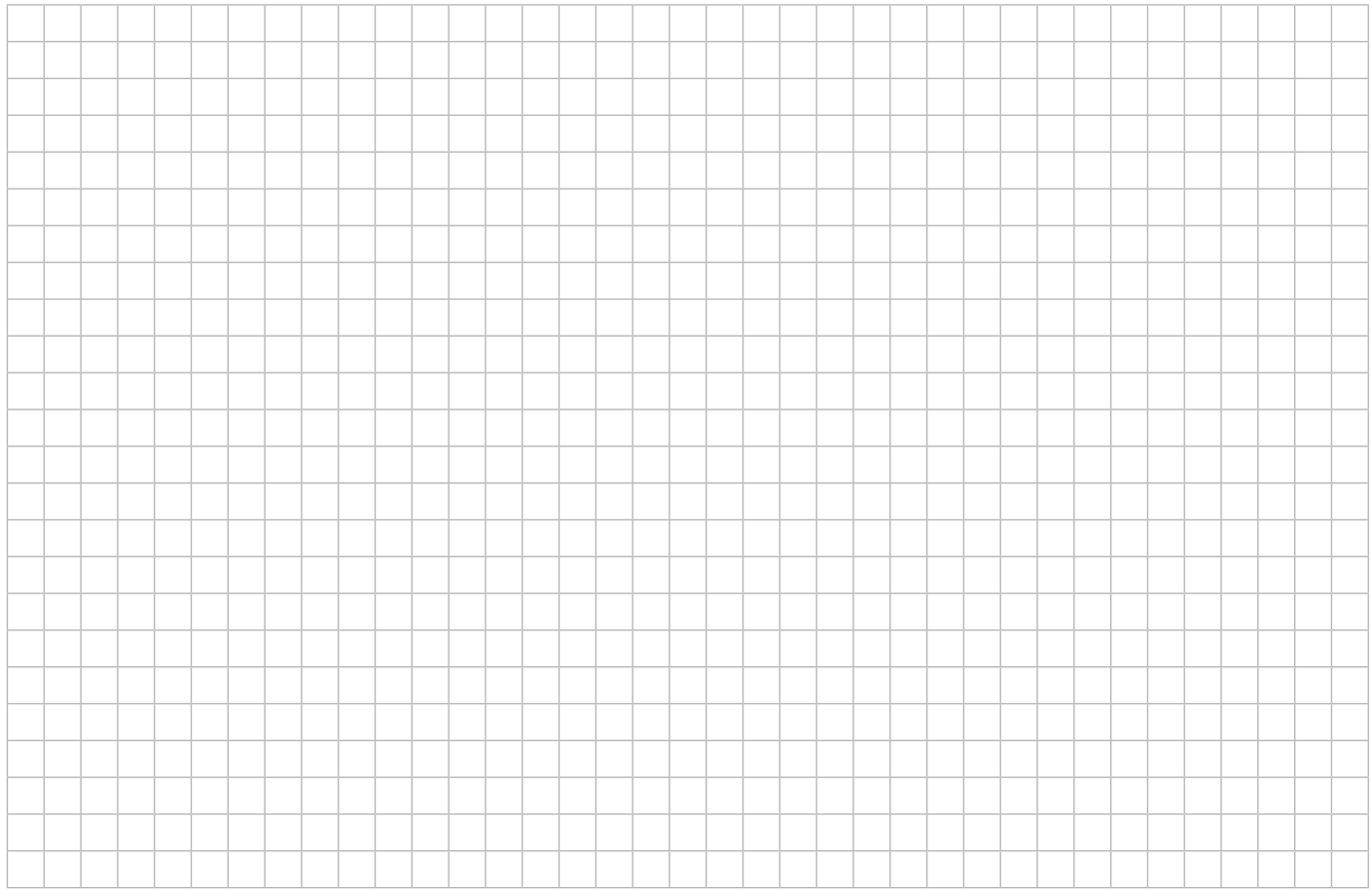
Your specialist dealer/contractor will gladly advise and assist you in matters not covered by our warranty terms and conditions and undertakings. We particularly advise you to have your fireplace insert/ stove serviced regularly by a stove fitter.

Technical data subject to change errors and omissions excepted.

