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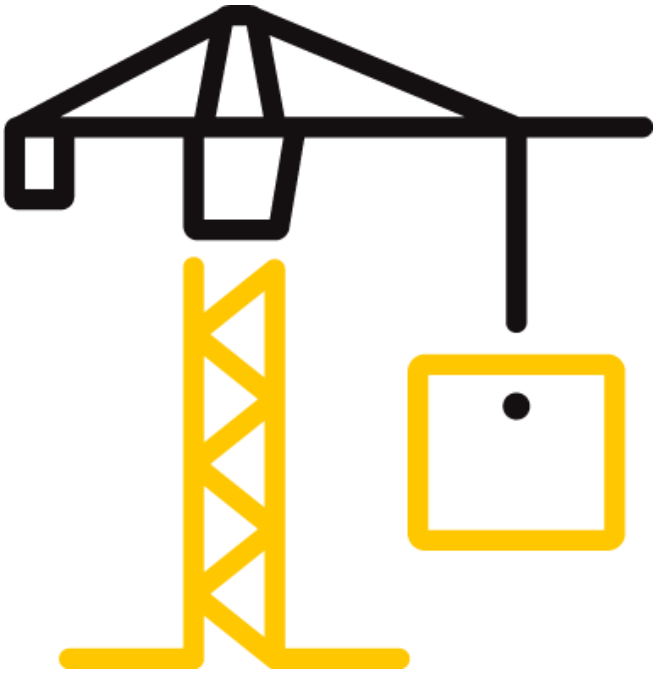
STOVE BUILDER INTERNATIONAL INC.
TEST REPORT

SCOPE OF WORK
EPA EMISSIONS TESTING/2.1 SERIES (DESTINATION 1.9, MATRIX 1900, CW2100, GREEN MOUNTAIN INSERT 50, HEI90, ARCHWAY 1500)/ WOOD FUEL ROOM HEATER

REPORT NUMBER
104576994MTL-001R2

TEST DATE(S)
02/22/21 - 02/25/21

ISSUE DATE 03/30/21
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Report No.: 104576994MTL-001R2
Date: 12/20/21

REPORT ISSUED TO

STOVE BUILDER INTERNATIONAL, INC.
250 de Copenhague
ST-Augustin-de-Desmaures, Qc, G3A 2H3

SECTION 1

SCOPE

Intertek Testing Services NA (Intertek) has conducted testing for Stove Builder International Inc., on model Matrix 1900 (2.1 Series) wood burning room heater to evaluate all applicable performance requirements included in "Determination of particulate matter emissions from wood heaters." Matrix 1900 is a representative model of the 2.1 Series. This series includes the following models: Destination 1.9, Matrix 1900, CW2100, Green Mountain Insert 50, HEI90, Archway 1500. See PEV # 104576994MTL-002 for more details.

The test was conducted to determine if the unit is in accordance with U.S EPA requirements under EPA 40 CFR Part 60 "Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces". This evaluation was conducted on February 22nd to February 25th, 2021. The following test methods were applicable:

ASTM E2515-11- Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel

ASTM E3053-17 - Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel. It is based on the ALT-125 send by EPA on February 28th, 2018.

CSA B415.1-10 - Performance Testing of Solid-Fuel-Burning Heating Appliances

Testing was performed by the undersigned at client's facility.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

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SECTION 2
SUMMARY OF TEST RESULTS

The appliance tests resulted in the following performance:

Particulate Emissions: 1.5 g/hr
Carbon Monoxide Emissions: 0.6 g/min
Heating Efficiency: 75% (Higher Heating Value Basis)

For INTERTEK B&C:

COMPLETED BY:	Hussein Mortada, CPI.	**REVIEWED BY:**	Brian Ziegler
TITLE:	Engineer B&C, Intertek, Quebec	**TITLE:**	Technical Team Leader - Hearth
SIGNATURE:		**SIGNATURE:**	
DATE:	12/20/21	**DATE:**	12/29/21

aaa:bbb

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SECTION 3
TEST METHOD(S)

The specimen was evaluated in accordance with the following:

ASTM E2515-11- Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel

ASTM E3053-17 - Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel. It is based on the ALT-125 send by EPA on February 28th, 2018.

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SECTION 4
MATERIAL SOURCE

A sample was submitted to Intertek directly from the client. The sample was not independently selected for testing. The test unit was handed to the Intertek representative at client's facility in St-Augustin-de-Desmaures, Quebec. The unit was inspected upon receipt and found to be in good condition. The unit was set up following the manufacturer's instructions without difficulty.

Following assembly, the unit was placed on the test stand. Prior to begin the emissions tests, the manufacturer operated the unit for a minimum of 50 hours at medium burn rates to break-in the stove. The unit was found to be operating satisfactory during this break-in. The 50 plus hours of pre-burning were conducted from January 14th to February 17th, 2021. The fuel used for the break-in process was beech cordwood. Table 1 shows the summary of the burn time in each test ran at medium burn rate; raw data is available on *Appendix F – Unit pre-burn documentation*.

Table 1 - Pre-burn time at medium burn rate summary

DATE	BURN CYCLE	DURATION (MIN)	LOAD TYPE (-)	FUEL ADDED (LBS)	MOISTURE (% DB)
2021-01-14	Preload	32	Kindling & SUF	6.00	15.1
	Condition	130	High fire	12.04	20.3
	Load	330	Medium fire	13.98	19.6
2021-01-19	Preload	34	Kindling & SUF	6.01	15.5
	Condition	137	High fire	12.04	20.1
	Load	340	Medium fire	14.41	19.5
2021-01-21	Preload	169	Kindling & SUF	5.59	16.4
	Condition	1	High fire	12.04	20.7
	Load	350	Medium fire	14.44	19.3
2021-01-28	Preload	34	Kindling & SUF	5.99	16
	Condition	155	High fire	12.06	23.8
	Load	280	Medium fire	14.49	21.0
2021-02-04	Preload	35	Kindling & SUF	5.90	15.8
	Condition	135	High fire	11.89	19.2
	Load	310	Medium fire	13.78	22.1
2021-02-10	Preload	42	Kindling & SUF	5.85	16
	Condition	128	High fire	11.75	20.1
	Load	355	Medium fire	14.3	20.4
2021-02-17	Preload	148	Kindling & SUF	5.34	14.9
	Condition	7	High fire	10.79	22.4
	Load	278	Medium fire	12.96	19.3
	Total	3430	Minutes		
		57.17	Hours		

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Following the pre-burn break-in process the unit was allowed to cool and ash and residue were removed from the firebox. The unit's chimney system and laboratory dilution tunnels were cleaned using standard wire brush chimney cleaning equipment on February 18th, 2021. On February 19th, 2021, the unit was set-up for testing.

SECTION 5
EQUIPMENT

Equipment	INV Number	Calibration Due	MU
Floor scale	SBI-014	March 31, 2021	± 0.020 kg
DGM system 1	SBI-046	April 01, 2021	±2% F.S.
DGM System 2	SBI-047	April 06, 2021	±2% F.S.
Reference DGM	SBI-103	October 13, 2021	±2% F.S.
5 kg weight	SBI-190	October 02, 2023	±0.2 g
Temperature acquisition	SBI-197	November 03, 2021	±0.5°F
Pitot tube type S	SBI-104	December 03, 2021	±0.22 mps
Analytical scale	SBI-206	March 31, 2021	±0.08 mg
Table scale	SBI-222	March 31, 2021	±0.5 g
100 mg weight	SBI-237	October 09, 2023	±0.0025 mg
10 g weight	SBI-238	October 09, 2023	±0.012 mg
Hot wire anemometer	SBI-241	March 02, 2021	±0.15 m/s
Magnesense (tunnel)	SBI-254	July 17, 2021	±0.00015" H2O
Magnesense (draft)	SBI-247	July 17, 2021	±0.00015" H2O
DGM system 3	SBI-290	April 05, 2021	±2% F.S.
Pressure transmitter	SBI-294	July 17, 2021	±9.5e-003 psi
Pressure transmitter	SBI-297	July 17, 2021	±9.5e-003 psi
Vacuum transmitter	SBI-301	July 27, 2021	±6.1e-003 in.HG
Vacuum transmitter	SBI-305	July 27, 2021	±5.8e-003 in.HG
Relative humidity temperature meter	SBI-212	September 10, 2021	±3%
200 g weight	SBI-312	October 09, 2023	±0.06 mg
Barometer	SBI-331	October 01, 2022	±0.62mb/hPa
Moisture Content Standard	SBI-153	October 28, 2021	±0.2%

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Multimeter	SBI-194	November 24, 2021	±1% Ω
Thermometer Calibrator	SBI-096	May 25, 2021	±0.5°F

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Guillaume Thibodeau-Fortin	Stove Builder International inc.
Gabrielle Santerre	Stove Builder International inc.
Claude Pelland, P.E.	Intertek B&C

SECTION 7
TEST PROCEDURE

From February 22nd to February 25th, 2021, the unit was tested for EPA emissions. For wood stoves or wood insert, the test was conducted in accordance with ASTM E3053-17 and ASTM E2515-11. The fuel used for the test run was beech cordwood.

The applicable EPA regulatory limits are:

Step 2 – 2020 – 2.0 grams per hour with crib, 2.5 grams per hour with cordwood.

MANUFACTURER LOADING PROCEDURE

Kindling and SUF (5.4 lbs) - Split the start-up fuel log into 6 pieces. Crisscross 6 kindling pieces on the brick. Then, crisscross the start-up fuel. Criss cross the rest of the kindling on the start-up fuel. The start-up fuel and the kindling are placed at the rear of the stove. Leave a little space between each piece.

The kindling is made of between 15 finely split piece of wood that are 10% of moisture content. Place crumbled newspaper on top of the kindling (5 full sheets). Light up the paper and let the door completely open for two minutes, then close the door. The fan is always OFF.

Low&Medium Pre-load (high fire) (10.8 lbs) - When there is a coal bed of 1.1 lbs left, break ashes and level coal bed, then add pre-load (four pieces). Place two pieces on the coal bed in an East-West orientation. The piece in front of the combustion chamber should be the largest and the piece at the back of the combustion chamber must be a medium piece. Place the last two pieces on top of the two others in an orientation that points to the left (10-15 degrees from East-West). Leave space between each piece. Let the door open of 5” for 4 minutes. Then, close the door and let burn until the weight is down to target.

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When the average stove temperature gets to 505°F, slightly level the coal bed. There should be approximately 1.6 lb of coal bed.

Low fire load (13 lbs) - Place the largest piece on the coal bed in the back of the stove in an East-West orientation. Leave 1" between the rear bricks and the piece. Place the second largest piece on top of the first one. The piece should touch the rear bricks. Place a medium piece on the coal bed at the front of the combustion chamber. There should be approximatively 4-5" between the piece in the back and at the front of the combustion chamber. Place a piece on the two bottom logs. The rear left corner of the piece is placed on the piece at the back of the stove and the front right corner on the piece in front of the stove. Place the last piece on the piece at the front of the stove. Let the door ajar for 4 minutes and then close the door with the primary air control fully open. After 5 minutes, close the primary air control of 50%. After 2 more minutes, continue to close slowly the primary air control so that at 16 min (15 min or 15 % as per E3053 clause 8.6.7 plus loading time of 1 min as per clause 8.6.5), the primary air control is completely closed. Start the fan at minimum speed at 30 minutes.

Medium fire load (13 lbs) - Same as for low fire load, but the primary air inlet is open of 5/8 inch from its minimum position at the end of the 16 minutes run time. Also, the largest piece is placed in front of the stove and the medium piece at the back. Start the fan at minimum speed at 30 minutes.

High fire load (10.8 lbs) – When there is a coal bed of 1.1 lbs left, break ashes and level coal bed, then add the load (four pieces). Place two pieces on the coal bed in an East-West orientation. The piece in front of the combustion chamber should be a medium piece and the piece at the back of the combustion chamber must be the largest piece. Place the last two pieces on top of the two others in an orientation that points to the right (10-15 degrees from East-West). Do not leave space between the pieces. Let the door open of 5" for 4 minutes and close the door. Start the fan at maximum speed. Stop the test when 90% of the high fire load has been consumed.

TEST SET-UP DESCRIPTON

A 6" flue is connected to a standard 6" diameter vertical single wall pipe and insulated chimney system was installed to 15' above floor level. The single wall pipe extended to 8 feet above the floor and insulated chimney extended the remaining height.

AIR SUPPLY SYSTEM

Combustion air enters at the bottom of the heater, which is directed to the firebox. All gases exit through the 6" flue located on top of the heater.

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TEST FUEL PROPERTIES

The species of fuel used was beech. The fuel was split cordwood of nominal length of 16 inches ± 1 inch. The fuel was dried in air to an average moisture content between 18% and 28% on a dry basis. Cordwood fuel was loaded from side to side into the firebox per manufacturer's instructions.

SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at point 20 feet from the tunnel entrance. The collection hood is 40 inches in diameter. The mixing section started with a 10-inch diameter elbow, followed by a strait 10-inch diameter section. A 10 to 8-inch diameter reducer is installed upstream of the 8-inch diameter elbow (see Figure 1). The sampling section is a continuous 13-foot section of 8-inch diameter pipe straight over its entire length. Tunnel velocity pressure is determined by a type "S" Pitot tube located 100 inches from the beginning of the sampling section. The dry bulb thermocouple is located on the pitot tube. Tunnel samplers are located 48 inches downstream of the Pitot tube and 36 inches upstream from the end of this section (See Figure 2).

The dilution tunnel is fully compliant with ASTM E2515-11.

Stack gas samples are collected from the steel chimney section 8 feet ± 6 inches above the scale platform.

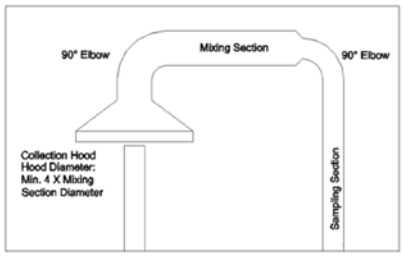


Figure 1 - Mixing Section with different diameter

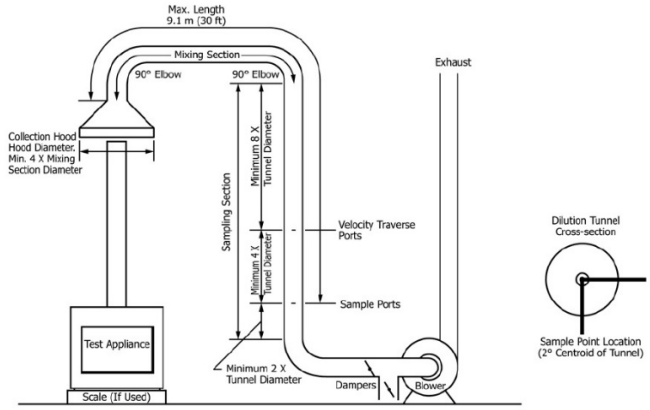


Figure 2 - Dilution tunnel

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SAMPLING METHODS

PARTICULATE SAMPLING

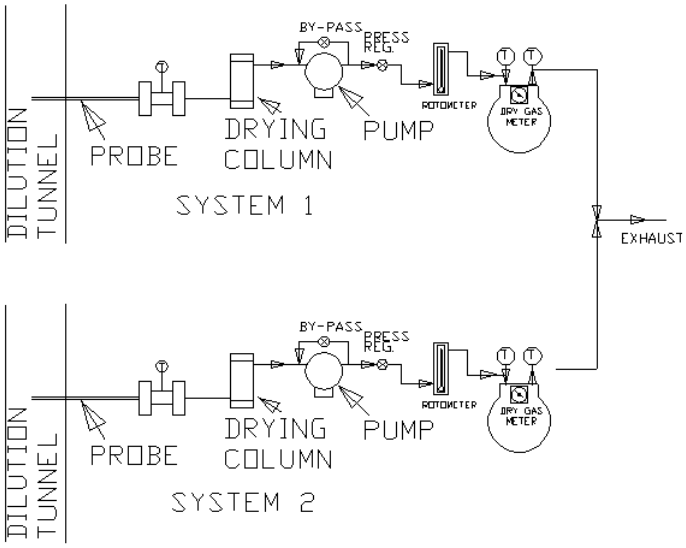


Figure 3 - Stack gas sample train

Particulates were sampled in strict accordance with ASTM E2515-2011. Schematic is presented on Figure 3. This method uses two identical sampling systems with Gelman A/E 61631 binder free, 47-mm diameter filters. The dryers used in the sample systems are filled with "Drierite" before each test run. In order to measure first-hour emissions rates, a third filter set is prepared at one hour into the test run, the filter sets are changed in one of the two sample trains. The two filter sets used for this train are analysed individually to determine the first hour and total emissions rate.

At the conclusion of each test program the dry gas meters are checked against our standard dry gas meter. Three runs are made on each dry gas meter used during the test program. The average calibration factors obtained are then compared with the six-month calibration factor and, if within 5%, the six-month factor is used to calculate standard volumes. Results of this calibration are contained in Appendix E.

An integral part of the post-test calibration procedure is a leak check of the pressure side by plugging the system exhaust and pressurizing the system to 10" W.C. The system is judged to be leak free if it retains the pressure for at least 10 minutes.

The standard dry gas meter is calibrated every 6 months using a Spirometer designed by the EPA Emissions Measurement Branch. The process involves sampling the train operation for 1 cubic foot of volume. With readings made to .001 ft^3, the resolution is .1%, giving an accuracy higher than the ±2% required by the standard.

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STACK SAMPLE ROTAMETER

The stack sample rotameter is checked by running three tests at each flow rate used during the test program. The flow rate is checked by running the rotameter in series with one of the dry gas meters for 10 minutes with the rotameter at a constant setting. The dry gas meter volume measured is then corrected to standard temperature and pressure conditions. The flow rate determined is then used to calculate actual sampled volumes.

GAS ANALYZERS

The continuous analyzers are zeroed and spanned before each test with appropriate 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.

At the conclusion of each unit test program, a three-point calibration check is made. This calibration check must meet accuracy requirements of the applicable standards. Consistent deviations between analyser readings and calibration gas concentrations are used to correct data before computer processing. Data is also corrected for interferences as prescribed by the instrument manufacturer's instructions.

TEST METHOD PROCEDURES

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, not just the dry gas meters. Pre-test and post-test leak checks are conducted with a vacuum of 10 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 was typically less than 2 inches of mercury. Thus, leakage rates reported are expected to be much higher than actual leakage during the tests.

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.

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PM SAMPLING PROPORTIONALITY

Proportionality was calculated in accordance with ASTM E2515-11. The data and results are included in Appendix B.

DEVIATIONS FROM STANDARD METHOD:

The following deviations were requested by EPA on ALT-125:

Changes to ASTM E3053-17 are:

1. Coal bed conditions prior to loading test fuel: The coal bed should be a level plane without valleys or ridges for all test runs in the high fire, low and medium burn rate categories.

Changes to ASTM E2515-11 must be as followed:

1. The filter temperature must be maintained between 80 and 90 Degrees F during testing.
2. Filters must be weighed in pairs to reduce weighing error propagation.
3. Sample filters must be Pall TX-40 or equivalent Teflon coated glass fiber, and of 47 mm,90mm, 100mm of 110mm in diameter.
4. Only one point is allowed outside the +/- 10% proportionality range per test run.

SECTION 8
TEST CALCULATIONS

Weight of test fuel load, dry basis ASTM E3053

$$M_{Fldb} = \Sigma((M_{FLnwb})(100)/(100+MC_{FLn}))$$

where:

M_{FLdb} = weight of test fuel load, dry basis, lb (kg);
M_{FLnwb} = weight of each test fuel piece, *n*, in test fuel load per 8.4.1, wet basis, lb (kg);
MC_{FLn} = average fuel moisture of test fuel piece, *n*, in test fuel load, % dry basis; and
n = individual test fuel pieces that comprise the test fuel load, as applicable.

Weighted Average Determination ASTM E3053

$$Vi_{WA} = 0.4(Vi_{LAve)}) + 0.4(Vi_{MAve}) + 0.2(Vi_{HAve})$$

where:

Vi_{WA} = Weighted average for variable *i*;

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Vi	= Test result variable (Particulate Matter: g/h, g/kg, lb/MMBtu; % Overall Efficiency: HHV, LHV; Carbon Monoxide: g/h, etc.)
Vi_{LAve}	= Arithmetic average for variable *Vi* for all test runs (except per 8.6.13 or 8.9) that are included in the low fire burn rate category
Vi_{MAve}	= Arithmetic average for variable *Vi* for all test runs (except per 8.6.13 or 8.9) that are included in the medium fire burn rate category;
Vi_{HAve}	= Arithmetic average for variable *Vi* for all test runs (except per 8.9) that are included in the high fire burn rate category.

NOMENCLATURE FOR ASTM E2515:

A = Cross-sectional area of tunnel m2 (ft2).

B_{ws} = Water vapor in the gas stream, proportion by volume (assumed to be 0.02 (2.0 %)).

C_p = Pitot tube coefficient, dimensionless (assigned a value of 0.99).

c_r = Concentration of particulate matter room air, dry basis, corrected to standard conditions, g/dscm (gr/ dscf) (mg/dscf).

c_s = Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dscm (gr/dscf) (mg/dscf).

E_T = Total particulate emissions, g.

F_p = Adjustment factor for center of tunnel pitot tube placement.

$F_p = V_{strav}/V_{scent}$

K_P = Pitot Tube Constant, $34.97 \frac{m}{\sec} \left[\frac{\left(\frac{g}{g}\blacksquare mole\right)(mm\ Hg)}{(K)(mm\ water)}\right]^{\frac{1}{2}}$

or

= Pitot Tube Constant, $85.49 \frac{ft}{\sec} \left[\frac{\left(\frac{lb}{lb}-mole\right)(in\ Hg)}{(R)(in\ water)}\right]^{\frac{1}{2}}$

L_a = Maximum acceptable leakage rate for either a pretest or post-test leak- check, equal to 0.0003 m3/min (0.010 cfm) or 4 % of the average sampling rate, whichever is less.

L_p = Leakage rate observed during the post-test leak-check, m3/min (cfm).

m_p = mass of particulate from probe, mg.

m_f = mass of particulate from filters, mg.

m_g = mass of particulate from filter gaskets, mg.

m_r = mass of particulate from the filter, filter gasket, and probe assembly from the room air blank filter holder assembly, mg.

m_n = Total amount of particulate matter collected, mg.

M_s = the dilution tunnel dry gas molecular weight (may be assumed to be 29 g/g mole (lb/lb mole).

P_{bar} = Barometric pressure at the sampling site, mm Hg (in. Hg).

P_g = Static Pressure in the tunnel (in. water).

P_R = Percent of proportional sampling rate.

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P_s = Absolute average gas static pressure in dilution tunnel, mm Hg (in. Hg).
P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
Q_{std} = Average gas flow rate in dilution tunnel.
$Q_{std} = 60 (1 - B_{ws}) V_s A [T_{std} P_s/T_s P_{std}]$
dscm/min (dscf/min).
T_m = Absolute average dry gas meter temperature, K (R).
T_{mi} = Absolute average dry gas meter temperature during each 10-min interval, *i*, of the test run.

$$T_{mi} = (T_{mi(b)} + T_{mi(e)})/2$$

where:
$T_{mi(b)}$ = Absolute dry gas meter temperature at the beginning of each 10-min test interval, i, of the test run, K (R), and
$T_{mi(e)}$ = Absolute dry gas meter temperature at the end of each 10-min test interval, i, of the test run, K (R).
Ts = Absolute average gas temperature in the dilution tunnel, K (R).
Tsi = Absolute average gas temperature in the dilution tunnel during each 10-min interval, i, of the test run, K (R).

$$T_{si} = (T_{si(b)} + T_{m=si(e)})/2$$

where:
$T_{si(b)}$ = Absolute gas temperature in the dilution tunnel at the beginning of each 10-min test interval, i, of the test run, K (R), and
$T_{si(e)}$ = Absolute gas temperature in the dilution tunnel at the end of each 10-min test interval, i, of the test run, K (R).
V_m = Volume of gas sample as measured by dry gas meter, dcm (dcf).
V_{mc} = Volume of gas sampled corrected for the post test leak rate, dcm (dcf).
V_{mi} = Volume of gas sample as measured by dry gas meter during each 10-min interval, i, of the test run, dcm.
$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter, corrected to standard conditions.

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

where:
K_1 = 0.3855 K/mm Hg for SI units and = 17.64 R/in. Hg for inch-pound units.

$$V_{m(std)} = K_1 V_{mc} Y [(P_{bar} + (\Delta H/13.6))/T_m]$$

where:
V_{mc} = Vm– (Lp– La)u
V_{mr} = Volume of room air sample as measured by dry gas meter, dcm (dcf), and
$V_{mr(std)}$ = Volume of room air sample measured by the dry gas meter, corrected to standard conditions.

$$V_{m(std)} = K_1 V_{mr} Y [(P_{bar} + (\Delta H/13.6))/T_m]$$

Where:
K_1 = 0.3855 K/mm Hg for SI units and = 17.64 R/in. Hg for inch-pound units, and
V_s = Average gas velocity in the dilution tunnel.

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$$V_s = F_p K_p C_p (\sqrt{\Delta P_{avg}})(\sqrt{(T_s/P_s M_s)})$$

V_{si} = Average gas velocity in dilution tunnel during each 10-min interval, i, of the test run.

$$V_{si} = F_p K_p C_p (\sqrt{\Delta P_i})(\sqrt{(T_{si}/P_s M_s)})$$

V_{scent} = Average gas velocity at the center of the dilution tunnel calculated after the Pitot tube traverse.

V_{strav} = Average gas velocity calculated after the multipoint Pitot traverse.

Y = Dry gas meter calibration factor.

ΔH = Average pressure at the outlet of the dry gas meter or the average differential pressure across the orifice meter, if used, mm water (in. water).

ΔP_{avg} = Average velocity pressure in the dilution tunnel, mm water (in. water).

ΔP_i = Velocity pressure in the dilution tunnel as measured with the Pitot tube during each 10-min interval, i, of the test run.

$$\Delta P_i = (\Delta P_{i(b)} + \Delta P_{i(e)})/2$$

where:

$\Delta P_{i(b)}$ = Velocity pressure in the dilution tunnel as measured with the Pitot tube at the beginning of each 10-min interval, i, of the test run, mm water (in. water), and

$\Delta P_{i(e)}$ = Velocity pressure in the dilution tunnel as measured with the Pitot tube at the end of each 10-min interval, i, of the test run, mm water (in. water).

θ = Total sampling time, min.

10 = ten min, length of first sampling period.

13.6 = Specific gravity of mercury.

100 = Conversion to percent.

TOTAL PARTICULATE WEIGHT – ASTM E2515

$$M_n = m_p + m_f + m_g$$

PARTICULATE CONCENTRATION – ASTM E2515

$$C_s = K_2(m_n/V_{m(std)}) \text{ g/dscm (g/dscf)}$$

where:

K_2 = 0.001 g/mg

TOTAL PARTICULATE EMISSIONS (g) – ASTM E2515

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

PROPORTIONAL RATE VARIATION (%) – ASTM E2515

$$PR = [\theta(V_{mi} V_s T_m T_{si})/(10(V_m V_{si} T_s T_{mi})] \times 100$$

MEASUREMENT OF UNCERTAINTY – ASTM E2515

$$MU_{weighing} = \sqrt{0.1^2} \bullet X$$

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GENERAL FORMULA – ASTM E2515

$$uY = \sqrt{((\delta Y/\delta x_1) \times u_1)^2 + \ldots + ((\delta Y/\delta x_n) \times u_n)^2}$$

Where:
$\delta Y/\delta x_i$ = Partial derivative of the combining formula with respect to individual measurement xi,
u_i = is the uncertainty associated with that measurement.

TOTAL PARTICULATE EMISSIONS – ASTM E2515

$$E_T = (c_s - c_r)\, Q_{std}\, \theta$$

where:
c_s = sample filter catch/(sample flow rate x test duration), g/dscf,
c_r = room background filter catch/(sample flow x sampling time), g/dscf,
Q_{std} = average dilution tunnel flow rate, dscf/min, and
θ = sampling time, minutes.

MU OF c_s

$c_s = F_c/(Q_{sample} \times \theta) = 0.025/(0.25 \times 180) = 0.0005555$
$\delta c_s/\delta F_c = 1/Q_{sample} \bullet \Theta = 1/0.25 \bullet 180 = 0.0222$
$\delta c_s/\delta Q_{sample} = -F_c/Q^2_{sample} \bullet \Theta = -0.025/0.25^2 \bullet 180 = -0.00222$
$\delta c_s/\delta \Theta = -F_c/Q_{sample} \bullet \Theta^2 = -0.025/0.25 \bullet 180^2 = -0.000003$
$MUc_s = \sqrt{(0.00027 \bullet 0.0222)^2 + (0.0025 \bullet - 0.00222)^2}$
$\sqrt{} + (0.1 \bullet - 0.000003)^2 = 0.0000091g$
Thus, c_s would be 0.555 mg/dscf ± 0.0081 mg/dscf at 95% confidence level.

MU OF c_r

$c_r = BG_c/(QBG \times \theta) = 0.002/(0.15 \times 180) = 0.000074$
$\delta c_r/\delta BG_c = 1/Q_{BG} \bullet \Theta = 1/0.15 \bullet 180 = 0.03704$
$\delta c_r/\delta Q_{BG} = -BG_c/Q^2_{BG} \bullet \Theta = -0.002/0.15^2 \bullet 180 = -0.0004938$
$\delta c_r/\delta \Theta = -BG_c/Q_{BG} \bullet \Theta^2 = -0.002/0.15 \bullet 180^2 = -0.0000004$
$MUc_r = \sqrt{(0.00027 \bullet 0.03704)^2 + (0.0015 \bullet - 0.0004938)^2}$
$\sqrt{} + (0.1 \bullet - 0.0000004)^2 = 0.00001g$
Thus, c_r would be 0.074 mg/dscf ± 0.01 mg/dscf at 95% confidence level.

E_T AND MU_{ET}

$E_T = (c_s - c_r)\, Q_{sd}\, \theta = (0.000555 - 0.000074) \times 150 \times 180 = 13.00g$
$\delta E_T/\delta c_s = Q_{std} \bullet \Theta = 150 \bullet 180 = 27{,}000$
$\delta E_T/\delta c_r = Q_{std} \bullet \Theta = 150 \bullet 180 = 27{,}000$
$\delta E_T/\delta Q_{std} = c_s \bullet \Theta - c_r \bullet \Theta = 0.000555 \bullet 180 - 0.000074 \bullet 180 = 0.08667$
$\delta E_T/\delta \Theta = c_s \bullet Q_{std} - c_r \bullet Q_{std} = 0.000555 \bullet 180 - 0.000074 \bullet 180 = 0.07222$
$MU_{ET} = \sqrt{(27{,}000 \bullet 0.0000081)^2 + (27{,}000 \bullet 0.00001)^2\ (0.08667 \bullet 3)^2}$

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$$\sqrt{} + (0.07222 \bullet 0.1)^2 = 0.436$$

Thus the result in this example would be:
ET = 13.00g ± 0.44 g at a 95% confidence level.

EFFICIENCY – CSA B415.1

The change in enthalpy of the circulating air shall be calculated using the moisture content and temperature rise of the circulating air, as follows:

$$\Delta h = \Delta t\ (1.006 + 1.84x)$$

Where:
Δh = change in enthalpy, kJ/kg
Δt = temperature rise, °C
1.006 = specific heat of air, kJ/kg °C
1.84 = specific heat of water vapor, kJ/kg °C
x = humidity ratio, kg/kg

The equivalent duct diameter shall be calculated as follows:

$$ED = 2HW/H+W$$

Where:
ED = equivalent duct diameter
H = duct height, m
W = duct width, m

The air flow velocity shall be calculated as follows:

$$V = F_p \times C_p \times 34.97 \times \sqrt{T/28.56(P_{baro} + P_s)}$$

where
V = velocity, m/s
F_P = Pitot tube calibration factor determined from vane anemometer measurements
C_P = Pitot factor
= 0.99 for a standard Pitot tube or as determined by calibration for a Type S Pitot tube
34.97 = Pitot tube constant
Note: The Pitot tube constant is determined on the basis of the following units: m/s $[g/g\ mole\ (mm\ Hg)/(K)(mm\ H_2O)]^{0.5}$
ΔP = velocity pressure, mm H2O
T = temperature, K
28.56 = molecular weight of air
P_{Baro} = barometric pressure, mm Hg
P_s = duct static pressure, mm Hg

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The mass flow rate shall be calculated as follows:

$$m = 3600VAp$$

where:
m = mass flow rate, kg/h
V = air flow velocity, m/s
3600 = number of seconds per hour
A = duct cross-sectional area, m2
p = density of air at standard temperature and pressure (use 1.204 kg/m3)

The rate of heat release into the circulating air shall be calculated using the air flow and change in enthalpy, as follows:

$$\Delta e = \Delta h \times m$$

Where:
Δe = rate of heat release into the circulating air, kJ/h
Δh = change in enthalpy of the circulating air, kJ/kg
m = mass air flow rate, kg/h

The heat output over any time interval shall be calculated as the sum of the heat released over each measurement time interval, as follows:

$$E_t = \sum(\Delta e \times i) \text{ for } i = t_1 \text{ to } t_2$$

Where:
Et = delivered heat output over any time interval $t_2 – t_1$, kJ
i = time interval for each measurement, h

The average heat output rate over any time interval shall be calculated as follows:

$$e_t = E_t / t$$

where
e_t = average heat output, kJ/h
t = time interval over which the average output is desired, h

The total heat output during the burn shall be calculated as the sum of all the heat outputs over each time interval, as follows:

$$E_d = \sum(E_t) \text{ for } t = t_0 \text{ to } t_{final}$$

Where:
E_d = heat output over a burn, kJ/h (Btu/h)
E_t = heat output during each time interval, kJ/h (Btu/h)

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The efficiency shall be calculated as the total heat output divided by the total energy input, expressed as a percentage as follows:

$$\text{Efficiency, \%} = 100 \times E_d/I$$

Where:

E_d = total heat output of the appliance over the test period, kJ/kg

I = input energy (fuel calorific value as-fired times weight of fuel charge), kJ/kg (Btu/lb)

SECTION 9
TEST SPECIMEN DESCRIPTION

The models from the 2.1 Series wood fuel room heater are constructed of sheet steel. The outer dimensions are 15 1/8-inches deep from the face plate to the rear, 18 5/8-inches high, and 24 15/16-inches wide in the front. The units have a door located on the front with a viewing glass.

FIREBOX VOLUME CALCULATION

The models from the 2.1 Series have a usable firebox volume (UFV) of 1.03 cubic foot. Schematic of the firebox dimensions is presented on Figure 4. Please note that the fuel cannot be stacked any higher due to the secondary air tubes being at the top of the combustion chamber.

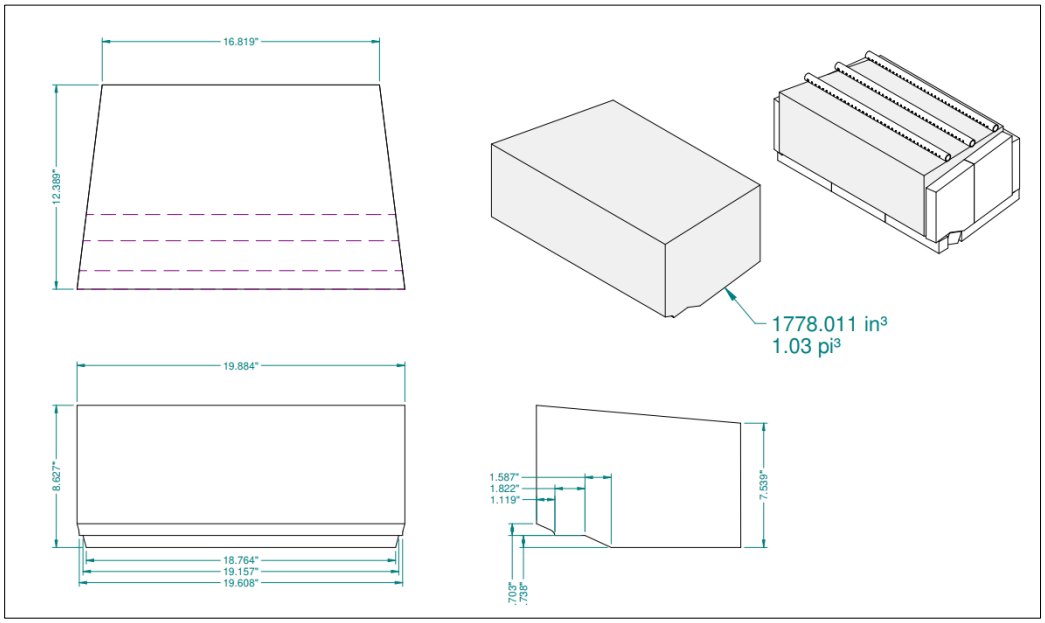


Figure 4 - Schematic of firebox volume

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Firebox volume calculation is presented below:

$$UFV = UFV_{OA} - V1_{rem} - V2_{rem} - V3_{rem}$$

$$UFV_{OA} = \frac{(8.627 + 7.539)}{2} \times \frac{(19.884 + 16.819)}{2} \times 12.389 = 1817.3\ in^3$$

$$V1_{rem} = \frac{(18.764 + 19.157)}{2} \times \frac{(1.587 \times 0.738)}{2} = 11.1\ in^3$$

$$V2_{rem} = \frac{(19.608 + 19.157)}{2} \times 1.822 \times 0.738 = 26.1\ in^3$$

$$V3_{rem} = \frac{(19.608 + 19.884)}{2} \times \frac{(1.119 \times 0.703)}{2} = 7.77\ in^3\ approx.$$

$$UFV = 1817.3 - 11.1 - 26.1 - 7.77 = 1772.3\ in^3$$

$$UFV = \frac{1772.3}{12^3} = 1.03\ ft^3$$

SECTION 10

TEST RESULTS

GENERAL DISCUSSION:

Except for run 2, all other runs have been found appropriate and they have been validated and found compliant. Run 2 ignited warmer than expected and burned much faster. By the manufacturer's experience, the air control adjustment period was always at the maximum of 15 minutes as per ASTM E3053-17 clause 8.6.7: *8.6.7 Low and Medium Fire Test Run Air Control Adjustment Period—The wood heater combustion air control(s) may be adjusted for up to 15 min after the maximum allowable load time has lapsed or until up to 15 % of the test fuel load weight (wet basis) has been consumed, whichever is less, to ensure that ignition of the test fuel load has occurred.* Since the combustion was very high, the air control adjustment period was calculated, and the maximum time was exceeded of 2 about minutes. 15% of the test fuel was consumed at 11:25 AM and the air control was completely closed at 11:27 AM. Also, one of the fuel pieces was found to be out of range on the preload of this same test. For these reasons, the run 2 was invalidated. Results from this run were calculated and can be found in the Tables below. A second low burn rate test was performed on Run 3 and burned as expected. All burn rate categories were achieved, and all data were used in the calculation of the weighted average.

All test fuel pieces have been positioned in an East-West orientation as per the manufacturer's written instructions. All test fuel pieces were split to meet individual and total load weight range for the firebox. Test fuel pieces were split in order to preserve the bark. In the area without bark,

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splitting was done to represent the random shape of the wood as it can be found in a standard cord of wood. No test fuel pieces were voluntary squared.

Filters were not altered by the gasket in all runs. No negative weight was found on probes or filters.

DESCRIPTION OF TEST RUNS:

RUN #1 (February 22nd, 2021) - Air control set at the medium burn rate (5/8 inch from fully closed position), burn time was 330 minutes with a category "Medium burn rate" of 0.863 kg/hr. Load time was 1 min. The door was left open for 4 min after the loading time, then closed. The air control was opened for 15 minutes after loading time and then set at the targeted burn rate 5/8 inch from fully closed position). The fan was turned on at medium speed at 20 minutes. At the 330 min reading, the fuel consumed for the last 30 min period was less than 1.0% of the test fuel load so the test was ended with a residual of 0.18 lb on the scale. The dry residual fuel was removed from the fuel consumed to calculate the burn rate.

RUN #2 (February 23rd, 2021)- Air control set to reach the minimum achievable burn rate (fully closed), burn time was 406 minutes with a category low burn rate of 0.707 kg/hr. Load time was 1 min. The door was left open for 5 min after the loading time, then closed. The air control was opened for 13 minutes after loading time and then set to fully closed position. The time allowed for the air control adjustment period was calculated and found to be not compliant. The air control adjustment period exceeded of 3 minutes. Run #2 was considered not valid and needed to be ran again. The fan was turned on at low speed at 32 minutes.

RUN #3 (February 24th, 2021) - Air control set to reach the minimum achievable burn rate (fully closed), burn time was 464 minutes with a category low burn rate of 0.632 kg/hr. Load time was 1 min. The door was left open for 5 min after the loading time, then closed. The air control was opened for 13 minutes after loading time and then set to fully closed position. The fan was turned on at low speed at 30 minutes.

RUN #4 (February 25th, 2021) - Air control was set fully opened, total burn time was 129 minutes 50 seconds with a category High burn rate 2.45 kg/hr. Burn time without the cold start was 88 minutes. Kindling and start-up fuel were ignited together in a cold chamber (average surface temperature was 72.0°F and ambient temperature was 70.5°F). Kindling was adjusted after 15 minutes from ignition. High fire load time was 1 min. The door was left open for 3 min after the loading time, then closed. The air control was always fully opened. The fan was started at full speed at 10 minutes after loading. The test run ended when 90 % ± 1% of the test full load was consumed.

RESULT TABLES:
Table 2 to Table 9 present the results of the evaluation. On section 14, Table 10 to Table 13 present the results as per the adjunct summary sheet of ASTM E3053-17.