10.6 FOR YOUR INFORMATION



10.6 FOR YOUR INFORMATION



11. SERVICE HISTORY

Appliance Service History

This heater must be serviced annually depending on usage.

Date	Dealer Name	Service Technician Name	Service Performed	Special Concerns

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The Fire Company

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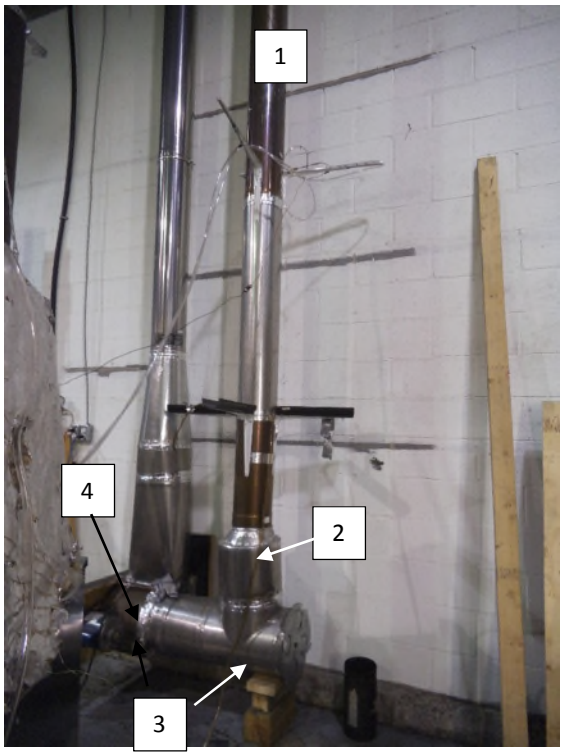
APPENDIX 8: Photographs of test set up