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Table 2 - EMISSION RESULTS

#	TEST DATE	BURN RATES (kg/hr) (Dry)	PM EMISSION RATE (g/hr)	1ST HOUR EMISSIONS (g)	CO EMISSION RATE (g/hr)	CO EMISSION RATE (g/min)	HEATING EFF. (% HHV)
1	2021-02-22	0.86	1.31	5.31	28	0.5	76%
2	2021-02-23	0.71	0.96	4.19	46	0.8	75%
3	2021-02-24	0.63	0.97	4.58	41	0.7	75%
4	2021-02-25	2.45	2.93	5.34	33	0.5	73%

Table 3 - FUEL DATA SUMMARY

#	KINDLING WEIGHT (LBS)	KINDLING MC (%DB)	SU FUEL WEIGHT (LBS)	SU FUEL MC (%DB)	HIGH WEIGHT (LBS)	HIGH MC (%DB)	LOW/MED WEIGHT (LBS)	LOW/MED MC (%DB)
1	2.15	10	3.21	19.5	10.76	21.6	12.80	20.1
2	2.14	10	3.20	19.8	11.18	21.3	12.75	20.7
3	2.15	10	3.20	20.7	10.76	21.2	12.92	20.0
4	2.13	10	3.23	19.6	10.78	20.1	NA	NA

Table 4 - TEST LAB CONDITIONS

#	AMB. TEMP. (°F) before	AMB. TEMP. (°F) after	PRESSURE (In. Hg) before	PRESSURE (In. Hg) after	R.H.% % before	R.H.% %% after	AIR VEL. (Ft/min) before	AIR VEL. (Ft/min) after
1	76.1	76.9	29.70	29.40	8.6	9.5	0	0
2	83.1	77.0	29.20	29.35	11.8	12.7	0	0
3	74.4	76.7	29.50	29.40	14.5	16.1	0	0
4	70.1	82.8	29.55	29.60	22.3	13.4	0	0

Table 5 - DILUTION TUNNEL

#	BURN TIME (min)	TUNNEL VELOCITY (ft/sec)	VOLUMETRIC FLOW RATE (dscf/min)	TUNNEL AVE. TEMP. (°R)	SAMPLE VOLUME (DSCF)		PARTICULATE CATCH (MG)	
					1	2	1	2
1	330	15.40	304.40	541	41.205	43.574	2.8	3.3
2	406	15.35	300.35	541	50.618	50.560	2.8	2.6
3	464	15.33	301.05	543	59.717	59.457	3.3	3.1
4	129.83	15.15	293.32	553	15.833	15.978	2.6	2.7

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Table 6 - DILUTION TUNNEL PRECISION

#	SAMPLE RATIOS (-)		TOTAL EMISSIONS (g)		DEVIATION %	DEVIATION g/kg
	Train 1	Train 2	Train 1	Train 2		
1	2438	2305	6.826	7.607	5.4%	1.35%
2	2409	2412	6.745	6.271	3.7%	0.91%
3	2339	2349	7.719	7.283	2.9%	0.73%
4	2405	2383	6.254	6.435	1.4%	0.36%

Table 7 - GENERAL SUMMARY

#	BURN RATE (kg/hr)(Dry)	CHANGE IN SURFACE TEMP. (°F)	INITIAL DRAFT (in. wc)	RUN TIME (min)	AVERAGE DRAFT (in. wc)
1	0.86	143	0.053	330	0.047
2	0.71	263	0.054	406	0.039
3	0.63	272	0.052	464	0.037
4	2.45	392	0.001	129.83	0.069

Table 8 - CSA B415.1-10 SUMMARY

#	CO EMISSIONS (g/min)	HEATING EFFICIENCY (% HHV)	HEATING EFFICIENCY (% LHV)	HEAT OUTPUT (Btu/hr)
1	0.5	76	82	11,800
2	0.8	75	80	9,400
3	0.7	75	81	8,500
4	0.5	73	78	32,300

Table 9 - WEIGHTED AVERAGE CALCULATION

#	CAT	(E) PM EMISSION RATE (g/hr)	(CO) EMISSION RATE (g/hr)	HEAT OUTPUT Btu/hr	EFF. (% HHV)	EFF. (% LHV)	(K) Weighting Factor	(KxE) g/hr	(KxCO) g/hr	(KxCO) g/min	(K x HHV)	(K x LHV)
1	M	1.31	28	11,800	76	82	40%	0.52	11.1	0.18	30.5	32.7
3	L	0.97	41	8,500	75	81	40%	0.39	16.3	0.27	30.0	32.2
4	H	2.93	33	32,300	73	78	20%	0.59	6.6	0.11	14.5	15.5
						Totals:	**100%**	**1.5**	**34**	**0.6**	**75**	**80**

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SECTION 11
CONCLUSION

This test demonstrates that the Matrix 1900 (2.1 Series) wood heater is an affected facility under the definition given in the regulation. The emission rate of 1.5 g/hr meets the EPA requirements for the Step 2 limits.

Matrix 1900 is a representative model of the 2.1 Series. This series includes the following models: Destination 1.9, Matrix 1900, CW2100, Green Mountain Insert 50, HEI90, Archway 1500.

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SECTION 12
PHOTOGRAPHS



Figure 5 - Isometric view of unit

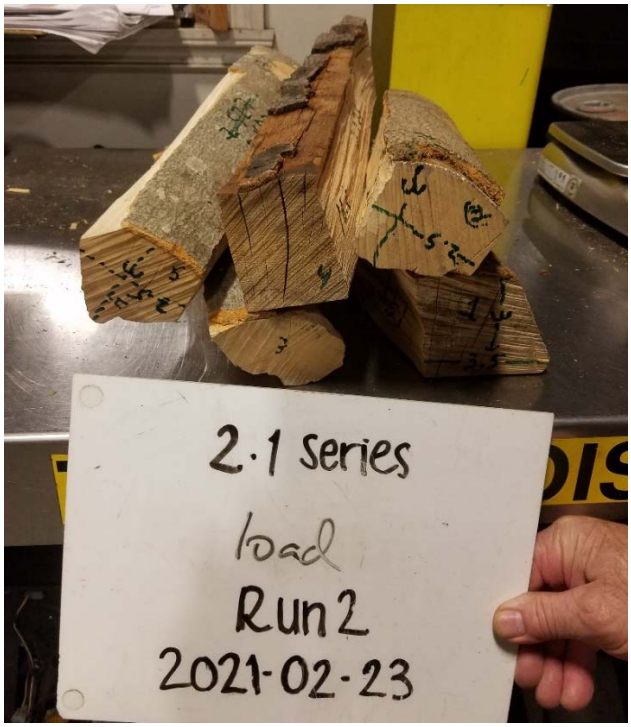


Figure 6 - Typical load

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SECTION 13
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	03/30/21	N/A	Original Report Issue
1	10/01/21	8 20	Add detail on the dilution tunnel description. Add an ASTM E2515-11 compliance statement. Corrected the exceeded time from 2 minutes to 3 minutes on description of Run#2.
2	12/20/21	22	Heat output of run 1 and 4 were rounded to 3 significant figures in Table 9.

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SECTION 14

APPENDIX - REPORT TABLES AS PER ASTM E3053-17

Table 10 - Section 1 - Model Identification

SECTION 1 – Model Identification	
Model Name(s)/Number(s)	2.1 Series
Manufacturer	Stove builder international inc.
Address 1	250 Rue Copenhague
Address 2	Saint-Augustin-de-Desmaures
Appliance Category(s) (Free-standing, Insert, etc.)	Insert
Usable Firebox Volume - ft^3	1.03
Catalytic/Non-Cat	Non-Cat
Convection Air Fan (No, Standard, Optional)	Optional
SECTION 1B – Laboratory Information	
Testing Laboratory	Intertek testing services
Address 1	1829 32nd Avenue
Address 2	Lachine, QC H8T 3J1
ISO/Accreditation Info	ISO 17025
Dates Tested	02/22/2021 - 02/25/2021
Test Methods/Standards	CAS B415.1-10, ASTM E2515, ASTM E3053
Dilution Tunnel Inside Diameter - in.	8.00
Fliter Diameter - mm	47
Filter Material	Pall TX40

Table 11 - Section 2 - Test Conditions Summary

SECTION 2 – Test Conditions Summary				
Model Name(s)/Number(s)	2.1 Series			
Usable Firebox Volume - ft^3	1.03			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	4
Date Tested	2021-02-22	2021-02-23	2021-02-24	2021-02-25
Test Run Category (L, M, H)	M	L	L	H
Average Barometric Pressure - in Hg	29.55	29.28	29.45	29.58
Max. Observed Ambient Temp - °F	84	83	83	78
Min. Observed Ambient Temp - °F	68	67	73	71

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Max. Observed Filter Temp - °F	87 & 86	87	87	88 & 87
Test Run Air Settings				
Primary (measured up from minimum)	0.625	Min	Min	Max (2.4375")
Secondary (measured up from minimum)	na	na	na	na
Convection Air Fan Setting	Off then M	Off then L	Off then L	Off then Max
Test Fuel Load				
Cordwood Fuel Species	Beech	Beech	Beech	Beech
Specific Gravity (from Table 1)	0.67	0.67	0.67	0.67
Higher Heating Value - Btu/lb (from Annex A1)	8088	8088	8088	8088
Nom. Test Fuel Load Piece Length - in.	16	16	16	16
Number of Test Fuel Pieces	5	5	5	4
Test Fuel Weight				
Kindling - As Fired lb	na	na	na	2.13
Kindling Wt. - As % of Test Fuel Load	na	na	na	20%
Kindling Moisture - % DB	na	na	na	10%
Kindling - kg DB	na	na	na	0.88
SU Fuel - As Fired lb	na	na	na	3.23
SU Fuel Wt. - As % of Test Fuel Load	na	na	na	30%
SU Fuel Moisture - % DB	na	na	na	20%
SU Fuel - kg DB	na	na	na	1.22
Test Fuel Load - As Fired lb	12.8	12.75	12.92	10.78
Ave. Test Fuel Load MC % DB	20.1%	20.7%	20.0%	20.1%
Test Fuel Load - kg DB	4.83	4.79	4.88	4.07
Test Fuel Loading Density - lb/ft^3	12.43	12.38	12.54	10.47
Residual SU Fuel Wt. - As Fired lb	na	na	na	1.18
Residual SU Fuel Wt. - As % of Test Fuel Load	na	na	na	11%
Test Run Duration - minutes	330	406	464	129.83
Test Run Duration - h	5.50	6.77	7.73	2.16
Test Fuel Load Wt. at End of Test - As Fired lb	0.2	0.0	0.0	1.07
Total Total Fuel Burned - kg DB	4.74	4.79	4.88	5.15
% Test Fuel Load Wt. at End of Test	1.6%	0.0%	0.0%	9.9%

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TEST REPORT FOR STOVE BUILDER INTERNATIONAL INC.
Report No.: 104576994MTL-001R2
Date: 12/20/21

Table 12 - Section 3 - Test Run Results Summary

SECTION 3 – Test Run Results Summary				
Model Name(s)/Number(s)	2.1 Series			
Usable Firebox Volume - ft^3	1.03			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	4
Date Tested	2-22-21	2-23-21	2-24-21	2-25-21
Test Run Category	M	L	L	H
Burn Rate - kg/h DB	0.86	0.71	0.63	2.45
Burn Rate - As % of Low to High Midpoint	56%	na	na	na
Burn Duration - h	5.50	6.77	7.73	2.16
Heat Output - Btu/h	11792	9446	8471	32293
Dilution Tunnel Flow Rate - dscfm				
Average	304.40	300.35	301.05	293.32
Maximum Observed	311.39	305.65	347.99	304.39
Minimum Observed	295.33	285.75	288.27	286.04
Dilution Tunnel Temperature - °F				
Average	81	81	83	93
Maximum Observed	94	98	96	104
Minimum Observed	73	74	75	69
Sample Dryer Exit Max. Temp (or Max. DGM Temp) - °F				
Train 1	65	67	69	69
Train 2	65	67	69	70
Average Sample Flow Rates - dscfm				
Train 1	0.125	0.125	0.129	0.122
Train 2	0.132	0.124	0.128	0.123
Sample Vacuum - in. Hg				
Train 1				
Start	0.1	0.1	0.1	0.1
End	0.1	0.2	0.1	0.3
Maximum Observed	0.1	0.2	0.1	0.3
Train 2				
Start	0.2	0.1	0.0	0.1

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End	0.1	0.1	0.1	0.2
Maximum Observed	0.2	0.1	0.1	0.2
Proportional Rate Variation (10-minute basis)				
# of Occurences > 5%, Total Both Trains	0	0	0	0
# of Occurences > 10%, Total Both Trains	0	0	0	0
Highest PR Variation - %, Either Train	102.4%	103.5%	102.2%	102.2%
Total Sample Volume - dscm (m^3)				
Train 1	1.166	1.437	1.690	0.447
Train 2	1.234	1.426	1.682	0.452
Average Dilution Ratio				
Train 1	2439.1	2402.8	2341.0	2410.2
Train 2	2306.0	2422.2	2352.0	2388.6
Total PM Catch - mg				
Train 1	2.8	2.8	3.3	2.6
Train 2	3.3	2.6	3.1	2.7
Total Catch PM Weight Excluding Probe - mg				
Train 1 - Immediately Post-Test	1.9	2.6	2.9	2.6
Train 1 - Final Dry Weight	1.9	2.6	2.9	2.5
Train 2 - Immediately Post-Test	2.3	2.5	2.8	2.6
Train 2 - Final Dry Weight	2.3	2.4	2.8	2.5
Final Dry Probe PM Catch - mg				
Train 1	0.9	0.2	0.4	0.1
Train 2	1.0	0.2	0.3	0.2
Probe PM Catch as % of Total PM Catch				
Train 1	32.1%	7.1%	12.1%	3.8%
Train 2	30.3%	7.7%	9.7%	7.4%
Total PM Emissions - g				
Train 1	6.829	6.728	7.725	6.266
Train 2	7.610	6.298	7.291	6.449
Average	7.220	6.513	7.508	6.358
PM Emission Train Precision - %	5.4%	3.3%	2.9%	1.4%
PM Emission Train Precision - g/kg	0.16	0.09	0.09	0.04
PM Concentration - mg/m^3				
Train 1	2.40	1.95	1.95	5.81
Train 2	2.68	1.82	1.84	5.98
PM Emission Rate - g/h	1.31	0.96	0.97	2.94

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TEST REPORT FOR STOVE BUILDER INTERNATIONAL INC.
Report No.: 104576994MTL-001R2
Date: 12/20/21

PM Emission Rate - g/Mj (from CSA B415.1-10/15)	0.11	0.10	0.11	0.13
PM Emission Rate - lb/MMBtu (from CSA B415.1-10/15)	0.25	0.22	0.25	0.30
First Hour Emissions				
Sampling Duration (minutes)	60.00	60.00	60.00	60.00
Average Sample Flow Rate - dscfm	0.1235	0.1256	0.1249	0.1221
Total Sample Volume - dscm (m^3)	0.210	0.213	0.212	0.207
Average Dilution Tunnel Flow Rate - dscfm	298.18	292.10	301.37	296.51
Average Dilution Ratio	2414.4	2325.6	2412.9	2428.4
Total PM Catch - mg	2.2	1.8	1.9	2.2
PM Concentration - mg/m^3	10.48	8.43	8.95	10.60
Total PM Emissions - g	5.31	4.19	4.58	5.34
PM Emission Rate - g/h	5.31	4.19	4.58	5.34
Total CO Emissions - g (CSA B415.1-10/15)	152.0	313.0	316.0	48.0
CO Emissions Rate - g/h (CSA B415.1-10/15)	27.7	46.3	40.9	32.8
Test Duration w/o Cold Start (High Fire Only) - h	na	na	na	1.47
Overall Efficiency - CSA B415.1-10/15				
% HHV Basis	76.3	74.7	75.1	72.1
% LHV Basis	81.7	80.1	80.5	77.3

Table 13 - Section 4 - Weighted Average Summary

SECTION 4 - Weighted Average Summary

Model Name(s)/Number(s)	2.1 Series		
Usable Firebox Volume - ft^3	1.03		
Convection Air Fan (No, Standard, Optional)	Optional		
Average for Each Test Run Category	L	M	H
Burn Rate - kg/h DB	0.63	0.86	2.45
PM Emission Rate - g/h	0.97	1.31	2.94
CO Emissions Rate - g/h	40.9	27.7	32.8
Overall Efficiency - CSA B415.1-10			
% HHV Basis	75	76	72
% LHV Basis	81	82	77
Heat Output - Btu/h	8500	11800	32300
Category Weighting	40%	40%	20%

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Report No.: 104576994MTL-001R2
Date: 12/20/21

ASTM E3053 Weighted Averages			
PM Emission Rate - g/h	1.5		
CO Emissions Rate - g/h	34		
CO Emissions Rate - g/min	0.6		
Overall Efficiency - CSA B415.1-10			
% HHV Basis	75		
% LHV Basis	80		
Heat Output Range - Btu/h	8500	to	32300

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Issue Date: October 1, 2021

Subject: Dilution tunnel depiction in test reports

Memo to file – G104576994

U.S. EPA has indicated that the Dilution Tunnel Diagram is inconsistent with ASTM E2515-11 in the test report 104576994MTL-001 of the client, Stove Builder International (SBI). Figure 1 showing the dilution tunnel in the test report is the same as that in Figure 3 of the test standard ASTM E2515-11. After the client requested for clarification Mr. Steffan Johnson from EPA answered that there is missing information about the second Figure of the standard (Figure 4). On September 21, 2021, Mr. Johnson answered the following:

"We are asking for confirmation that the dilution tunnel used for testing met the requirements of ASTM E2515, Figures 3 and 4. You are fine to include figure 3 (your Fig 1) but we ask that there be confirmation that the dilution tunnel used met both criteria (fully compliant with ASTM E2515)."

To fulfil EPA's request, a supplemental audit of the Dilution Tunnel was performed by Mr. Claude Pelland on October 1, 2021, at the client facility located at the 250 Copenhague Street, Saint-Augustin-de-Desmaures, G3E1G6, QC, Canada. The dilution tunnel was deemed compliant. Figure 4 of ASTM E2515-11 will be added to the test report as a clarification of compliance of the Dilution Tunnel of the client.

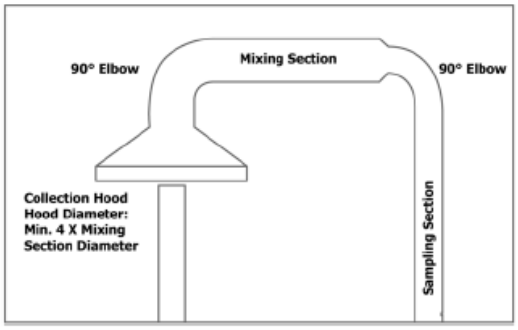


FIG. 4 Mixing Section and Sampling Section with Different Diameters

INTERTEK TESTING SERVICES NA, INC.

Reported by:

Claude Pelland P. Eng.
Project Engineer

Reviewed By:

Greg Dupuis
Manager US Evaluation Services

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Fabricant de poêles international inc.
Stove Builder International Inc.

Test load procedure for certification of 2.1 Series wood stove using ASTM E3053-17 according to EPA Alt-125

Kindling and SUF (5.4 lbs) - Split the start-up fuel log into 6 pieces. Crisscross 6 kindling pieces on the brick. Then, crisscross the start-up fuel. Criss cross the rest of the kindling on the start-up fuel. The start-up fuel and the kindling are placed at the rear of the stove. Leave a little space between each piece.

The kindling is made of between 15 finely split piece of wood that are 10% of moisture content. Place crumbled newspaper on top of the kindling (5 full sheets). Light up the paper and let the door completely open for two minutes, then close the door. The fan is always OFF.

Low&Medium Pre-load (high fire) (10.8 lbs) - When there is a coal bed of 1.1 lbs left, break ashes and level coal bed, then add pre-load (four pieces). Place two pieces on the coal bed in an East-West orientation. The piece in front of the combustion chamber should be the largest and the piece at the back of the combustion chamber must be a medium piece. Place the last two pieces on top of the two others in an orientation that points to the left (10-15 degrees from East-West). Leave space between each piece. Let the door open of 5" for 4 minutes. Then, close the door and let burn until the weight is down to target.

When the average stove temperature gets to 505°F, slightly level the coal bed. There should be approximately 1.6 lb of coal bed.

Low fire load (13 lbs) - Place the largest piece on the coal bed in the back of the stove in an East-West orientation. Leave 1" between the rear bricks and the piece. Place the second largest piece on top of the first one. The piece should touch the rear bricks. Place a medium piece on the coal bed at the front of the combustion chamber. There should be approximatively 4-5" between the piece in the back and at the front of the combustion chamber. Place a piece on the two bottom logs. The rear left corner of the piece is placed on the piece at the back of the stove and the front right corner on the piece in front of the stove. Place the last piece on the piece at the front of the stove. Let the door ajar for 4 minutes and then close the door with the primary air control fully open. After 5 minutes, close the primary air control of 50%. After 2 more minutes, continue to close slowly the primary air control so that at 16 min (15 min or 15 % as per E3053 clause 8.6.7 plus loading time of 1 min as per clause 8.6.5), the primary air control is completely closed. Start the fan at minimum speed at 30 minutes.

Medium fire load (13 lbs) - Same as for low fire load, but the primary air inlet is open of 5/8 inch from its minimum position at the end of the 16 minutes run time. Also, the largest piece is placed in front of the stove and the medium piece at the back. Start the fan at minimum speed at 30 minutes.

High fire load (10.8 lbs) – When there is a coal bed of 1.1 lbs left, break ashes and level coal bed, then add the load (four pieces). Place two pieces on the coal bed in an East-West orientation. The piece in front of the combustion chamber should be a medium piece and the piece at the back of the combustion chamber must be the largest piece. Place the last two pieces on top of the two others in an orientation that points to the right (10-15 degrees from East-West). Do not leave space between the pieces. Let the door open of 5" for 4 minutes and close the door. Start the fan at maximum speed. Stop the test when 90% of the high fire load has been consumed.

Intertek ETL SEMKO

Date: 22 feb 2021 Page ____ of ____

Manufacturer: SBI Model: Series 2-1

Project #: G104576994 Run: 1 Tech: ____ Reviewer: ✓

COMMENTS

Start up 8:41 h.
Loading 9:10 h am
Door closed 9.12 h

11:30 h weight 1.3 Strong
11:31 h Loading
11:36 h. Door closed (Mic stand to loading)

11:44 (start) Air intake adjusted to "5/8" (Area to be qualified Gradually
11:46 (8 cm) Air intake to 5/8" done (Clamp into Tool)
11:52 Fan open to max power.
17:00 h Test ends

TEST LOAD CONFIGURATION

Fuel load data - PRELOAD

Date: 22 feb 2021

Run #: 1

Rev date: 05-07-2017

Doc rev: Rev 2

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 10 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft³			
Usable Firebox Volume	1.03	ft³			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.80	to	10.80	lb	
Core Target Wt. Allowable Range	4.6	to	6.70	lb	
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb	
					Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb	2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb	3.35

	Pc. #			
Core Load Piece Wt. Actual	1	2.021	lb	
	2	2.355	lb	
	3	1.994	lb	
Core Load Total. Wt. Actual		0.00	lb	
	Pc. #			
Remainder Load Piece Wt.	1	4.394	lb	
(1 to 3 Pcs.)	2		lb	
	3		lb	
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!		≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb	
Total Load Wt. Actual		0.00	lb	
Core % of Total Wt.		#DIV/0!		45-65%
Remainder % of Total Wt.		#DIV/0!		35-55%
Actual Load % of Nominal Target		0%		95-105%
Actual Fuel Load Density		0.0	lb/ft³	

Kindling and Start-up Fuel				
Maximim Kindling Wt. (20% of Tot. Load Wt.)	0.00	lb		
Actual Kindling Wt.	2.152	lb	#DIV/0!	#DIV/0!
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)	0.00	lb		
Actual Start-up Fuel Wt.	3.206	lb	In Range	#DIV/0!

Cal. Block #: SBI-153

12%: 12.0

22%: 22.0

Wood moisture meter #: SBI-229

Room temp. (°F): 63.0 °F

Room RH (%): 19.6%

Ambiant hygrometer #: SBI-212

Fuel Piece Moisture Reading (%-dry basis)

	1	2	3	Ave.		
20.0	15.0	20.4				0
25.8	20.4	26.5				0
25.4	22.4	12.0				0
24.9	20.0	22.7				0
						0
						0

Kindling Moisture (%-dry basis)

10	10	10			kg

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

20.5	16.4	21.5			kg

Total Wt. All Fuel Added (dry basis) → kg

Total Wt. All Fuel Burned (dry basis) → kg

Signature: _____

Fuel load data - MEDIUM

Date: 21 feb 2021

Run #: 1

Rev date: 05-07-2017

Doc rev: Rev 2

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 12 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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

Nominal Required Load Density (wet basis)	10	lb/ft³			
Usable Firebox Volume	1.03	ft³			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.79	to	10.82	lb	
Core Target Wt. Allowable Range	4.635	to	6.70	lb	
Remainder Load Wt. Allowable Range	3.61	to	5.67	lb	
					Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.55	to	2.58	lb	2.06
Remainder Load Pc. Wt. Allowable Range	1.03	to	3.09	lb	2.06

	Pc. #		
Core Load Piece Wt. Actual	1	2.332	lb
	2	2.286	lb
	3	2.670	lb
Core Load Total. Wt. Actual		0.00	lb
	Pc. #		
Remainder Load Piece Wt.	1	3.562	lb
(2 or 3 Pcs.)	2	1.954	lb
	3		lb
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!	≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb
Total Load Wt. Actual		0.00	lb
Core % of Total Wt.		#DIV/0!	45-65%
Remainder % of Total Wt.		#DIV/0!	35-55%
Actual Load % of Nominal Target		0%	95-105%
Actual Fuel Load Density		0.0	lb/ft³

Allowable Charcoal Bed Wt. Range (lb)	0.1	to	-0.1		Mid-Point
Actual Charcoal Bed Wt.			lb	Out of Range	0.0
Actual Fuel Load Ending Wt.			lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0.0	lb		

Cal. Block #: SBI-153

12%: 12,0

22%: 22,0

Wood moisture meter #: SBI-729

Room temp. (°F): 63.0 °F

Room RH (%): 19.6%

Ambiant hygrometer # : SBI-712

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.	Pc. Wt. Dry Basis
21.2	19.1	18.6	#DIV/0!	
26.9	~~19.2~~ 20.4	~~13.2~~ 20.3	#DIV/0!	
18.1	19.1	17.6	#DIV/0!	
19.8	23.2	12.4	#DIV/0!	
20.9	20.4	21.2	#DIV/0!	
			NA	

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

Signature:

Date: 2021-07-22

Manufacturer: SBI Model: 2.1 series Project #: G104576994

Category #: Med Run: 1 Engineer: C. Pelland

RAW DRY GAS METER READINGS

	Start	End	Difference
System 1 (ft^3) Equipment #: SBI-047	394,516	435,543	41,027
System 2 (ft^3) Equipment #: SBI-046	107,713	1501,085 (ES)	43,372
System 3 (ft^3) Equipment #: SBI-290	087,125	94,512	7,387

AMBIENT CONDITIONS

	Start Date: 2021-07-22 Time: 11h30	End Date: 2021-07-22 Time: 17h01
Barometer. (inches Hg) Equipment #: SBI-3331	29,70	29,40
Indoor Dry Bulb (°F) Equipment #: SBI-212	76.1 ~~10.7~~ (ES)	76,9
Indoor Humidity (%) Equipment #: SBI-212	8,6 (ES)	9,5

Signature: _____

Date: 2021-07-22 Page____ of ____

Manufacturer: SBI Model: 2.1 Series

Project #: G104576994 Run: 1 Tech:____ Reviewer: C. Pelland

SAMPLING EQUIPMENT CHECK OUT

Leakage Checks Tunnel Samplers

	SYSTEM 1 (#SBI-047)		SYSTEM 2 (#SBI-046)		SYSTEM 3 (#SBI-290)	
Plug and set vacuum at 5 in Hg. (17.3 mA)	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Plug and note initial reading on DGM (ft^3)	394,431	437,691	107,564	151,092	87,082	94,517
Wait 1 min and note final reading DGM (ft^3)	394,431	437,691	107,564	151,092	87,082	94,518
Difference between initial and final (ft^3)	0	0	0	0	0	~~0~~ 0,001
Allowable leakage 4% x Sample rate	0,004	0,004	0,004	0,004	0,004	0,004
Check OK	✓	✓	✓	✓	✓	✓

Leakage Checks Flue Gas Sampler (Testo 350 #SBI-~~332~~ 246)

Plugged Probe	Pre Test	Post Test
Check OK	✓	✓

Signature : ____

Intertek ETL SEMKO

Date: 2021-02-22 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G104576994 Run: 1 Tech: _____ Reviewer: ✓

PRETEST DILUTION TUNNEL TRAVERSE RUN

Barometric pressure (P_{bar}) 29.7 (inches Hg.) Static pressure (P_q) 0.118 (inches w.c.)
Inside diameter: Port A 8in. Port B 8in.
Tunnel cross sectional area: 0.349 ft²
Pitot tube #: 104 Pitot tube factor: 0.844

Traverse Point	Position (inches)	Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)	$\sqrt{\Delta_p}$
A- Centroid	4.00	0.070	93.2	
B - Centroid	4.00	0.077	88.5	
A-1	0.54	0.073	93.0	
A-2	2.00	0.080	93.1	
A-3	6.00	0.067	92.7	
A-4	7.46	0.046	74.2	
B-1	0.54	0.070	91.5	
B-2	2.00	0.079	91.8	
B-3	6.00	0.070	91.7	
B-4	7.46	0.055	82.0	
		AVERAGE		

SBI

Continuous Analyzer

Project:	2.1 series (G104576PH)
Project Engineer:	Claude Fetland
Equipment :	Testo 350 (SBI-246)

Pre-test (after adjustment) Run: 1 Date : 2021-02-22 Time : 10h50

	Zero		Span		Mid point (record only)		Full Scale
CO [ppm]	0.0	0.0	30102ppm	29900 ppm	5569	5569	6000
CO2 [%]	0.0	0.0	16.03%	16.1%	15,97	16,00	50%
O2 [%]	0.0	0.0	17.95%	17.9%	18,3	18,00	21%
	Actual	Calibration gaz	Actual	Calibration gaz	Actual	Calibration gaz	

B
5314
16,08
18,30
corrigé

Post-test Date : 2021-02-23 Time : 8h12

	Zero	Span	Cal.	Zero drift	Span drift	Cal. Drift	Max drift
CO [ppm]	0.0	30618ppm	5650ppm	0.0	2.4%	1.5% (85ppm)	282
CO2 [%]	0,0	16,19%	16.06%	0.0	0.56%	0,4%	0.80%
O2 [%]	0.0	18,49%	18.09%	0.0	3,3%	0,5%	0.90%

Max drift is 5 % of full scale according to Intertek 192-Q-0602
Max drift is 1 % of full scale according to CSA B415.1-10, 6.3.1 (est-ce que c'est pour un 24h sans test ?)

Federal Register p.13709
The manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon

CSA B415.1-10 p.11
6.3 Flue gas composition
6.3.1
The percentage of carbon monoxide (CO) and carbon dioxide (CO2) in the flue gas shall be measured by a continuous infrared analyzer or equivalent. Continuous analyzers (or equivalent) shall have maximum

zero and span drift, over a 24 h period, of 1% of full scale.
6.3.2
Gas samples shall be taken by a probe inserted at the centreline of the chimney 50 mm (2 in) above the thermocouple measuring flue gas temperature.
6.3.3
Continuous analyzers (or equivalent) shall be arranged so that they are synchronized to reach 90% of their final reading within 30 s when beginning at ambient levels and responding to a calibration gas that contains at least 80% of full-scale value of the constituent being measured. The calibration gas for this test shall be introduced through the sampling probe.

Signature : _____

Intertek ETL SEMKO

Date: 2021-02-23 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G104576994 Run: 2 Tech: ____ Reviewer: ____

COMMENTS

08:32	Kindling Ignition
08:34	Door closed
08.54	Repositioning of a small Piece.
08:58	Even The Ambers. Location of Dri-Load + Picture.
09:01	Door closed
11:11	RAKING (flatten Ambers) STOVE Door open 1 MIN
11:12	Door closed
11:13	Door open - Loading (Test = 00:00:00)
11:19	Door closed
11:26	Start To close Air intake
11:27	Air intake completely closed
11:45	Fan open min power
	final air control adjustment is either 15 minutes after 15% of test full load has been consumed. Experience shows that 15% is never exceeded. in doubt today, calculation was verified and it was found that it was exceeded by approximately 3 minutes
17:59	Stop test

TEST LOAD CONFIGURATION

Fuel load data - PRELOAD

Date: 23 février 2021

Run #: 2

Rev date: 05-07-2017

Doc rev: Rev 2

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 10 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft³			
Usable Firebox Volume	1.03	ft³			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.80	to	10.80	lb	
Core Target Wt. Allowable Range	4.6	to	6.70	lb	
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb	
					Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb	2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb	3.35

	Pc. #			
Core Load Piece Wt. Actual	1	2.103	lb	
	2	2.254	lb	
	3	2.320	lb	
Core Load Total. Wt. Actual		0.00	lb	
	Pc. #			
Remainder Load Piece Wt.	1	4.502	lb	
(1 to 3 Pcs.)	2		lb	
	3		lb	
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!		≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb	
Total Load Wt. Actual		0.00	lb	
Core % of Total Wt.		#DIV/0!		45-65%
Remainder % of Total Wt.		#DIV/0!		35-55%
Actual Load % of Nominal Target		0%		95-105%
Actual Fuel Load Density		0.0	lb/ft³	

Kindling and Start-up Fuel

Maximim Kindling Wt. (20% of Tot. Load Wt.)	0.00	lb		
Actual Kindling Wt.	2.138	lb	#DIV/0!	#DIV/0!
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)	0.00	lb		
Actual Start-up Fuel Wt.	3.200	lb	In Range	#DIV/0!

Cal. Block #: SBI-153

12%: 12.0

22%: 22.0

Wood moisture meter #: SBi-229

Room temp. (°F): 65.6°F

Room RH (%): 24.9%

Ambiant hygrometer # : SBi-212

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		
27.8	15.9	20.8			0
24.5	18.6	17.9			0
24.8	22.1	20.4			0
18.1	25.2	20.3			0
					0
					0

Kindling Moisture (%-dry basis)

10	10	10			kg

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

20.4	22.7	16.4			kg

Total Wt. All Fuel Added (dry basis) → kg

Total Wt. All Fuel Burned (dry basis) → kg

Signature:

Fuel load data - LOW

Date: 2021-02-23

Run #: 2

Rev date: 05-07-2017

Doc rev: Rev 2

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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

Nominal Required Load Density (wet basis)	10	lb/ft^3			
Usable Firebox Volume	1.03	ft^3			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.79	to	10.82	lb	
Core Target Wt. Allowable Range	4.635	to	6.70	lb	
Remainder Load Wt. Allowable Range	3.61	to	5.67	lb	
					Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.55	to	2.58	lb	2.06
Remainder Load Pc. Wt. Allowable Range	1.03	to	3.09	lb	2.06

Pc. #			
Core Load Piece Wt. Actual	1	2.268	lb
	2	2.501	lb
	3	2.480	lb
Core Load Total. Wt. Actual		0.00	lb
Pc. #			
Remainder Load Piece Wt.	1	1.999	lb
(2 or 3 Pcs.)	2	3.502	lb
	3		lb

2.266

Remainder Load Piece Weight Ratio - Small/Large	#NOMBRE!		≤ 67%
Remainder Load Tot. Wt. Act	0.00	lb	
Total Load Wt. Actual	0.00	lb	
Core % of Total Wt.	#DIV/0!		45-65%
Remainder % of Total Wt.	#DIV/0!		35-55%
Actual Load % of Nominal Target	0%		95-105%
Actual Fuel Load Density	0.0	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			

Cal. Block #: SBI-153

12%: 12.0

22%: 22.0

Wood moisture meter #: SBi-229

Room temp. (°F): 65.7 °F

Room RH (%): 25.5%

Ambiant hygrometer # : SBi. 212

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.	Pc. Wt. Dry Basis	
21.2	23.2	17.6	#DIV/0!		kg
23.7	16.4	23.6	#DIV/0!		kg
20.1	16.6	24.9	#DIV/0!		kg
20.4	23.7	24.9	#DIV/0!		kg
20.3	19.4	17.6	#DIV/0!		kg
			NA		kg

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

Signature:

Date: 2021-02-23

Manufacturer: SBI Model: 2.1 series Project #: G104576994

Category #: 10W Run: 2 Engineer: C. Pelland

RAW DRY GAS METER READINGS

	Start	End	Difference
System 1 (ft^3) Equipment #: SBI-047	437,755	488,846	51,091
System 2 (ft^3) Equipment #: SBI-046	151,214	202,233	5,019
System 3 (ft^3) Equipment #: SBI-240	94,549	102,166	7,617

AMBIENT CONDITIONS

	Start Date: 2021-02-23 Time: 11h13	End Date: 2021-02-23 Time: 17h59
Barometer. (inches Hg) Equipment #: SBI-331	29.20	~~ND~~ CB 29.35
Indoor Dry Bulb (°F) Equipment #: SBI-212	83.1°F	77.0
Indoor Humidity (%) Equipment #: SBI-212	11.8%	~~ND~~ CB 12.7

Signature: _____

Date: 2021-02-23 Page ____ of ____

Manufacturer: SBI Model: 2.1 Series

Project #: G104576994 Run: 2 Tech: _____ Reviewer: C. Pelland

SAMPLING EQUIPMENT CHECK OUT

Leakage Checks Tunnel Samplers

	SYSTEM 1 (#SBI-047)		SYSTEM 2 (#SBI-046)		SYSTEM 3 (#SBI-290)	
Plug and set vacuum at 5 in Hg. (17.3 mA)	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Plug and note initial reading on DGM (ft^3)	437,700	588,852	151,897	202,242	94,526	102,171
Wait 1 min and note final reading DGM (ft^3)	437,701	588,852	151,897	202,243	94,527	102,172
Difference between initial and final (ft^3)	0,001	0,000	0,000	0,001	0,001	0,001
Allowable leakage 4% x Sample rate	0,004	0,004	0,004	0,004	0,004	0,004
Check OK	✓	✓	✓	✓	✓	✓

Leakage Checks Flue Gas Sampler (Testo 350 #SBI-246)

Plugged Probe	Pre Test	Post Test
Check OK	✓	✓

Signature : _____

Intertek ETL SEMKO

Date: 2021-02-23 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G104576994 Run: 2 Tech: _____ Reviewer: ✓

PRETEST DILUTION TUNNEL TRAVERSE RUN

Barometric pressure (P_{bar}) 29.12 (inches Hg.) Static pressure (P_q) 0.116 (inches w.c.)
Inside diameter: Port A 8in. Port B 8in.
Tunnel cross sectional area: 0.349 ft^2
Pitot tube #: 104 Pitot tube factor: 0.844

Traverse Point	Position (inches)	Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)	$\sqrt{\Delta_p}$
A- Centroid	4.00	0.067	97.2	
B - Centroid	4.00	0.072	94.6	
A-1	0.54	0.070	95.9	
A-2	2.00	0.074	96.8	
A-3	6.00	0.064	95.6	
A-4	7.46	0.054	73.2	
B-1	0.54	0.066	95.5	
B-2	2.00	0.076	96.6	
B-3	6.00	0.067	96.3	
B-4	7.46	0.054	82.0	
		AVERAGE		

Continuous Analyzer

Project:	2.1 series (6104576994)
Project Engineer:	C. Pelland
Equipment :	Testo 350 (SBI-246)

Pre-test (after adjustment) Run: 2 Date : 2021-02-23 Time : 8h50

	Zero		Span		Mid point (record only)		Full Scale
CO [ppm]	0.0	0.0	30745ppm	29900ppm	5569 ppm	5569ppm	6000
CO2 [%]	0.0	0.0	16.04%	16.1%	16.04%	16%	50%
O2 [%]	0.0	0.0	17.87	17.9%	18.03%	18%	21%
	Actual	Calibration gaz	Actual	Calibration gaz	Actual	Calibration gaz	

Post-test Date : 2021-02-24 Time : 7h15

	Zero	Span	Cal.	Zero drift	Span drift	Cal. Drift	Max drift
CO [ppm]	0.0	30953ppm	5655 ppm	0.0	3.5%	1.5%	282
CO2 [%]	0.0	16.16%	16.07%	0.0	0.37%	0.44%	0.80%
O2 [%]	0.0	17.84%	18.38%	0.0	0.34%	2.11%	0.90%

Max drift is 5 % of full scale according to Intertek 192-Q-0602
Max drift is 1 % of full scale according to CSA B415.1-10, 6.3.1 (est-ce que c'est pour un 24h sans test ?)

Federal Register p.13709
The manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon

CSA B415.1-10 p.11
6.3 Flue gas composition
6.3.1
The percentage of carbon monoxide (CO) and carbon dioxide (CO2) in the flue gas shall be measured by a continuous infrared analyzer or equivalent. Continuous analyzers (or equivalent) shall have maximum

zero and span drift, over a 24 h period, of 1% of full scale.
6.3.2
Gas samples shall be taken by a probe inserted at the centreline of the chimney 50 mm (2 in) above the thermocouple measuring flue gas temperature.
6.3.3
Continuous analyzers (or equivalent) shall be arranged so that they are synchronized to reach 90% of their final reading within 30 s when beginning at ambient levels and responding to a calibration gas that contains at least 80% of full-scale value of the constituent being measured. The calibration gas for this test shall be introduced through the sampling probe.

Signature : _____

Intertek **ETL SEMKO**

Date: 2021-02-24 Page ____ of ____

Manufacturer: SBI Model: 21 Series

Project #: G104576994 Run: 3 Tech: ____ Reviewer: VV

COMMENTS

8:41 PM	Kidling inserted & ignited
8:45	Door closed.
9:20	One load Loaded
9:21	closed door.
11:19	STARTING & Raking for the next 1 the minute door ajar.
11:20	Loading STARTS
11:22	Door AJAR for activation
11:27	Door closed
11:31	STARTING TO close Air INTAKE
11:34	Air intake slightly closed to be closed
11:35	Air intake started shut
11:51	FAN ON (Low Speed)
19:05	Test is over

TEST LOAD CONFIGURATION

Pre-load

Fuel load data - HIGH

Date: 2021-02-24

Run #: 3

Rev date: 05-07-2017

Doc rev: Rev 2

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 10 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft³			
Usable Firebox Volume	1.03	ft³			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.80	to 10.80	lb		
Core Target Wt. Allowable Range	4.6	to 6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to 5.70	lb		
				Mid-Point	
Core Load Pc. Wt. Allowable Range	1.50	to 2.60	lb	2.05	
Remainder Load Pc. Wt. Allowable Range	1.00	to 5.70	lb	3.35	
Pc. #					
Core Load Piece Wt. Actual 1	2.131		lb		
2	2.228		lb		
3	2.125		lb		
Core Load Total. Wt. Actual	0.00		lb		
Pc. #					
Remainder Load Piece Wt. 1	4.278		lb		
(1 to 3 Pcs.) 2			lb		
3			lb		
Remainder Load Piece Weight Ratio - Small/Large	#NOMBRE!				≤ 67%
Remainder Load Tot. Wt. Act	0.00		lb		
Total Load Wt. Actual	0.00		lb		
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	0%			Out of Range	95-105%
Actual Fuel Load Density	0.0		lb/ft³		

Kindling and Start-up Fuel

Maximim Kindling Wt. (20% of Tot. Load Wt.)	0.00	lb		
Actual Kindling Wt.	2.148	lb	#DIV/0!	#DIV/0!
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)	0.00	lb		
Actual Start-up Fuel Wt.	3.202	lb	In Range	#DIV/0!

Cal. Block #: SBI-153

12%: 12.0 %

22%: 22.9

Wood moisture meter #: SBi-229

Room temp. (°F): 69.2°F

Room RH (%): 26.9 %

Ambiant hygrometer # : ~~26.9%~~ SBi-212

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		
24.5	24.9	19.3			0
29.2	23.2	20.4			0
19.5	21.9	18.1			0
17.0	20.4	20.9			0
					0
					0

Kindling Moisture (%-dry basis)

10	10	10			kg

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

17.0	27.1	17.9			kg

Total Wt. All Fuel Added (dry basis) → kg

Total Wt. All Fuel Burned (dry basis) → kg

Signature:

Fuel load data - LOW

Date: 2021-02-24 **Rev date:** 05-07-2017

Run #: 3 **Doc rev:** Rev 2

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 12 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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

Nominal Required Load Density (wet basis)	10	lb/ft³			
Usable Firebox Volume	1.03	ft³			
Total Nom. Load Wt. Target	10.3	lb			
Total Load Wt. Allowable Range	9.79	to	10.82	lb	
Core Target Wt. Allowable Range	4.635	to	6.70	lb	
Remainder Load Wt. Allowable Range	3.61	to	5.67	lb	
					Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.55	to	2.58	lb	2.06
Remainder Load Pc. Wt. Allowable Range	1.03	to	3.09	lb	2.06

	Pc. #		
Core Load Piece Wt. Actual	1	2.298	lb
	2	2.401	lb
	3	2.649	lb
Core Load Total. Wt. Actual		0.00	lb
	Pc. #		
Remainder Load Piece Wt.	1	3.548	lb
(2 or 3 Pcs.)	2	2.020	lb
	3		lb
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!	≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb
Total Load Wt. Actual		0.00	lb
Core % of Total Wt.		#DIV/0!	45-65%
Remainder % of Total Wt.		#DIV/0!	35-55%
Actual Load % of Nominal Target		0.0	95-105%
Actual Fuel Load Density		0.0 lb/ft³	

Allowable Charcoal Bed Wt. Range (lb)	0.1	to	-0.1		Mid-Point
Actual Charcoal Bed Wt.			lb	Out of Range	0.0
Actual Fuel Load Ending Wt.			lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0.0	lb		

Cal. Block #: SBI-153 12%: 12.0

22%: 22.0

Wood moisture meter #: SBI-229

Room temp. (°F): 69.2

Room RH (%): 29.9

Ambiant hygrometer # : SBI-212

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.	Pc. Wt. Dry Basis	
27.7	17.2	14.5	#DIV/0!		kg
19.2	19.3	20.8	#DIV/0!		kg
18.7	18.8	22.5	#DIV/0!		kg
16.2	22.4	23.1	#DIV/0!		kg
20.2	17.1	20.6	#DIV/0!		kg
			NA		kg

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

Signature:

Date: 2021-02-24

Manufacturer: SBI Model: 2.1 series Project #: G104576994

Category #: LOW Run: 3 Engineer: C. Pelland

RAW DRY GAS METER READINGS

	Start	End	Difference
System 1 (ft^3) Equipment #: SBI-047	488,922	549,061	60,139
System 2 (ft^3) Equipment #: SBI-046	202,366	262,208	59,842
System 3 (ft^3) Equipment #: SBI-290	102,214	109,772	7,558

AMBIENT CONDITIONS

	Start Date: 2021-02-24 Time: 11h19	End Date: 2021-02-24 Time: 19h05
Barometer. (inches Hg) Equipment #: SBI-331	29,50	29,40
Indoor Dry Bulb (°F) Equipment #: SBI-212	74,4	76,7
Indoor Humidity (%) Equipment #: SBI-212	14,5	16,1

Signature: _____

SBI

Date: 2021-02-24 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G1045769 4 Run: 3 Tech: ____ Reviewer: C. Pelland

SAMPLING EQUIPMENT CHECK OUT

Leakage Checks Tunnel Samplers

	SYSTEM 1 (#SBI-047)		SYSTEM 2 (#SBI-046)		SYSTEM 3 (#SBI-290)	
Plug and set vacuum at 5 in Hg. (17.3 mA)	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Plug and note initial reading on DGM (ft^3)	488,853	549,105	202,249	262,236	102,176	109,778
Wait 1 min and note final reading DGM (ft^3)	488,853	549,105	202,250	262,236	102,176	109,778
Difference between initial and final (ft^3)	0,000	0,000	0,001	0,000	0,000	0,000
Allowable leakage 4% x Sample rate	0,004	0,004	0,004	0,004	0,004	0,004
Check OK	✓	✓	✓	✓	✓	✓

Leakage Checks Flue Gas Sampler (Testo 350 #SBI-246)

Plugged Probe	Pre Test	Post Test
Check OK	✓	✓

Signature : ____

Intertek ETL SEMKO

Date: 2021-02-24 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G104576994 Run: 3 Tech: _____ Reviewer: _____

PRETEST DILUTION TUNNEL TRAVERSE RUN

Barometric pressure (P_{bar}) 29.5 (inches Hg.) Static pressure (P_q) 0.116 (inches w.c.)
Inside diameter: Port A 8in. Port B 8in.
Tunnel cross sectional area: 0.349 ft^2
Pitot tube #: 104 Pitot tube factor: 0.844

Traverse Point	Position (inches)	Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)	$\sqrt{\Delta_p}$
A- Centroid	4.00	0.070	100.3	
B - Centroid	4.00	0.072	96.0	
A-1	0.54	0.067	99.5	
A-2	2.00	0.076	100.4	
A-3	6.00	0.063	99.9	
A-4	7.46	0.054	73.0	
B-1	0.54	0.067	99.5	
B-2	2.00	0.075	99.9	
B-3	6.00	0.065	100.0	
B-4	7.46	0.0751 (63)	85.8	
		AVERAGE		

Continuous Analyzer

Project:	2.1 Seves (G1045769944)
Project Engineer:	C. Pellard
Equipment :	Testo 350 (SBI-246)

Pre-test (after adjustment) Run: 3 Date : 2024-02-24 Time : 7h15

	Zero		Span		Mid point (record only)		Full Scale
CO [ppm]	0.0	0.0	30,953 ppm	29,900 ppm	5655 ppm	5569 ppm	6000
CO2 [%]	0.0	0.0	16.16 %	16.1 %	16.07 %	16.0 %	50%
O2 [%]	0.0	0.0	17.84 %	17.9 %	18.38 %	18.0 %	21%
	Actual	Calibration gaz	Actual	Calibration gaz	Actual	Calibration gaz	

Post-test Date : 2024-02-25 Time : 8h05

	Zero	Span	Cal.	Zero drift	Span drift	Cal. Drift	Max drift
CO [ppm]	0.0	30,575 ppm	5614 ppm	0 %	2.3 %	0.8 %	282
CO2 [%]	0.0	16.03 %	15.88 %	0 %	0.5 %	0.8 %	0.80%
O2 [%]	0.0	17.91 %	18.09 %	0 %	0.06 %	0.5 %	0.90%

Max drift is 5 % of full scale according to Intertek 192-Q-0602
Max drift is 1 % of full scale according to CSA B415.1-10, 6.3.1 (est-ce que c'est pour un 24h sans test ?)

Federal Register p.13709
The manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon

CSA B415.1-10 p.11
6.3 Flue gas composition
6.3.1
The percentage of carbon monoxide (CO) and carbon dioxide (CO2) in the flue gas shall be measured by a continuous infrared analyzer or equivalent. Continuous analyzers (or equivalent) shall have maximum

zero and span drift, over a 24 h period, of 1% of full scale.
6.3.2
Gas samples shall be taken by a probe inserted at the centreline of the chimney 50 mm (2 in) above the thermocouple measuring flue gas temperature.
6.3.3
Continuous analyzers (or equivalent) shall be arranged so that they are synchronized to reach 90% of their final reading within 30 s when beginning at ambient levels and responding to a calibration gas that contains at least 80% of full-scale value of the constituent being measured. The calibration gas for this test shall be introduced through the sampling probe.

Signature : _____

Intertek ETL SEMKO

Date: 2021-02-25 Page ____ of ____

Manufacturer: SBI Model: 2.1 Series

Project #: G104576894 Run: 4 Tech: ____ Reviewer: ✓

COMMENTS

9:58	st Kindling Lite.
10:00	Door closed
10:13	Kidling readjust.
10:38	at 1.18 lbs: door open loading!
10:39	Loading complete - ~ activity (Picture Taken)
10:42	Door closed
10:48	FAN-ON (high)
12:07	Test ends.

final weight : 2.25 lbs (on scale)

Residual high fire load (end) 2.25 - 1.18 : 1.07 lbs.
: 9.9% of load.

TEST LOAD CONFIGURATION

Fuel load data - HIGH

Date: 2021-02-25 **Rev date:** 05-07-2017

Run #: 4 **Doc rev:** Rev 2

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 10 lb/ft³ Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft³				
Usable Firebox Volume	1.03	ft³				
Total Nom. Load Wt. Target	10.3	lb				
Total Load Wt. Allowable Range	9.80	to	10.80	lb		
Core Target Wt. Allowable Range	4.6	to	6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb		
					Mid-Point	
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb	2.05	
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb	3.35	

	Pc. #			
Core Load Piece Wt. Actual	1	1.652	lb	
	2	2.355	lb	
	3	2.326	lb	
Core Load Total. Wt. Actual		0.00	lb	
	Pc. #			
Remainder Load Piece Wt.	1	4.442	lb	
(1 to 3 Pcs.)	2		lb	
	3		lb	
Remainder Load Piece Weight Ratio - Small/Large		#NOMBRE!		≤ 67%
Remainder Load Tot. Wt. Act		0.00	lb	
Total Load Wt. Actual		0.00	lb	
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		0%	Out of Range	95-105%
Actual Fuel Load Density		0.0	lb/ft³	

Kindling and Start-up Fuel

Maximim Kindling Wt. (20% of Tot. Load Wt.)	0.00	lb		
Actual Kindling Wt.	2.128	lb	#DIV/0!	#DIV/0!
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)	0.00	lb		
Actual Start-up Fuel Wt.	3.225	lb	In Range	#DIV/0!

Cal. Block #: SBI-153 12%: 12.0%

22%: 22.0%

Wood moisture meter #: SBi-214

Room temp. (°F): 69.4 °F

Room RH (%): 24.6%

Ambiant hygrometer # : SBi-212

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.	
17.6	19.0	18.9		0
20.2	19.7	25.5		0
18.4	24.2	17.7		0
18.7	22.3	18.7		0
				0
				0

Kindling Moisture (%-dry basis)

10	10	10		kg

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

22.1	19.0	17.6		kg

Total Wt. All Fuel Added (dry basis) → kg

Total Wt. All Fuel Burned (dry basis) → kg

Signature:

Date: 2021-02-25

Manufacturer: SBI Model: 7.1 series Project #: G104576994

Category #: High Run: 4 Engineer: C. Pelland

RAW DRY GAS METER READINGS

	Start	End	Difference
System 1 (ft^3) Equipment #: SBI-047	549,166	565.041	15,875
System 2 (ft^3) Equipment #: SBI-046	262,425	278.436	16.011
System 3 (ft^3) Equipment #: SBI200	109,803	117,160	7,357

AMBIENT CONDITIONS

	Start Date: 2021-02-25 Time: 9h58	End Date: 2021-02-25 Time: 12h25
Barometer. (inches Hg) Equipment #: SBI-331	29.55	29,60
Indoor Dry Bulb (°F) Equipment #: SBI-212	70,1	82.8
Indoor Humidity (%) Equipment #: SBI-212	22,3	13.4

Signature: _____

Date: 2021-02-25 Page ____ of ____

Manufacturer: SBI Model: 2.1 series

Project #: G1045769 94 Run: 4 Tech: ____ Reviewer: C. Pelland

SAMPLING EQUIPMENT CHECK OUT

Leakage Checks Tunnel Samplers

	SYSTEM 1 (#SBI-047)		SYSTEM 2 (#SBI-046)		SYSTEM 3 (#SBI-790)	
Plug and set vacuum at 5 in Hg. (17.3 mA)	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Plug and note initial reading on DGM (ft^3)	549,106	565.049	262,268	278.486	109,780	117,164
Wait 1 min and note final reading DGM (ft^3)	549,106	565.049	262,268	278.486	109,780	117,164
Difference between initial and final (ft^3)	0,000	ϕ	0,000	ϕ	0,000	0,000
Allowable leakage 4% x Sample rate	0,004	0,004	0,004	0,004	0,004	0,004
Check OK	✓	✓	✓	✓	✓	✓

Leakage Checks Flue Gas Sampler (Testo 350 #SBI-246)

Plugged Probe	Pre Test	Post Test
Check OK	✓	✓

Signature : ____

Intertek ETL SEMKO

Date: 2021-07-15 Page ____ of ____

Manufacturer: SIBI Model: 7.1 series

Project #: G104576994 Run: 4 Tech: _____ Reviewer: _____

PRETEST DILUTION TUNNEL TRAVERSE RUN

Barometric pressure (P_{bar}) 29.55 (inches Hg.) Static pressure (P_q) 0.121 (inches w.c.)

Inside diameter: Port A 8in. Port B 8in.

Tunnel cross sectional area: 0.349 ft^2

Pitot tube #: 104 Pitot tube factor: 0.844

Traverse Point	Position (inches)	Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)	$\sqrt{\Delta_p}$
A- Centroid	4.00	0.074	68.3	
B - Centroid	4.00	0.077	68.3	
A-1	0.54	0.078	68.3	
A-2	2.00	0.078	68.3	
A-3	6.00	0.066	68.3	
A-4	7.46	0.064	67.6	
B-1	0.54	0.069	68.3	
B-2	2.00	0.077	68.3	
B-3	6.00	0.072	68.3	
B-4	7.46	0.051	68.5	
		AVERAGE		

Continuous Analyzer

Project:	2-Series (G104576994)
Project Engineer:	C. Pelland
Equipment :	Testo 350 (SBI-246)

Pre-test (after adjustment) Run: 4 Date : 2021-02-25 Time : 8h54

	Zero		Span		Mid point (record only)		Full Scale
CO [ppm]	0.0	0.0	30575 ppm	29900 ppm	5614 ppm	5568 ppm	6000
CO2 [%]	0.0	0.0	16.03 %	16.1 %	15.88 %	16.0 %	50%
O2 [%]	0.0	0.0	17.91 %	17.9 %	18.09 %	18.0 %	21%
	Actual	Calibration gaz	Actual	Calibration gaz	Actual	Calibration gaz	

Post-test Date : 2021-02-25 Time : 13h05

	Zero	Span	Cal.	Zero drift	Span drift	Cal. Drift	Max drift
CO [ppm]	0.0	30591 ppm	5568 ppm	0 %	2.31 %	0.02 %	282
CO2 [%]	0.0	16.10 %	16.05 %	0 %	0 %	0.31 %	0.80%
O2 [%]	0.0	18.7 %	17.39 %	0 %	4.47 %	3.5 %	0.90%

Max drift is 5 % of full scale according to Intertek 192-Q-0602
Max drift is 1 % of full scale according to CSA B415.1-10, 6.3.1 (est-ce que c'est pour un 24h sans test ?)

Federal Register p.13709
The manufacturer must have the approved test laboratory measure the efficiency, heat output and carbon

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6.3.2
Gas samples shall be taken by a probe inserted at the centreline of the chimney 50 mm (2 in) above the thermocouple measuring flue gas temperature.
6.3.3
Continuous analyzers (or equivalent) shall be arranged so that they are synchronized to reach 90% of their final reading within 30 s when beginning at ambient levels and responding to a calibration gas that contains at least 80% of full-scale value of the constituent being measured. The calibration gas for this test shall be introduced through the sampling probe.

Signature : _____

Time	Ambiant	Flue	Dilution Tunnel	Firebox Top	Firebox Back	Firebox Right	Firebox Left	Firebox Botto
0	74.2751	281.4400051	85.53013684	479.3472238	604.4016565	454.448848	451.8773115	502.760868
10	75.8764	337.6351916	86.75863704	467.92441	555.1520178	452.2073426	427.556931	499.052985
20	72.9064	411.3232362	93.04626007	747.5475384	509.0588652	465.8452047	413.4462446	479.657432
30	67.7142	424.2620281	93.84986218	826.1205769	423.5521377	496.4782484	426.0357555	396.849687
40	68.2134	435.3971266	93.50252146	868.5492207	375.0402266	516.0215443	437.1248074	333.456577
50	68.7395	442.1807741	94.02638105	888.829986	358.1546006	529.7554848	453.9631682	298.518894
60	67.7802	423.004239	93.1555971	871.9284985	356.0299493	539.6624132	475.4998074	278.994873
70	70.7514	377.1127994	88.60403206	759.3548165	360.9316022	539.2182884	490.0578295	269.948119
80	79.7552	352.4463293	88.48958712	681.7868438	372.6099272	532.4674853	493.6733343	270.536582
90	82.6913	318.8297512	87.52469564	606.040977	370.2220723	522.4901534	490.25869	273.566896
100	83.808	294.8885435	86.11018054	545.8414394	362.9353114	507.6425612	481.2192617	276.938243
110	82.985	263.6963257	84.20762335	486.5966155	351.4998939	488.6010042	466.615359	279.133854
120	83.7162	232.1557287	81.9657658	407.0400427	335.5840954	466.0850014	441.3439919	279.186055
130	83.2411	216.5508461	80.96364485	361.7959128	325.1269687	441.6071801	413.9951734	277.572243
140	82.5503	207.8851332	79.9665658	336.3449286	318.531222	419.585101	389.8856655	274.785729
150	81.9739	203.6824125	79.0140294	324.6343229	314.8909695	403.8595608	370.3546834	271.925392
160	82.0063	199.4131868	78.43382374	315.4768005	314.1029879	391.8276999	355.0916669	269.943423
170	82.0011	196.0221865	78.23234553	309.7003045	314.8753786	381.1409654	343.5308576	268.46307
180	81.6405	194.9432317	78.25452706	306.4270974	317.1244347	371.0758203	334.9537556	267.064246
190	81.5311	190.8841391	77.5635323	300.9643442	315.5681199	361.7425864	327.9882724	265.957214
200	80.9345	187.2458924	77.43683618	293.2249012	311.1288799	351.0849644	321.6848814	264.562901
210	80.7561	183.3526244	77.10954583	283.5408972	304.9600683	339.1500405	315.8212733	262.748237
220	80.74	179.522108	76.67274973	275.1664553	295.9589049	325.8685184	310.0508974	260.710902
230	80.3999	176.7042177	76.29331338	268.798885	285.4414377	313.1991509	304.7852246	258.753168
240	80.201	174.3588927	76.33821971	262.7694174	277.5460334	302.2968172	299.5251519	257.200634
250	79.3962	172.4031594	75.91109011	256.3776451	271.5080821	292.2269831	293.8392649	255.573088
260	79.2418	169.3235061	75.38043838	251.3810019	266.8449071	282.9951439	288.6632224	253.947249
270	78.9799	163.5038943	75.15250172	242.5834389	261.3024663	274.2424167	281.8528515	251.066513
280	78.8098	158.2127615	74.41344661	232.8670102	255.9885394	265.2031818	272.0168882	245.898304
290	78.7055	153.262767	74.12636866	223.7500618	247.8658825	256.615443	261.37137	240.311723
300	78.5681	149.9257073	73.91343937	216.2938622	239.0511105	248.1720032	250.8541343	234.814906
310	78.0128	144.582501	73.34022391	208.3530616	230.2765437	240.0225323	241.3587502	230.201966
320	77.5761	138.8963248	73.06093009	197.9680234	220.7920839	230.9802574	230.7984632	224.27282
330	77.1998	134.5737216	72.59893736	189.3043789	216.4983575	222.542201	219.9760077	217.04106

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	0.1891554	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	281.44	74.27511	85.53014	63.05497	63.13103	77.12469	63.22381	63.48248	71.93682			394.516	107.713	0.053447	0.074708				12.8	12.61	13.93	3.80	-0.236638	-0.23132
10.0	337.6352	75.87641	86.75864	63.66305	63.241	82.1312	63.81764	63.62962	84.73353			395.736	109.024	0.067658	0.074379				11.9	11.69	13.97	3.85	-0.233086	-0.23141
20.0	411.3232	72.90645	93.04626	63.80509	63.3137	84.82531	63.89325	63.73573	86.18602			396.942	110.312	0.07754	0.075477				10.4	10.23	14.01	3.89	-0.230615	-0.23113
30.0	424.262	67.71416	93.84986	63.90673	63.38318	85.79109	63.97107	63.78014	79.77916			398.147	111.585	0.078359	0.074211				8.9	8.76	14.05	3.94	-0.23041	-0.23145
40.0	435.3971	68.21337	93.50252	64.04003	63.53741	83.796	64.17371	63.91888	86.20352			399.372	112.880	0.076933	0.076033				7.4	7.25	14.10	3.98	-0.230767	-0.23099
50.0	442.1808	68.73948	94.02638	64.16155	63.6414	84.62692	64.28353	64.0333	86.06422			400.586	114.161	0.077761	0.075849				6.0	5.77	14.14	4.03	-0.23056	-0.23104
60.0	423.0042	67.78018	93.1556	64.22978	63.73012	84.96158	64.38893	64.13078	85.58249			401.816	115.453	0.074806	0.076556				4.7	4.50	14.18	4.08	-0.231298	-0.23086
70.0	377.1128	70.7514	88.60403	64.37063	63.83172	84.79006	64.50972	64.21983	85.37796			403.044	116.750	0.07157	0.076561				3.8	3.60	14.23	4.12	-0.232107	-0.23086
80.0	352.4463	79.75517	88.48959	64.42939	63.94899	84.23204	64.62486	64.36506	84.7097			404.270	118.037	0.066424	0.07606				3.1	2.88	14.27	4.17	-0.233394	-0.23099
90.0	318.8298	82.69133	87.5247	64.53278	64.02233	83.88355	64.72532	64.4622	84.07715			405.510	119.337	0.062457	0.076449				2.6	2.38	14.31	4.21	-0.234386	-0.23089
100.0	294.8885	83.80804	86.11018	64.54551	64.10065	83.49608	64.76102	64.50166	83.90319			406.747	120.642	0.05787	0.076807				2.2	2.02	14.36	4.26	-0.235533	-0.2308
110.0	263.6963	82.98498	84.20762	64.64156	64.15786	83.37316	64.84745	64.59979	83.90772			407.984	121.942	0.051922	0.075993				2.0	1.83	14.40	4.30	-0.23702	-0.231
120.0	232.1557	83.71623	81.96577	64.65915	64.16502	82.86583	64.90973	64.64621	83.62397			409.231	123.250	0.046746	0.077504				1.9	1.74	14.45	4.35	-0.238314	-0.23062
130.0	216.5508	83.24108	80.96364	64.65694	64.19079	82.41614	64.88914	64.68367	83.19597			410.485	124.572	0.043454	0.075824				1.9	1.66	14.49	4.40	-0.239136	-0.23104
140.0	207.8851	82.55032	79.96657	64.77142	64.25016	82.33752	64.9606	64.72882	82.87485			411.744	125.901	0.042	0.076777				1.8	1.56	14.53	4.44	-0.2395	-0.23081
150.0	203.6824	81.97387	79.01403	64.8728	64.33193	82.38876	65.06698	64.78468	82.78411			412.990	127.225	0.042003	0.077474				1.7	1.46	14.58	4.49	-0.239499	-0.23063
160.0	199.4132	82.00628	78.43382	64.82322	64.36504	82.46795	65.04329	64.85245	82.6265			414.239	128.553	0.039444	0.076689				1.5	1.36	14.62	4.54	-0.240139	-0.23083
170.0	196.0222	82.00106	78.23235	64.83716	64.37272	86.62923	65.05013	64.84467	85.12496			415.490	129.880	0.038846	0.077789				1.4	1.23	14.67	4.58	-0.240288	-0.23055
180.0	194.9432	81.64053	78.25453	64.88329	64.39087	85.37236	65.05074	64.92714	86.46169			416.741	131.202	0.039606	0.077972				1.3	1.11	14.71	4.63	-0.240098	-0.23051
190.0	190.8841	81.53114	77.56353	64.93878	64.42716	84.14132	65.15216	64.94421	84.98371			417.987	132.525	0.037484	0.07735				1.2	1.01	14.75	4.68	-0.240629	-0.23066
200.0	187.2459	80.93449	77.43684	64.92657	64.41119	82.16756	65.17795	64.95413	81.50494			419.237	133.850	0.037863	0.077645				1.1	0.91	14.80	4.72	-0.240534	-0.23059
210.0	183.3526	80.75614	77.10955	64.9101	64.43733	85.11325	65.16316	64.98778	83.98964			420.491	135.175	0.036726	0.078922				1.0	0.80	14.84	4.77	-0.240818	-0.23027
220.0	179.5221	80.73997	76.67275	64.92597	64.4486	86.26635	65.22662	64.99445	85.46339			421.743	136.497	0.036476	0.076846				0.9	0.71	14.89	4.82	-0.240881	-0.23079
230.0	176.7042	80.39988	76.29331	65.03175	64.50637	86.60154	65.27895	65.05222	86.02931			422.989	137.818	0.036228	0.07792				0.8	0.62	14.93	4.86	-0.240943	-0.23052
240.0	174.3589	80.20098	76.33822	65.14246	64.57117	86.64869	65.34831	65.1291	86.22026			424.235	139.135	0.033095	0.078631				0.7	0.53	14.98	4.91	-0.241726	-0.23034
250.0	172.4032	79.39615	75.91109	65.16195	64.63368	86.94595	65.40746	65.18241	86.1755			425.484	140.454	0.034539	0.076615				0.6	0.45	15.02	4.96	-0.241365	-0.23085
260.0	169.3235	79.24179	75.38044	65.22949	64.69413	82.2816	65.43032	65.2583	82.2315			426.737	141.778	0.033557	0.079274				0.6	0.37	15.06	5.00	-0.241611	-0.23018
270.0	163.5039	78.97987	75.1525	65.19294	64.70727	85.06915	65.37206	65.20547	82.6962			427.983	143.101	0.030346	0.077806				0.5	0.30	15.11	5.05	-0.242413	-0.23055
280.0	158.2128	78.80978	74.41345	65.08183	64.64166	86.19125	65.30564	65.14405	83.49203			429.224	144.420	0.029908	0.079606				0.4	0.23	15.15	5.10	-0.242523	-0.2301
290.0	153.2628	78.70545	74.12637	65.04905	64.59175	86.76612	65.22943	65.14383	84.11859			430.487	145.750	0.029418	0.077935				0.4	0.17	15.20	5.14	-0.242645	-0.23052
300.0	149.9257	78.56811	73.91344	64.94294	64.52739	86.80491	65.22522	65.01268	83.89145			431.756	147.086	0.027947	0.077006				0.3	0.11	15.24	5.19	-0.243013	-0.23075
310.0	144.5825	78.01284	73.34022	64.92026	64.48174	86.58792	65.12905	65.00629	84.02701			433.006	148.413	0.027235	0.078601				0.3	0.07	15.29	5.24	-0.243191	-0.23035
320.0	138.8963	77.57608	73.06093	64.94431	64.46276	86.42786	65.12178	64.99484	83.97471			434.270	149.743	0.02456	0.077451				0.2	0.03	15.33	5.29	-0.24386	-0.23064
330.0	134.5737	77.19983	72.59894	64.88358	64.40829	86.43223	65.12578	64.92325	83.89304			435.543	151.084	0.023807	0.078989				0.2	0.00	15.37	5.33	-0.244048	-0.23025

Intertek Testing Services

Total Quality. Assured.

Manufacturer:	**SBI**			RESULTS	
Model:	**2.1 Series**		**Average emission rate:(gr/hr)**		**1.312**
Date:	**2-22-21**		Burn Rate (Dry kg/hr):		0.863
Run:	**1**				
Project #:	**G104576994**				
Test Duration: (minutes)	**330**				
PRESSURE FACTOR:		0.98763	BAROMETRIC PRESSURE		
				Average:	29.55
TEMPERATURE FACTORS				Start:	29.7
DGM #1:		1.00684		End:	29.4
DGM #2:		1.00619			
			DRY GAS METER VALUES		
VOLUMES SAMPLED			DGM #1	Final:	435.543
DGM #1:		41.20461		Initial:	394.516
DGM #2:		43.57388			
			DGM #2	Final:	151.084
TOTAL TUNNEL VOLUME (scf):		100450		Initial:	107.713
SAMPLE RATIOS			TEMPERATURES (DEG. RANKIN)		
Sample Train 1:		2437.843		DGM #1:	524.415
Sample Train 2:		2305.288		DGM #2:	524.752
TOTAL EMISSIONS			CALIBRATION FACTORS		
Sample Train 1 (g):		**6.826**		DGM #1:	1.0100
Sample Train 2 (g):		**7.607**		DGM #2:	1.0110
EMISSION RATES			TUNNEL FLOW RATE:		304.395
Sample Train 1 (g/hr):		**1.24**			
Sample Train 2 (g/hr):		**1.38**	PARTICULATE CATCH (mg)		
				Total Sample Train 1:	2.8
				Total Sample Train 2:	3.3
				Filter and seal Sample Train 1:	1.9
MAX Allowed		7.50%		Filter and seal Sample Train 2:	2.3
				Probe Sample Train 1:	0.9
DEVIATION:		5.41%		Probe Sample Train 2:	1

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	Room Temp		Bar Pressure		Relative Humidity		Air Velocity	
	Before	After	Before	After	Before	After	Before	After
	74	77	29.70	29.40	8.6	9.5	0	0

Average Dilution Tunnel Measurements						Sample Data	
Burn	Velocity	Flow Rate	Temp	Total Sample		Particulate Catch	
Time	(Ft/sec)	(dscf/min)	(R)	1	2	1	2
330	15.40	304.39	541.20	41.20	43.57	2.80	3.30

	Dilution Tunnel Dual Train Precision						
	Sample Ratios		Total Emissions (g)				
	Train 1	Train 2	Train 1	Train 2	Deviation (%)		
	2437.84	2305.29	6.83	7.61	5.41%		

Burn				Initial		Run	Average
Rate		Surface		Draft		Time	Draft
0.863		0.000		0.053		330.000	0.047

Run	Date	Burn Rate	Emission
1	2021-02-22	0.863	1.312

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E&E Tunnel Traverse Worksheet

Static Pressure: 0.118
Barometer: 29.7

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
A CENTER	0.070	93.200	0.2646
B CENTER	0.077	88.500	0.2775
A1	0.073	93.000	0.2702
A2	0.080	93.100	0.2828
A3	0.067	92.700	0.2588
A4	0.046	74.200	0.2145
B1	0.070	91.500	0.2646
B2	0.079	91.800	0.2811
B3	0.070	91.700	0.2646
B4	0.055	82.000	0.2345
AVERAGE		89.17	0.2613

PITOT CONSTANT= 0.9641

E&E FUEL LOAD DATA SHEET

			Test Load Weight: Lower	Ideal	Upper	
Firebox Volume:	1.03	cu. ft	11.74	12.36	12.98	
Load Volume:	1.0300	cu. ft	Loading Density:	12.431	lbs./ft3	
Number of Spacers:			Load Density:	12.431	lbs./ft3	

Piece Size: Thick	x Wide	x Length	Weight lbs	Meter Moisture Content Dry Uncorrected %			
2	4	16	2.33	21.20	19.10	18.60	84.00
2	4	16	2.29	26.90	20.40	20.30	84.00
2	4	16	2.67	18.10	19.10	17.60	84.00
2	4	16	3.56	19.80	23.20	16.40	84.00
2	4	16	1.95	20.90	20.40	21.20	84.00
							0.00
							0.00
							0.00
							0.00

Test Load Weigh 12.804 lbs. **Dry Weigh** 4.831 kg.

Average Moisture Content: %

Dry: 20.21 20.213 Wet: 16.815

Pre-test moisture content: %

#DIV/0! #DIV/0! Wet: #DIV/0!

Coal Bed Range: 2.6 lbs. to 3.2 lbs. 20% to 25% of test load

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method

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

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

Values to be input manually

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

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	12.36	lb				
Total Load Wt. Allowable Range	11.74	to	12.98	lb		
Core Target Wt. Allowable Range	5.562	to	8.03	lb		
Remainder Load Wt. Allowable Range	4.33	to	6.80	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.85	to	3.09	lb		2.47
Remainder Load Pc. Wt. Allowable Range	1.24	to	3.71	lb		2.47
	Pc. #					Ordre
Core Load Piece Wt. Actual	1	2.33	lb	In Range		
	2	2.29	lb	In Range		
	3	2.67	lb	In Range		
Core Load Total. Wt. Actual		7.29	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3.56	lb	In Range		
(2 or 3 Pcs.)	2	1.95	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		55%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		5.52	lb	In Range		
Total Load Wt. Actual		12.80	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		104%		In Range		95-105%
Actual Fuel Load Density		12.4	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	1.3	to	2.5			Mid-Point
Actual Charcoal Bed Wt.		1.3	lb	In Range		1.9
Actual Fuel Load Ending Wt.		0.2	lb	lb		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		12.6	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
21.2	19.1	18.6	19.6	In Range	1.95	lb	0.88	kg
26.9	20.4	20.3	22.5	In Range	1.87	lb	0.85	kg
18.1	19.1	17.6	18.3	In Range	2.26	lb	1.02	kg
19.8	23.2	16.4	19.8	In Range	2.97	lb	1.35	kg
20.9	20.4	21.2	20.8	In Range	1.62	lb	0.73	kg
					0.00	lb	0.00	kg
Total Load Ave. MC % (dry basis)			20.1	In Range				
Total Load Ave. MC % (wet basis)			16.7					
Total Test Load Weight (dry basis) →					10.66	lb	4.84	kg
Total Fuel Weight Burned During Test Run (dry basis)					10.5	lb	4.75	kg

1.9206

14.70

3.82 braise

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method

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

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	10.30	lb				
Total Load Wt. Allowable Range	9.80	to	10.80	lb		
Core Target Wt. Allowable Range	4.60	to	6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb		2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb		3.35
	Pc. #					
Core Load Piece Wt. Actual	1	2.02	lb	In Range		
	2	2.36	lb	In Range		
	3	1.99	lb	In Range		
Core Load Total. Wt. Actual		6.37	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.39	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		100%		NA		≤ 67%
Remainder Load Tot. Wt. Act		4.39	lb	In Range		
Total Load Wt. Actual		10.76	lb	In Range		
Core % of Total Wt.		59%		In Range		45-65%
Remainder % of Total Wt.		41%		In Range		35-55%
Actual Load % of Nominal Target		105%		In Range		95-105%
Actual Fuel Load Density		10.5	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		2.15	lb			
Actual Kindling Wt.		2.15	lb	In Range		20.0%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		3.23	lb			
Actual Start-up Fuel Wt.		3.21	lb	In Range		29.8%
Allowable Residual Start-up Fuel Wt. Range	1.1	to	2.2	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.10	lb	In Range		1.6
Total Wt. All Fuel Added (wet basis)		16.12	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.0	to	1.2	lb		1.1
Actual Fuel Load Ending Wt.		0.0	lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
20	15	20.4	18.5	In Range	1.71	lb	0.77	kg
25.8	20.4	26.5	24.2	In Range	1.90	lb	0.86	kg
25.4	22.4	12	19.9	In Range	1.66	lb	0.75	kg
24.9	20	22.7	22.5	In Range	3.59	lb	1.63	kg
					0.00	lb	0.00	kg
					0.00	lb	0.00	kg
Total Load Ave. MC (%-dry basis)			21.6	In Range				
Total Load Ave. MC % (wet basis)			17.8					
Total Test Load Weight (dry basis) →					8.85	lb	4.01	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	1.96	lb	0.89	kg
Start-up Fuel Moisture Readings (%-dry basis)								
20.5	16.4	21.5	19.5	In Range	2.68	lb	1.22	kg
Total Wt. All Fuel Added (dry basis) →					13.49	lb	6.12	kg
Total Wt. All Fuel Burned (dry basis) →					12.4	lb	5.6	kg

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	4.6907659	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	281.44	74.27511	85.53014	64.51104	64.51104	73.61479						87.125		0.053447	0.074708				12.8	8.11	3.08	0.00	-0.236638	-0.23132
10.0	337.6352	75.87641	86.75864	64.56288	64.56288	86.38106						88.332		0.067658	0.074379				11.9	7.19	3.12		-0.233086	-0.23141
20.0	411.3232	72.90645	93.04626	64.68775	64.68775	83.34858						89.552		0.07754	0.075477				10.4	5.73	3.16		-0.230615	-0.23113
30.0	424.262	67.71416	93.84986	64.79854	64.79854	81.37961						90.790		0.078359	0.074211				8.9	4.26	3.20		-0.23041	-0.23145
40.0	435.3971	68.21337	93.50252	65.08922	65.08922	87.91541						92.022		0.076933	0.076033				7.4	2.74	3.25		-0.230767	-0.23099
50.0	442.1808	68.73948	94.02638	65.25577	65.25577	84.36844						93.265		0.077761	0.075849				6.0	1.27	3.29		-0.23056	-0.23104
60.0	423.0042	67.78018	93.1556	65.35487	65.35487	82.17697						94.512		0.074806	0.076556				4.7	0.00	3.34		-0.231298	-0.23086

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Intertek Testing Services

Manufacturer:	**SBI**
Model:	**2.1 Series**
Date:	**2-22-21**
Run:	**1**
Project #:	**G104576994**
Test Duration: (minutes)	**60**

PRESSURE FACTOR:	0.98763

TEMPERATURE FACTORS

DGM #1:	1.00592
DGM #2:	1.14783

VOLUMES SAMPLED

DGM #1:	7.41221
DGM #2:	0.00000
TOTAL TUNNEL VOLUME (scf):	17891

SAMPLE RATIOS

Sample Train 1:	2413.678
Sample Train 2:	#DIV/0!

TOTAL EMISSIONS

Sample Train 1 (g):	**5.310**
Sample Train 2 (g):	**#DIV/0!**

EMISSION RATES

Sample Train 1 (g/hr):	**5.31**
Sample Train 2 (g/hr):	**#DIV/0!**
MAX Allowed	7.50%
DEVIATION:	#DIV/0!