Dilution picture Dia 8

Picture 1: Sampling system



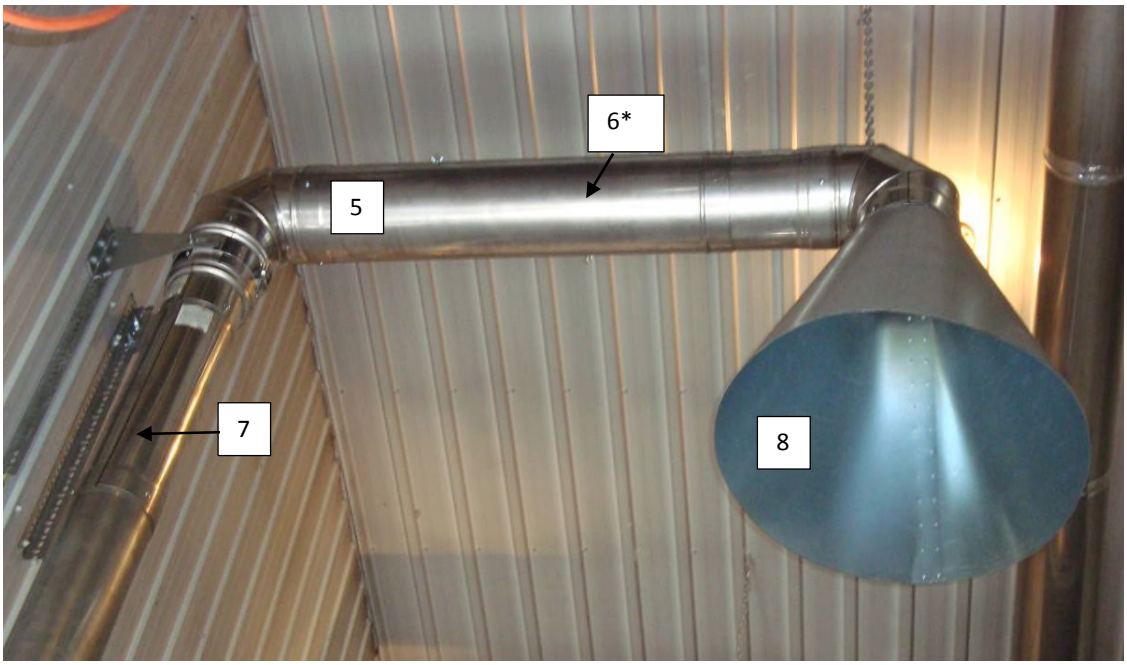
1 : 8 in dia Stainless steel pipe

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

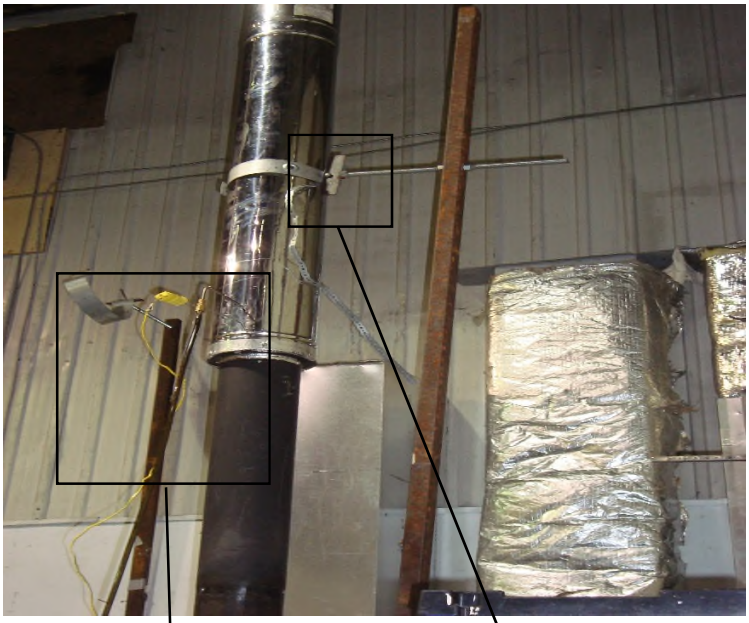
5 : 8 in. dia. Stainless steel pipe

6 : Mixing baffle (2) location 1 foot between baffles

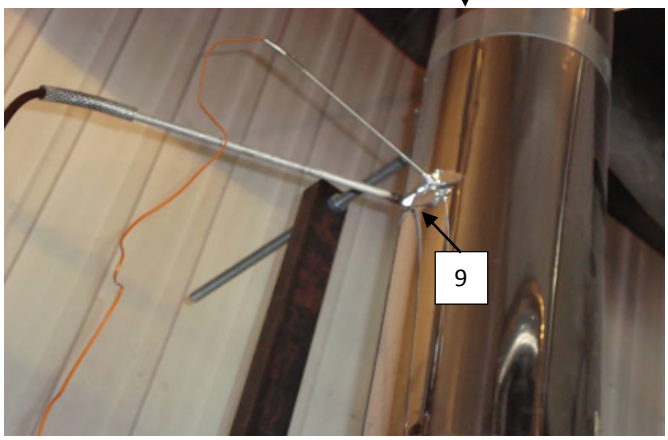
7 : 10 feet long between velocity port and upper elbow