RESULTS

Average emission rate:(gr/hr)	**#DIV/0!**
Burn Rate (Dry kg/hr):	4.831

BAROMETRIC PRESSURE

Average:	29.55
Start:	29.7
End:	29.4

DRY GAS METER VALUES

DGM #1	Final:	94.512
	Initial:	87.125
DGM #2	Final:	0.000
	Initial:	0.000

TEMPERATURES (DEG. RANKIN)

DGM #1:	524.894
DGM #2:	460.000

CALIBRATION FACTORS

DGM #1:	1.0100
DGM #2:	1.0110

TUNNEL FLOW RATE:	298.178

PARTICULATE CATCH (mg)

Total Sample Train 1:	2.2
Total Sample Train 2:	0
Filter and seal Sample Train 1:	2.1
Filter and seal Sample Train 2:	
Probe Sample Train 1:	0.1
Probe Sample Train 2:	

Time	Ambiant	Flue	Dilution Tunnel	Firebox Top	Firebox Back	Firebox Right	Firebox Left	Firebox Bottom
0	83.23501	301.2575721	91.43603598	507.0046602	569.0643234	480.903476	508.418085	480.4750497
10	83.43669	456.0407639	98.48547378	589.1175568	527.099325	472.9993836	477.9647924	482.6436858
20	78.653965	384.8489777	96.36836027	818.2269735	505.8987755	489.6860027	468.4748543	472.6924839
30	72.734141	370.9099722	92.40588651	871.5868682	485.7686631	499.5976501	465.0994364	451.6390247
40	69.797641	370.171828	92.55346439	892.5821253	449.9361097	514.4805017	466.632236	401.3366859
50	68.741481	368.1594722	91.94093401	909.9780517	431.9299357	528.695055	478.4954254	360.6582303
60	69.666817	358.7040674	91.50018121	921.556362	428.5729163	542.5367428	496.3426636	336.4307334
70	68.222267	308.1208285	88.78144643	826.6952826	424.7107919	545.280091	512.2189437	321.2384567
80	67.185261	271.9737987	86.21301165	730.8665424	414.3020052	524.5439028	509.3149612	310.2168484
90	72.57079	230.8318568	84.52147766	624.3818143	395.184583	493.9429142	491.4307229	302.3706781
100	77.697584	211.7948535	84.59253346	525.8682902	378.7163168	468.8296748	463.1767428	297.7443224
110	79.969673	207.7209217	84.00263545	485.4029246	371.0580438	451.797586	440.0248289	294.4714397
120	80.765239	211.5785173	83.97431838	490.7409926	382.5900115	444.384323	423.3543471	292.1193486
130	80.627018	193.6215004	83.30588826	451.4688205	364.5777587	428.5510652	409.7570568	290.0176942
140	80.145609	182.8200483	80.48422771	413.570089	350.5836509	405.4566309	397.4322959	287.758724
150	76.993431	176.5954438	83.99763393	388.1199937	345.8326891	384.5100962	386.3451261	286.4440654
160	76.228962	170.553736	83.05260352	370.8826853	345.3267916	366.6680763	375.5626196	284.2617211
170	75.617998	166.1018155	82.17135953	358.3004825	348.8523678	353.2366344	365.6974671	282.639166
180	75.316829	162.7895436	81.53283291	348.7853564	353.5675776	342.7511504	356.5624421	281.369309
190	74.792567	160.1441001	81.12003651	340.256991	357.3025117	334.3459893	347.1333947	280.0942558
200	74.728516	157.9496507	80.55523195	332.8002624	358.6308216	326.9012695	338.4790308	278.5281048
210	74.609711	155.9028285	80.16530382	326.441245	359.7374076	320.3843268	330.6016398	277.1716538
220	74.644811	155.0579451	79.9188443	322.1581735	359.8126754	314.4042924	323.5293085	275.7869082
230	74.405122	154.1545328	79.77805924	319.8469176	357.1636521	308.8383291	319.1947325	274.6159743
240	74.10688	152.4739483	79.47192758	316.544411	353.2845435	303.9452559	314.4940593	273.2096434
250	74.043299	150.8460083	79.10662327	311.8424667	349.7321204	299.2253656	308.6351646	271.1909042
260	75.665492	149.0631953	75.86739497	305.9533403	346.7777676	294.4496261	302.6855011	268.8131634
270	76.653719	148.5087126	75.7989487	300.2295407	344.613334	290.4817095	296.5402147	267.3905891
280	77.304922	147.6230928	75.70982887	294.9968637	342.7251143	286.1033242	290.4150697	266.000896
290	77.527446	146.5677268	75.49257422	290.3665349	341.6628929	281.5221064	284.4570838	265.0504971
300	77.314716	145.4150751	75.30164651	285.6968027	339.3373938	277.2609456	278.3030383	263.3739138
310	77.359566	144.0629898	75.21689489	280.8883441	336.0921341	272.5468099	272.2432323	261.0620774
320	77.393702	142.5923135	75.16671064	276.1183951	333.3015074	267.4286773	266.755707	258.1635397
330	77.357162	141.5447632	75.02332358	271.6122962	330.8009032	262.3107247	261.3799164	255.1673466
340	77.183421	140.2228699	74.96367198	267.0857577	328.363663	257.2000241	256.3418294	252.4225552
350	77.131213	139.3009487	74.88563632	263.4109675	325.7991799	252.4316834	251.9757212	249.7305466
360	76.869204	138.6317011	74.63870815	260.7508726	323.3137186	248.1963839	248.0656369	247.4714022
370	76.928314	137.9281666	74.37073276	258.0315345	316.8528579	244.6519338	244.4009799	245.2931255
380	77.162473	136.6097967	74.46011807	254.281791	309.1499269	241.040658	240.5573457	242.6677905
390	76.984359	134.9010047	74.23727377	249.9061778	302.2930832	237.1603198	236.3586998	239.7920402
400	76.911868	133.3130019	73.95969524	245.1176196	296.8594381	233.2698585	232.0944676	236.7357591
406	76.991505	132.4592671	74.18331292	242.0959419	293.9180373	230.9129096	229.4613176	234.9585858

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	0.0306189	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	301.2576	83.23501	91.43604	64.95233	65.02666	83.51391	65.08053	65.26384	81.289			437.755	151.214	0.054278	0.071095				12.8	12.72	15.45	5.34	-0.236431	-0.23223
10.0	456.0408	83.43669	98.48547	65.72324	65.22391	83.25627	65.818	65.46774	81.85121			438.989	152.444	0.081441	0.068985				11.4	11.32	15.50	5.38	-0.22964	-0.23275
20.0	384.849	78.65396	96.36836	65.98	65.36007	82.22104	66.06515	65.68154	85.78685			440.218	153.667	0.073013	0.071996				9.8	9.79	15.54	5.42	-0.231747	-0.232
30.0	370.91	72.73414	92.40589	66.11308	65.5437	86.96054	66.23829	65.88518	86.3033			441.451	154.898	0.07122	0.072088				8.6	8.58	15.58	5.47	-0.232195	-0.23198
40.0	370.1718	69.79764	92.55346	66.25388	65.66074	81.81157	66.39786	66.03976	83.13637			442.690	156.133	0.071216	0.072225				7.2	7.19	15.63	5.51	-0.232196	-0.23194
50.0	368.1595	68.74148	91.94093	66.39904	65.78382	83.25756	66.5572	66.19371	82.12167			443.931	157.360	0.070946	0.072865				5.9	5.89	15.67	5.55	-0.232264	-0.23178
60.0	358.7041	69.66682	91.50018	66.39662	65.89953	86.76037	66.63782	66.28185	83.7732			445.167	158.585	0.069201	0.070932				4.7	4.66	15.71	5.60	-0.2327	-0.23227
70.0	308.1208	68.22227	88.78145	66.56541	66.02453	82.15631	66.77321	66.45732	82.87086			446.403	159.819	0.060143	0.073668				3.9	3.84	15.76	5.64	-0.234964	-0.23158
80.0	271.9738	67.18526	86.21301	66.68668	66.09491	82.56604	66.86067	66.54438	82.01744			447.643	161.064	0.053124	0.074185				3.4	3.35	15.80	5.69	-0.236719	-0.23145
90.0	230.8319	72.57079	84.52148	66.65995	66.15874	82.87937	66.87192	66.60362	84.29815			448.884	162.310	0.047236	0.073332				3.1	3.07	15.85	5.73	-0.238191	-0.23167
100.0	211.7949	77.69758	84.59253	66.62941	66.16743	82.49888	66.87768	66.60438	86.7884			450.139	163.553	0.044452	0.072486				2.8	2.79	15.89	5.77	-0.238887	-0.23188
110.0	207.7209	79.96967	84.00264	66.70192	66.22743	82.51699	66.92807	66.62472	84.94928			451.402	164.813	0.043234	0.074471				2.5	2.50	15.93	5.82	-0.239192	-0.23138
120.0	211.5785	80.76524	83.97432	66.68963	66.23935	82.4841	66.90701	66.64289	84.14557			452.663	166.080	0.044184	0.074653				2.2	2.20	15.98	5.86	-0.238954	-0.23134
130.0	193.6215	80.62702	83.30589	66.71819	66.28127	82.59482	66.97854	66.6823	83.67539			453.929	167.338	0.039716	0.074093				2.1	2.07	16.02	5.91	-0.240071	-0.23148
140.0	182.82	80.14561	80.48423	66.81517	66.31985	82.38262	67.05466	66.71211	83.48359			455.191	168.610	0.03732	0.073123				2.0	1.97	16.07	5.95	-0.24067	-0.23172
150.0	176.5954	76.99343	83.99763	66.87754	66.39976	82.55049	67.14038	66.84917	83.83257			456.433	169.857	0.034713	0.075394				1.9	1.90	16.11	6.00	-0.241322	-0.23115
160.0	170.5537	76.22896	83.0526	66.91094	66.42231	82.52691	67.24053	66.90969	84.07253			457.685	171.110	0.033099	0.07636				1.9	1.91	16.16	6.04	-0.241725	-0.23091
170.0	166.1018	75.618	82.17136	66.9707	66.53884	82.76297	67.32656	67.01493	84.55323			458.951	172.366	0.031651	0.073962				1.9	1.84	16.20	6.08	-0.242087	-0.23151
180.0	162.7895	75.31683	81.53283	67.04837	66.62153	82.56061	67.38086	67.07841	84.32418			460.209	173.629	0.032081	0.076207				1.8	1.75	16.25	6.13	-0.24198	-0.23095
190.0	160.1441	74.79257	81.12004	67.04358	66.62675	82.52314	67.41527	67.10991	84.49271			461.465	174.884	0.031162	0.075582				1.7	1.68	16.29	6.17	-0.242209	-0.2311
200.0	157.9497	74.72852	80.55523	67.08692	66.67929	82.53263	67.44526	67.15159	84.57579			462.732	176.139	0.030299	0.074954				1.6	1.60	16.33	6.22	-0.242425	-0.23126
210.0	155.9028	74.60971	80.1653	67.12622	66.72067	82.53601	67.4566	67.21299	84.29299			463.988	177.397	0.030775	0.074449				1.6	1.52	16.38	6.26	-0.242306	-0.23139
220.0	155.0579	74.64481	79.91884	67.16019	66.69206	82.47327	67.49349	67.22152	84.04954			465.244	178.651	0.029254	0.074491				1.4	1.41	16.42	6.31	-0.242686	-0.23138
230.0	154.1545	74.40512	79.77806	67.23295	66.76609	82.43286	67.54288	67.28927	84.04557			466.509	179.902	0.029202	0.07423				1.4	1.32	16.47	6.35	-0.2427	-0.23144
240.0	152.4739	74.10688	79.47193	67.24073	66.77888	82.22032	67.53564	67.29496	83.82617			467.765	181.156	0.029682	0.072985				1.3	1.23	16.51	6.39	-0.24258	-0.23175
250.0	150.846	74.0433	79.10662	67.2466	66.82898	82.24685	67.58823	67.33671	83.91639			469.019	182.414	0.028919	0.074822				1.2	1.15	16.56	6.44	-0.24277	-0.23129
260.0	149.0632	75.66549	75.86739	67.25911	66.81855	81.70602	67.58406	67.35923	83.84772			470.291	183.671	0.028931	0.073688				1.0	1.00	16.60	6.48	-0.242767	-0.23158
270.0	148.5087	76.65372	75.79895	67.28925	66.89166	81.57193	67.64672	67.37518	83.31034			471.555	184.939	0.028114	0.073499				0.9	0.85	16.65	6.53	-0.242971	-0.23163
280.0	147.6231	77.30492	75.70983	67.36078	66.87142	81.58373	67.64984	67.41376	83.17273			472.827	186.203	0.029027	0.074074				0.8	0.75	16.69	6.57	-0.242743	-0.23148
290.0	146.5677	77.52745	75.49257	67.37792	66.9766	83.21291	67.68908	67.46719	83.02005			474.102	187.477	0.028058	0.07401				0.7	0.63	16.74	6.62	-0.242986	-0.2315
300.0	145.4151	77.31472	75.30165	67.3068	66.95386	84.24206	67.64925	67.43569	82.99295			475.376	188.755	0.027224	0.074105				0.6	0.57	16.78	6.66	-0.243194	-0.23147
310.0	144.063	77.35957	75.21689	67.31141	66.93969	84.61595	67.68931	67.46283	83.15313			476.651	190.029	0.027433	0.075077				0.5	0.51	16.83	6.71	-0.243142	-0.23123
320.0	142.5923	77.3937	75.16671	67.28105	66.9231	84.39355	67.66272	67.46376	83.29973			477.918	191.306	0.027236	0.075634				0.5	0.43	16.87	6.75	-0.243191	-0.23109
330.0	141.5448	77.35716	75.02332	67.23682	66.89096	84.37907	67.64853	67.44831	83.08866			479.192	192.575	0.02717	0.074837				0.4	0.37	16.92	6.80	-0.243208	-0.23129
340.0	140.2229	77.18342	74.96367	67.23034	66.85277	84.47231	67.61243	67.41931	83.02801			480.459	193.851	0.02615	0.075182				0.3	0.31	16.96	6.84	-0.243463	-0.2312
350.0	139.3009	77.13121	74.88564	67.17996	66.80781	84.41658	67.59585	67.38771	82.99252			481.735	195.117	0.025059	0.07405				0.3	0.26	17.01	6.89	-0.243735	-0.23149
360.0	138.6317	76.8692	74.63871	67.19412	66.81696	84.34004	67.55744	67.36849	82.73462			482.996	196.389	0.026362	0.074107				0.2	0.20	17.05	6.93	-0.243409	-0.23147
370.0	137.9282	76.92831	74.37073	67.14588	66.7829	84.1946	67.54091	67.33443	82.50046			484.267	197.659	0.025767	0.074858				0.2	0.15	17.09	6.98	-0.243558	-0.23129
380.0	136.6098	77.16247	74.46012	67.1317	66.74159	84.08292	67.48794	67.31358	82.4276			485.537	198.925	0.024271	0.073896				0.1	0.09	17.14	7.02	-0.243932	-0.23153
390.0	134.901	76.98436	74.23727	67.14086	66.70278	83.9009	67.46875	67.25851	82.19615			486.797	200.195	0.02437	0.073798				0.1	0.04	17.18	7.07	-0.243908	-0.23155
400.0	133.313	76.91187	73.9597	67.14354	66.7309	84.0231	67.48894	67.25742	82.13172			488.069	201.455	0.024515	0.07438				0.0	0.00	17.23	7.11	-0.243871	-0.2314
406.0	132.4593	76.99151	74.18331	67.20603	66.78673	84.11526	67.52264	67.29906	82.10721			488.846	202.233	0.024057	0.075235				0.0	-0.03	17.26	7.14	-0.243986	-0.23119

Intertek Testing Services

Total Quality. Assured.

Manufacturer:	**SBI**			RESULTS	
Model:	**2.1 Series**		**Average emission rate:(gr/hr)**		**0.962**
Date:	**2-23-21**		Burn Rate (Dry kg/hr):		0.707
Run:	**2**				
Project #:	**G104576994**				
Test Duration: (minutes)	**406**				
PRESSURE FACTOR:		0.97844	BAROMETRIC PRESSURE		
				Average:	29.275
TEMPERATURE FACTORS				Start:	29.2
DGM #1:		1.00254		End:	29.35
DGM #2:		1.00182			
			DRY GAS METER VALUES		
VOLUMES SAMPLED			DGM #1	Final:	488.846
DGM #1:		50.61778		Initial:	437.755
DGM #2:		50.56024			
			DGM #2	Final:	202.233
TOTAL TUNNEL VOLUME (scf):		121941		Initial:	151.214
SAMPLE RATIOS			TEMPERATURES (DEG. RANKIN)		
Sample Train 1:		2409.057		DGM #1:	526.662
Sample Train 2:		2411.799		DGM #2:	527.040
TOTAL EMISSIONS			CALIBRATION FACTORS		
Sample Train 1 (g):		**6.745**		DGM #1:	1.0100
Sample Train 2 (g):		**6.271**		DGM #2:	1.0110
EMISSION RATES			TUNNEL FLOW RATE:		300.348
Sample Train 1 (g/hr):		**1.00**			
Sample Train 2 (g/hr):		**0.93**	PARTICULATE CATCH (mg)		
				Total Sample Train 1:	2.8
				Total Sample Train 2:	2.6
				Filter and seal Sample Train 1:	2.6
MAX Allowed		7.50%		Filter and seal Sample Train 2:	2.4
				Probe Sample Train 1:	0.2
DEVIATION:		3.65%		Probe Sample Train 2:	0.2

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	Room Temp		Bar Pressure		Relative Humidity		Air Velocity	
	Before	After	Before	After	Before	After	Before	After
	83	0	29.20	29.35	11.8	12.7	0	0

Average Dilution Tunnel Measurements						Sample Data	
Burn	Velocity	Flow Rate	Temp	Total Sample		Particulate Catch	
Time	(Ft/sec)	(dscf/min)	(R)	1	2	1	2
406	15.35	300.35	541.45	50.62	50.56	2.80	2.60

Dilution Tunnel Dual Train Precision				
Sample Ratios		Total Emissions (g)		
Train 1	Train 2	Train 1	Train 2	Deviation (%)
2409.06	2411.80	6.75	6.27	3.65%

Burn			Initial		Run	Average
Rate		Surface	Draft		Time	Draft
0.707		0.000	0.054		406.000	0.039

Run	Date	Burn Rate	Emission
2	2021-02-23	0.707	0.962

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E&E Tunnel Traverse Worksheet

Static Pressure: **0.116**

Barometer: 29.2

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
A CENTER	0.067	97.200	0.2588
B CENTER	0.072	94.600	0.2683
A1	0.070	95.900	0.2646
A2	0.074	96.800	0.2720
A3	0.064	95.600	0.2530
A4	0.054	73.200	0.2324
B1	0.066	95.500	0.2569
B2	0.076	96.600	0.2757
B3	0.067	96.300	0.2588
B4	0.054	82.000	0.2324
AVERAGE		92.37	0.2573

PITOT CONSTANT= 0.9761

E&E FUEL LOAD DATA SHEET

intertek
Total Quality. Assured.

			Test Load Weight: Lower	Ideal	Upper	
Firebox Volume:	1.03	cu. ft	11.74	12.36	12.98	
Load Volume:	1.0300	cu. ft	Loading Density:	12.377	lbs./ft3	
Number of Spacers:			Load Density:	12.377	lbs./ft3	

Piece Size: Thick	x Wide	x Length	Weight lbs	Meter Moisture Content Dry Uncorrected %			
2	4	16	2.27	21.20	23.20	17.60	84.00
2	4	16	2.50	23.70	16.40	23.60	84.00
2	4	16	2.48	20.10	16.60	24.90	84.00
2	4	16	2.00	20.40	23.70	24.90	84.00
2	4	16	3.50	20.30	19.40	17.60	84.00
							0.00
							0.00
							0.00
							0.00

Test Load Weigh 12.748 lbs. **Dry Weigh** 4.782 kg.

Average Moisture Content: %

Dry: 20.91 | 20.907 | Wet: 17.292

Pre-test moisture content: %

#DIV/0! | #DIV/0! | Wet: #DIV/0!

Coal Bed Range: 2.6 lbs. to 3.1 lbs. 20% to 25% of test load

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	12.36	lb				
Total Load Wt. Allowable Range	11.74	to	12.98	lb		
Core Target Wt. Allowable Range	5.562	to	8.03	lb		
Remainder Load Wt. Allowable Range	4.33	to	6.80	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.85	to	3.09	lb		2.47
Remainder Load Pc. Wt. Allowable Range	1.24	to	3.71	lb		2.47
	Pc. #					Ordre
Core Load Piece Wt. Actual	1	2.27	lb		In Range	
	2	2.50	lb		In Range	
	3	2.48	lb		In Range	
Core Load Total. Wt. Actual		7.25	lb		In Range	
	Pc. #					
Remainder Load Piece Wt.	1	2.00	lb		In Range	
(2 or 3 Pcs.)	2	3.50	lb		In Range	
	3		lb		NA	
Remainder Load Piece Weight Ratio - Small/Large		57%			In Range	≤ 67%
Remainder Load Tot. Wt. Act		5.50	lb		In Range	
Total Load Wt. Actual		12.75	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		103%			In Range	95-105%
Actual Fuel Load Density		12.4	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	1.3	to	2.5			Mid-Point
Actual Charcoal Bed Wt.		1.9	lb		In Range	1.9
Actual Fuel Load Ending Wt.		0.0	lb		lb	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		12.7	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
21.2	23.2	17.6	20.7	In Range	1.88	lb	0.85	kg
23.7	16.4	23.6	21.2	In Range	2.06	lb	0.94	kg
20.1	16.6	24.9	20.5	In Range	2.06	lb	0.93	kg
20.4	23.7	24.9	23.0	In Range	1.63	lb	0.74	kg
20.3	19.4	17.6	19.1	In Range	2.94	lb	1.33	kg
					0.00	lb	0.00	kg
Total Load Ave. MC % (dry basis)			20.7	In Range				
Total Load Ave. MC % (wet basis)			17.1					
Total Test Load Weight (dry basis) →					10.56	lb	4.79	kg
Total Fuel Weight Burned During Test Run (dry basis)					10.6	lb	4.79	kg

1.9122
14.66
3.82 braise

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
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

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	10.30	lb				
Total Load Wt. Allowable Range	9.80	to	10.80	lb		
Core Target Wt. Allowable Range	4.60	to	6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb		2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb		3.35
	Pc. #					
Core Load Piece Wt. Actual	1	2.10	lb	In Range		
	2	2.25	lb	In Range		
	3	2.32	lb	In Range		
Core Load Total. Wt. Actual		6.68	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.50	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		100%		NA		≤ 67%
Remainder Load Tot. Wt. Act		4.50	lb	In Range		
Total Load Wt. Actual		11.18	lb	Out of Range		
Core % of Total Wt.		60%		In Range		45-65%
Remainder % of Total Wt.		40%		In Range		35-55%
Actual Load % of Nominal Target		109%		Out of Range		95-105%
Actual Fuel Load Density		10.9	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		2.24	lb			
Actual Kindling Wt.		2.14	lb	In Range		19.1%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		3.35	lb			
Actual Start-up Fuel Wt.		3.20	lb	In Range		28.6%
Allowable Residual Start-up Fuel Wt. Range	1.1	to	2.2	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.36	lb	In Range		1.7
Total Wt. All Fuel Added (wet basis)		16.52	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.0	to	1.2	lb		1.1
Actual Fuel Load Ending Wt.			lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
27.8	15.9	20.8	21.5	In Range	1.73	lb	0.78	kg
24.5	18.6	17.9	20.3	In Range	1.87	lb	0.85	kg
24.8	22.1	20.4	22.4	In Range	1.89	lb	0.86	kg
18.1	25.2	20.3	21.2	In Range	3.71	lb	1.68	kg
					0.00	lb	0.00	kg
					0.00	lb	0.00	kg

Total Load Ave. MC (%-dry basis)	21.3	In Range			
Total Load Ave. MC % (wet basis)	17.6				
Total Test Load Weight (dry basis) →			9.21	lb	4.18 kg

Kindling Moisture (%-dry basis)

10	10	10	10.0	In Range	1.94	lb	0.88	kg

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

20.4	22.7	16.4	19.8	In Range	2.67	lb	1.21	kg

Total Wt. All Fuel Added (dry basis) →	13.83	lb	6.27	kg
Total Wt. All Fuel Burned (dry basis) →	12.5	lb	5.7	kg

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	4.690729	Meter	Meter		
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	% 25	% 25	% 27	Lbs 28	Corrected Scale	#1 Cu Ft	#2 Cu Ft	Draft	Calculated Tunnel
0.0	301.2576	83.23501	91.43604	66.7018	66.7018	82.58642						94.549		0.054278	0.071095				12.75	8.06	3.34	0.00	-0.236431	-0.23223
10.0	456.0408	83.43669	98.48547	66.88221	66.88221	85.31313						95.802		0.081441	0.068985				11.35	6.66	3.38		-0.22964	-0.23275
20.0	384.849	78.65396	96.36836	67.09962	67.09962	82.79856						97.081		0.073013	0.071996				9.82	5.13	3.43		-0.231747	-0.232
30.0	370.91	72.73414	92.40589	67.34108	67.34108	88.23181						98.347		0.07122	0.072088				8.61	3.92	3.47		-0.232195	-0.23198
40.0	370.1718	69.79764	92.55346	67.48681	67.48681	83.84683						99.613		0.071216	0.072225				7.22	2.53	3.52		-0.232196	-0.23194
50.0	368.1595	68.74148	91.94093	67.57725	67.57725	82.13824						100.875		0.070946	0.072865				5.92	1.23	3.56		-0.232264	-0.23178
60.0	358.7041	69.66682	91.50018	67.68744	67.68744	86.17166						102.166		0.069201	0.070932				4.69	0.00	3.61		-0.2327	-0.23227

intertek
Total Quality. Assured.

Intertek Testing Services

Manufacturer:	**SBI**
Model:	**2.1 Series**
Date:	**2-23-21**
Run:	**2**
Project #:	**G104576994**
Test Duration: (minutes)	**60**

RESULTS

Average emission rate:(gr/hr)	**#DIV/0!**
Burn Rate (Dry kg/hr):	4.783

PRESSURE FACTOR:	0.97844

TEMPERATURE FACTORS

DGM #1:	1.00142
DGM #2:	1.14783

VOLUMES SAMPLED

DGM #1:	7.53798
DGM #2:	0.00000
TOTAL TUNNEL VOLUME (scf):	17526

SAMPLE RATIOS

Sample Train 1:	2325.036
Sample Train 2:	#DIV/0!

TOTAL EMISSIONS

Sample Train 1 (g):	**4.185**
Sample Train 2 (g):	**#DIV/0!**

EMISSION RATES

Sample Train 1 (g/hr):	**4.19**
Sample Train 2 (g/hr):	**#DIV/0!**
MAX Allowed	7.50%
DEVIATION:	#DIV/0!

BAROMETRIC PRESSURE

Average:	29.275
Start:	29.2
End:	29.35

DRY GAS METER VALUES

DGM #1	Final:	102.166
	Initial:	94.549
DGM #2	Final:	0.000
	Initial:	0.000

TEMPERATURES (DEG. RANKIN)

DGM #1:	527.254
DGM #2:	460.000

CALIBRATION FACTORS

DGM #1:	1.0100
DGM #2:	1.0110

TUNNEL FLOW RATE:	292.101

PARTICULATE CATCH (mg)

Total Sample Train 1:	1.8
Total Sample Train 2:	0
Filter and seal Sample Train 1:	1.6
Filter and seal Sample Train 2:	
Probe Sample Train 1:	0.2
Probe Sample Train 2:	

Time	Ambiant	Flue	Dilution Tunnel	Firebox Top	Firebox Back	Firebox Right	Firebox Left	Firebox Bottom
0	72.7647844	287.1258049	90.76383645	502.3911208	547.7881522	495.7331036	479.035211	482.0223515
10	79.0814281	394.4809138	95.70184264	522.4732657	512.4419486	472.6877681	458.893719	477.5260339
20	81.6949427	341.2050989	88.91014053	724.7131766	483.1653016	468.6983908	456.3889637	463.0601936
30	82.1670292	345.939923	94.4926936	793.969591	468.956822	476.5578181	453.2023351	442.8093377
40	79.2616652	346.31116	94.84467202	827.5624062	429.1370869	488.2679594	457.287727	384.1367222
50	78.9610597	344.7092307	96.28178593	838.5110456	412.6579829	491.9115396	464.1274008	344.8764632
60	79.0527341	334.7746301	94.17953202	837.0884217	408.5451773	495.8550964	474.743742	319.7791452
70	78.3701511	306.9712629	92.54428087	770.3906825	410.0193119	493.1522666	476.5620785	303.0355181
80	78.781904	272.5227491	92.9945718	702.9067584	402.3080366	479.0368427	469.8229425	293.4233239
90	81.5447325	250.6764563	89.63054161	620.3203153	385.4803275	460.4328144	457.2697784	287.349972
100	82.5716997	234.1795099	89.03531818	562.5886768	380.5250375	451.5992324	442.6140467	283.739205
110	82.6284813	223.3136733	88.55715356	516.882096	376.8382495	446.5634433	426.283921	281.2442279
120	82.5232654	218.3874495	88.0527304	493.3965009	373.0959065	440.3989561	412.6954433	279.2222507
130	82.5260286	216.4280444	87.15540009	485.2698149	374.643145	435.4193327	403.1624794	277.654747
140	81.2515476	210.5194036	87.13866579	469.4234475	372.2058598	428.2993231	395.6809498	276.9137154
150	80.8761483	203.4303579	86.53226817	450.1839491	365.4550084	418.4363915	387.9461654	276.2110632
160	80.5684686	204.1122554	86.35647511	445.57325	366.3416022	407.2613652	381.4637691	275.5546884
170	80.3747792	190.057363	85.53934316	425.724901	355.0966205	394.4585296	376.3924155	274.8241023
180	79.6999445	177.6310561	84.50863889	384.6276868	340.6707303	375.4893918	367.1498284	273.7401216
190	78.3821574	170.7978247	84.83144271	358.4522373	332.7237536	359.7634358	356.8433004	272.1416864
200	77.3839694	164.6754412	83.65498174	341.4099515	328.2566074	346.0367175	347.3592609	270.8932866
210	77.8759358	161.2491006	82.56791064	329.6542342	327.4388874	335.9364031	339.3303457	271.6766823
220	77.6242904	158.5374183	82.23241344	320.6035832	327.4232631	328.015209	332.5703954	272.8891543
230	79.3927365	154.9217584	79.65727447	311.077754	326.6899104	320.9624708	325.5472806	274.1876791
240	79.8364898	152.9759365	80.16355727	303.0208068	326.1446163	314.1815414	318.1382484	274.5179977
250	78.5377729	151.0865471	80.39995844	296.6488838	326.0857973	307.606512	310.7242933	273.8437203
260	78.0132685	149.4489236	80.0666482	291.5463958	327.0155365	301.8163258	304.3528359	273.3470128
270	77.9346813	148.0927716	79.81568952	288.1159847	328.7950261	296.6457494	298.9873983	273.5373228
280	79.4856644	147.2875873	78.61595829	285.1689212	329.9959348	292.5484196	294.8016609	273.4311429
290	79.7728365	144.95232	78.35776046	280.2032689	327.7640113	287.0779109	290.6039523	273.225241
300	79.7302745	142.6179245	77.99484118	273.5112821	319.644169	280.2862069	285.6415384	271.7033315
310	79.5857896	140.4751595	77.87637114	267.0022574	311.8155664	273.147512	280.5128814	268.6157653
320	79.4443074	139.0253729	77.67832043	261.8717382	305.9918095	266.320629	275.4311289	265.2645926
330	79.4725778	138.2175506	77.48664043	257.7457517	301.4604184	260.1777789	270.9074678	261.6474523
340	79.2682536	137.0101605	76.98942793	254.1344347	297.8533045	254.7414549	266.7157797	259.0107868
350	79.1867176	135.8295441	76.84842227	250.5249167	294.3669863	249.9388198	262.7400259	256.8428703
360	79.0774193	135.1829766	76.77553242	248.1781045	291.4409879	245.1252545	259.1954034	254.8789911
370	78.9576233	134.6781803	76.71331337	246.3895992	289.0872579	240.7724883	256.0335129	253.5570943
380	78.7579895	133.9202314	76.55788356	243.4104199	286.5079535	236.5313819	253.1607799	252.5023531
390	78.7331469	132.9263169	76.46739828	240.4166962	284.1975268	232.2774009	250.1875263	251.5137904
400	78.6143166	132.2849226	76.29236141	237.7883449	282.2574015	228.4968043	247.2394384	250.3924126
410	78.6151465	131.3402967	76.22756966	235.1203486	279.2410637	225.2997611	244.2927199	249.2749128
420	78.5943091	130.441484	76.15852621	232.4161766	275.0154957	222.4902865	240.8853915	247.9027954
430	78.3679237	129.5081983	75.79269329	230.0140106	270.5077281	220.0879891	237.2839219	245.9736137
440	78.4053323	128.7946518	75.86255406	227.743062	266.0172317	218.1842873	233.8236075	243.8630273
450	78.1932792	127.6965152	75.7158667	225.2530275	260.0011658	216.0944057	230.5976322	241.3746363
460	78.2305289	126.3963471	75.59030438	222.1866524	253.2813045	213.5039766	227.1712513	237.8320248
464	78.1159572	126.0547582	75.3845817	220.8790156	250.8759551	212.3495039	225.6695859	236.5086985

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	0.2813563	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	287.1258	72.76478	90.76384	67.41227	67.52364	78.80888	67.65169	67.88942	78.66826			488.922	202.366	0.05203	0.103187				12.9	12.64	17.26	7.14	-0.236992	-0.2242
10.0	394.4809	79.08143	95.70184	68.1501	67.62838	83.576	68.28311	68.02875	83.82962			490.187	203.620	0.076339	0.071443				11.6	11.32	17.30	7.19	-0.230915	-0.23214
20.0	341.2051	81.69494	88.91014	68.32605	67.79061	84.66718	68.45655	68.13883	82.42333			491.442	204.869	0.067019	0.072604				10.4	10.08	17.35	7.23	-0.233245	-0.23185
30.0	345.9399	82.16703	94.49269	68.4186	67.90404	84.1109	68.53326	68.22639	82.93538			492.712	206.121	0.067396	0.074632				9.2	8.97	17.39	7.28	-0.233151	-0.23134
40.0	346.3112	79.26167	94.84467	68.51268	67.96853	83.20797	68.58814	68.29462	85.34756			493.978	207.377	0.06671	0.075024				8.2	7.91	17.44	7.32	-0.233323	-0.23124
50.0	344.7092	78.96106	96.28179	68.60781	68.02157	84.68736	68.63616	68.3464	85.75559			495.240	208.641	0.067184	0.074942				7.1	6.86	17.48	7.37	-0.233204	-0.23126
60.0	334.7746	79.05273	94.17953	68.60324	68.12542	82.4866	68.70496	68.42229	83.95282			496.516	209.899	0.063774	0.074863				6.2	5.92	17.53	7.41	-0.234056	-0.23128
70.0	306.9713	78.37015	92.54428	68.63428	68.14688	83.13666	68.72683	68.43208	82.7091			497.778	211.165	0.060426	0.074947				5.5	5.20	17.57	7.45	-0.234894	-0.23126
80.0	272.5227	78.7819	92.99457	68.72123	68.22175	86.96822	68.80544	68.5378	82.03903			499.045	212.425	0.055175	0.074106				5.0	4.70	17.62	7.50	-0.236206	-0.23147
90.0	250.6765	81.54473	89.63054	68.73768	68.23654	82.62135	68.8023	68.53507	83.75487			500.313	213.682	0.05061	0.07485				4.6	4.29	17.66	7.54	-0.237347	-0.23129
100.0	234.1795	82.5717	89.03532	68.73021	68.22948	86.25833	68.83067	68.58013	85.12671			501.580	214.958	0.04691	0.073779				4.1	3.84	17.71	7.59	-0.238272	-0.23156
110.0	223.3137	82.62848	88.55715	68.73611	68.25457	86.37573	68.81531	68.58395	85.90675			502.872	216.233	0.04596	0.075492				3.7	3.44	17.75	7.63	-0.23851	-0.23113
120.0	218.3874	82.52327	88.05273	68.70603	68.23991	84.85218	68.8215	68.57596	86.36492			504.157	217.521	0.045156	0.07558				3.4	3.08	17.80	7.68	-0.238711	-0.23111
130.0	216.428	82.52603	87.1554	68.74091	68.2552	84.46871	68.85805	68.58124	84.72262			505.442	218.796	0.044458	0.074912				3.0	2.72	17.84	7.72	-0.238885	-0.23127
140.0	210.5194	81.25155	87.13867	68.78363	68.26499	84.42342	68.87117	68.59353	83.6838			506.733	220.080	0.043208	0.075559				2.7	2.40	17.89	7.77	-0.239198	-0.23111
150.0	203.4304	80.87615	86.53227	68.74107	68.2737	84.34438	68.85696	68.61392	83.12265			508.012	221.356	0.041903	0.075817				2.4	2.17	17.93	7.81	-0.239524	-0.23105
160.0	204.1123	80.56847	86.35648	68.7642	68.29601	84.24491	68.88676	68.6554	82.85672			509.299	222.639	0.040969	0.074828				2.2	1.91	17.98	7.86	-0.239758	-0.23129
170.0	190.0574	80.37478	85.53934	68.76114	68.28877	84.09916	68.88911	68.64899	82.7829			510.575	223.911	0.038148	0.075255				2.0	1.77	18.02	7.90	-0.240463	-0.23119
180.0	177.6311	79.69994	84.50864	68.86078	68.28503	84.17901	68.93748	68.66818	82.54406			511.876	225.205	0.033941	0.077192				1.9	1.66	18.07	7.95	-0.241515	-0.2307
190.0	170.7978	78.38216	84.83144	68.86562	68.34783	83.97823	68.94816	68.67053	82.50581			513.181	226.495	0.033724	0.074989				1.8	1.57	18.12	8.00	-0.241569	-0.23125
200.0	164.6754	77.38397	83.65498	68.90508	68.3381	83.6856	68.93509	68.65413	82.47007			514.474	227.780	0.031937	0.077776				1.8	1.54	18.16	8.04	-0.242016	-0.23056
210.0	161.2491	77.87594	82.56791	68.81227	68.36576	83.55003	68.93815	68.65927	82.41639			515.774	229.072	0.032138	0.076009				1.7	1.44	18.21	8.09	-0.241965	-0.231
220.0	158.5374	77.62429	82.23241	68.94009	68.41857	83.0264	68.97802	68.74042	82.09826			517.080	230.358	0.031705	0.07577				1.6	1.35	18.25	8.13	-0.242074	-0.23106
230.0	154.9218	79.39274	79.65727	68.94376	68.44434	82.82475	69.06839	68.77119	82.97003			518.380	231.657	0.029952	0.077434				1.5	1.22	18.30	8.18	-0.242512	-0.23064
240.0	152.9759	79.83649	80.16356	69.01182	68.52742	82.68744	69.11519	68.82383	84.8917			519.683	232.954	0.028233	0.076164				1.4	1.08	18.34	8.22	-0.242942	-0.23096
250.0	151.0865	78.53777	80.39996	69.06991	68.53883	82.75837	69.12701	68.88442	85.89674			520.994	234.247	0.028216	0.07534				1.3	0.98	18.39	8.27	-0.242946	-0.23116
260.0	149.4489	78.01327	80.06665	69.09819	68.5692	82.71443	69.15362	68.9077	86.39376			522.311	235.550	0.026749	0.0767				1.2	0.89	18.44	8.31	-0.243313	-0.23082
270.0	148.0928	77.93468	79.81569	69.13554	68.59864	82.76891	69.22807	68.9388	86.48655			523.618	236.845	0.026635	0.077068				1.1	0.82	18.48	8.36	-0.243341	-0.23073
280.0	147.2876	79.48566	78.61596	69.13054	68.65534	82.46424	69.18431	68.93964	86.30023			524.921	238.138	0.028673	0.074396				1.0	0.72	18.53	8.41	-0.242832	-0.2314
290.0	144.9523	79.77284	78.35776	69.14664	68.61183	82.38583	69.19207	68.95116	86.32239			526.230	239.438	0.026749	0.075701				0.9	0.63	18.58	8.45	-0.243313	-0.23107
300.0	142.6179	79.73027	77.99484	69.08468	68.58987	82.18185	69.11302	68.95213	86.23328			527.542	240.737	0.025662	0.076584				0.8	0.56	18.62	8.50	-0.243585	-0.23085
310.0	140.4752	79.58579	77.87637	68.98944	68.52255	82.20111	69.06197	68.90233	85.97524			528.853	242.031	0.026327	0.075544				0.8	0.51	18.67	8.54	-0.243418	-0.23111
320.0	139.0254	79.44431	77.67832	68.99394	68.57415	82.22793	69.10939	68.90807	85.85117			530.157	243.329	0.026039	0.077812				0.7	0.44	18.71	8.59	-0.24349	-0.23055
330.0	138.2176	79.47258	77.48664	68.99151	68.5463	82.42302	69.13239	68.88814	85.88596			531.467	244.639	0.024792	0.075124				0.7	0.39	18.76	8.64	-0.243802	-0.23122
340.0	137.0102	79.26825	76.98943	68.89533	68.49846	82.29643	69.03372	68.82488	85.71332			532.778	245.951	0.024999	0.0756				0.6	0.32	18.81	8.68	-0.24375	-0.2311
350.0	135.8295	79.18672	76.84842	68.92675	68.5178	82.26388	69.07598	68.84505	85.70686			534.093	247.260	0.023764	0.075913				0.5	0.26	18.85	8.73	-0.244059	-0.23102
360.0	135.183	79.07742	76.77553	68.9061	68.48588	82.36303	69.09617	68.84608	85.70788			535.406	248.572	0.024266	0.076272				0.5	0.20	18.90	8.77	-0.243934	-0.23093
370.0	134.6782	78.95762	76.71331	68.88241	68.45635	82.37137	69.05122	68.82321	85.65132			536.715	249.886	0.024665	0.075801				0.4	0.16	18.95	8.82	-0.243834	-0.23105
380.0	133.9202	78.75799	76.55788	68.91896	68.43204	82.29092	69.04109	68.79849	85.75907			538.023	251.199	0.022933	0.075538				0.4	0.11	18.99	8.87	-0.244267	-0.23112
390.0	132.9263	78.73315	76.4674	69.06031	68.49754	82.2446	69.16701	68.83272	85.66364			539.338	252.511	0.024603	0.075629				0.3	0.05	19.04	8.91	-0.243849	-0.23109
400.0	132.2849	78.61432	76.29236	69.13389	68.56447	82.30693	69.18516	68.90006	85.67626			540.655	253.820	0.023316	0.075658				0.3	0.00	19.09	8.96	-0.244171	-0.23109
410.0	131.3403	78.61515	76.22757	69.09805	68.61534	82.24151	69.15765	68.93382	85.75272			541.967	255.128	0.022713	0.07598				0.2	-0.04	19.13	9.01	-0.244322	-0.23101
420.0	130.4415	78.59431	76.15853	69.08045	68.64067	82.39999	69.23258	68.97624	85.84437			543.288	256.446	0.022608	0.076689				0.2	-0.09	19.18	9.05	-0.244348	-0.23083
430.0	129.5082	78.36792	75.79269	69.12267	68.64247	82.35209	69.19936	68.96512	85.75606			544.585	257.751	0.021845	0.076068				0.1	-0.14	19.22	9.10	-0.244539	-0.23098
440.0	128.7947	78.40533	75.86255	69.1565	68.67797	82.40143	69.20152	69.00187	85.81853			545.893	259.061	0.022823	0.075821				0.1	-0.18	19.27	9.14	-0.244294	-0.23104
450.0	127.6965	78.19328	75.71587	69.19147	68.66626	82.41256	69.24065	69.01142	85.86767			547.207	260.367	0.023419	0.075924				0.1	-0.23	19.32	9.19	-0.244145	-0.23102
460.0	126.3963	78.23053	75.5903	69.19847	68.72745	82.48327	69.27682	69.03592	86.02007			548.521	261.671	0.021413	0.076271				0.0	-0.26	19.36	9.24	-0.244647	-0.23093
464.0	126.0548	78.11596	75.38458	69.26718	68.77117	82.52172	69.3247	69.04462	86.08035			549.061	262.208	0.020549	0.078098				0.0	-0.28	19.38	9.26	-0.244863	-0.23048

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Intertek Testing Services

Manufacturer:	**SBI**			RESULTS	
Model:	**2.1 Series**		**Average emission rate:(gr/hr)**		**0.970**
Date:	**2-24-21**		Burn Rate (Dry kg/hr):		0.632
Run:	**3**				
Project #:	**G104576994**				
Test Duration: (minutes)	**464**				
PRESSURE FACTOR:		0.98429	BAROMETRIC PRESSURE		
				Average:	29.45
TEMPERATURE FACTORS				Start:	29.5
DGM #1:		0.99884		End:	29.4
DGM #2:		0.99844			
			DRY GAS METER VALUES		
VOLUMES SAMPLED			DGM #1	Final:	549.061
DGM #1:		59.71709		Initial:	488.922
DGM #2:		59.45686			
			DGM #2	Final:	262.208
TOTAL TUNNEL VOLUME (scf):		139686		Initial:	202.366
SAMPLE RATIOS			TEMPERATURES (DEG. RANKIN)		
Sample Train 1:		2339.132		DGM #1:	528.611
Sample Train 2:		2349.370		DGM #2:	528.826
TOTAL EMISSIONS			CALIBRATION FACTORS		
Sample Train 1 (g):		**7.719**		DGM #1:	1.0100
Sample Train 2 (g):		**7.283**		DGM #2:	1.0110
EMISSION RATES			TUNNEL FLOW RATE:		301.048
Sample Train 1 (g/hr):		**1.00**			
Sample Train 2 (g/hr):		**0.94**	PARTICULATE CATCH (mg)		
				Total Sample Train 1:	3.3
				Total Sample Train 2:	3.1
				Filter and seal Sample Train 1:	2.9
MAX Allowed		7.50%		Filter and seal Sample Train 2:	2.8
				Probe Sample Train 1:	0.4
DEVIATION:		2.91%		Probe Sample Train 2:	0.3

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	Room Temp		Bar Pressure		Relative Humidity		Air Velocity	
	Before	After	Before	After	Before	After	Before	After
	73	78	29.50	29.40	14.5	16.1	0	0

Average Dilution Tunnel Measurements						Sample Data	
Burn	Velocity	Flow Rate	Temp	Total Sample		Particulate Catch	
Time	(Ft/sec)	(dscf/min)	(R)	1	2	1	2
464	15.33	301.05	542.96	59.72	59.46	3.30	3.10

Dilution Tunnel Dual Train Precision					
Sample Ratios		Total Emissions (g)			
Train 1	Train 2	Train 1	Train 2	Deviation (%)	
2339.13	2349.37	7.72	7.28	2.91%	

Burn				Initial		Run	Average
Rate		Surface		Draft		Time	Draft
0.632		0.000		0.052		464.000	0.037

Run	Date	Burn Rate	Emission
3	2021-02-24	0.632	0.970

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E&E Tunnel Traverse Worksheet

Static Pressure: **0.116**

Barometer: 29.5

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
A CENTER	0.070	100.300	0.2646
B CENTER	0.072	96.000	0.2683
A1	0.067	99.500	0.2588
A2	0.076	100.400	0.2757
A3	0.063	99.900	0.2510
A4	0.054	73.000	0.2324
B1	0.067	99.500	0.2588
B2	0.075	99.900	0.2739
B3	0.065	100.000	0.2550
B4	0.051	85.800	0.2258
AVERAGE		95.43	0.2564

PITOT CONSTANT= 0.9624

E&E FUEL LOAD DATA SHEET

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			Test Load Weight: Lower	Ideal	Upper	
Firebox Volume:	1.03	cu. ft	11.74	12.36	12.98	
Load Volume:	1.0300	cu. ft	Loading Density:	12.540	lbs./ft3	
Number of Spacers:			Load Density:	12.540	lbs./ft3	

Piece Size: Thick	x Wide	x Length	Weight lbs	Meter Moisture Content Dry Uncorrected %			
2	4	16	2.30	27.70	17.20	14.50	84.00
2	4	16	2.40	19.20	19.30	20.80	84.00
2	4	16	2.65	18.70	18.80	22.50	84.00
2	4	16	3.55	16.20	22.40	23.10	84.00
2	4	16	2.02	20.20	17.10	20.60	84.00
							0.00
							0.00
							0.00
							0.00

Test Load Weigh 12.916 lbs. **Dry Weigh** 4.887 kg.

Average Moisture Content: %

Dry: 19.89 19.887 Wet: 16.588

Pre-test moisture content: %

#DIV/0! #DIV/0! Wet: #DIV/0!

Coal Bed Range: 2.6 lbs. to 3.2 lbs. 20% to 25% of test load

November 20, 2015 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

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

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	12.36	lb				
Total Load Wt. Allowable Range	11.74	to	12.98	lb		
Core Target Wt. Allowable Range	5.562	to	8.03	lb		
Remainder Load Wt. Allowable Range	4.33	to	6.80	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	1.85	to	3.09	lb		2.47
Remainder Load Pc. Wt. Allowable Range	1.24	to	3.71	lb		2.47
	Pc. #					Ordre
Core Load Piece Wt. Actual	1	2.30	lb		In Range	
	2	2.40	lb		In Range	
	3	2.65	lb		In Range	
Core Load Total. Wt. Actual		7.35	lb		In Range	
	Pc. #					
Remainder Load Piece Wt.	1	3.55	lb		In Range	
(2 or 3 Pcs.)	2	2.02	lb		In Range	
	3		lb		NA	
Remainder Load Piece Weight Ratio - Small/Large		57%			In Range	≤ 67%
Remainder Load Tot. Wt. Act		5.57	lb		In Range	
Total Load Wt. Actual		12.92	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		104%			In Range	95-105%
Actual Fuel Load Density		12.5	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	1.3	to	2.5			Mid-Point
Actual Charcoal Bed Wt.		2.0	lb		In Range	1.9
Actual Fuel Load Ending Wt.		0.0	lb		lb	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		12.9	lb			

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.		Pc. Wt. Dry Basis				
27.7	17.2	14.5	19.8	In Range	1.92	lb	0.87	kg	
19.2	19.3	20.8	19.8	In Range	2.00	lb	0.91	kg	
18.7	18.8	22.5	20.0	In Range	2.21	lb	1.00	kg	
16.2	22.4	23.1	20.6	In Range	2.94	lb	1.33	kg	
20.2	17.1	20.6	19.3	In Range	1.69	lb	0.77	kg	
					0.00	lb	0.00	kg	
Total Load Ave. MC % (dry basis)			20.0	In Range					
Total Load Ave. MC % (wet basis)			16.6						
Total Test Load Weight (dry basis) →					10.77	lb	4.88	kg	
Total Fuel Weight Burned During Test Run (dry basis)					10.8	lb	4.88	kg	

1.9374
14.80
3.82 braise

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
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

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	10.30	lb				
Total Load Wt. Allowable Range	9.80	to	10.80	lb		
Core Target Wt. Allowable Range	4.60	to	6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb		2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb		3.35
	Pc. #					
Core Load Piece Wt. Actual	1	2.13	lb	In Range		
	2	2.23	lb	In Range		
	3	2.13	lb	In Range		
Core Load Total. Wt. Actual		6.48	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.28	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		100%		NA		≤ 67%
Remainder Load Tot. Wt. Act		4.28	lb	In Range		
Total Load Wt. Actual		10.76	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.)		2.15	lb			
Actual Kindling Wt.		2.15	lb	In Range		20.0%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		3.23	lb			
Actual Start-up Fuel Wt.		3.20	lb	In Range		29.8%
Allowable Residual Start-up Fuel Wt. Range	1.1	to	2.2	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.16	lb	In Range		1.6
Total Wt. All Fuel Added (wet basis)		16.11	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.0	to	1.2	lb		1.1
Actual Fuel Load Ending Wt.		0.0	lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)							
1	2	3	Ave.		Pc. Wt. Dry Basis		
24.5	24.9	19.3	22.9	In Range	1.73 lb	0.79	kg
29.2	23.2	20.4	24.3	In Range	1.79 lb	0.81	kg
19.5	21.9	18.1	19.8	In Range	1.77 lb	0.80	kg
17	20.4	20.9	19.4	In Range	3.58 lb	1.62	kg
					0.00 lb	0.00	kg
					0.00 lb	0.00	kg
Total Load Ave. MC (%-dry basis)			21.2	In Range			
Total Load Ave. MC % (wet basis)			17.5				
Total Test Load Weight (dry basis) →					8.88 lb	4.03	kg
Kindling Moisture (%-dry basis)							
10	10	10	10.0	In Range	1.95 lb	0.89	kg
Start-up Fuel Moisture Readings (%-dry basis)							
17	27.1	17.9	20.7	In Range	2.65 lb	1.20	kg
Total Wt. All Fuel Added (dry basis) →					13.49 lb	6.12	kg
Total Wt. All Fuel Burned (dry basis) →					12.3 lb	5.6	kg

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	6.2057871	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	287.1258	72.76478	90.76384	68.67039	68.67039	79.65446						102.214		0.05203	0.103187				12.9	6.71	3.61	0.00	-0.236992	-0.2242
10.0	394.4809	79.08143	95.70184	68.92889	68.92889	84.8483						103.463		0.076339	0.071443				11.6	5.40	3.65		-0.230915	-0.23214
20.0	341.2051	81.69494	88.91014	69.13229	69.13229	82.49867						104.705		0.067019	0.072604				10.4	4.15	3.70		-0.233245	-0.23185
30.0	345.9399	82.16703	94.49269	69.28982	69.28982	81.97738						105.946		0.067396	0.074632				9.2	3.04	3.74		-0.233151	-0.23134
40.0	346.3112	79.26167	94.84467	69.42637	69.42637	85.89149						107.218		0.06671	0.075024				8.2	1.99	3.78		-0.233323	-0.23124
50.0	344.7092	78.96106	96.28179	69.61396	69.61396	85.65681						108.495		0.067184	0.074942				7.1	0.94	3.83		-0.233204	-0.23126
60.0	334.7746	79.05273	94.17953	69.75857	69.75857	83.21799						109.772		0.063774	0.074863				6.2	0.00	3.87		-0.234056	-0.23128

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Intertek Testing Services

Manufacturer:	**SBI**			RESULTS	
Model:	**2.1 Series**		**Average emission rate:(gr/hr)**		**#DIV/0!**
Date:	**2-24-21**		Burn Rate (Dry kg/hr):		4.887
Run:	**3**				
Project #:	**G104576994**				
Test Duration: (minutes)	**60**				
PRESSURE FACTOR:		0.98429	BAROMETRIC PRESSURE		
				Average:	29.45
TEMPERATURE FACTORS				Start:	29.5
DGM #1:		0.99762		End:	29.4
DGM #2:		1.14783			
			DRY GAS METER VALUES		
VOLUMES SAMPLED			DGM #1	Final:	109.772
DGM #1:		7.49578		Initial:	102.214
DGM #2:		0.00000			
			DGM #2	Final:	0.000
TOTAL TUNNEL VOLUME (scf):		18082		Initial:	0.000
SAMPLE RATIOS			TEMPERATURES (DEG. RANKIN)		
Sample Train 1:		2412.294		DGM #1:	529.260
Sample Train 2:		#DIV/0!		DGM #2:	460.000
TOTAL EMISSIONS			CALIBRATION FACTORS		
Sample Train 1 (g):		**4.583**		DGM #1:	1.0100
Sample Train 2 (g):		**#DIV/0!**		DGM #2:	1.0110
EMISSION RATES			TUNNEL FLOW RATE:		301.367
Sample Train 1 (g/hr):		**4.58**			
Sample Train 2 (g/hr):		**#DIV/0!**	PARTICULATE CATCH (mg)		
				Total Sample Train 1:	1.9
				Total Sample Train 2:	0
				Filter and seal Sample Train 1:	1.8
MAX Allowed		7.50%		Filter and seal Sample Train 2:	
				Probe Sample Train 1:	0.1
DEVIATION:		#DIV/0!		Probe Sample Train 2:	

Time	Ambiant	Flue	Dilution Tunnel	Firebox Top	Firebox Back	Firebox Right	Firebox Left	Firebox Bottom
0	70.479535	71.24247266	69.03951774	71.32074944	72.61687693	71.80491653	72.09169918	72.55113312
10	72.042215	384.6938934	84.41017319	356.8924944	142.7910462	133.0482357	107.4993416	73.86356782
20	73.615488	350.9318016	84.13572555	434.4342388	222.529872	215.0848217	166.8261806	94.13433493
30	75.402968	386.186557	86.47131136	528.9940918	288.5114435	275.6634028	247.8344692	136.245286
40	76.397844	382.4273367	88.9348303	594.809706	362.1848537	330.8814747	333.748836	188.2448245
50	77.969175	426.745027	93.16586554	592.6070984	379.0406872	358.0888701	379.1019173	239.8699602
60	72.430201	478.8293243	100.0968665	699.6727838	362.4025506	403.6340895	407.861221	229.1122876
70	73.006683	496.340078	102.7548166	727.9169897	376.7416913	445.1170241	443.9596498	226.127318
80	73.24561	505.0733382	103.7572179	764.4377909	411.9467815	477.4697815	485.0258131	230.663535
90	71.908831	489.5085127	103.410917	767.8408222	451.1889561	505.4702981	517.7284616	242.4389846
100	73.149871	455.3586148	100.8641423	727.229934	477.7697109	524.1124508	537.8542796	260.3811677
110	72.256656	411.5667472	98.34277976	654.9918165	494.0379096	529.8929101	540.2679473	282.6836345
120	72.171783	363.8955076	94.96856726	568.9198842	490.8561922	522.156353	533.6238973	305.4879472
129	71.957314	336.3745799	92.83057277	502.4488137	472.0194957	505.4487691	517.3914411	321.5353764

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	%	%	%	Lbs
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28
0.0	71.24247	70.47953	69.03952	67.54346	67.61103	83.08249	67.70446	67.93425	86.55622			549.166	262.425	0.001265	0.075055				5.5
10.0	384.6939	72.04222	84.41017	68.26331	67.79751	84.68394	68.38006	68.13655	84.79972			550.399	263.673	0.072185	0.073332				4.1
20.0	350.9318	73.61549	84.13573	68.39026	67.84941	83.87305	68.46197	68.22722	84.21804			551.635	264.903	0.068758	0.07254				3.1
30.0	386.1866	75.40297	86.47131	68.50821	68.00577	85.04382	68.62745	68.38355	86.68737			552.859	266.135	0.071117	0.073392				2.1
40.0	382.4273	76.39784	88.93483	68.58573	68.08205	82.26179	68.71747	68.45315	86.94343			554.083	267.367	0.069297	0.074281				1.2
50.0	426.745	77.96917	93.16587	68.6754	68.18967	84.71967	68.80671	68.55492	84.19319			555.307	268.608	0.076731	0.07396				10.7
60.0	478.8293	72.4302	100.0969	68.77248	68.2284	87.52818	68.86419	68.56737	84.75104			556.534	269.849	0.080489	0.072623				9.2
70.0	496.3401	73.00668	102.7548	68.81772	68.36872	83.19337	68.96904	68.68808	86.98288			557.749	271.070	0.08245	0.073038				7.6
80.0	505.0733	73.24561	103.7572	68.95752	68.431	83.62387	69.09048	68.79745	85.84192			558.963	272.299	0.083321	0.070629				6.1
90.0	489.5085	71.90883	103.4109	69.06521	68.54455	86.00407	69.179	68.9014	82.27513			560.181	273.529	0.08148	0.072589				4.7
100.0	455.3586	73.14987	100.8641	69.15711	68.60729	85.57156	69.2463	68.95829	84.79766			561.395	274.754	0.077546	0.07237				3.7
110.0	411.5667	72.25666	98.34278	69.23097	68.71703	82.15991	69.30891	69.01299	87.13711			562.610	275.980	0.070351	0.071616				3.0
120.0	363.8955	72.17178	94.96857	69.27601	68.78459	84.45828	69.32436	69.09596	85.87918			563.825	277.208	0.065226	0.071515				2.5
129.8	336.3746	71.95731	92.83057	69.40675	68.9041	85.1367	69.48176	69.21629	84.49662			565.041	278.436	0.062395	0.073376				2.3

Intertek Testing Services

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Manufacturer:	**SBI**
Model:	**2.1 Series**
Date:	**2-25-21**
Run:	**4**
Project #:	**G104576994**
Test Duration: (minutes)	**129.83**

PRESSURE FACTOR:	0.98847
TEMPERATURE FACTORS	
DGM #1:	0.99900
DGM #2:	0.99858

VOLUMES SAMPLED	
DGM #1:	15.83305
DGM #2:	15.97768
TOTAL TUNNEL VOLUME (scf):	38082

SAMPLE RATIOS	
Sample Train 1:	2405.197
Sample Train 2:	2383.426

TOTAL EMISSIONS	
Sample Train 1 (g):	**6.254**
Sample Train 2 (g):	**6.435**

EMISSION RATES	
Sample Train 1 (g/hr):	**2.89**
Sample Train 2 (g/hr):	**2.97**
MAX Allowed	7.50%
DEVIATION:	1.43%

RESULTS

Average emission rate:(gr/hr)	**2.932**
Burn Rate (Dry kg/hr):	3.193

BAROMETRIC PRESSURE

Average:	29.575
Start:	29.55
End:	29.6

DRY GAS METER VALUES

DGM #1	Final:	565.041
	Initial:	549.166
DGM #2	Final:	278.436
	Initial:	262.425

TEMPERATURES (DEG. RANKIN)

DGM #1:	528.528
DGM #2:	528.753

CALIBRATION FACTORS

DGM #1:	1.0100
DGM #2:	1.0110

TUNNEL FLOW RATE:	293.319

PARTICULATE CATCH (mg)

Total Sample Train 1:	2.6
Total Sample Train 2:	2.7
Filter and seal Sample Train 1:	2.5
Filter and seal Sample Train 2:	2.5
Probe Sample Train 1:	0.1
Probe Sample Train 2:	0.2

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	Room Temp		Bar Pressure		Relative Humidity		Air Velocity	
	Before	After	Before	After	Before	After	Before	After
	70	72	29.55	29.60	22.3	13.4	0	0

Average Dilution Tunnel Measurements						Sample Data	
Burn	Velocity	Flow Rate	Temp	Total Sample		Particulate Catch	
Time	(Ft/sec)	(dscf/min)	(R)	1	2	1	2
130	15.15	293.32	553.08	15.83	15.98	2.60	2.70

Dilution Tunnel Dual Train Precision				
Sample Ratios		Total Emissions (g)		
Train 1	Train 2	Train 1	Train 2	Deviation (%)
2405.20	2383.43	6.25	6.44	1.43%

Burn				Initial		Run	Average
Rate		Surface		Draft		Time	Draft
3.193		0.000		0.001		129.830	0.069

Run	Date	Burn Rate	Emission
4	2021-02-25	3.193	2.932

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E&E Tunnel Traverse Worksheet

Static Pressure: **0.121**

Barometer: 29.55

	TUNNEL VELOCITY	TUNNEL TEMP	SQUARE ROOT
A CENTER	0.074	68.300	0.2720
B CENTER	0.077	68.300	0.2775
A1	0.078	68.300	0.2793
A2	0.078	68.300	0.2793
A3	0.066	68.300	0.2569
A4	0.064	67.600	0.2530
B1	0.069	68.300	0.2627
B2	0.077	68.300	0.2775
B3	0.072	68.300	0.2683
B4	0.051	68.500	0.2258
AVERAGE		68.25	0.2652

PITOT CONSTANT= 0.9653

E&E FUEL LOAD DATA SHEET

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			Test Load Weight: Lower	Ideal	Upper	
Firebox Volume:	1.03	cu. ft	11.74	12.36	12.98	
Load Volume:	1.0300	cu. ft	Loading Density:	17.494	lbs./ft3	
Number of Spacers:			Load Density:	17.494	lbs./ft3	

Piece Size: Thick	x Wide	x Length	Weight lbs	Meter Moisture Content Dry Uncorrected %			
2	4	16	1.65	17.60	19.00	18.90	84.00
2	4	16	2.36	20.20	19.70	25.50	84.00
2	4	16	2.33	18.40	24.20	17.70	84.00
2	4	16	6.33	18.70	22.30	18.70	84.00
2	4	16	2.13	10.00	10.00	10.00	84.00
2	4	16	3.23	22.10	19.00	17.60	84.00
							0.00
							0.00
							0.00

Test Load Weigh 18.019 lbs. **Dry Weigh** 6.908 kg.

Average Moisture Content: %

Dry: 18.31 | 18.311 | Wet: 15.477

Pre-test moisture content: %

#DIV/0! | #DIV/0! | Wet: #DIV/0!

Coal Bed Range: 3.7 lbs. to 4.5 lbs. 20% to 25% of test load

November 20 Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method
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

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For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.03	ft^3				
Total Nom. Load Wt. Target	10.30	lb				
Total Load Wt. Allowable Range	9.80	to	10.80	lb		
Core Target Wt. Allowable Range	4.60	to	6.70	lb		
Remainder Load Wt. Allowable Range	3.60	to	5.70	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	1.50	to	2.60	lb		2.05
Remainder Load Pc. Wt. Allowable Range	1.00	to	5.70	lb		3.35
	Pc. #					
Core Load Piece Wt. Actual	1	1.65	lb	In Range		
	2	2.36	lb	In Range		
	3	2.33	lb	In Range		
Core Load Total. Wt. Actual		6.33	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.44	lb	In Range		
(1 to 3 Pcs.)	2		lb	NA		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		100%		NA		≤ 67%
Remainder Load Tot. Wt. Act		4.44	lb	In Range		
Total Load Wt. Actual		10.78	lb	In Range		
Core % of Total Wt.		59%		In Range		45-65%
Remainder % of Total Wt.		41%		In Range		35-55%
Actual Load % of Nominal Target		105%		In Range		95-105%
Actual Fuel Load Density		10.5	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		2.16	lb			
Actual Kindling Wt.		2.13	lb	In Range		19.7%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		3.23	lb			
Actual Start-up Fuel Wt.		3.23	lb	In Range		29.9%
Allowable Residual Start-up Fuel Wt. Range	1.1	to	2.2	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.21	lb	In Range		1.6
Total Wt. All Fuel Added (wet basis)		16.13	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.0	to	1.2	lb		1.1
Actual Fuel Load Ending Wt.		1.0	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
17.6	19	18.9	18.5	In Range	1.39	lb	0.63	kg
20.2	19.7	25.5	21.8	In Range	1.93	lb	0.88	kg
18.4	24.2	17.7	20.1	In Range	1.94	lb	0.88	kg
18.7	22.3	18.7	19.9	In Range	3.70	lb	1.68	kg
					0.00	lb	0.00	kg
					0.00	lb	0.00	kg

Total Load Ave. MC (%-dry basis)	20.1	In Range			
Total Load Ave. MC % (wet basis)	16.8				
Total Test Load Weight (dry basis) →			8.97	lb	4.07 kg

Kindling Moisture (%-dry basis)

10	10	10	10.0	In Range	1.93	lb	0.88 kg

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

22.1	19	17.6	19.6	In Range	2.70	lb	1.22 kg

Total Wt. All Fuel Added (dry basis) →	13.60	lb	6.17	kg
Total Wt. All Fuel Burned (dry basis) →	11.3	lb	5.1	kg

Time	Flue	Room	Tunnel	DGM 1	DGM 1	Filter 1	DGM 2	DGM 2	Filter 2	DGM 3	Filter 3	Meter #1	Meter #2	Draft	Tunnel	CO	CO2	O2	scale	1.2119599	Meter	Meter		
																%	%	%	Lbs	Corrected	#1	#2	Draft	Calculated
10.0	Temp 1	Temp 2	Dry Bulb 3	In 13	Out 14	15	In 16	Out 17	18	In 19	20	21	22	23	24	25	25	27	28	Scale	Cu Ft	Cu Ft		Tunnel
0.0	71.24247	70.47953	69.03952	68.62141	68.62141	85.98314						109.803		0.001265	0.075055				5.5	4.25	3.88	0.00	-0.249684	-0.23124
10.0	384.6939	72.04222	84.41017	68.89784	68.89784	82.89505						111.039		0.072185	0.073332				4.1	2.90	3.92		-0.231954	-0.23167
20.0	350.9318	73.61549	84.13573	69.06476	69.06476	85.54653						112.280		0.068758	0.07254				3.1	1.91	3.96		-0.23281	-0.23187
30.0	386.1866	75.40297	86.47131	69.25228	69.25228	86.01888						113.498		0.071117	0.073392				2.1	0.87	4.01		-0.232221	-0.23165
40.0	382.4273	76.39784	88.93483	69.41604	69.41604	83.0061						114.706		0.069297	0.074281				1.2	0.00	4.05		-0.232676	-0.23143
50.0	426.745	77.96917	93.16587	69.59277	69.59277	82.56944						115.922		0.076731	0.07396				10.7	9.51	4.09		-0.230817	-0.23151
60.0	478.8293	72.4302	100.0969	69.73148	69.73148	86.69187						117.160		0.080489	0.072623				9.2	7.98	4.14		-0.229878	-0.23184

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Intertek Testing Services

Manufacturer:	**SBI**
Model:	**2.1 Series**
Date:	**2-25-21**
Run:	**4**
Project #:	**G104576994**
Test Duration: (minutes)	**60**

RESULTS

Average emission rate:(gr/hr)	**#DIV/0!**
Burn Rate (Dry kg/hr):	4.785

PRESSURE FACTOR:	0.98847

TEMPERATURE FACTORS

DGM #1:	0.99768
DGM #2:	1.14783

VOLUMES SAMPLED

DGM #1:	7.32789
DGM #2:	0.00000
TOTAL TUNNEL VOLUME (scf):	17791

SAMPLE RATIOS

Sample Train 1:	2427.807
Sample Train 2:	#DIV/0!

TOTAL EMISSIONS

Sample Train 1 (g):	**5.341**
Sample Train 2 (g):	**#DIV/0!**

EMISSION RATES

Sample Train 1 (g/hr):	**5.34**
Sample Train 2 (g/hr):	**#DIV/0!**
MAX Allowed	7.50%
DEVIATION:	#DIV/0!

BAROMETRIC PRESSURE

Average:	29.575
Start:	29.55
End:	29.6

DRY GAS METER VALUES

DGM #1	Final:	117.160
	Initial:	109.803
DGM #2	Final:	0.000
	Initial:	0.000

TEMPERATURES (DEG. RANKIN)

DGM #1:	529.225
DGM #2:	460.000

CALIBRATION FACTORS

DGM #1:	1.0100
DGM #2:	1.0110

TUNNEL FLOW RATE:	296.512

PARTICULATE CATCH (mg)

Total Sample Train 1:	2.2
Total Sample Train 2:	0
Filter and seal Sample Train 1:	2.2
Filter and seal Sample Train 2:	
Probe Sample Train 1:	0
Probe Sample Train 2:	

Filters weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date		**2021-02-12**		**2021-02-16**		**2021-02-17**		**2021-02-19**		**2021-02-22**		**2021-02-23**		**2021-02-24**		**2021-02-25**	
	Pression barométrique		**101.1**		**99.0**		**100.8**		**100.8**		**100.5**		**98.7**		**99.5**		**99.7**	
Calibration Record	SBI-237	0.1000	0.0999		0.1001		0.1000		0.1000		0.1000		0.1001		0.0999		0.1001	
	SBI-238	10.0001	10.0000		10.0001		10.0001		10.0001		10.0000		10.0001		10.0002		10.0001	
	SBI-238	200.0000	200.0000		200.0000		199.9999		200.0000		200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	13h18	69.4	14h30	69.6	12h58	69.4	14h09	69.6	8h45	69.2	8h45	70.1	8h00	70.3	7h45	69.9
	End Time	RH [%]	14h00	0	15h32	0.9	13h45	1.4	14h38	1.2	9h45	1	9h53	0	9h15	0.1	9h00	0
		Filter ID	**Weight (mg)**		**Weight (mg)**		**Weight (mg)**		**Weight (mg)**		**Weight (mg)**		**Weight (mg)**		**Weight (mg)**		**Weight (mg)**	
front	1		176.1		176.1		176.1		176.1		176.1							
rear	2																	
front	3		184.2		184.2		184.2		184.2		184.1		184.2		184.2		184.2	
rear	4																	
front	7		183.5		183.4		183.4		183.4		183.4		183.5		183.5		183.5	
rear	8																	
front	9		183.4		183.4		183.4		183.4		183.4							
rear	10																	
front	11		183.8		183.7		183.8		183.8		183.7		183.8		183.8		183.8	
rear	12																	
front	13		183.3		183.3		183.3		183.3		183.2		183.3					
rear	14																	
front	23		181.8		181.7		181.7		181.8		181.8		181.8		181.8			
rear	24																	
front	27		182.6		182.5		182.5		182.5		182.5							
rear	28																	
front	35		184.0		184.0		184.0		184.0		183.9		184.0		184.0			
rear	36																	
front	47		174.9		174.9		174.9		174.8		174.9		174.9					
rear	48																	
front	49		178.2		178.2		178.1		178.2		178.1		178.2		178.2			
rear	50																	
front	81		186.4		186.4		186.4		186.4		186.4		186.4					
rear	82																	

Probes weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date		**2021-02-05**		**2021-02-08**		**2021-02-11**		**2021-02-16**		**2021-02-17**		**2021-02-19**		**2021-02-22**		**2021-02-23**		**2021-02-24**		**2021-02-25**	
	Pression barométrique		**98.9**		**100.7**		**100.6**		**99.0**		**100.8**		**100.8**		**100.5**		**98.7**		**99.5**		**99.7**	
Calibration Record	SBI-237	0.1000	0.1000		0.0999		0.0999		0.1001		0.1000		0.1000		0.1000		0.1001		0.0999		0.1001	
	SBI-238	10.0001	10.0000		10.0000		10.0001		10.0001		10.0001		10.0001		10.0000		10.0001		10.0002		10.0001	
	SBI-238	200.0002	200.0000		200.0000		200.0000		200.0000		199.9999		200.0000		200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	13h18	69.4	9h15	68.9	13h38	68.9	14h30	69.6	12h58	69.4	14h09	69.6	8h45	69.2	8h45	70.1	8h00	70.3	7h45	69.9
	End Time	RH [%]	14h00	0	10h03	0	14h30	0	15h32	0.9	13h45	1.4	14h38	1.2	9h45	1	9h53	0	9h15	0.1	9h00	0
	#Run.#Sys	**Probe ID**	**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**		**Weight (g)**	
	1.1	1	80.1510		80.1504		80.1505		80.1510		80.1504		80.1504		80.1504							
	3.1	6	80.5806		80.5801		80.5800		80.5809		80.5800		80.5797		80.5800		80.5801		80.5801			
	1.2	12	81.0306		81.0302		81.0302		81.0308		81.0303		81.0303		81.0303							
	2.1	26	80.8544		80.8540		80.8538		80.8545		80.8540		80.8540		80.8543		80.8545					
	1.3	34	80.6259		80.6251		80.6248		80.6251		80.6246		80.6246		80.6245							
	3.2	37	80.7562		80.7556		80.7555		80.7563		80.7558		80.7558		80.7560		80.7565		80.7563			
	2.2	50	94.1153		94.1147		94.1148		94.1153		94.1148		94.1147		94.1152		94.1155					
	3.3	51	94.2010		94.2003		94.2003		94.2007		94.2004		94.2005		94.2009		94.2011		94.2011			
	2.3	53	93.7797		93.7790		93.7790		93.7796		93.7791		93.7790		93.7794		93.7797					
	4.1	57	80.6852		80.6844		80.6842		80.6850		80.6843		80.6844		80.6846		80.6852		80.6851		80.6851	
	4.2	58	93.8972		93.8966		93.8965		93.8972		93.8965		93.8965		93.8970		93.8971		93.8971		93.8970	
	4.3	64	94.2305		94.2294		94.2294		94.2302		94.2297		94.2290		94.2293		94.2299		94.2300		94.2300	

Filters weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

		Date/Pressure [kPa]		2021-02-22/100.5		2021-02-22/100.5		2021-02-25 / 99.7		2021-03-02 / 99.6	
Calibration Record		SBI-237	0.1000	0.1000		0.1000		0.1001		0.1000	
		SBI-238	10.0001	10.0000		10.0000		10.0001		10.0002	
		SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
		Start Time	Temp. [°F]	8h45	69.2	17h15	68.8	7h45	69.9	9h46	68.8
		End Time	RH [%]	9h45	1	17h26	0.1	9h00	0	10h28	0
Run	**Sampling train**		**Filter ID**	**Pretest Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
1	1	front	1	176.1		178.0		178.0		178.0	
		rear	2								
	2	front	9	183.4		185.7		185.7		185.7	
		rear	10								
	3 (1 hr)	front	27	182.5		184.6		184.6		184.6	
		rear	28								
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
1	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									

Filters weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

		Date/Pressure		2021-02-23 / 98.7		2021-02-23 / 98.7		2021-02-25 / 99.7		2021-03-02 / 99.6	
Calibration Record		SBI-237	0.1000	0.1001		0.1001		0.1001		0.1000	
		SBI-238	10.0001	10.0001		10.0001		10.0001		10.0002	
		SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
		Start Time	Temp. [°F]	8h45	70.1	18h16	70.1	7h45	69.9	9h46	68.8
		End Time	RH [%]	9h53	0	18h30	0	9h00	0	10h28	0
Run	**Sampling train**		**Filter ID**	**Pretest Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
2	1	front	13	183.3		185.9		185.9		185.9	
		rear	14								
	2	front	47	174.9		177.4		177.3		177.3	
		rear	48								
	3 (1 hr)	front	81	186.4		188.0		187.8		188.0	
		rear	82								

		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
2	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									

		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
2	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									

Filters weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

		Date/Pressure		2021-02-24 / 99.5		2021-02-24 / 99.5		2021-03-02 / 99.6		2021-03-08 / 101.2	
Calibration Record		SBI-237	0.1000	0.0999		0.0999		0.1000		0.1000	
		SBI-238	10.0001	10.0002		10.0002		10.0002		10.0001	
		SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
		Start Time	Temp. [°F]	8h00	70.3	19h20	70.3	9h46	68.8	12h45	69.5
		End Time	RH [%]	9h15	0.1	19h38	0.1	10h28	0	13h01	0.2
Run	**Sampling train**		**Filter ID**	**Pretest Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
3	1	front	23	181.8		184.7		184.7		184.7	
		rear	24								
	2	front	35	184.0		186.8		186.8		186.8	
		rear	36								
	3 (1 hr)	front	49	178.2		180.1		180.0		180.0	
		rear	50								
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
3	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0002								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									

Filters weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

		Date/Pressure		2021-02-25 / 99.7		2021-02-25 / 99.7		2021-03-02 / 99.6		2021-03-08 / 101.2	
Calibration Record		SBI-237	0.1000	0.1001		0.1001		0.1000		0.1000	
		SBI-238	10.0001	10.0001		10.0001		10.0002		10.0001	
		SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
		Start Time	Temp. [°F]	7h45	69.9	12h30	69.9	9h46	68.8	12h45	69.5
		End Time	RH [%]	9h00	0	12h44	0	10h28	0	13h01	0.2
Run	**Sampling train**		**Filter ID**	**Pretest Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
4	1	front	3	184.2		186.8		186.8		186.7	
		rear	4								
	2	front	7	183.5		186.1		186.1		186.0	
		rear	8								
	3 (1 hr)	front	11	183.8		186.2		186.1		186.0	
		rear	12								
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0000								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
4	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									
		Date/Pressure									
Calibration Record		SBI-237	0.1000								
		SBI-238	10.0001								
		SBI-238	200.0002								
		Start Time	Temp. [°F]								
		End Time	RH [%]								
Run	**Sampling train**		**Filter ID**	**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**		**Post test Weight (mg)**	
	1	front									
		rear									
	2	front									
		rear									
	3 (1 hr)	front									
		rear									

Probes weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date/Pressure		2021-02-22/100.5		2021-02-22/100.5		2021-03-04 / 99.1		2021-03-05 / 99.2	
Calibration Record	SBI-237	0.1000	0.1000		0.1000		0.1000		0.1000	
	SBI-238	10.0001	10.0000		10.0000		10.0001		9.9999	
	SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	8h45	69.2	17h15	68.8	14h00	69.8	15h00	69.6
	End Time	RH [%]	9h45	1	17h26	0.1	14h21	0.2	15h17	0.1

Run	**Sampling train**	**Probe ID**	**Pretest Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
1	1	1	80.1504	80.1512	80.1512	80.1513
	2	12	81.0303	81.0311	81.0312	81.0313
	3 (1 hr)	34	80.6245	80.6256	80.6247	80.6246

	Date/Pressure											
Calibration Record	SBI-237	0.1000										
	SBI-238	10.0001										
	SBI-238	200.0000										
	Start Time	Temp. [°F]										
	End Time	RH [%]										

Run	**Sampling train**	**Probe ID**	**Post test weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
1	1					
	2					
	3 (1 hr)					

	Date/Pressure											
Calibration Record	SBI-237	0.1000										
	SBI-238	10.0001										
	SBI-238	200.0000										
	Start Time	Temp. [°F]										
	End Time	RH [%]										

Run	**Sampling train**	**Probe ID**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
1	1					
	2					
	3 (1 hr)					

Probes weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date/Pressure		2021-02-23 / 98.7		2021-02-23 / 98.7		2021-03-04 / 99.1		2021-03-05 / 99.2	
Calibration Record	SBI-237	0.1000	0.1001		0.1001		0.1000		0.1000	
	SBI-238	10.0001	10.0001		10.0001		10.0001		9.9999	
	SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	8h45	70.1	18h16	70.1	14h00	69.8	15h00	69.6
	End Time	RH [%]	9h53	0	18h30	0	14h21	0.2	15h17	0.1

Run	**Sampling train**	**Probe ID**	**Pretest Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
2	1	26	80.8545	80.8550	80.8547	80.8547
	2	50	94.1155	94.1158	94.1157	
	3 (1 hr)	53	93.7797	93.7804	93.7799	93.7799

	Date/Pressure									
Calibration Record	SBI-237	0.1000								
	SBI-238	10.0001								
	SBI-238	200.0000								
	Start Time	Temp. [°F]								
	End Time	RH [%]								

Run	**Sampling train**	**Probe ID**	**Post test weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
2	1					
	2					
	3 (1 hr)					

	Date/Pressure									
Calibration Record	SBI-237	0.1000								
	SBI-238	10.0001								
	SBI-238	200.0000								
	Start Time	Temp. [°F]								
	End Time	RH [%]								

Run	**Sampling train**	**Probe ID**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
2	1					
	2					
	3 (1 hr)					

Probes weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date/Pressure		2021-02-24 / 99.5		2021-02-24 / 99.5		2021-03-04 / 99.1		2021-03-05 / 99.2	
Calibration Record	SBI-237	0.1000	0.0999		0.0999		0.1000		0.1000	
	SBI-238	10.0001	10.0002		10.0002		10.0001		9.9999	
	SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	8h00	70.3	19h20	70.3	14h00	69.8	15h00	69.6
	End Time	RH [%]	9h15	0.1	19h38	0.1	14h21	0.2	15h17	0.1

Run	**Sampling train**	**Probe ID**	**Pretest Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
3	1	6	80.5801	80.5813	80.5807	80.5805
	2	37	80.7563	80.7570	80.7567	80.7566
	3 (1 hr)	51	94.2011	94.2018	94.2014	94.2012

	Date/Pressure									
Calibration Record	SBI-237	0.1000								
	SBI-238	10.0001								
	SBI-238	200.0000								
	Start Time	Temp. [°F]								
	End Time	RH [%]								

Run	**Sampling train**	**Probe ID**	**Post test weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
3	1					
	2					
	3 (1 hr)					

	Date/Pressure									
Calibration Record	SBI-237	0.1000								
	SBI-238	10.0001								
	SBI-238	200.0000								
	Start Time	Temp. [°F]								
	End Time	RH [%]								

Run	**Sampling train**	**Probe ID**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
3	1					
	2					
	3 (1 hr)					

Probes weights

General information

Project:	G104576994
Project Engineer:	Claude Pelland
Scale ID:	SBI-206

	Date/Pressure		2021-02-25 / 99.7		2021-02-25 / 99.7		2021-03-05 / 99.2		2021-03-22 / 101.0	
Calibration Record	SBI-237	0.1000	0.1001		0.1001		0.1000		0.1000	
	SBI-238	10.0001	10.0001		10.0001		9.9999		10.0001	
	SBI-238	200.0000	200.0000		200.0000		200.0000		200.0000	
	Start Time	Temp. [°F]	7h45	69.9	12h30	69.9	15h00	69.6	15h05	71.1
	End Time	RH [%]	9h00	0	12h44	0	15h17	0.1	15h20	1.8

Run	**Sampling train**	**Probe ID**	**Pretest Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
4	1	57	80.6851	80.6849	80.6851	80.6852
	2	58	93.8970	93.8972	93.8973	93.8972
	3 (1 hr)	64	94.2300	94.2312	94.2299	94.2300

	Date/Pressure											
Calibration Record	SBI-237	0.1000										
	SBI-238	10.0001										
	SBI-238	200.0000										
	Start Time	Temp. [°F]										
	End Time	RH [%]										

Run	**Sampling train**	**Probe ID**	**Post test weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
4	1					
	2					
	3 (1 hr)					

	Date/Pressure											
Calibration Record	SBI-237	0.1000										
	SBI-238	10.0001										
	SBI-238	200.0000										
	Start Time	Temp. [°F]										
	End Time	RH [%]										

Run	**Sampling train**	**Probe ID**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**	**Post test Weight (g)**
4	1					
	2					
	3 (1 hr)					

ID Certificat de Calibration
CA0003-051-030920-ACC-USI

METTLER TOLEDO

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, OH 43240
1-800-METTLER

Accredited by the American Association for Laboratory Accreditation (A2LA)
CALIBRATION CERT #1902.01

ISO 17025 Registered
ANSI/NCSL Z540-1 Accredited

Certificat de Calibration de Précision

Accuracy Calibration Certificate

Client

Compagnie:	SBI Fabricant De Poeles		
Adresse:	250 Rue de Copenhague		
Ville:	Saint-Augustin-De-Desmaures	**Contact:**	Gabrielle Santerre
Zip/Code Postal:	G3A 2H3		
État/Province:	Quebec		

Weighing Device

Manufacturier:	Weigh-Tronix	**Type d'Instrument:**	Weighing Instrument
Modèle:	DSL 4848-05	**# Outil:**	SBI-014 FLOOR SCALE
No. Série:	B00927386KL	**Modèle Indicateur:**	N/D
Building:	N/D	**Terminal Serial No.:**	N/D
Floor:	N/D	**Terminal Asset No.:**	N/D
Room:	N/D		

Plage	Capacité Max	Lisibilité (d)
1	500 kg	0.02 kg

Procedure

Instruction de Calibration:	EURAMET cg-18 v. 4.0 (11/2015)
Instruction de travail METTLER TOLEDO:	30260953 Rev1.31

Ce certificat de calibration contient des mesures pour les calibrations Tel que Trouvé et Tel que Laissé.