8 : 48 in. dia. Galvanized steel smoke captures hood

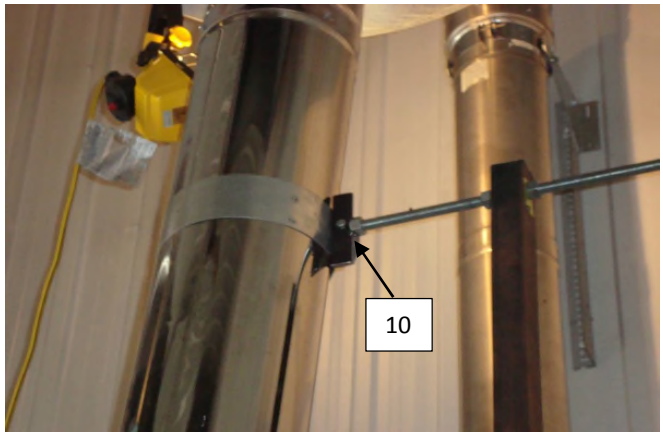
Picture 3: Stack sampling



Picture 3.1: Gas analysis and temperature probe



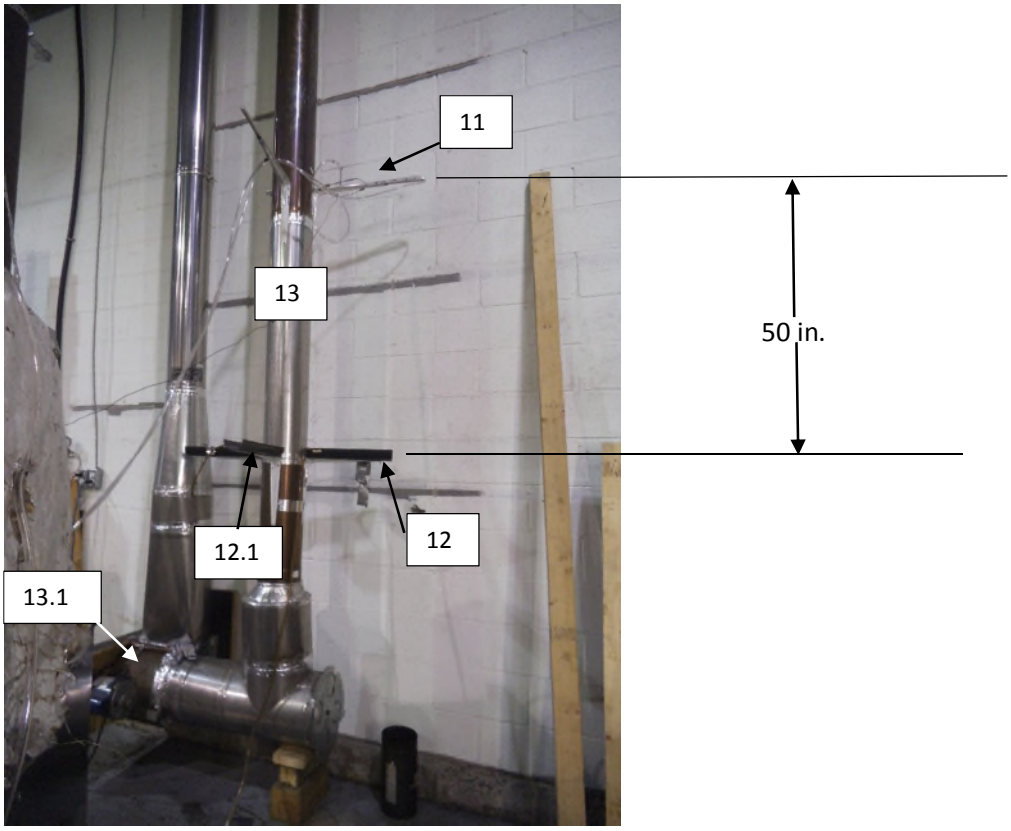
Picture 3.2: chimney support