The sensitivity/span of the weighing instrument was adjusted before As Left calibration with an external weight.

The calibration was agreed with the user below the maximum capacity of the balance.

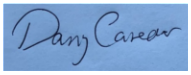
	Temperature	
Tel que Trouvé	Start: 19.0 °C	End: 19.0 °C
Tel que Laissé	Start: 19.0 °C	End: 19.0 °C

Environmental conditions have been verified to ensure the accuracy of the calibration.

This certificate is issued in accordance with the conditions of accreditation granted by A2LA, which is based on ISO/IEC 17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards.

Date calibration Tel que Trouvé:	09-Mar-2020
Date calibration Tel que Laissé:	09-Mar-2020
Date d'Émission:	09-Mar-2020
Requested Next Calibration Date:	31-Mar-2021

Authorized A2LA Signatory:



Dany Careau

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Le document a été fourni par voie électronique.

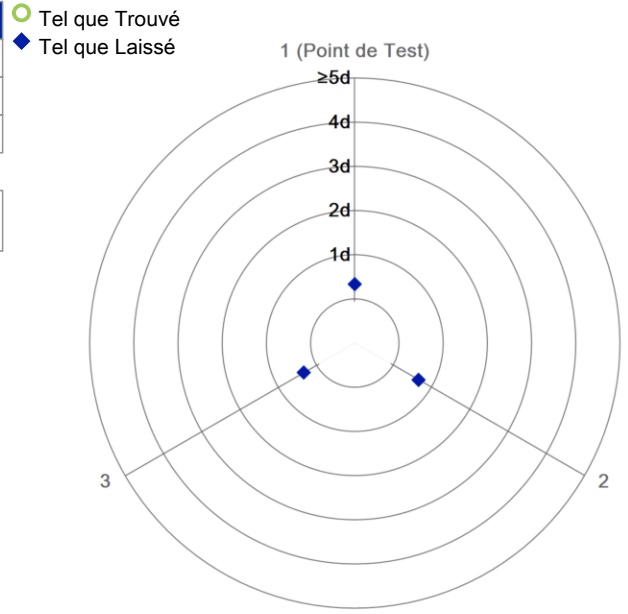
Résultats de Mesure

Répétabilité

Charge de Test: 100 kg

	Tel que Trouvé	Tel que Laissé
1	N/D	100.00 kg
2	N/D	100.02 kg
3	N/D	100.00 kg

Écart Type	**N/D**	**0.012 kg**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

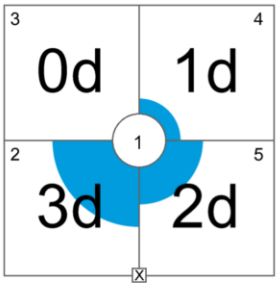
The results of this graph are based upon the absolute values of the differences from the mean value.

Excentricité

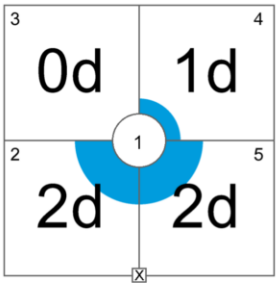
Charge de Test: 100 kg

Position	Tel que Trouvé	Tel que Laissé
1	99.96 kg	100.00 kg
2	99.90 kg	99.96 kg
3	99.96 kg	100.00 kg
4	99.98 kg	100.02 kg
5	100.00 kg	100.04 kg

Déviation Maximale	**0.06 kg**	**0.04 kg**



Tel que Trouvé



Tel que Laissé

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Erreur d'indication

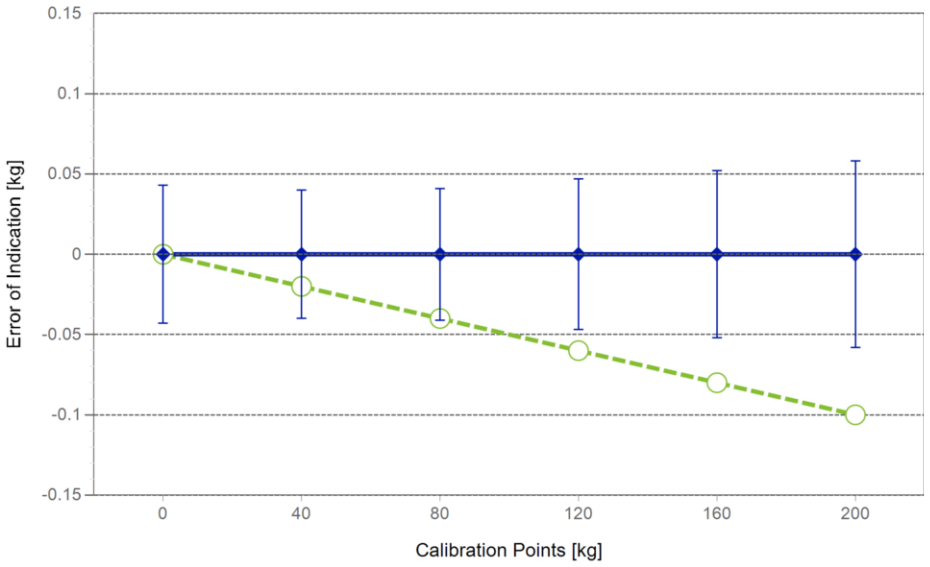
Tel que Trouvé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0 kg	0.00 kg	0.00 kg	N/D	N/D
2	40 kg	39.98 kg	-0.02 kg	N/D	N/D
3	80 kg	79.96 kg	-0.04 kg	N/D	N/D
4	120 kg	119.94 kg	-0.06 kg	N/D	N/D
5	160 kg	159.92 kg	-0.08 kg	N/D	N/D
6	200 kg	199.90 kg	-0.10 kg	N/D	N/D

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Tel que Laissé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0 kg	0.00 kg	0.00 kg	0.043 kg	3.31
2	40 kg	40.00 kg	0.00 kg	0.040 kg	2.65
3	80 kg	80.00 kg	0.00 kg	0.041 kg	2.37
4	120 kg	120.00 kg	0.00 kg	0.047 kg	2.28
5	160 kg	160.00 kg	0.00 kg	0.052 kg	2.13
6	200 kg	200.00 kg	0.00 kg	0.058 kg	2.05



For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

Tous les poids utilisés pour le contrôle métrologique sont retraçables aux étalons Nationaux et Internationaux. Les poids ont été calibrés et certifiés par un laboratoire de calibration accrédité.

Jeu de Poids 1: OIML M1

Weight Set Number:	Q1	Date d'Émission:	13-Mar-2019
# Certificat:	1415364	Date de Calibration Due:	13-Mar-2020

Remarques

N/D

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Incertitude de Mesure du dispositif de pesage en opération

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Coefficient de température pour l'évaluation de l'incertitude de mesure en opération: $10.0 \cdot 10^{-6}$ / K

Plage d'opération sur le site pour l'évaluation de l'incertitude de mesure en opération: 10 K

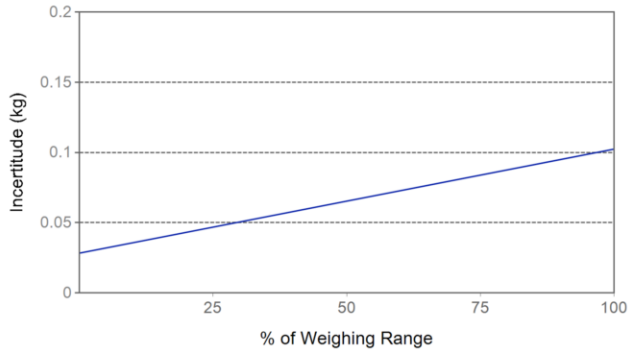
Linéarisation de l'Équation d'Incertitude

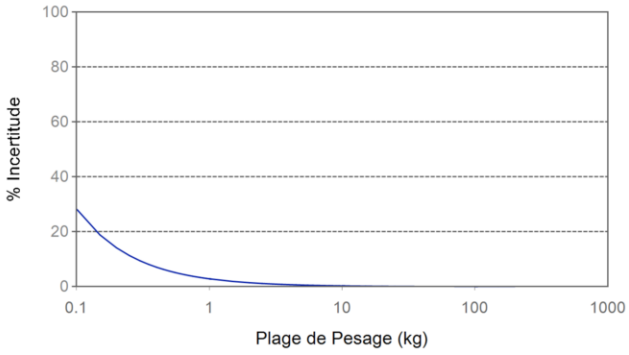
Plage		Tel que Trouvé	Tel que Laissé
1	0 kg - 500 kg	N/A	U_1 = 28 g + 0.371 g/kg · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Indication Net	Tel que Trouvé		Tel que Laissé	
0.20 kg	N/A	N/A	0.028 kg	14%
2.00 kg	N/A	N/A	0.029 kg	1.4%
20.00 kg	N/A	N/A	0.035 kg	0.18%
100.00 kg	N/A	N/A	0.065 kg	0.065%
200.00 kg	N/A	N/A	0.10 kg	0.051%





Tel que Trouvé Tel que Laissé

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METTLER TOLEDO Service

Handbook 44 Tolerance Assessment (Entretien)

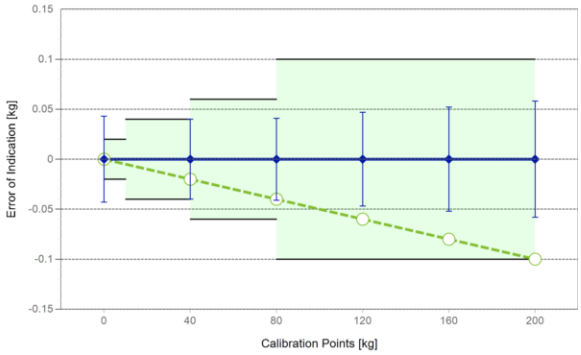
Les mesures du certificat de calibration joint ont été évaluées selon les tolérances définies par NIST HB44.

	Tel que Trouvé	Tel que Laissé
Global	✓	✓

✓ = Passed
✗ = Failed

Weighing Device

Range	Max. Capacity	Readability (d)	Verification Scale Interval (e)	Class
1	500 kg	0.02 kg	0.02 kg	III



Tolerances according to NIST Handbook 44

Test Load		Tolérance
From	To	
0.00 kg	0.00 kg	0.005 kg
0.02 kg	10.00 kg	0.02 kg
10.02 kg	40.00 kg	0.04 kg
40.02 kg	80.00 kg	0.06 kg
80.02 kg	200.00 kg	0.1 kg

○ Tel que Trouvé
◆ Tel que Laissé
— Tolérance

Eccentricity and Repeatability

Test	Test Load	Tolérance	As Found		As Left	
			Max. Error / Range	Result	Max. Error / Range	Result
Excentricité (Maximum Error)	100 kg	0.10 kg	0.1 kg	✓	0.04 kg	✓
Excentricité (Plage)	100 kg	0.1 kg	0.10 kg	✓	0.08 kg	✓
Répétabilité (Maximum Error)	100 kg	0.1 kg	N/D	N/D	0.02 kg	✓
Répétabilité (Plage)	100 kg	0.10 kg	N/D	N/D	0.02 kg	✓

Max. Error: Maximum of the absolute values of the individual errors.
Range: Difference between largest and smallest measurement value.

Error of Indication

	Reference Value	Tolérance	As Found		As Left	
			Error of Indication	Result	Error of Indication	Result
1	0 kg	0.02 kg	0.00 kg	✓	0.00 kg	✓
2	40 kg	0.04 kg	-0.02 kg	✓	0.00 kg	✓
3	80 kg	0.06 kg	-0.04 kg	✓	0.00 kg	✓
4	120 kg	0.10 kg	-0.06 kg	✓	0.00 kg	✓
5	160 kg	0.10 kg	-0.08 kg	✓	0.00 kg	✓
6	200 kg	0.10 kg	-0.10 kg	✓	0.00 kg	✓

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Ulrich Métrologie Inc.
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Montréal (Québec) H8T 1A1

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info@ulrich.ca
www.ulrich.ca

ACCREDITATION ISO 17025 TM
SCC Scope Number 220

CALIBRATION CERTIFICATE

Certificate no.:	753379	**Calibration date:**	May 25, 2020
Identification:	SBI-096	**Certificate issued:**	May 25, 2020
Description:	CALIBRATOR, OMEGA CL23A	**Interval:**	12 months
Size:	TC K/J/T	**Due date:**	May 25, 2021
Manufacturer:	OMEGA	**Procedure no.:**	MET/CAL
Model no.:	CL23A	**Environment:**	CLAS Type 2 Laboratory
Serial no.:	T-256137	**Temperature:**	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	YUK

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

Notes:

9V battery replaced.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

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166727 P

ULRICH
DIVISION - [illegible] CANADA

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Ulrich Metrology Inc.
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Montréal (Québec) H8T 1A1

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CALIBRATION DATA

Certificate no.: 753379
Identification: SBI-096
Description: CALIBRATOR THERMOMETER
Serial no.: T-256137
Procedure: Omega CL23A: 5520A-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
7870009	CALIBRATOR	FLUKE	5520A	2020/03/20	2021/03/31

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
Temperature measurements are performed by electrical simulation.						
DISPLAY CALIBRATION						
Did all segments of the display illuminate?						
Result of Operator Evaluation					PASS	
THERMOMETER CALIBRATION						
K Type Thermocouple						
-200.0degF		-199.8	-201.0	-199.0	PASS	1.7
-60.0degF		-59.7	-61.0	-59.0	PASS	3.1
-40.0degF		-39.9	-40.5	-39.5	PASS	1.5
32.0degF		32.2	31.5	32.5	PASS	1.7
300.0degF		300.2	299.5	300.5	PASS	1.1
572.0degF		572.2	571.5	572.5	PASS	1.1
1240.0degF		1240.2	1239.5	1240.5	PASS	1.1
1260.0degF		1260.1	1259.5	1260.5	PASS	1.1
2500.0degF		2500.2	2499.0	2501.0	PASS	1.4
J Type Thermocouple						
-200.0degF		-200.1	-201.0	-199.0	PASS	2.1
-60.0degF		-59.9	-61.0	-59.0	PASS	3.5
-40.0degF		-40.0	-40.5	-39.5	PASS	1.7
32.0degF		31.9	31.5	32.5	PASS	2.0
572.0degF		571.9	571.5	572.5	PASS	1.6
300.0degF		299.9	299.5	300.5	PASS	2.0
1240.0degF		1239.8	1239.5	1240.5	PASS	1.6
1260.0degF		1259.8	1259.5	1260.5	PASS	1.6
1400.0degF		1399.8	1399.4	1400.6	PASS	1.8
T Type Thermocouple						
-200.0degF		-200.1	-201.0	-199.0	PASS	2.3
-60.0degF		-59.9	-61.0	-59.0	PASS	2.3
-40.0degF		-40.0	-40.5	-39.5	PASS	1.2
32.0degF		32.0	31.5	32.5	PASS	1.7
300.0degF		300.0	299.5	300.5	PASS	2.0
572.0degF		571.9	571.5	572.5	PASS	2.0
750.0degF		750.0	749.5	750.5	PASS	2.0

ULRICH
DIVISION - TRESCOR CANADA

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Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
CALIBRATOR CALIBRATION						
K Type Thermocouple						
-200.0degF		-199.5	-201.0	-199.0	PASS	1.7
-60.0degF		-59.8	-61.0	-59.0	PASS	3.1
-40.0degF		-39.7	-40.5	-39.5	PASS	1.5
32.0degF		32.2	31.5	32.5	PASS	1.7
300.0degF		300.1	299.5	300.5	PASS	1.1
572.0degF		572.2	571.5	572.5	PASS	1.1
1240.0degF		1240.3	1239.5	1240.5	PASS	1.1
1260.0degF		1260.2	1259.5	1260.5	PASS	1.1
2500.0degF		2500.4	2499.0	2501.0	PASS	1.4
J Type Thermocouple						
-200.0degF		-199.7	-201.0	-199.0	PASS	2.1
-60.0degF		-60.0	-61.0	-59.0	PASS	3.5
-40.0degF		-39.8	-40.5	-39.5	PASS	1.7
32.0degF		32.0	31.5	32.5	PASS	2.0
300.0degF		300.1	299.5	300.5	PASS	2.0
572.0degF		572.0	571.5	572.5	PASS	1.6
1240.0degF		1240.2	1239.5	1240.5	PASS	1.6
1260.0degF		1260.1	1259.5	1260.5	PASS	1.6
1400.0degF		1399.9	1399.4	1400.6	PASS	1.8
T Type Thermocouple						
-200.0degF		-199.8	-201.0	-199.0	PASS	2.3
-60.0degF		-59.9	-61.0	-59.0	PASS	2.3
-40.0degF		-39.8	-40.5	-39.5	PASS	1.2
32.0degF		32.0	31.5	32.5	PASS	1.7
300.0degF		300.0	299.5	300.5	PASS	2.0
572.0degF		572.0	571.5	572.5	PASS	2.0
750.0degF		750.0	749.5	750.5	PASS	2.0

End of Test Data

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CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

CERTIFICAT D'ÉTALONNAGE # 13027

Date d'étalonnage : 2020-10-13
Date d'émission du certificat : 2020-10-13

Stove Builder International
250, rue de Copenhague
Saint-Augustin-de-Desmaures, Québec, Canada
G3A 2H3

Étalonnage d'un
Débitmètre volumétrique American Meter Company DTM-200A S/N : 07J264834

CONFORMITÉ AU PROGRAMME DE QUALITÉ

Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2017, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

TRAÇABILITÉ

La traçabilité des étalons de débit au National Institute of Standards and Technology, NIST, est maintenue par les laboratoires de Fluke Corporation de Phoenix, Arizona et est conforme aux normes ISO/IEC 17025, ANSI/NCSL Z540-1-1994, ISO-10012-1, MIL-STD 45662A.

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

APTITUDE EN MATIÈRE DE MESURE ET D'ÉTALONNAGE - CMC

Les références utilisées pour l'étalonnage de débit ont une incertitude de ±0.2% de la lecture pour les mesures entre 5 SCCM à 10 SLPM, ±0.3% de la lecture pour les mesures entre 10 SLPM à 30 SLPM, ±0.2% de la lecture pour les mesures entre 30 SLPM à 3000 SLPM, ±0.3% de la lecture pour les mesures supérieures à 3000 SLPM jusqu'à 6000 SLPM et ±0.5% pour les mesures inférieures à 5 SCCM jusqu'à concurrence de 1 SCCM, équivalent air ou azote. Les incertitudes exprimées sont élargies avec un facteur d'élargissement k = 2, et ce, pour un niveau de confiance d'environ 95 %, dans l'hypothèse d'une distribution normale incluant la résolution de l'instrument. Le rapport d'incertitude des essais (RIE) de cet étalonnage respecte un ratio de 4:1 à moins d'indication contraire.

SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
	Lectures Initiales = Lectures finales, aucun ajustement
Résultats	Lectures finales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

Bernard Poirier
Métrologiste

Responsable du laboratoire

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Tel: (450) 444-3600 Fax: (450) 444-1088 www.polycontrols.com

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Conseil canadien des normes
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Portée d'accréditation 655

Certificat d'étalonnage # 13027

Numéro de série:	07J264834	Station de mesure:	3
Date d'étalonnage:	2020-10-13	Procédure:	POS-CAL-005
Identification de l'instrument:	SBI-103	Règle de décision:	Méthode #2

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500279712	2021-03-04
DHI molbox1	Molbox1	755	1500285062	2021-06-09
RTD Mist	Mist	L00295	2019008203	2020-12-13
Module 44.5 PSI avec Baro 163671	Module 30	160659	2020003156	2021-04-28

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	0-200 ACFH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %F.S.

Condition d'étalonnage

Gaz	Air
Température ambiante	22 °C
Pression ambiante	1017.71 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	Viton

Lectures finales

Débit du test ACFH	Instrument en test ft³	Valeurs mesurées Pression PSIA	Température °C	Référence ft³	Référence calculée ft³	Erreur calculée ft³	Tolérance acceptable ft³	Incertitude k = 2 ft³	TUR
5.0012	0.8350	14.7006	22.19	0.8297	0.8325	0.0025	0.6658	0.0034	>4
10.0479	1.6910	14.6978	22.14	1.6681	1.6737	0.0173	0.6663	0.0056	>4
15.0460	2.5350	14.6960	22.09	2.4977	2.5060	0.0290	0.6662	0.0083	>4
25.0808	4.2250	14.6987	22.01	4.1601	4.1720	0.0530	0.6654	0.0139	>4
40.1053	6.7640	14.7066	21.93	6.6675	6.6813	0.0827	0.6664	0.0222	>4

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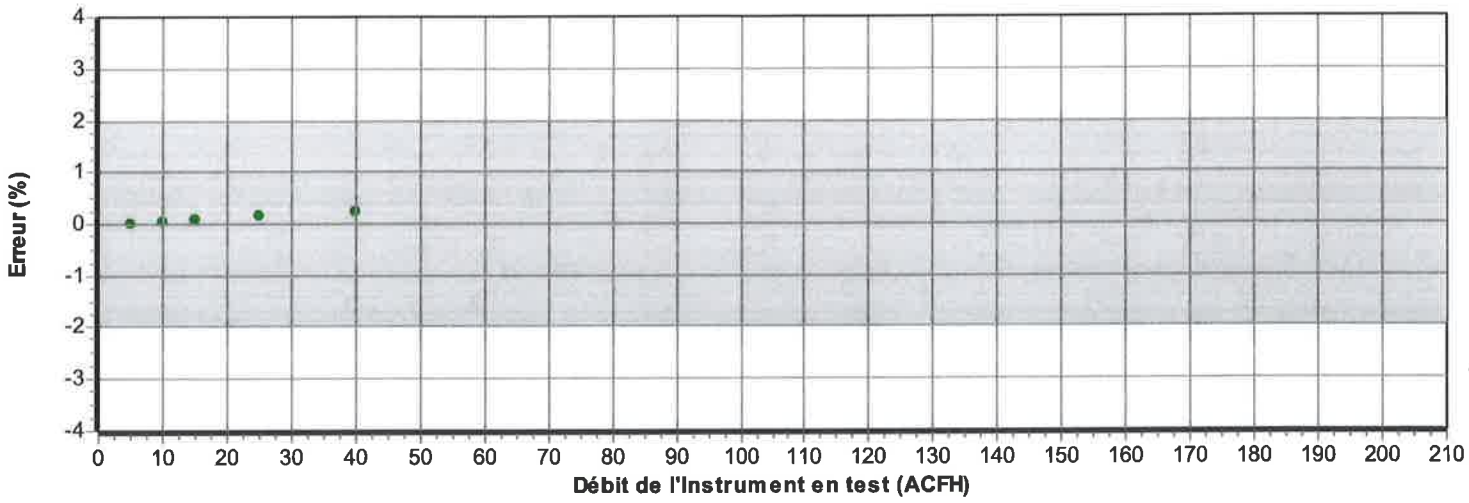
CLAS 2009-02

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Laboratoire accrédité
Portée d'accréditation 655

Certificat d'étalonnage # 13027

Numéro de série:	07J264834	Station de mesure:	3
Date d'étalonnage:	2020-10-13	Procédure:	POS-CAL-005
Identification de l'instrument:	SBI-103	Règle de décision:	Méthode #2

Résultats finaux



Voir l'annexe pour la règle de décision

MICRO PRECISION CALIBRATION, INC.
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

Certificate of Calibration

ACCREDITED ISO/IEC 17025 CALIBRATION LABORATORY AC-1969.00

Date: Dec 4, 2020

Cert No. 551220083969913

Customer:

STOVE BUILDERS INTERNATIONAL INC.

PORTES 11-12
250 DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC G3A 2H3

		Work Order #:	SAC-70112509
		Purchase Order #:	66348
MPC Control #:	DA5990	Serial Number:	N/A
Asset ID:	SBI-104	Department:	N/A
Gage Type:	PITOT STATIC TUBE	Performed By:	BRETT SHANLEY
Manufacturer:	DWYER INSTRUMENTS INC.	Received Condition:	IN TOLERANCE
Model Number:	160S-24	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	December 03, 2020
Temp/RH:	20.0°C / 40.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	December 03, 2021

Calibration Notes:

See attached calibration data.(1 Page)
Pitot Coefficient: 0.84

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
AW4419	MULTI-FUNCTION PRESSURE INDICATOR	DPI 145	14501283	DRUCK INC	Aug 31, 2022	551220083774826
CJ5100	WIND TUNNEL WITH CONTROLLER	JS-500	375/305	INTERACTIVE INSTRUMENTS	Oct 31, 2021	551220083300219
AE2821	ANEMOMETER	AM-4822	N272316	LANDTEK	Oct 31, 2021	551220083907679

Procedures Used in this Event

Procedure Name	Description
MPC-AIR-001 Rev. 01	Air Velocity, Temperature and Flow Meters, General, rev01, Feb-11-2020

Calibrating Technician: Brett Shanley — BRETT SHANLEY

QC Approval: mjilao — MARVIN ILAO

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:
PASS- Term used when compliance statement is given, and the measurement result is PASS.
PASS²- Term used when compliance statement is given, and the measurement result is conditional passed or PASS².
FAIL- Term used when compliance statement is given, and the measurement result is FAIL.
FAIL²- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL².
REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.
ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.
LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

(CERT, Rev 7)

MICRO PRECISION

Calibration Report of Dwyer Instruments 160S-24 Pitot Static Tube

MPC Control #:	DA5990	Serial Number:	NA
Asset ID:	SBI-104	Calibration Date:	December 03, 2020

Velocity Accuracy

Function Tested	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)	TUR
Velocity	10.0 mps	9.8 mps	9.9 mps	9.9 mps	10.2 mps	PASS[Z]	0.14 mps	1.4 : 1
	20.0 mps	19.6 mps	19.8 mps	19.8 mps	20.4 mps	PASS[Z]	0.30 mps	1.3 : 1

Statements of Pass or Fail Conformance

The uncertainty of measurement has been taken into account when determining compliance with specification.
All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006

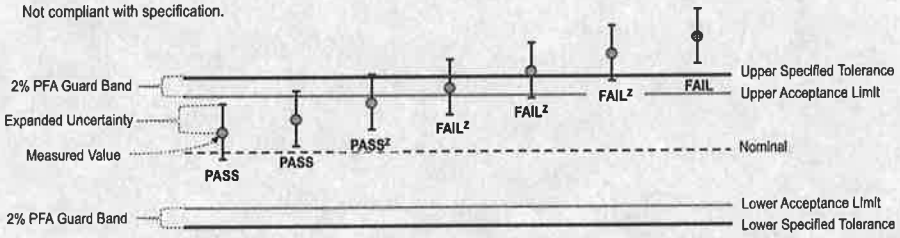
The status of compliance with the acceptance criteria is reported as:

PASS — Compliant with specification.

PASS[Z] — The measured value is within acceptance limits.
However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

FAIL[Z] — The measured value is not within the acceptance limits.
However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

FAIL — Not compliant with specification.



Acceptance limits for ≤ 2% probability of false accept (PFA) guard band

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated.

This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3-2006, Method 6 --- Guard Bands Based on Test Uncertainty Ratio.

- End of Calibration Report -

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Fabricant de poêle international inc.
Stove Builder International Inc.

CERTIFICAT DE VÉRIFICATION

VERIFICATION CERTIFICATE

No. Certificat : 20201028001

Identification : SBI-153
Description : Moisture content standard
Manufacturier : Delmhorst
No. Modèle : MCS-1
No. Série : 81808
Propriété de : SBI
250 de Copenhague
St-Augustin-de-Desmaures, QC G3A 2H3

Date de vérification : 28 octobre 2020
Prochaine vérification : 28 octobre 2021
Méthode utilisée : Cal-Temp_01
Température : 69.8 °F
Humidité : 25.4 %
État avant calibration : Bon état

Ce certificat de calibration est émis en accordance avec les requis applicables du standard ISO/IEC 17025 et le manuel qualité, version 2.0 de SBI.

MESURES D'INCERTITUDE

Les incertitudes signalées représentent un niveau de confiance de 95% en supposant une distribution normale, avec un facteur de couverture de K = 2.

REMARQUES

L'instrument de mesure est vérifié et nettoyé avant l'étalonnage. Les résultats de calibration de ce certificat se rapportent seulement à l'instrument calibré ci-dessus.

ÉTALON UTILISÉ POUR VÉRIFIER L'ÉQUIPEMENT

No. de l'étalon utilisé	Description	No. de certificat	Date de calibration	Date d'échéance
SBI-194	Multimètre	724382	2019-10-30	2020-10-30

Fabricant de poêle international inc.
Stove Builder International Inc.

CERTIFICAT DE VÉRIFICATION

VERIFICATION CERTIFICATE

DONNÉES DE VÉRIFICATION

Unités : MΩ

Résultat : PASS

S.D.	0.00	%	
R.M.U.	0.91	%	
O.M.U	**98.18**	**%**	
	Ave A.D.	0.00	%
Standard	Reading	A.D.	
1.10	1.10	0.00	
1.10	1.10	0.00	
1.10	1.10	0.00	

S.D.	0.00	%	
R.M.U.	0.83	%	
O.M.U	**98.00**	**%**	
	Ave A.D.	0.56	%
Standard	Reading	A.D.	
120	120	0.00	
120	119	0.83	
120	119	0.83	

VÉRIFIÉ PAR : Gabrielle Santerre

Gabrielle Santerre

FIN DU CERTIFICAT

28 octobre 2020

Certificat # 20201028001

Digital Measurement Metrology Inc.
A Trescal company
26 Automatic Road, Unit 4
Brampton, ON, L6S 5N7
Tel. (905) 790-9400 Fax. (905) 790-9266
www.dmm.ca // service@dmm.ca

ACCREDITED
CERTIFICATE #1692.01

CALIBRATION CERTIFICATE

Description:	WEIGHT	**Calibration Date:**	Oct 02, 2018 **Certificate:** 95513
Asset Number:	SBI-190	**Property of:**	SBI ST-AUGUSTIN
Serial/Model Number:	N / A	**Address:**	250, rue de Copenhague, Doors 10-12
Manufacturer:	N / A	**City/Prov/PC:**	St-Augustin-de-Desmaures QC G3A 2H3
Instrument Capacity:	5 kg	**Country:**	Canada
Procedure:	CP34G	**Method Used:**	COMPARISON
Room Humidity:	45 % **Room Temp:** 19.6 °C	**Conformance Stds:**	ISO/IEC 17025: 2005

CALIBRATION DATA

Units: kg

Range	Std/Nominal	As Found	As Left	Min	Max	Tolerance In	Tolerance Out	Comments
	5	5.0005	5.0005	4.9995	5.0005	✔		

Remarks:
Inspected, cleaned and tested using the mfgr's specs and procedures, customer's, national or international standards, or new procedure design. Measurement uncertainty is not included when any statement of compliance is made. The user must decide on acceptance for the intended use.

Received Condition:
In tolerance.

CALIBRATION STANDARD(S) USED

Traceable No.	Asset Number	Calibration Date	Date Due
95457	DMML-2356075	Oct 01, 2018	Oct 01, 2019
W-046636-25724	DMML-21701	Jan 08, 2018	Jan 08, 2020

Weights are accurate to class F tolerance.

Estimated measurement uncertainty is ± 0.2 g.

Reported uncertainties represent a 95 % confidence level assuming a normal distribution, with a coverage factor of k=2.

This calibration was performed in the lab and is traceable to the International System of Units (SI Units) through NIST or NRC. This report is covered by our accreditation.

Calibration of the instrument expires on Oct 02, 2023

The results shown above relate to the above calibrated instrument/equipment only. Copyright of this Certificate is owned by the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

CALIBRATED BY Chris Riddle — Christopher Riddle

Q.A. APPROVAL Andrés Galeano — Andres Galeano

END OF REPORT

ACCREDITATION 17025 ISO/IEC

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ULRICH
DIVISION - TRANSCAT CANADA

Transcat Canada Inc.
9900, Côte-de-Liesse
Montréal (Québec)
H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@transcat.ca
www.transcat.ca

ACCREDITATION
ISO 17025
SCC Scope Number 220

CALIBRATION CERTIFICATE

Certificate no.:	780975	**Calibration date:**	November 24, 2020
Identification:	SBI-194	**Certificate issued:**	November 25, 2020
Description:	MULTIMETER, RADIO SHACK 22-168A	**Interval:**	12 months
Manufacturer:	RADIO SHACK	**Due date:**	November 24, 2021
Model no.:	22-168A	**Procedure no.:**	MET/CAL
Serial no.:	FC388201	**Environment:**	CLAS Type 2 Laboratory
		Temperature:	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	MIC

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

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ULRICH
DIVISION - TRANSCAT CANADA

Ulrich Métrologie inc.
Ulrich Metrology Inc.
9900, Côte-de-Liesse
Montréal (Québec) H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

CALIBRATION DATA

Certificate no.: 780975
Identification: SBI-194
Description: MULTIMETER
Serial no.: FC388201
Procedure: MICRONTA 22-168A: 5520A-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
8608002	CALIBRATOR	FLUKE	5520A	2020/07/15	2021/07/31

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
DC VOLTAGE CALIBRATION						
200 mV Range						
190.0mV		189.9	187.8	192.2	PASS	
2V Range						
1.900V		1.899	1.878	1.922	PASS	
-1.900V		-1.897	-1.922	-1.878	PASS	
20V Range						
19.00V		18.98	18.78	19.22	PASS	
200V Range						
190.0V		190.1	187.8	192.2	PASS	
1000V Range						
950V		950	938	962	PASS	
AC VOLTAGE CALIBRATION						
200 mV Range						
190.0mV @ 60Hz		185.8	185.8	194.2	PASS	
2V Range						
1.900V @ 60Hz		1.858	1.858	1.942	PASS	
20V Range						
19.00V @ 60Hz		18.58	18.58	19.42	PASS	
200V Range						
190.0V @ 60Hz		185.8	185.8	194.2	PASS	
750V Range						
700V @ 60Hz		683	678	723	PASS	
FREQUENCY CALIBRATION						
1.900kHz @ 5V		1.904	1.809	1.990	PASS	
RESISTANCE CALIBRATION						
200 Ohm Range						
190.0 Ohm		190.0	186.8	193.2	PASS	
2 kOhm Range						
1.900 kOhm		1.903	1.870	1.930	PASS	
20 kOhm Range						
19.00 kOhm		18.98	18.70	19.30	PASS	

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www.ulrich.ca

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
200 kOhm Range						
190.0 kOhm		190.0	187.0	193.0	PASS	
2 MOhm Range						
1.900 MOhm		1.899	1.870	1.930	PASS	
20 MOhm Range						
19.00 MOhm		19.02	18.50	19.50	PASS	
2000 MOhm Range						
1100 MOhm		1090	935	1266	PASS	
CONTINUITY CALIBRATION						
Is the beeper on when 30 Ohms resistance is applied?						
Result of Operator Evaluation					PASS	
Is the beeper off when 100 Ohms resistance is applied?						
Result of Operator Evaluation					PASS	
DC CURRENT CALIBRATION						
200 µA Range						
190.0uA		189.7	187.0	193.0	PASS	
2 mA Range						
1.900mA		1.900	1.870	1.930	PASS	
20 mA Range						
19.00mA		19.06	18.47	19.54	PASS	
200 mA Range						
190.0mA		191.6	184.7	195.3	PASS	
20 A Range						
10.00A		9.89	9.30	10.70	PASS	
AC CURRENT CALIBRATION						
200 µA Range						
190.0uA @ 60Hz		185.1	184.8	195.2	PASS	
2 mA Range						
1.900mA @ 60Hz		1.855	1.848	1.952	PASS	
20 mA Range						
19.00mA @ 60Hz		18.60	18.15	19.85	PASS	
200 mA Range						
190.0mA @ 60Hz		186.8	181.5	198.5	PASS	
20 A Range						
10.00A @ 60Hz		9.83	8.98	11.02	PASS	
CAPACITANCE CALIBRATION						
200 nF Range						
190.0nF		188.5	180.9	199.1	PASS	
20 µF Range						
19.00uF		18.46	17.30	20.70	PASS	
200 µF Range						
190.0uF		183.5	172.9	207.1	PASS	

End of Test Data

Fabricant de poêle international inc.
Stove Builder International Inc.

CERTIFICAT DE VÉRIFICATION

VERIFICATION CERTIFICATE

No. Certificat : 20201103001

Identification : SBI-197
Description : EPA sampling banc 4
Manufacturier : Home made
No. Modèle : NA
No. Série : NA
Propriété de : SBI
250 de Copenhague
St-Augustin-de-Desmaures, QC G3A 2H3

Date de vérification : 3 novembre 2020
Prochaine vérification : 3 novembre 2021
Méthode utilisée : Cal-Temp_01
Température : 67.5 °F
Humidité : 24.8 %
État avant calibration : Bon état

Ce certificat de calibration est émis en accordance avec les requis applicables du standard ISO/IEC 17025 et le manuel qualité, version 2.0 de SBI.

MESURES D'INCERTITUDE

Les incertitudes signalées représentent un niveau de confiance de 95% en supposant une distribution normale, avec un facteur de couverture de K = 2.

REMARQUES

L'instrument de mesure est vérifié et nettoyé avant l'étalonnage. Les résultats de calibration de ce certificat se rapportent seulement à l'instrument calibré ci-dessus.

ÉTALON UTILISÉ POUR VÉRIFIER L'ÉQUIPEMENT

No. de l'étalon utilisé	Description	No. de certificat	Date de calibration	Date d'échéance
SBI-096	Calibreur de température de référence	700929	2020-05-25	2021-05-25

Fabricant de poêle international inc.
Stove Builder International Inc.

CERTIFICAT DE VÉRIFICATION

VERIFICATION CERTIFICATE

DONNÉES DE VÉRIFICATION

Unités : °F

Résultat : PASS

S.D.	0.01	%	
R.M.U.	0.14	%	
O.M.U	**98.26**	**%**	
	Ave A.D.	0.86	%
Standard	Reading	A.D.	
70	70.6	0.86	
70	70.6	0.86	
70	70.6	0.86	

S.D.	0.00	%	
R.M.U.	0.05	%	
O.M.U	**99.49**	**%**	
	Ave A.D.	0.25	%
Standard	Reading	A.D.	
200	200.5	0.25	
200	200.5	0.25	
200	200.5	0.25	

S.D.	0.00	%	
R.M.U.	0.02	%	
O.M.U	**99.79**	**%**	
	Ave A.D.	0.11	%
Standard	Reading	A.D.	
600	600.7	0.12	
600	600.6	0.10	
600	600.6	0.10	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**99.85**	**%**	
	Ave A.D.	0.08	%
Standard	Reading	A.D.	
1000	1000.8	0.08	
1000	1000.8	0.08	
1000	1000.7	0.07	

S.D.	0.00	%	
R.M.U.	0.01	%	
O.M.U	**99.88**	**%**	
	Ave A.D.	0.06	%
Standard	Reading	A.D.	
1400	1400.9	0.06	
1400	1400.8	0.06	
1400	1400.8	0.06	

VÉRIFIÉ PAR : Gabrielle Santerre

Gabrielle Santerre

FIN DU CERTIFICAT

ID Certificat de Calibration
CA0003-041-030920-ACC-USL

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, OH 43240
1-800-METTLER

METTLER TOLEDO

Accredited by the American Association for Laboratory Accreditation (A2LA)
CALIBRATION CERT #1788.01

ISO 17025 Accredited
ANSI/NCSL Z540-1 Accredited

Certificat de Calibration de Précision

Accuracy Calibration Certificate

Client

Compagnie:	SBI Fabricant De Poeles		
Adresse:	250 Rue de Copenhague		
Ville:	Saint-Augustin-De-Desmaures	**Contact:**	Gabrielle Santerre
Zip/Code Postal:	G3A 2H3		
État/Province:	Quebec		

Weighing Device

Manufacturier:	SARTORIUS	**Type d'Instrument:**	Weighing Instrument
Modèle:	TE214S	**# Outil:**	SBI-206 BAL. ANALYTIQUE
No. Série:	25851066	**Modèle Indicateur:**	N/D
Building:	N/D	**Terminal Serial No.:**	N/D
Floor:	N/D	**Terminal Asset No.:**	N/D
Room:	N/D		

Plage	Capacité Max	Lisibilité (d)
1	210 g	0.0001 g

Procedure

Instruction de Calibration:	EURAMET cg-18 v. 4.0 (11/2015)
Instruction de travail METTLER TOLEDO:	30260953 Rev1.31

Ce certificat de calibration contient des mesures pour les calibrations Tel que Trouvé et Tel que Laissé.

The sensitivity/span of the weighing instrument was adjusted before As Left calibration with an external weight.

	Temperature	
Tel que Trouvé	Start: 66.5 °F	End: 66.5 °F
Tel que Laissé	Start: 66.7 °F	End: 67.1 °F

Environmental conditions have been verified to ensure the accuracy of the calibration.

This certificate is issued in accordance with the conditions of accreditation granted by A2LA, which is based on ISO/IEC 17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards.

Date calibration Tel que Trouvé:	09-Mar-2020	**Authorized A2LA Signatory:**	Dany Careau
Date calibration Tel que Laissé:	09-Mar-2020		
Date d'Émission:	09-Mar-2020		
Requested Next Calibration Date:	31-Mar-2021		

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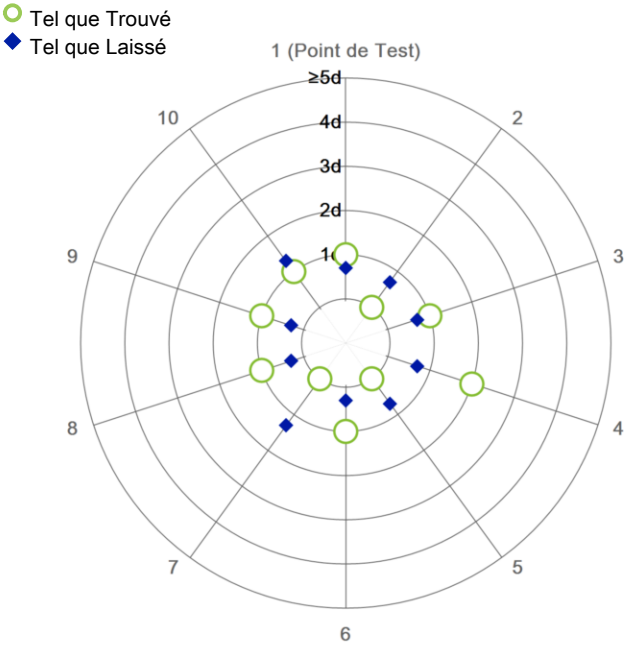
Résultats de Mesure

Répétabilité

Charge de Test: 100 g

	Tel que Trouvé	Tel que Laissé
1	99.9996 g	99.9999 g
2	99.9997 g	99.9999 g
3	99.9998 g	99.9999 g
4	99.9999 g	99.9999 g
5	99.9997 g	99.9999 g
6	99.9998 g	100.0000 g
7	99.9997 g	100.0001 g
8	99.9996 g	100.0000 g
9	99.9996 g	100.0000 g
10	99.9996 g	100.0001 g

Écart Type	**0.00011 g**	**0.00008 g**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

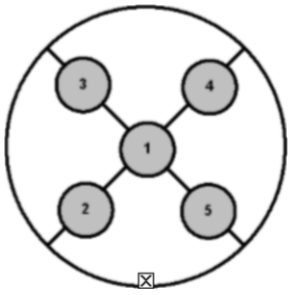
The results of this graph are based upon the absolute values of the differences from the mean value.

Excentricité

Charge de Test: 100 g

Position	Tel que Trouvé	Tel que Laissé
1	99.9997 g	99.9998 g
2	99.9998 g	99.9998 g
3	99.9997 g	99.9998 g
4	99.9997 g	99.9998 g
5	99.9999 g	99.9998 g

Déviation Maximale	**0.0002 g**	**0.0000 g**



Erreur d'indication

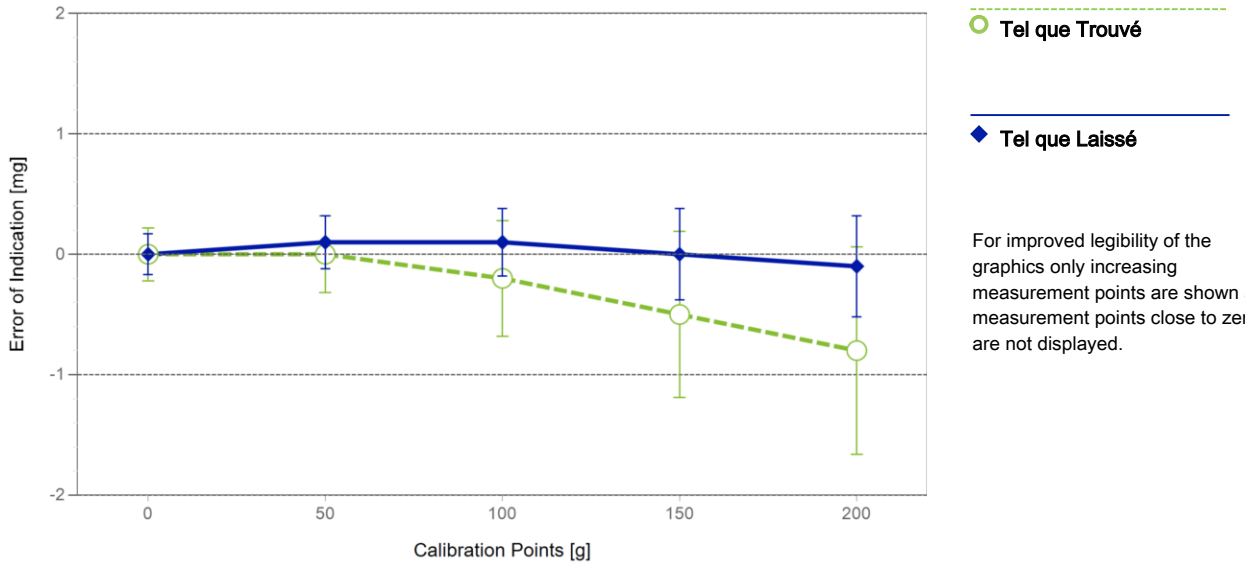
Tel que Trouvé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0.0000 g	0.0000 g	0.0000 g	0.22 mg	2
2	50.0000 g	50.0000 g	0.0000 g	0.32 mg	2
3	99.9999 g	99.9997 g	-0.0002 g	0.48 mg	2
4	149.9999 g	149.9994 g	-0.0005 g	0.69 mg	2
5	200.0001 g	199.9993 g	-0.0008 g	0.86 mg	2

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Tel que Laissé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0.0000 g	0.0000 g	0.0000 g	0.17 mg	2
2	50.0000 g	50.0001 g	0.0001 g	0.22 mg	2
3	99.9999 g	100.0000 g	0.0001 g	0.28 mg	2
4	149.9999 g	149.9999 g	0.0000 g	0.38 mg	2
5	200.0001 g	200.0000 g	-0.0001 g	0.42 mg	2



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

Tous les poids utilisés pour le contrôle métrologique sont retraçables aux étalons Nationaux et Internationaux. Les poids ont été calibrés et certifiés par un laboratoire de calibration accrédité.

Jeu de Poids 1: OIML E2

Weight Set Number:	434	Date d'Émission:	13-Mar-2020
# Certificat:	01124860-1	Date de Calibration Due:	28-Feb-2021

Remarques

N/D

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Incertitude de Mesure du dispositif de pesage en opération

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Coefficient de température pour l'évaluation de l'incertitude de mesure en opération: $3.0 \cdot 10^{-6}$ / K

Plage d'opération sur le site pour l'évaluation de l'incertitude de mesure en opération: 5 °F

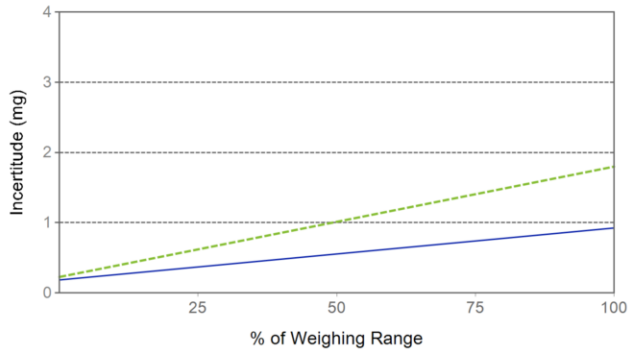
Linéarisation de l'Équation d'Incertitude

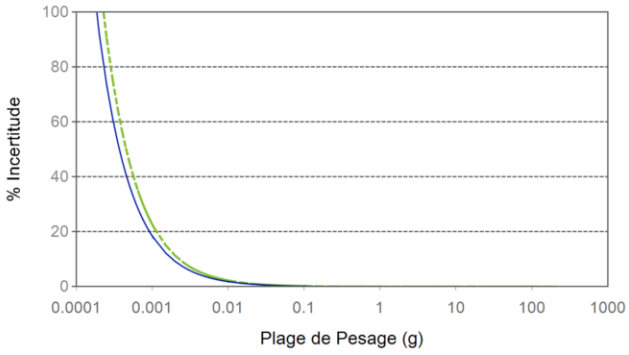
Plage		Tel que Trouvé	Tel que Laissé
1	0 g - 210 g	U_1 = 0.23 mg + 0.00749 mg/g · R	U_1 = 0.18 mg + 0.00352 mg/g · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Indication Net	Tel que Trouvé		Tel que Laissé	
0.0210 g	0.23 mg	1.1%	0.18 mg	0.86%
0.2100 g	0.23 mg	0.11%	0.18 mg	0.086%
2.1000 g	0.25 mg	0.012%	0.19 mg	0.0089%
21.0000 g	0.39 mg	0.0018%	0.25 mg	0.0012%
210.0000 g	1.8 mg	0.00086%	0.92 mg	0.00044%





Tel que Trouvé Tel que Laissé

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Certificate

No Pass/Fail statement is possible because one or more of the process requirements are not specified.

Tests Performed: ☑ ☑

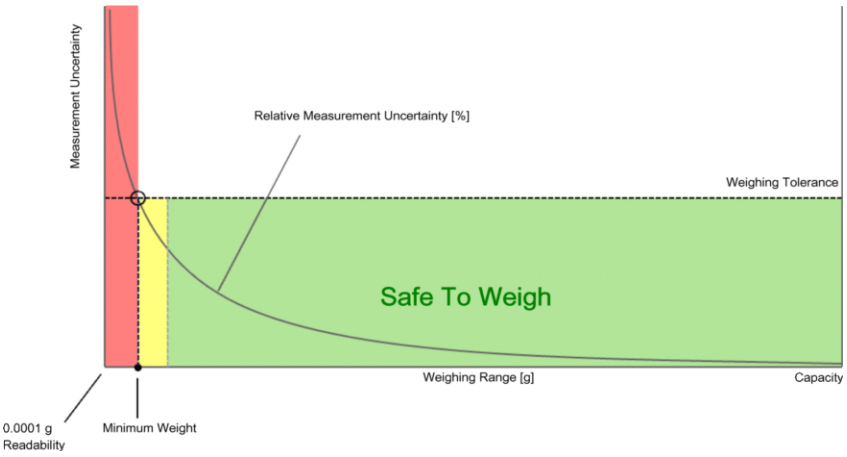
Process Requirements

Weighing Tolerance: **Not Specified**

Smallest Net Weight: **Not Specified**

Facteur de Sécurité: ***Not specified, default = 2**

Safe Weighing Range



Since the weighing tolerance is not specified, only a generic behavior curve is shown.

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Poids Minimum

As Found Minimum Weight Table

Poids minimum pour différentes tolérances de pesage et facteurs de sécurité					
	Facteur de Sécurité				
Tolérance	**1**	**2**	**3**	**5**	**10**
0.1%	0.22778 g	0.45903 g	0.69382 g	1.17436 g	2.44377 g
0.2%	0.11346 g	0.22778 g	0.34297 g	0.57598 g	1.17436 g
0.5%	0.04528 g	0.09070 g	0.13626 g	0.22778 g	0.45903 g
1%	0.02262 g	0.04528 g	0.06798 g	0.11346 g	0.22778 g
2%	0.01131 g	0.02262 g	0.03395 g	0.05663 g	0.11346 g
5%	0.00452 g	0.00905 g	0.01357 g	0.02262 g	0.04528 g

As Left Minimum Weight Table

Poids minimum pour différentes tolérances de pesage et facteurs de sécurité					
	Facteur de Sécurité				
Tolérance	**1**	**2**	**3**	**5**	**10**
0.1%	0.18444 g	0.37018 g	0.55725 g	0.93542 g	1.90502 g
0.2%	0.09206 g	0.18444 g	0.27715 g	0.46355 g	0.93542 g
0.5%	0.03678 g	0.07362 g	0.11051 g	0.18444 g	0.37018 g
1%	0.01839 g	0.03678 g	0.05519 g	0.09206 g	0.18444 g
2%	0.00919 g	0.01839 g	0.02758 g	0.04599 g	0.09206 g
5%	0.00368 g	0.00735 g	0.01103 g	0.01839 g	0.03678 g

À ces valeurs de poids net minimum, l'incertitude de mesure du dispositif est égale ou inférieure à 1/1 (pas de facteur de sécurité), 1/2, 1/3, 1/5 ou 1/10 de la tolérance requise. Ces valeurs sont calculées avec k=2 et basées sur la formule linéaire de l'incertitude de mesure du dispositif de pesage en opération.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

Résultats de Mesure

Results Summary

	Répétabilité	Excentricité	Erreur d'indication
As Found	N/D	N/D	N/D
As Left	N/D	N/D	N/D

✔ = Passed

✘ = Failed

⚠ = Safety Factor not met

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Répétabilité

Charge de Test: 100 g

		Tel que Trouvé		Tel que Laissé	
Tolérance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/D	0.00011 g	N/D	0.00008 g	N/D
0.2%	N/D		N/D		N/D
0.5%	N/D		N/D		N/D
1%	N/D		N/D		N/D
2%	N/D		N/D		N/D
5%	N/D		N/D		N/D

An assessment cannot be made because the smallest net weight is not defined.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Excentricité

Charge de Test: 100 g

		Tel que Trouvé		Tel que Laissé	
Tolérance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0002 g	✓	0.0000 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

Erreur d'indication

Tel que Trouvé

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/D	N/D	N/D	N/D	N/D	N/D
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	-0.0002 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	-0.0005 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	-0.0008 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

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Tel que Laissé

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/D	N/D	N/D	N/D	N/D	N/D
50.0000 g	0.0001 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	-0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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Handbook 44 Tolerance Assessment (Entretien)

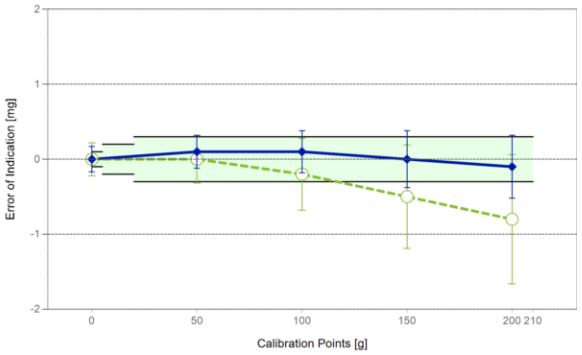
Les mesures du certificat de calibration joint ont été évaluées selon les tolérances définies par NIST HB44.

	Tel que Trouvé	Tel que Laissé
Global	✗	✓

✓ = Passed
✗ = Failed

Weighing Device

Range	Max. Capacity	Readability (d)	Verification Scale Interval (e)	Class
1	210 g	0.0001 g	0.0001 g	I



Tolerances according to NIST Handbook 44

Test Load		Tolérance
From	To	
0.0000 g	0.0000 g	0.000025 g
0.0001 g	5.0000 g	0.0001 g
5.0001 g	20.0000 g	0.0002 g
20.0001 g	210.0000 g	0.0003 g

○ Tel que Trouvé
◆ Tel que Laissé
— Tolérance

Eccentricity and Repeatability

Test	Test Load	Tolérance	As Found		As Left	
			Max. Error / Range	Result	Max. Error / Range	Result
Excentricité (Maximum Error)	100 g	0.0003 g	0.0002 g	✓	0.0001 g	✓
Excentricité (Plage)	100 g	0.0003 g	0.0002 g	✓	0.0000 g	✓
Répétabilité (Maximum Error)	100 g	0.0003 g	0.0003 g	✓	0.0002 g	✓
Répétabilité (Plage)	100 g	0.0003 g	0.0003 g	✓	0.0002 g	✓

Max. Error: Maximum of the absolute values of the individual errors.
Range: Difference between largest and smallest measurement value.

Error of Indication

	Reference Value	Tolérance	As Found		As Left	
			Error of Indication	Result	Error of Indication	Result
1	0.0000 g	0.0001 g	0.0000 g	✓	0.0000 g	✓
2	50.0000 g	0.0003 g	0.0000 g	✓	0.0001 g	✓
3	99.9999 g	0.0003 g	-0.0002 g	✓	0.0001 g	✓
4	149.9999 g	0.0003 g	-0.0005 g	✗	0.0000 g	✓
5	200.0001 g	0.0003 g	-0.0008 g	✗	-0.0001 g	✓

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info@ulrich.ca
www.ulrich.ca

ACCREDITATION ISO 17025 TM
SCC Scope Number 220

CALIBRATION CERTIFICATE

Certificate no.:	769847	**Calibration date:**	September 10, 2020
Identification:	SBI-212	**Certificate issued:**	September 10, 2020
Description:	THERMO-HYGROMETER, AMPROBE TH-3	**Interval:**	12 months
Manufacturer:	AMPROBE	**Due date:**	September 10, 2021
Model no.:	TH-3	**Procedure no.:**	MET/CAL
Serial no.:	100906351	**Environment:**	CLAS Type 2 Laboratory
		Temperature:	23 ± 2°C
		Humidity:	35 - 55% RH
		Metrologist:	NFS

Property of: SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

Approved by: David Llorens, Quality Manager

This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.

CALIBRATION STANDARDS

See notes below.

MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

CALIBRATION DATA

See next page for measurement results.

Notes:

9V battery replaced.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

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Montréal (Québec) H8T 1A1

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CALIBRATION DATA

Certificate no.: 769847
Identification: SBI-212
Description: THERMO-HYGROMETER
Serial no.: 100906351
Procedure: Amprobe TH-3: 2500ST-LT-M

Result: PASS
Condition: FOUND-LEFT

CALIBRATION STANDARDS

Identification	Description	Manufacturer	Model no.	Cal. Date	Due Date
1304953	HUMIDITY GENERATOR	THUNDER SCIENTIFIC	2500ST-LT	2019/07/23	2021/01/31

MEASUREMENT RESULTS (Per MET/CAL)

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS LOW	HIGH	PASS/ FAIL	TUR
TEMPERATURE CALIBRATION						
23°C						
23.10degC		23.60	22.30	23.90	PASS	
RELATIVE HUMIDITY CALIBRATION AT 23°C						
20% RH						
20.00%		20.90	17.00	23.00	PASS	
50% RH						
50.00%		49.90	47.00	53.00	PASS	
80% RH						
79.94%		77.00	76.94	82.94	PASS	

End of Test Data

ID Certificat de Calibration
CA0003-049-030920-ACC-USI

METTLER TOLEDO

Mettler Toledo
Service Business Unit Industrial
1900 Polaris Parkway
Columbus, OH 43240
1-800-METTLER

Accredited by the American Association for Laboratory Accreditation (A2LA)
CALIBRATION CERT #1902.01
ISO 17025 Registered
ANSI/NCSL Z540-1 Accredited

Certificat de Calibration de Précision

Accuracy Calibration Certificate

Client

Compagnie:	SBI Fabricant De Poeles		
Adresse:	250 Rue de Copenhague		
Ville:	Saint-Augustin-De-Desmaures	**Contact:**	Gabrielle Santerre
Zip/Code Postal:	G3A 2H3		
État/Province:	Quebec		

Weighing Device

Manufacturier:	Ohaus	**Type d'Instrument:**	Weighing Instrument
Modèle:	FD15	**# Outil:**	SBI-222 BALANCE BENCH
No. Série:	B144397174	**Modèle Indicateur:**	N/D
Building:	N/D	**Terminal Serial No.:**	N/D
Floor:	N/D	**Terminal Asset No.:**	N/D
Room:	N/D		

Plage	Capacité Max	Lisibilité (d)
1	15000 g	1 g

Procedure

Instruction de Calibration:	EURAMET cg-18 v. 4.0 (11/2015)
Instruction de travail METTLER TOLEDO:	30260953 Rev1.31

Ce certificat de calibration contient des mesures pour les calibrations Tel que Trouvé et Tel que Laissé.

The sensitivity/span of the weighing instrument was adjusted before As Left calibration with an external weight.

	Temperature	
Tel que Trouvé	Start: 22.0 °C	End: 22.0 °C
Tel que Laissé	Start: 22.0 °C	End: 22.0 °C

Environmental conditions have been verified to ensure the accuracy of the calibration.

This certificate is issued in accordance with the conditions of accreditation granted by A2LA, which is based on ISO/IEC 17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards.

Date calibration Tel que Trouvé:	09-Mar-2020	**Authorized A2LA Signatory:**	Dany Careau
Date calibration Tel que Laissé:	09-Mar-2020		
Date d'Émission:	09-Mar-2020		
Requested Next Calibration Date:	31-Mar-2021		

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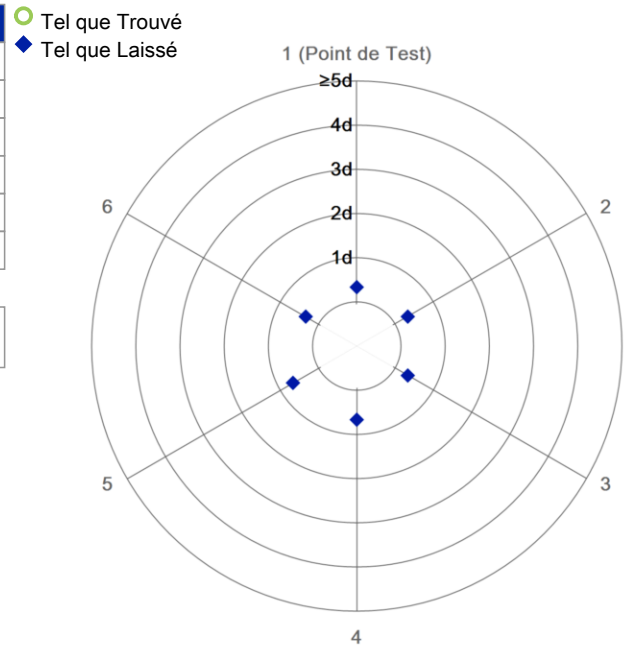
Résultats de Mesure

Répétabilité

Charge de Test: 10000 g

	Tel que Trouvé	Tel que Laissé
1	N/D	10000 g
2	N/D	10000 g
3	N/D	10000 g
4	N/D	10001 g
5	N/D	10001 g
6	N/D	10000 g

Écart Type	**N/D**	**0.5 g**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

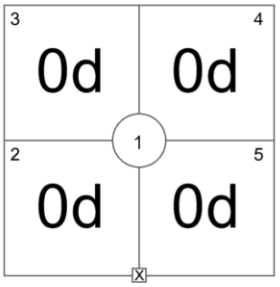
The results of this graph are based upon the absolute values of the differences from the mean value.

Excentricité

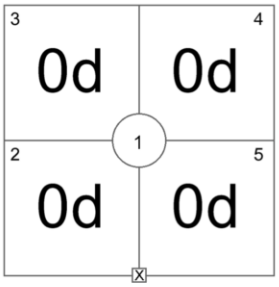
Charge de Test: 5000 g

Position	Tel que Trouvé	Tel que Laissé
1	5001 g	5000 g
2	5001 g	5000 g
3	5001 g	5000 g
4	5001 g	5000 g
5	5001 g	5000 g

Déviation Maximale	**0 g**	**0 g**



Tel que Trouvé



Tel que Laissé

The "d" in the graph represents the readability of the range/interval in which the test was performed.

Erreur d'indication

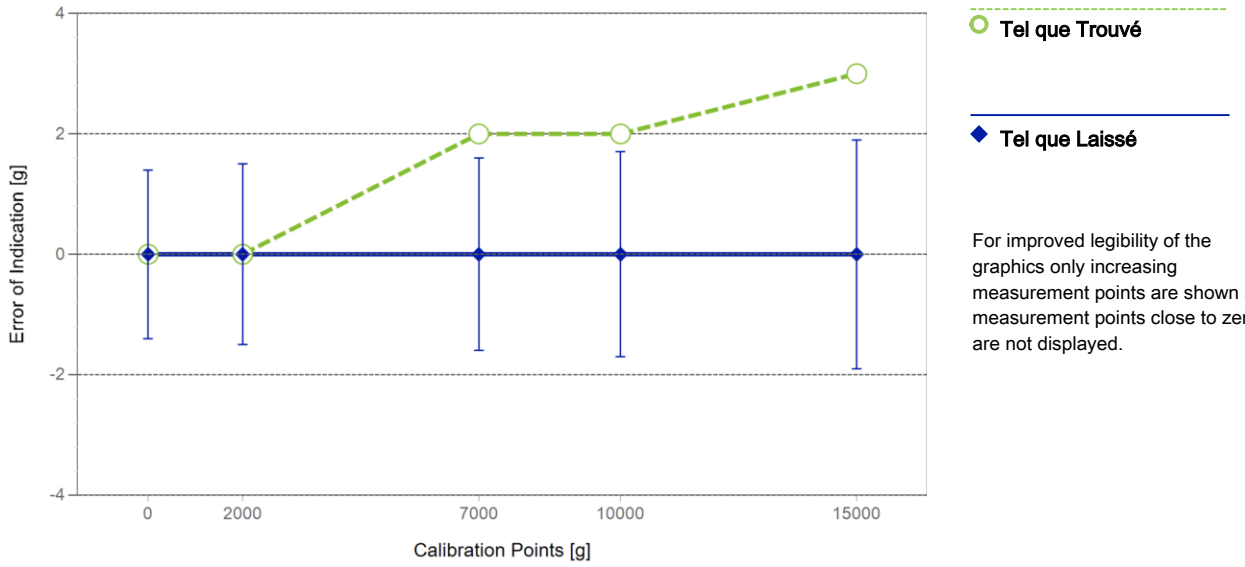
Tel que Trouvé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0 g	0 g	0 g	N/D	N/D
2	2000 g	2000 g	0 g	N/D	N/D
3	7000 g	7002 g	2 g	N/D	N/D
4	10000 g	10002 g	2 g	N/D	N/D
5	15000 g	15003 g	3 g	N/D	N/D

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Tel que Laissé

	Reference Value	Indication	Erreur d'indication	Incertitude Élargie	k
1	0 g	0 g	0 g	1.4 g	2.37
2	2000 g	2000 g	0 g	1.5 g	2.28
3	7000 g	7000 g	0 g	1.6 g	2.28
4	10000 g	10000 g	0 g	1.7 g	2.13
5	15000 g	15000 g	0 g	1.9 g	2.13



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%. The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

Tous les poids utilisés pour le contrôle métrologique sont retraçables aux étalons Nationaux et Internationaux. Les poids ont été calibrés et certifiés par un laboratoire de calibration accrédité.

Jeu de Poids 1: OIML M1

Weight Set Number:	22940	Date d'Émission:	12-Jul-2019
# Certificat:	M19-0315	Date de Calibration Due:	12-Jul-2020

Remarques

N/D

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Incertitude de Mesure du dispositif de pesage en opération

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Coefficient de température pour l'évaluation de l'incertitude de mesure en opération: $10.0 \cdot 10^{-6}$ / K

Plage d'opération sur le site pour l'évaluation de l'incertitude de mesure en opération: 10 K

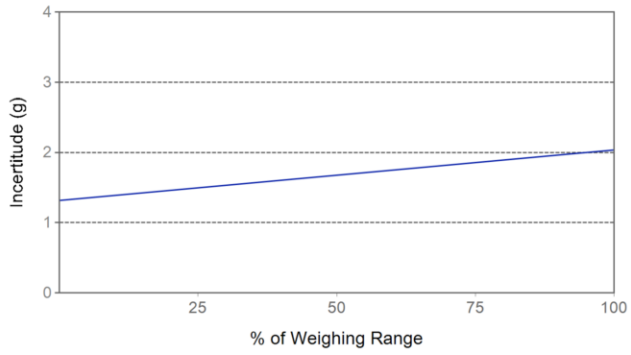
Linéarisation de l'Équation d'Incertitude

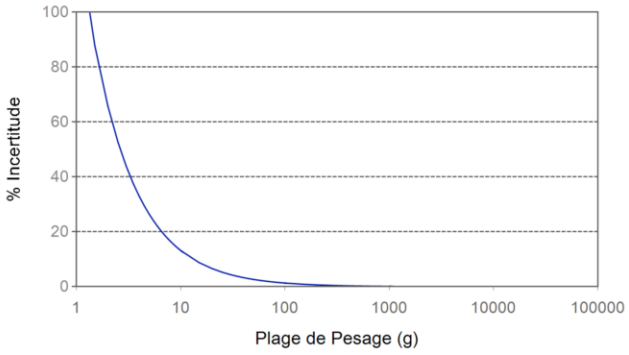
Plage		Tel que Trouvé	Tel que Laissé
1	0 g - 15000 g	N/A	U_1 = 1317 mg + 0.0480 mg/g · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Indication Net	Tel que Trouvé		Tel que Laissé	
15 g	N/A	N/A	1.3 g	8.8%
150 g	N/A	N/A	1.3 g	0.88%
1500 g	N/A	N/A	1.4 g	0.093%
7500 g	N/A	N/A	1.7 g	0.022%
15000 g	N/A	N/A	2.0 g	0.014%





Tel que Trouvé Tel que Laissé

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METTLER TOLEDO Service

Handbook 44 Tolerance Assessment (Entretien)

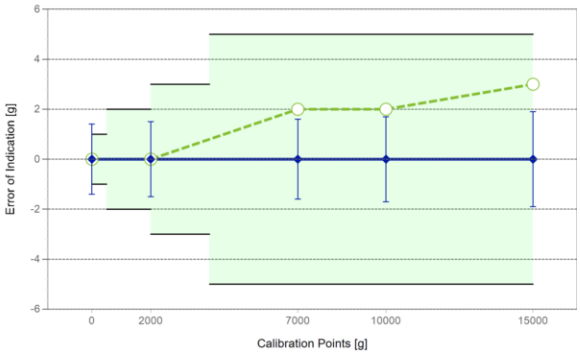
Les mesures du certificat de calibration joint ont été évaluées selon les tolérances définies par NIST HB44.

	Tel que Trouvé	Tel que Laissé
Global	✓	✓

✓ = Passed
✗ = Failed

Weighing Device

Range	Max. Capacity	Readability (d)	Verification Scale Interval (e)	Class
1	15000 g	1 g	1 g	III



Tolerances according to NIST Handbook 44

Test Load		Tolérance
From	To	
0 g	0 g	0.25 g
1 g	500 g	1 g
501 g	2000 g	2 g
2001 g	4000 g	3 g
4001 g	15000 g	5 g

○ Tel que Trouvé
◆ Tel que Laissé
— Tolérance

Eccentricity and Repeatability

Test	Test Load	Tolérance	As Found		As Left	
			Max. Error / Range	Result	Max. Error / Range	Result
Excentricité (Maximum Error)	5000 g	5 g	1 g	✓	0 g	✓
Excentricité (Plage)	5000 g	5 g	0 g	✓	0 g	✓
Répétabilité (Maximum Error)	10000 g	5 g	N/D	N/D	1 g	✓
Répétabilité (Plage)	10000 g	5 g	N/D	N/D	1 g	✓

Max. Error: Maximum of the absolute values of the individual errors.
Range: Difference between largest and smallest measurement value.

Error of Indication

	Reference Value	Tolérance	As Found		As Left	
			Error of Indication	Result	Error of Indication	Result
1	0 g	1 g	0 g	✓	0 g	✓
2	2000 g	2 g	0 g	✓	0 g	✓
3	7000 g	5 g	2 g	✓	0 g	✓
4	10000 g	5 g	2 g	✓	0 g	✓
5	15000 g	5 g	3 g	✓	0 g	✓

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Certificate No: 01037944A-1

METTLER TOLEDO

METTLER-TOLEDO, LLC
201 Wolf Dr
Thorofare NJ 08086
1-800-METTLER

NVLAP CALIBRATION
NVLAP LAB CODE 105013-0

ilac-MRA

Mass Calibration Certificate

Customer Information

Customer Name:	Stove Builder International, Inc.	*City:*	
Address:	250 de Copenhauge St.-Augustin-de-Desmaures	*State / Province:*	QC
Purchase Order:	220309982	*Zip / Postal Code:*	G3A 2H3

Measurement and Test Equipment Identification

Serial Number:	B316238717	*Date Received:*	03-OCT-2018
Manufacturer:	Mettler Toledo	*Condition:*	Good
Asset Number:	SBI-237	*Tolerance Class:*	OIML R111 Class E2

Environmental Conditions

Temperature: 21.51 °C *Barometric Pressure:* 770.05 mm Hg *Relative Humidity:* 50 %RH

The standards used to perform this calibration have been compared to reference mass standards that are traceable to the SI through the National Institute of Standards and Technology under Test No 684/289871-17.

The weights calibrated for this report have been calibrated in accordance with the calibration laboratory's process. The calibration performed meets the criteria as described in the current revisions of ASTM E617 and OIML R111. This calibration also meets specifications as outlined in ISO/IEC 17025, ANSI/NCSL Z540-1-1994, and applicable documents.

This certificate may not be partially reproduced, except with prior written permission of the issuing laboratory. This certificate must not be used by the customer to claim product endorsement by NIST, NVLAP, or any other agency of the U.S. government.

Calibration Date:	09-OCT-2018	*Next Calibration Due:*	09-OCT-2023
Calibration Technician:	Robotic Calibration	*Signature:*	Joseph Moran, Metrology Manager Approved Signatory 10-OCT-2018

16280500A

Certificate No: 01037944A-1

As Found Data

Nominal Value&Suffix	Serial Number	True Mass (g)	Conv. Mass (g)	Uncertainty (mg, k = 2)	Tolerance (mg)	Density (g/cm³)
100 mg	B316238717	0.0999983	0.0999983	0.0025	0.0160	8.00

16280500A

Certificate No: 01037944A-1

As Left Data

Nominal Value&Suffix	Serial Number	True Mass (g)	Conv. Mass (g)	Uncertainty (mg, k = 2)	Tolerance (mg)	Density (g/cm³)
100 mg	B316238717	0.0999983	0.0999983	0.0025	0.0160	8.00

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16280500A

Certificate No: 01037944A-1

Standards and Comparators Used

Nominal Value&Suffix	Serial Number	Standard Set No.	Cal Due	Comparator Used		Cal Due	Procedure Used
100 mg	B316238717	A031	07/01/19	A5XL	131	01/01/19	Multi A-B

Comments

No remarks

1 As Found / 1 Total

16280500A

Definitions

Nominal Value - The value as labeled on the weight or defined by shape in accordance with OIML R111 for milligram weights.

True Mass - The mass value of the weight if measured in a vacuum.

Conventional Mass - For a mass at 20 °C, "Conventional Mass" is the mass of a reference standard of density 8000 kg/m³ which it balances in air with a density of 1.2 kg/m³. This value should be referenced when testing the accuracy of a weighing device using any of the nominal values contained in this certificate. The As Found results will equal the As Left in cases where no adjustment or replacement was required.

Uncertainty - All Uncertainty values are reported at approximately 95% confidence level (k=2). The uncertainty value does not include a component for the affects due to magnetism.

Tolerance - The acceptable range of deviation (positive and negative) from the nominal value, including the uncertainty, as defined by ASTM and OIML for the respective classes.

Density - The assumed density of the material used by the manufacturer.

Calibration Process - This calibration was performed in the Level I Mass Metrology Laboratory at 201 Wolf Dr Thorofare, New Jersey 08086 unless otherwise noted in Comments.

OOT - The As Found measurement result combined with the uncertainty exceeded the tolerance for the specified weight class.

A - Weight was adjusted after As Found testing to within the appropriate tolerance class.

R - The received weight was replaced due to an out of tolerance condition and the weight was not adjustable or the weight for this nominal value was missing.

MICRO PRECISION CALIBRATION, INC.
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
530-268-1860

Certificate of Calibration

ACCREDITED ISO/IEC 17025 CALIBRATION LABORATORY AC-1969.00

Date: Mar 3, 2020 **Cert No. 551220083500445**

Customer:

STOVE BUILDERS INTERNATIONAL INC.

PORTES 11-12
250 DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC G3A 2H3

		Work Order #:	SAC-70107380
		Purchase Order #:	63318
MPC Control #:	DA0650	Serial Number:	16425450039
Asset ID:	SBI-241	Department:	N/A
Gage Type:	DIGITAL VANE/HOT-WIRE ANEMOMETER	Performed By:	JACK WERTZ III
Manufacturer:	TPI, INC.	Received Condition:	IN TOLERANCE
Model Number:	575	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	March 02, 2020
Temp/RH:	68.0°F / 40.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	March 02, 2021

Calibration Notes:

See attached calibration data. (1 page)

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CJ5100	WIND TUNNEL WITH CONTROLLER	JS-500	375/305	INTERACTIVE INSTRUMENTS	Oct 31, 2021	551220083300219
DA8367	PRECISION PLATINUM RESISTANCE THERMOMETER SPRT W/ CASE	8167-25	180322	LEEDS & NORTHRUP CO.	Oct 31, 2022	551220083240044
DF8059	DIGITAL MULTIMETER	34401A	US36090404	HEWLETT PACKARD	Sep 30, 2020	551220083194555
DS2399	AIR VELOCITY TRANSDUCER	8455-03	56020622	TSI	Oct 3, 2021	800406957

Procedures Used in this Event

Procedure Name	Description
MPC-AIR-001 Rev. 01	Air Velocity, Temperature and Flow Meters, General, rev01, Feb-11-2020

Calibrating Technician: Jack A. Wertz III

JACK WERTZ III

QC Approval: rjilao

MARVIN ILAO

Statements of Pass or Fail Conformance: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006.

The status of compliance with the acceptance criteria is reported as:

PASS - Compliant with specification; .

FAIL - Not compliant with specification.

FAIL² - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

PASS² - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3 Method 6-Guard Bands based on Test Uncertainty Ratio. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

(CERT, Rev 6)

MICRO PRECISION

Calibration Report of TPI 575 Vane/Hotwire Air Velocity Meter

MPC Control #:	DA0650	Serial Number:	16425450039
Asset ID:	SBI-241	Calibration Date:	March 02, 2020

Velocity Measurement

Hot Wire

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
0.2 to 20 m/s	5.0 m/s	4.7 m/s	4.9 m/s	4.9 m/s	5.3 m/s	PASS	0.15 m/s
	10.0 m/s	9.7 m/s	9.9 m/s	9.9 m/s	10.4 m/s	PASS[Z]	0.29 m/s
	15.0 m/s	14.6 m/s	14.9 m/s	14.9 m/s	15.4 m/s	PASS[Z]	0.44 m/s
	19.0 m/s	18.6 m/s	18.8 m/s	18.8 m/s	19.4 m/s	PASS[Z]	0.38 m/s

Vane

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
0.4 to 25 m/s	6.3 m/s	5.8 m/s	6.3 m/s	6.3 m/s	6.7 m/s	PASS	0.18 m/s
	12.5 m/s	12.0 m/s	12.3 m/s	12.3 m/s	13.1 m/s	PASS[Z]	0.36 m/s
	18.8 m/s	18.1 m/s	18.9 m/s	18.9 m/s	19.4 m/s	PASS	0.38 m/s
	23.8 m/s	23.0 m/s	23.9 m/s	23.9 m/s	24.5 m/s	PASS	0.48 m/s

Temperature Measurement

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
-20°C to 80°C	20.0 °C	19.3 °C	20.2 °C	20.2 °C	20.7 °C	PASS	0.0090 °C
	40.0 °C	39.1 °C	40.2 °C	40.2 °C	40.9 °C	PASS	0.0090 °C
	60.0 °C	58.9 °C	60.1 °C	60.1 °C	61.1 °C	PASS	0.0090 °C
	76.0 °C	74.7 °C	76.2 °C	76.2 °C	77.3 °C	PASS	0.0090 °C

Statements of Pass or Fail Conformance

The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009.
All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006.

The status of compliance with the acceptance criteria is reported as:

PASS - Compliant with specification

FAIL - Not compliant with specification.

FAIL[Z] - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

PASS[Z] - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated.
This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3 Method 6-Guard Bands based on Test Uncertainty Ratio.

- End of Calibration Report -

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CERTIFICATE OF CALIBRATION

ACCREDITED CALIBRATION CERT #2260.01

Certificate Number: 2020005339

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	MS-121-LCD	***Workorder:***	2020005339
Description:	Digital Pressure Gauge	***Barcode:***	AL0015068-P
Serial:	E51U01003410	***Received Conditions:***	In Tolerance
ID:	SBI-247	***Calibration Date:***	17-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	17-Jul-2021
		Temperature:	22.39°C
		Humidity:	55.3%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	*Model*	*ID*	*Cal Date*	*Due Date*
Multimeter	Fluke 8845A	ELC-MTR-04	09-Jan-2020	09-Jan-2021
Low Pressure Calibrator	Ruska 7250LP	PRE-CAL-06	17-Nov-2019	17-Nov-2020

Notes: Transmitter was calibrated in vertical position.

Performed by: Sree Chukka
Technician
(digitally signed on 17-Jul-2020 1:17 pm)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 17-Jul-2020 2:17 pm)

Form: ROC101 Rev 9.3.