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

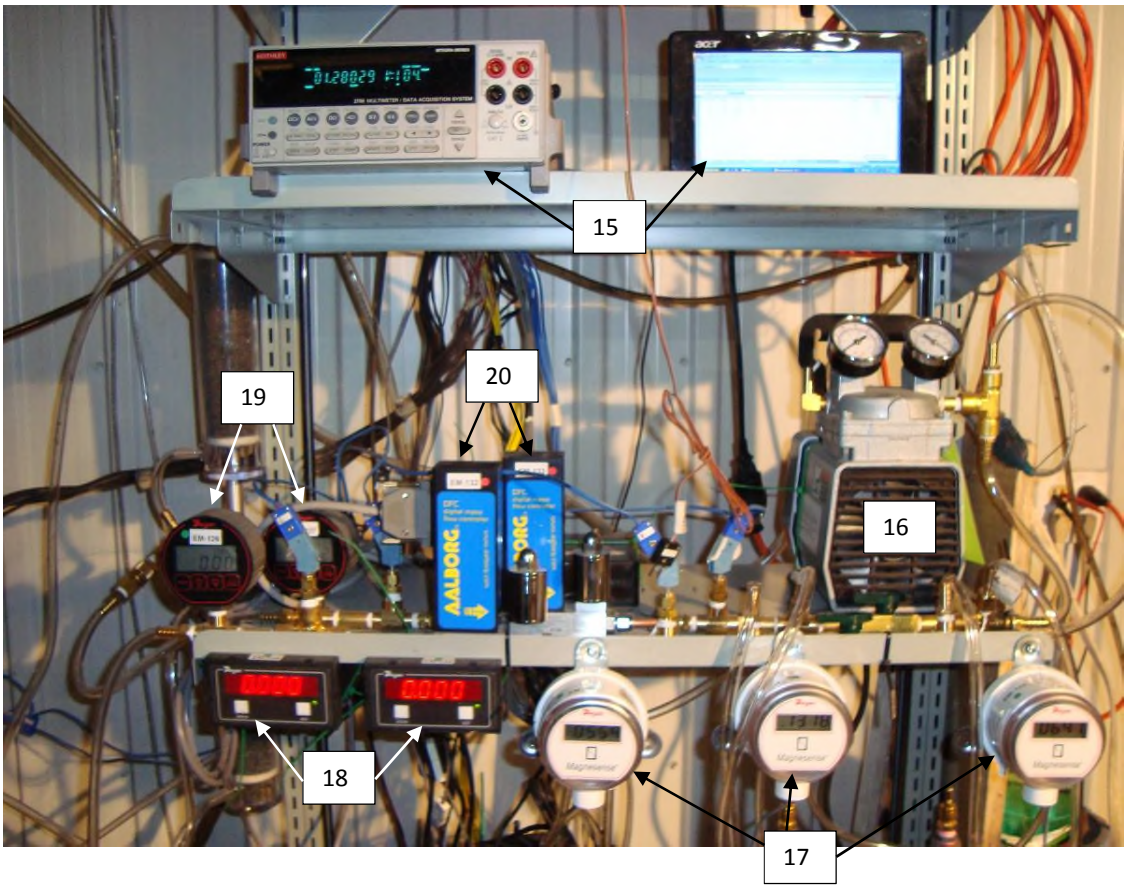
13 :18 feet long dilution tunnel

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

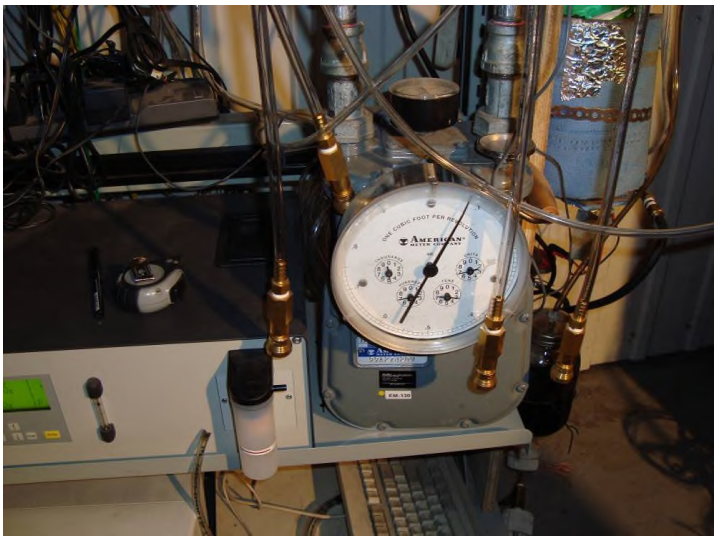
18 : Digital read out for mass flow meter

19 : Digital vacuum gage

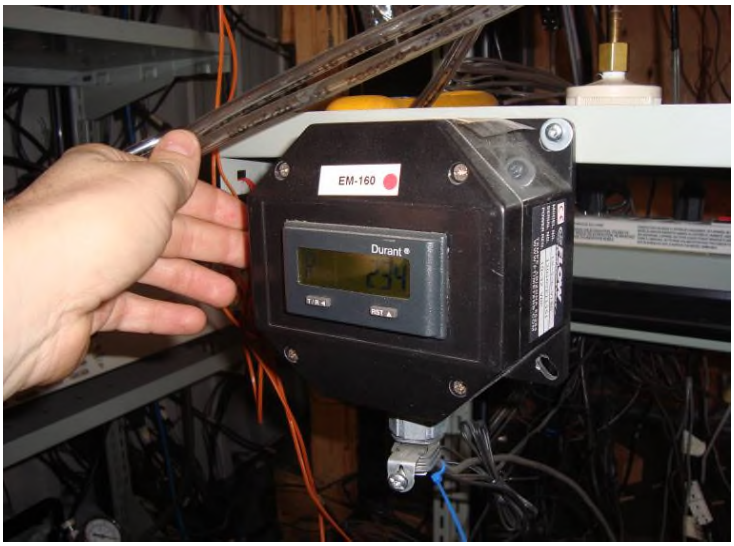
20 : Mass flow meter

Picture 7: Gaz analyser

Picture 8: Reference dry gas meter

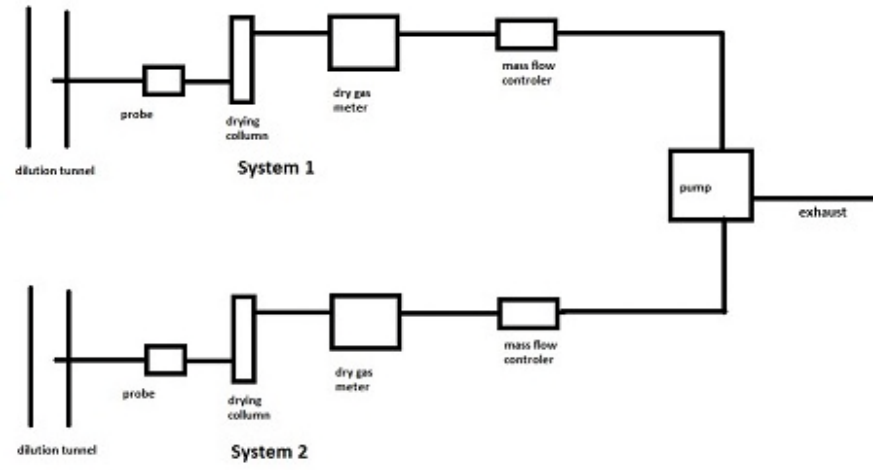


Picture 10: Water flow meter

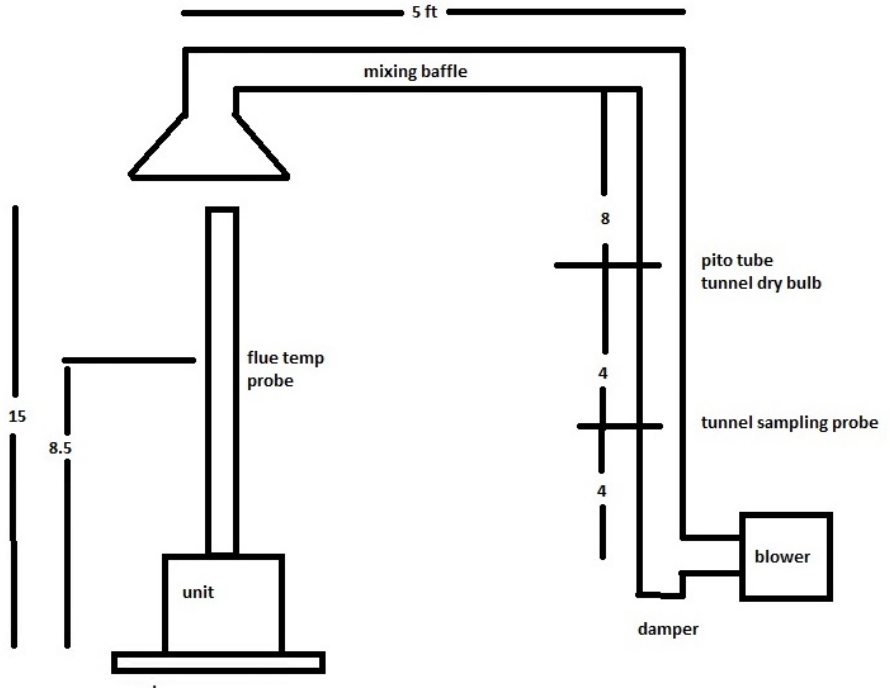


Picture 11: Dry gas meter

Picture 12 : Dilution tunnel sample system



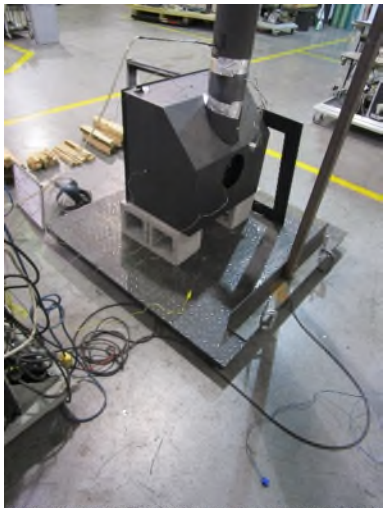
Picture 13: Dilution tunnel



APPENDIX 9: Test load photographs

POLYTESTS
TESTING THROUGH YOUR REALITY

Run 1.1



POLYTESTS
TESTING THROUGH YOUR REALITY

Run 1.2

POLYTESTS
TESTING THROUGH YOUR REALITY

Run 2.1

APPENDIX 12: Volume calculations

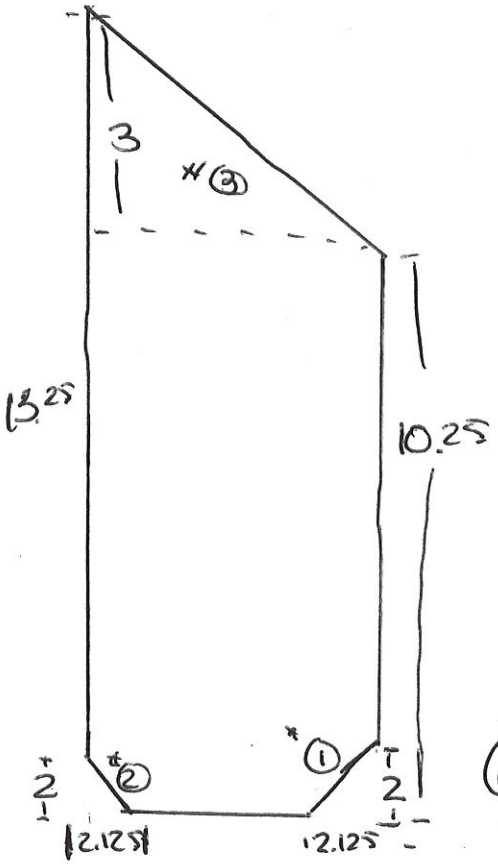
Services PolyTests INC.

Feuille de données

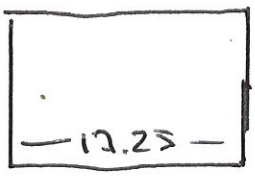
Date	Projet	Numéro
26 MARS 2019	SPAZ HELM	600

DT - 20196.

COTÉ



FAÇADE



TRIANGLE *③:

$\frac{((3 \times 8.5) \div 2) \times 17.25}{1728} = 0.127$

CARRÉ:

$\frac{10.25 \times 8.5 \times 17.25}{1728} = 0.869$

total 0.996

TRIANGLE *①

$\frac{((2.125 \times 2) \div 2) \times 17.25}{1728} = 0.021$

TRIANGLE *②

$\frac{((2.125 \times 2) \div 2) \times 17.25}{1728} = 0.021$

total 0.042

total $0.996 - 0.042 = 0.954 \text{ pi}^3$

APPENDIX 13: Operating instruction

POLYTESTS
TESTING THROUGH YOUR REALITY

Operating instruction for High burn rate Cord wood method ALT-125, ASTME3053

- Start the fire with approximately 2.5 lbs. of startup fuel, 1.2 lbs. of kindling.
- Close the Door immediately
- When left approximately 1.0lbs. from the startup load, the high burn rate load can be inserted.
- The high bur rate load can be up to 10 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, ASTME3053

- From the high burn rate coal bed, when 2.0 lbs. left, the load can be inserted in the firebox.
- open the door
- Insert the 11.5 lbs. load in the firebox
- Cloe the door
- Keep the combustion air damper fully open for 4 minutes then close half way
- At minute 14 air setting should be at the medium setting (drill bit 7/16)

Operating instruction for Low burn rate Cord wood method ALT-125, ASTME3053

- From the high burn rate coal bed, when 1.9 lbs. left, the load can be inserted in the firebox.
- open the door
- Insert the 11.5 lbs. load in the firebox
- Door can be close immediately.
- Keep the combustion air damper fully open for 8 minutes then close half way
- At minute 15 air setting should be at the minimum setting