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.5 inH2O/7520ip 8845A (1.0.A) — **Found / Left (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
Range: 0 to 0.5 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading						0	
Output @ 0.0000 inH2O, mA						4.03	
0.0000 inH2O	0.0000 inH2O	0.0009 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O
Display Reading						0.1238	
Output @ 0.1250 inH2O, mA						7.982	
0.1250 inH2O	0.1250 inH2O	0.1244 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.2485	
Output @ 0.2500 inH2O, mA						11.982	
0.2500 inH2O	0.2500 inH2O	0.2494 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Pass	0.00015 inH2O
Display Reading						0.3730	
Output @ 0.3750 inH2O, mA						15.941	
0.3750 inH2O	0.3750 inH2O	0.3732 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Pass	0.00015 inH2O
Display Reading						0.4976	
Output @ 0.5000 inH2O, mA						19.925	
0.5000 inH2O	0.5000 inH2O	0.4977 inH2O	±0.0050 inH2O	0.4950 inH2O	0.5050 inH2O	Pass	0.00015 inH2O
Display Reading						0.3760	
Output @ 0.3750 inH2O, mA						16.037	
0.3750 inH2O	0.3750 inH2O	0.3762 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Pass	0.00015 inH2O
Display Reading						0.2517	
Output @ 0.2500 inH2O, mA						12.046	
0.2500 inH2O	0.2500 inH2O	0.2514 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Pass	0.00015 inH2O
Display Reading						0.1262	
Output @ 0.1250 inH2O, mA						8.036	
0.1250 inH2O	0.1250 inH2O	0.1261 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.0012	
Output @ 0.0000 inH2O, mA						4.040	
0.000 inH2O	0.0000 inH2O	0.0013 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O

END OF CERTIFICATE

CERTIFICATE OF CALIBRATION

ACCREDITED
CALIBRATION
CERT #2260.01

Certificate Number: 2020005338

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	MS-121-LCD	***Workorder:***	2020005338
Description:	Digital Pressure Gauge	***Barcode:***	AL0015074-P
Serial:	E52U01007512	***Received Conditions:***	Out of Tolerance
ID:	SBI-254	***Calibration Date:***	17-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	17-Jul-2021
		Temperature:	22.75°C
		Humidity:	56.1%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	***Model***	***ID***	***Cal Date***	***Due Date***
Multimeter	Fluke 8845A	ELC-MTR-04	09-Jan-2020	09-Jan-2021
Low Pressure Calibrator	Ruska 7250LP	PRE-CAL-06	17-Nov-2019	17-Nov-2020

Notes: Adjusted trim pots.

Performed by: Sree Chukka
Technician
(digitally signed on 17-Jul-2020 2:10 pm)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 17-Jul-2020 2:16 pm)

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.5 inH2O/7520Ip 8845A (1.0.A) — **As Found (Fail)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
Range: 0 to 0.5 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading						0	
Output @ 0.0000 inH2O, mA						4.013	
0.0000 inH2O	0.0000 inH2O	0.0004 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O
Display Reading						0.1223	
Output @ 0.1250 inH2O, mA						7.915	
0.1250 inH2O	0.1250 inH2O	0.1223 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.2439	
Output @ 0.2500 inH2O, mA						11.794	
0.2500 inH2O	0.2500 inH2O	0.2436 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Fail	0.00015 inH2O
Display Reading						0.3679	
Output @ 0.3750 inH2O, mA						15.767	
0.3750 inH2O	0.3750 inH2O	0.3677 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Fail	0.00015 inH2O
Display Reading						0.4912	
Output @ 0.5000 inH2O, mA						19.709	
0.5000 inH2O	0.5000 inH2O	0.4909 inH2O	±0.0050 inH2O	0.4950 inH2O	0.5050 inH2O	Fail	0.00015 inH2O
Display Reading						0.3699	
Output @ 0.3750 inH2O, mA						15.811	
0.3750 inH2O	0.3750 inH2O	0.3691 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Fail	0.00015 inH2O
Display Reading						0.2463	
Output @ 0.2500 inH2O, mA						11.879	
0.2500 inH2O	0.2500 inH2O	0.2462 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Pass	0.00015 inH2O
Display Reading						0.1250	
Output @ 0.1250 inH2O, mA						8.001	
0.1250 inH2O	0.1250 inH2O	0.1250 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.0012	
Output @ 0.0000 inH2O, mA						4.048	
0.000 inH2O	0.0000 inH2O	0.0015 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O

Procedure: Dwyer MS-121-LCD 0 to 0.1;0.5 inH2O/7520Ip 8845A (1.0.A) — **As Left (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
Range: 0 to 0.5 inH2O							
Output signal: 4 to 20 mA							
PRESSURE TEST							
Display Reading						0.0012	
Output @ 0.0000 inH2O, mA						4.021	
0.0000 inH2O	0.0000 inH2O	0.0007 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O
Display Reading						0.1257	
Output @ 0.1250 inH2O, mA						8.019	
0.1250 inH2O	0.1250 inH2O	0.1256 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.2493	
Output @ 0.2500 inH2O, mA						11.956	

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
0.2500 inH2O	0.2500 inH2O	0.2486 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Pass	0.00015 inH2O
Display Reading						0.3748	
Output @ 0.3750 inH2O, mA						15.987	
0.3750 inH2O	0.3750 inH2O	0.3746 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Pass	0.00015 inH2O
Display Reading						0.4998	
Output @ 0.5000 inH2O, mA						19.972	
0.5000 inH2O	0.5000 inH2O	0.4991 inH2O	±0.0050 inH2O	0.4950 inH2O	0.5050 inH2O	Pass	0.00015 inH2O
Display Reading						0.3762	
Output @ 0.3750 inH2O, mA						16.021	
0.3750 inH2O	0.3750 inH2O	0.3757 inH2O	±0.0050 inH2O	0.3700 inH2O	0.3800 inH2O	Pass	0.00015 inH2O
Display Reading						0.2515	
Output @ 0.2500 inH2O, mA						12.001	
0.2500 inH2O	0.2500 inH2O	0.2500 inH2O	±0.0050 inH2O	0.2450 inH2O	0.2550 inH2O	Pass	0.00015 inH2O
Display Reading						0.1270	
Output @ 0.1250 inH2O, mA						8.058	
0.1250 inH2O	0.1250 inH2O	0.1268 inH2O	±0.0050 inH2O	0.1200 inH2O	0.1300 inH2O	Pass	0.00015 inH2O
Display Reading						0.0005	
Output @ 0.0000 inH2O, mA						4.013	
0.000 inH2O	0.0000 inH2O	0.0004 inH2O	±0.0050 inH2O	-0.0050 inH2O	0.0050 inH2O	Pass	0.00015 inH2O

END OF CERTIFICATE

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CERTIFICATE OF ANALYSIS

Customer: SBI FABRICANT DE POELES
INTERNATIONAL INC
250 RUE DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC
G3A 2H3

Analysis Date:	3/26/2020 11:21:38AM	**Servitrax barcode No:**	T2UMTNM
Product code:	A1310737	**Work order number:**	1301047
Grade:	CERTIFIED	**Pressure:**	1450 psig
Size:	7AL		
CGA #:	590	**Volume:**	.58 M3
		Expiry date:	03/26/2023

COMPONENTS	NOMINAL CONCENTRATION	ANALYSIS RESULTS
CARBON DIOXIDE	16.0000 % Molar	16.1 % Molar
CARBON MONOXIDE	3.0000 % Molar	2.99 % Molar
OXYGEN	18.0000 % Molar	17.9 % Molar
NITROGEN	BALANCE	BALANCE

Analysis performed by:

Ross A. Crichton

ROSS CRICHTON – LAB TECHNICIAN

This Air Liquide Canada mixture is traceable to NIST

METHOD OF ANALYSIS:

Method of analysis is based on principles of gas chromatography and as documented in Air Liquide Canada operating procedure, where applicable, FID, TCD, PDHID, FT-IR, FPD,NO/NOx and SO2 chemiluminescence , hygrometer, and electrochemical cells and paramagnetic cell. Detectors were used in conjunction with packed or capillary columns calibrated flow meters and dilution calibrated system.

ANALYTICAL ACCURACY:

Quality	Concentration	Blend Tolerance	AA
PRIMARY	5%-50%	+/-1%	+/-1%
	0.5%-5%	+/-2%	
	1ppm-0.5%	+/-5%	
CERTIFIED	5%-50%	+/-5%	+/-2%
	0.5%-5%	+/-10%	+/-2%
	1ppm-0.5%	+/-20%	+/-5%
UNANALYZE	5%-50%	+/-10%	
	<5%	+/-20%	

This mixture was certified by a combination of weight and analysis (depending on component) using scales certified against weights traceable to the Institute for National Measurement Standards (INMS) of the National Research Council of Canada (NRCC), Report # W-021221-13857(MTL) and W-35174-20727(Calgary) or calibration standards prepared in that manner.

How to contact us & order

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Customer Solution Center: 1 800 217-2688

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CERTIFICATE OF ANALYSIS

Customer: SBI FABRICANT DE POELES
INTERNATIONAL INC
250 RUE DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC
G3A 2H3

Analysis Date:	3/31/2020 2:27:55PM	**Servitrax barcode No:**	T2M5LHF
Product code:	A1310736	**Work order number:**	1301048
Grade:	CERTIFIED	**Pressure:**	2000 psig
Size:	7AL		
CGA #:	590	**Volume:**	.9 M3
		Expiry date:	03/31/2023

COMPONENTS	NOMINAL CONCENTRATION	ANALYSIS RESULTS
CARBON DIOXIDE	16.0000 % Molar	16.0 % Molar
CARBON MONOXIDE	5,500.0000 ppm Molar	5569 ppm Molar
OXYGEN	18.0000 % Molar	18.0 % Molar
NITROGEN	BALANCE	BALANCE

Analysis performed by:

Aymen Oueslati

This Air Liquide Canada mixture is traceable to NIST

METHOD OF ANALYSIS:

Method of analysis is based on principles of gas chromatography and as documented in Air Liquide Canada operating procedure, where applicable, FID, TCD, PDHID, FT-IR, FPD,NO/NOx and SO2 chemiluminescence , hygrometer, and electrochemical cells and paramagnetic cell. Detectors were used in conjunction with packed or capillary columns calibrated flow meters and dilution calibrated system.

ANALYTICAL ACCURACY:

Qualitiy	Concentiration	Blend Tolerance	AA
PRIMARY	5%-50%	+/-1%	+/-1%
	0.5%-5%	+/-2%	
	1ppm-0.5%	+/-5%	
CERTIFIED	5%-50%	+/-5%	+/-2%
	0.5%-5%	+/-10%	+/-2%
	1ppm-0.5%	+/-20%	+/-5%
UNANALYZE	5%-50%	+/-10%	
	<5%	+/-20%	

This mixture was certified by a combination of weight and analysis (depending on component) using scales certified against weights traceable to the Institute for National Measurement Standards (INMS) of the National Research Council of Canada (NRCC), Report # W-021221-13857(MTL) and W-35174-20727(Calgary) or calibration standards prepared in that manner.

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CERTIFICATE OF ANALYSIS

Customer: SBI FABRICANT DE POELES
INTERNATIONAL INC
250 RUE DE COPENHAGUE
SAINT-AUGUSTIN-DE-DESMAURES QC
G3A 2H3

Analysis Date:	9/11/2019 8:34:56AM	**Servitrax barcode No:**	T2L7XUG
Product code:	A0923375	**Work order number:**	1191003
Grade:	CERTIFIED	**Pressure:**	2000 psig
Size:	7AL		
CGA #:	580	**Volume:**	0.85 M3
		Expiry date:	09/11/2022

COMPONENTS	NOMINAL CONCENTRATION	ANALYSIS RESULTS
CARBON DIOXIDE	8.0000 % Molar	8.03 % Molar
CARBON MONOXIDE	600.0000 ppm Molar	616 ppm Molar
OXYGEN	4.0000 % Molar	4.02 % Molar
NITROGEN	BALANCE	BALANCE

Analysis performed by:

Aymen Oueslati

This Air Liquide Canada mixture is traceable to NIST

METHOD OF ANALYSIS:

Method of analysis is based on principles of gas chromatography and as documented in Air Liquide Canada operating procedure, where applicable, FID, TCD, PDHID, FT-IR, FPD,NO/NOx and SO2 chemiluminescence , hygrometer, and electrochemical cells and paramagnetic cell. Detectors were used in conjunction with packed or capillary columns calibrated flow meters and dilution calibrated system.

ANALYTICAL ACCURACY:

Qualitiy	Concentration	Blend Tolerance	AA
PRIMARY	5%-50%	+/-1%	+/-1%
	0.5%-5%	+/-2%	
	1ppm-0.5%	+/-5%	
CERTIFIED	5%-50%	+/-5%	+/-2%
	0.5%-5%	+/-10%	+/-2%
	1ppm-0.5%	+/-20%	+/-5%
UNANALYZE	5%-50%	+/-10%	
	<5%	+/-20%	

This mixture was certified by a combination of weight and analysis (depending on component) using scales certified against weights traceable to the Institute for National Measurement Standards (INMS) of the National Research Council of Canada (NRCC), Report # W-021221-13857(MTL) and W-35174-20727(Calgary) or calibration standards prepared in that manner.

How to contact us & order

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specgas.qc@airliquide.com specgas.ab@airliquide.com specgas.pacific@airliquide.com

Customer Solution Center: 1 800 217-2688 Online 24/7 through My.Airliquide.ca Air Liquide Mobile App

CERTIFICATE OF CALIBRATION

ACCREDITED
CALIBRATION
CERT #2260.01

Certificate Number: 2020005340

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	626-06-GH-P1-E1-S1	***Workorder:***	2020005340
Description:	Pressure Transmitter	***Barcode:***	AL00023151-P
Serial:	N/A	***Received Conditions:***	In Tolerance
ID:	SBI-294	***Calibration Date:***	17-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	17-Jul-2021
		Temperature:	21.96°C
		Humidity:	57%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	*Model*	*ID*	*Cal Date*	*Due Date*
Multimeter	Fluke 8845A	ELC-MTR-04	09-Jan-2020	09-Jan-2021
Pressure Controller/Calibrator	DH Instruments PPC3	PRE-CAL-04	16-Jun-2020	16-Jun-2021

Notes: Unit was calibrated in vertical position.
Tolerance specified by customer.
Unit is not adjustable.

Performed by: Sree Chukka
Technician
(digitally signed on 17-Jul-2020 10:31 am)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 17-Jul-2020 2:18 pm)

Form: ROC101 Rev 9.3.

Procedure: Pressure Transmitter: psi/4-20mA: CAL VER /PPC3,8845 (1.1.A) — **FOUND-LEFT (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
Calibrated in the vertical position.							
Range: 0 to 5 psi							
Output: 4-20 mA							
PRESSURE TEST							
Output=4.045 mA							
0.0000 psi	0.0000 psi	0.014 psi	±0.0600 psi	-0.060 psi	0.060 psi	Pass	4.5e-003 psi
Output=8.023 mA							
1.2500 psi	1.2500 psi	1.257 psi	±0.0600 psi	1.190 psi	1.310 psi	Pass	5.8e-003 psi
Output=12.015 mA							
2.5000 psi	2.5000 psi	2.505 psi	±0.0600 psi	2.440 psi	2.560 psi	Pass	7.0e-003 psi
Output=16.031 mA							
3.7500 psi	3.7500 psi	3.760 psi	±0.0600 psi	3.690 psi	3.810 psi	Pass	8.2e-003 psi
Output=20.059 mA							
5.0000 psi	5.0000 psi	5.018 psi	±0.0600 psi	4.940 psi	5.060 psi	Pass	9.5e-003 psi
Output=16 mA							
3.7500 psi	3.7500 psi	3.750 psi	±0.0600 psi	3.690 psi	3.810 psi	Pass	8.2e-003 psi
Output=11.981 mA							
2.5000 psi	2.5000 psi	2.494 psi	±0.0600 psi	2.440 psi	2.560 psi	Pass	7.0e-003 psi
Output=8.019 mA							
1.2500 psi	1.2500 psi	1.255 psi	±0.0600 psi	1.190 psi	1.310 psi	Pass	5.8e-003 psi
Output=4.096 mA							
0.0000 psi	0.0000 psi	0.030 psi	±0.0600 psi	-0.060 psi	0.060 psi	Pass	4.6e-003 psi

END OF CERTIFICATE

CERTIFICATE OF CALIBRATION

ACCREDITED
CALIBRATION
CERT #2260.01

Certificate Number: 2020005341

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	626-06-GH-PA-E1-S1	***Workorder:***	2020005341
Description:	Pressure Transmitter	***Barcode:***	AL00023422-P
Serial:	N/A	***Received Conditions:***	In Tolerance
ID:	SBI-297	***Calibration Date:***	17-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	17-Jul-2021
		Temperature:	22.11°C
		Humidity:	56.6%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	*Model*	*ID*	*Cal Date*	*Due Date*
Multimeter	Fluke 8845A	ELC-MTR-04	09-Jan-2020	09-Jan-2021
Pressure Controller/Calibrator	DH Instruments PPC3	PRE-CAL-04	16-Jun-2020	16-Jun-2021

Notes: Unit calibrated in vertical position.
Tolerance specified by customer.
Unit is not adjustable.

Performed by: Sree Chukka
Technician
(digitally signed on 17-Jul-2020 11:05 am)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 17-Jul-2020 2:18 pm)

Form: ROC101 Rev 9.3.

Procedure: Pressure Transmitter: psi/4-20mA: CAL VER /PPC3,8845 (1.1.A) — **FOUND-LEFT (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
Calibrated in the vertical position.							
Range: 0 to 5 psi							
Output: 4-20 mA							
PRESSURE TEST							
Output=4.051 mA							
0.0000 psi	0.0000 psi	0.016 psi	±0.0300 psi	-0.030 psi	0.030 psi	Pass	4.6e-003 psi
Output=8.023 mA							
1.2500 psi	1.2500 psi	1.257 psi	±0.0300 psi	1.220 psi	1.280 psi	Pass	5.8e-003 psi
Output=12.017 mA							
2.5000 psi	2.5000 psi	2.505 psi	±0.0300 psi	2.470 psi	2.530 psi	Pass	7.0e-003 psi
Output=16.027 mA							
3.7500 psi	3.7500 psi	3.758 psi	±0.0300 psi	3.720 psi	3.780 psi	Pass	8.2e-003 psi
Output=20.058 mA							
5.0000 psi	5.0000 psi	5.018 psi	±0.0300 psi	4.970 psi	5.030 psi	Pass	9.5e-003 psi
Output=16.027 mA							
3.7500 psi	3.7500 psi	3.759 psi	±0.0300 psi	3.720 psi	3.780 psi	Pass	8.2e-003 psi
Output=12.011 mA							
2.5000 psi	2.5000 psi	2.503 psi	±0.0300 psi	2.470 psi	2.530 psi	Pass	7.0e-003 psi
Output=8.01 mA							
1.2500 psi	1.2500 psi	1.253 psi	±0.0300 psi	1.220 psi	1.280 psi	Pass	5.8e-003 psi
Output=4.026 mA							
0.0000 psi	0.0000 psi	0.008 psi	±0.0300 psi	-0.030 psi	0.030 psi	Pass	4.5e-003 psi

END OF CERTIFICATE

CERTIFICATE OF CALIBRATION

ACCREDITED
CALIBRATION
CERT #2260.01

Certificate Number: 2020005343

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	628-00C-GH-P1-E1-S1	***Workorder:***	2020005343
Description:	Pressure Transmitter	***Barcode:***	AL00023153-P
Serial:	N/A	***Received Conditions:***	In Tolerance
ID:	SBI-301	***Calibration Date:***	27-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	27-Jul-2021
		Temperature:	22.78°C
		Humidity:	68%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	*Model*	*ID*	*Cal Date*	*Due Date*
Pressure Controller/Calibrator	DH Instruments PPC3	PRE-CAL-04	16-Jun-2020	16-Jun-2021
Reference Pressure Monitor	Fluke RPM4	PRE-MTR-04	13-May-2020	13-May-2021

Notes: Unit was calibrated in vertical position.
Unit cannot be adjusted. Tolerance specified by customer.

Performed by: Sree Chukka
Technician
(digitally signed on 27-Jul-2020 9:35 am)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 27-Jul-2020 10:30 am)

Form: ROC101 Rev 9.3

Procedure: Pressure/Vacuum: CAL VER /DHI PPC3 (2.3.A) **FOUND-LEFT (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
PRESSURE TEST							
MEASUREMENT UNITS: inHg							
OUT = 4.925 mA							
-28.500	-28.500	-28.26	±0.400	-28.90	-28.10	Pass	6.1e-003
OUT = 7.843 mA							
-23.000	-23.000	-22.79	±0.400	-23.40	-22.60	Pass	6.1e-003
OUT = 11.035 mA							
-17.000	-17.000	-16.81	±0.400	-17.40	-16.60	Pass	6.1e-003
OUT = 14.248 mA							
-11.000	-11.000	-10.79	±0.400	-11.40	-10.60	Pass	6.1e-003
OUT = 16.941 mA							
-6.000	-6.000	-5.74	±0.400	-6.40	-5.60	Pass	6.1e-003
OUT = 20.145 mA							
0.000	0.000	0.27	±0.400	-0.40	0.40	Pass	6.1e-003
OUT = 16.963 mA							
-6.000	-6.000	-5.69	±0.400	-6.40	-5.60	Pass	6.1e-003
OUT = 14.305 mA							
-11.000	-11.000	-10.68	±0.400	-11.40	-10.60	Pass	6.1e-003
OUT = 11.11 mA							
-17.000	-17.000	-16.67	±0.400	-17.40	-16.60	Pass	6.1e-003
OUT = 7.913 mA							
-23.000	-23.000	-22.66	±0.400	-23.40	-22.60	Pass	6.1e-003
OUT = 4.961 mA							
-28.500	-28.500	-28.19	±0.400	-28.90	-28.10	Pass	6.1e-003

END OF CERTIFICATE

CERTIFICATE OF CALIBRATION

ACCREDITED
CALIBRATION
CERT #2260.01

Certificate Number: 2020005342

Manufacturer:	Dwyer Instruments Inc.	***RMA:***	AC20071072
Model:	628-00C-GH-P1-E1-S1	***Workorder:***	2020005342
Description:	Pressure Transmitter	***Barcode:***	AL00023737-P
Serial:	N/A	***Received Conditions:***	In Tolerance
ID:	SBI-305	***Calibration Date:***	27-Jul-2020
Customer:	STOVE BUILDER INTERNATIONAL INC. 250 RUE DE COPENHAGUE ST-AUGUSTIN-DE-DESMAURES QC G3A 2H3	***Calibration Due:***	27-Jul-2021
		Temperature:	22.82°C
		Humidity:	69%RH

STATEMENT OF UNCERTAINTY: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls & Instrumentation Inc. certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2017 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

This certificate shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation Inc.

STANDARDS USED

Description	*Model*	*ID*	*Cal Date*	*Due Date*
Pressure Controller/Calibrator	DH Instruments PPC3	PRE-CAL-04	16-Jun-2020	16-Jun-2021
Reference Pressure Monitor	Fluke RPM4	PRE-MTR-04	13-May-2020	13-May-2021

Notes: Unit was calibrated in vertical position.
Unit cannot be adjusted. Tolerance specified by customer.

Performed by: Sree Chukka
Technician
(digitally signed on 27-Jul-2020 9:29 am)

QA Reviewed by: Slava Peciurov
Lab Manager
(digitally signed on 27-Jul-2020 10:30 am)

Form: ROC101 Rev 9.3.

Procedure: Pressure/Vacuum: CAL VER /DHI PPC3 (2.3.A) — **FOUND-LEFT (Pass)**

Test Description	True Value	Test Results	Tolerance	Lower Limit	Upper Limit	Status	Uncertainty
PRESSURE TEST							
MEASUREMENT UNITS: inHg							
OUT = 4.882 mA							
-28.50	-28.50	-28.3	±0.40	-28.9	-28.1	Pass	5.8e-002
OUT = 7.813 mA							
-23.00	-23.00	-22.9	±0.40	-23.4	-22.6	Pass	5.8e-002
OUT = 11.004 mA							
-17.00	-17.00	-16.9	±0.40	-17.4	-16.6	Pass	5.8e-002
OUT = 14.207 mA							
-11.00	-11.00	-10.9	±0.40	-11.4	-10.6	Pass	5.8e-002
OUT = 16.902 mA							
-6.00	-6.00	-5.8	±0.40	-6.4	-5.6	Pass	5.8e-002
OUT = 20.117 mA							
0.00	0.00	0.2	±0.40	-0.4	0.4	Pass	5.8e-002
OUT = 16.935 mA							
-6.00	-6.00	-5.8	±0.40	-6.4	-5.6	Pass	5.8e-002
OUT = 14.287 mA							
-11.00	-11.00	-10.7	±0.40	-11.4	-10.6	Pass	5.8e-002
OUT = 11.094 mA							
-17.00	-17.00	-16.7	±0.40	-17.4	-16.6	Pass	5.8e-002
OUT = 7.896 mA							
-23.00	-23.00	-22.7	±0.40	-23.4	-22.6	Pass	5.8e-002
OUT = 4.939 mA							
-28.50	-28.50	-28.2	±0.40	-28.9	-28.1	Pass	5.8e-002

END OF CERTIFICATE

Certificate No: 01037944-1

METTLER TOLEDO

METTLER-TOLEDO, LLC
201 Wolf Dr
Thorofare NJ 08086
1-800-METTLER

NVLAP® CALIBRATION NVLAP LAB CODE 105013-0

ilac-MRA

Mass Calibration Certificate

Customer Information

Customer Name:	Stove Builder International, Inc.	*City:*	
Address:	250 de Copenhauge St.-Augustin-de-Desmaures	*State / Province:*	QC
Purchase Order:	220309982	*Zip / Postal Code:*	G3A 2H3

Measurement and Test Equipment Identification

Serial Number:	B739752165	*Date Received:*	03-OCT-2018
Manufacturer:	Mettler Toledo	*Condition:*	Good
Asset Number:	SBI-312	*Tolerance Class:*	OIML R111 Class E2

Environmental Conditions

Temperature: 21.07 °C *Barometric Pressure:* 769.28 mm Hg *Relative Humidity:* 52 %RH

The standards used to perform this calibration have been compared to reference mass standards that are traceable to the SI through the National Institute of Standards and Technology under Test No 684/289871-17.

The weights calibrated for this report have been calibrated in accordance with the calibration laboratory's process. The calibration performed meets the criteria as described in the current revisions of ASTM E617 and OIML R111. This calibration also meets specifications as outlined in ISO/IEC 17025, ANSI/NCSL Z540-1-1994, and applicable documents.

This certificate may not be partially reproduced, except with prior written permission of the issuing laboratory. This certificate must not be used by the customer to claim product endorsement by NIST, NVLAP, or any other agency of the U.S. government.

Calibration Date:	09-OCT-2018	*Next Calibration Due:*	09-OCT-2023
Calibration Technician:	Robotic Calibration	*Signature:*	Joseph Moran, Metrology Manager Approved Signatory 10-OCT-2018

16280500A

Certificate No: 01037944-1

As Found Data

Nominal Value&Suffix	Serial Number	True Mass (g)	Conv. Mass (g)	Uncertainty (mg, k = 2)	Tolerance (mg)	Density (g/cm³)
200 g	B739752165	200.00009	200.00009	0.06	0.30	8.00

1 As Found / 1 Total

16280500A

Certificate No: 01037944-1

As Left Data

Nominal Value&Suffix	Serial Number	True Mass (g)	Conv. Mass (g)	Uncertainty (mg, k = 2)	Tolerance (mg)	Density (g/cm³)
200 g	B739752165	200.00009	200.00009	0.06	0.30	8.00

1 As Found / 1 Total

16280500A

Certificate No: 01037944-1

Standards and Comparators Used

Nominal Value&Suffix	Serial Number	Standard Set No.	Cal Due	Comparator Used		Cal Due	Procedure Used
200 g	B739752165	MS002	08/01/19	A200XXL	132	01/01/19	Multi A-B

Comments

1 As Found / 1 Total

16280500A

Definitions

Nominal Value - The value as labeled on the weight or defined by shape in accordance with OIML R111 for milligram weights.

True Mass - The mass value of the weight if measured in a vacuum.

Conventional Mass - For a mass at 20 °C, "Conventional Mass" is the mass of a reference standard of density 8000 kg/m³ which it balances in air with a density of 1.2 kg/m³. This value should be referenced when testing the accuracy of a weighing device using any of the nominal values contained in this certificate. The As Found results will equal the As Left in cases where no adjustment or replacement was required.

Uncertainty - All Uncertainty values are reported at approximately 95% confidence level (k=2). The uncertainty value does not include a component for the affects due to magnetism.

Tolerance - The acceptable range of deviation (positive and negative) from the nominal value, including the uncertainty, as defined by ASTM and OIML for the respective classes.

Density - The assumed density of the material used by the manufacturer.

Calibration Process - This calibration was performed in the Level I Mass Metrology Laboratory at 201 Wolf Dr Thorofare, New Jersey 08086 unless otherwise noted in Comments.

OOT - The As Found measurement result combined with the uncertainty exceeded the tolerance for the specified weight class.

A - Weight was adjusted after As Found testing to within the appropriate tolerance class.

R - The received weight was replaced due to an out of tolerance condition and the weight was not adjustable or the weight for this nominal value was missing.

1628C500A

ilac-MRA ACCREDITED A2LA Certificate No. 1750.01 Calibration

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 4199-11583105

Traceable® Certificate of Calibration for Dial Barometer

Manufactured for and distributed by : Control Company 12554 Galveston Rd B230, Webster, TX 77598

Instrument Identification: SBI-331

Model: 4199, S/N: 200586704 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4540001	01 Nov 2020	1000447551

Certificate Information:

Technician: 57 Procedure: CAL-33 Cal Date: 01 Oct 2020 Cal Due Date: 01 Oct 2022

Test Conditions: 44.14%RH 23.01°C 1018mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
mb/hPa	N.A.	N.A.		960.40	960	Y	955	965	0.62	>4:1
mb/hPa	N.A.	N.A.		985.58	984	Y	981	991	0.62	>4:1
mb/hPa	N.A.	N.A.		1015.85	1015	Y	1011	1021	0.62	>4:1

This certificate indicates Traceability to standards provided by (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement : (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ± U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min=As Left Nominal(Rounded) – Tolerance; Max= As Left Nominal(Rounded) + Tolerance;

Nicol Rodriguez

Nicol Rodriguez, Quality Manager

Marisa Elms

Marisa Elms, Technical Manager

Note :

Maintaining Accuracy:

In our opinion once calibrated your Dial Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Dial Barometer change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

Issue Date : 01 Oct 2020

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.traceable.com

Control Company is an ISO/IEC 17025:2017 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2015 Quality Certified by DNV GL, Certificate No. CERT-01805-2006-AQ-HOU-ANAB.
International Laboratory Accreditation Cooperation - Multilateral Recognition Arrangement (ILAC-MRA).

Traceable® is a registered trademark of Control Company

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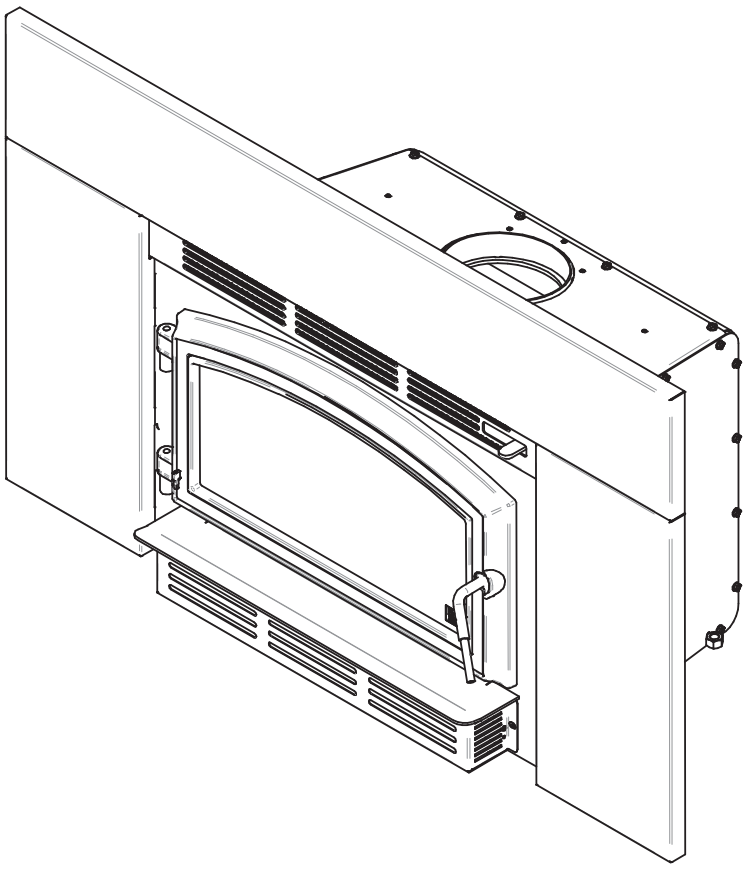
EMPIRE STOVE

Product Specification Manual

ARCHWAY 1500 INSERT

(SF00609 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS MANUAL FOR REFERENCE

2021-03-29

Printed in Canada

45983A

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

C ETL LISTED US

Intertek

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CS A B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

LISTED SOLID FUEL BURNING INSERT APPLIANCE

APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

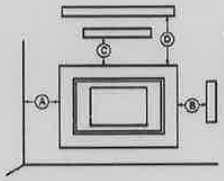
MODEL / MODÈLE :

ARCHWAY 1500

Serial Number / No. de Série: 1

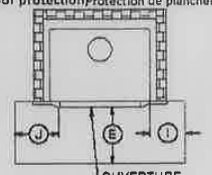
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E: 16 in./po. (406 mm) USA
18 in./po. (457 mm) CANADA
I: 8 in./po. (203 mm) CANADA
J: 8 in./po. (203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. (For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

EMPIRE
SINCE 1932

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27881

ENGLISH

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	Archway 1500 (SF00609)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft³ and 12 lb/ft3. The moisture content is between 19% and 25%.

[3] As measured per CSA B415.1-10 stack loss method.

[4] Higher Heating Value of the fuel.

[5] Lower Heating Value of the fuel.

[6] Optimum overall efficiency at a specific burn rate (LHV).

[7] This appliance is officially tested and certified by an independent agency.

[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

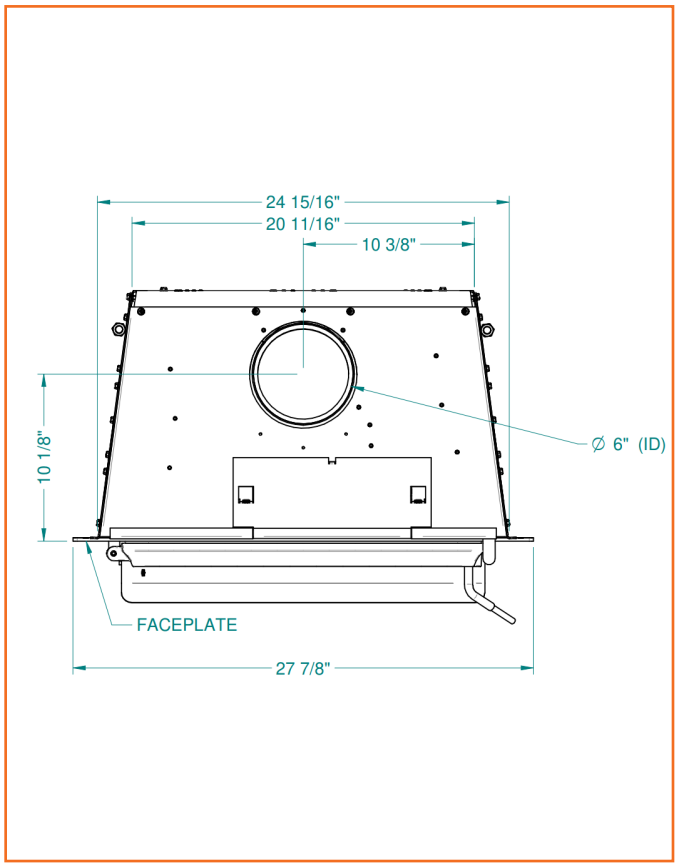


Figure 1 : Top View

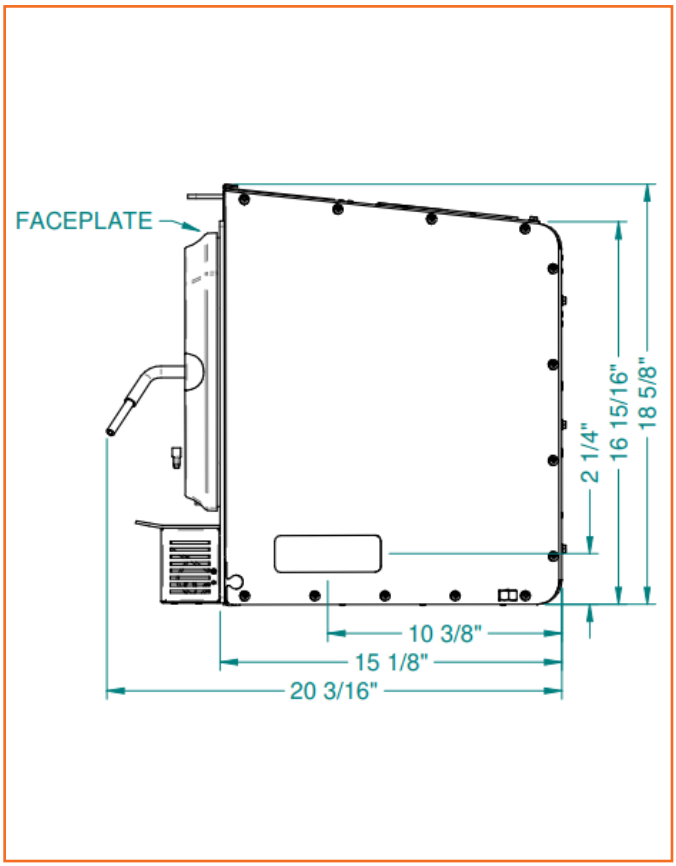


Figure 2 : Side View

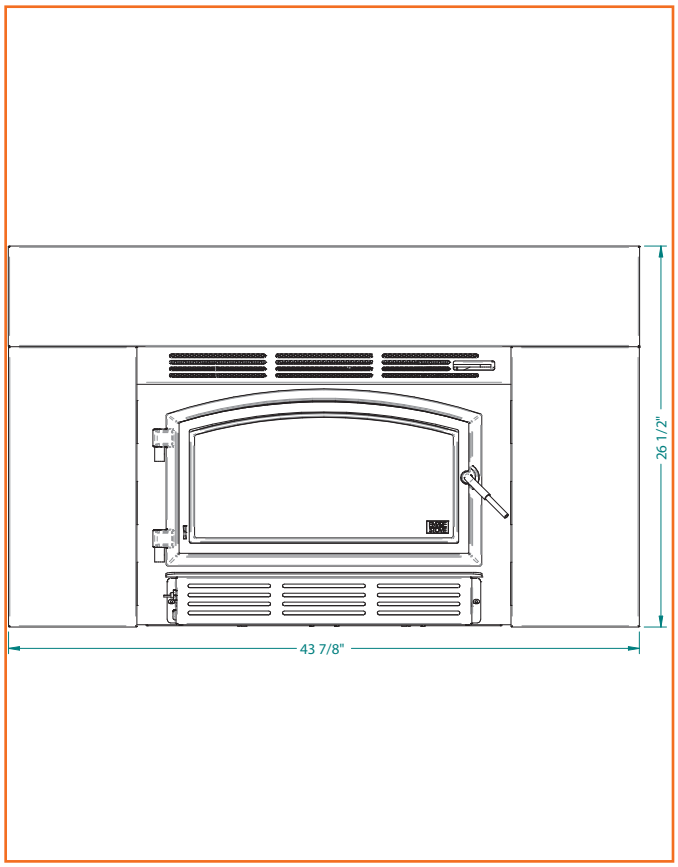


Figure 3 : Front View

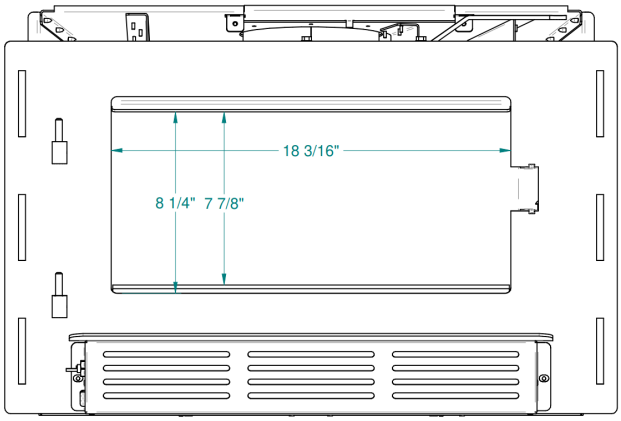


Figure 4 : Door Opening

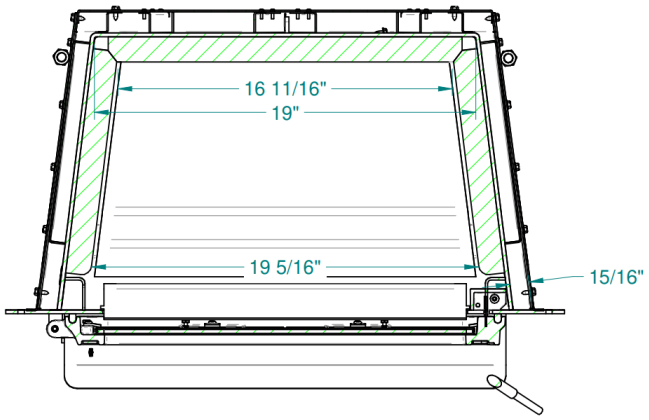


Figure 5 : Top View - Combustion Chamber

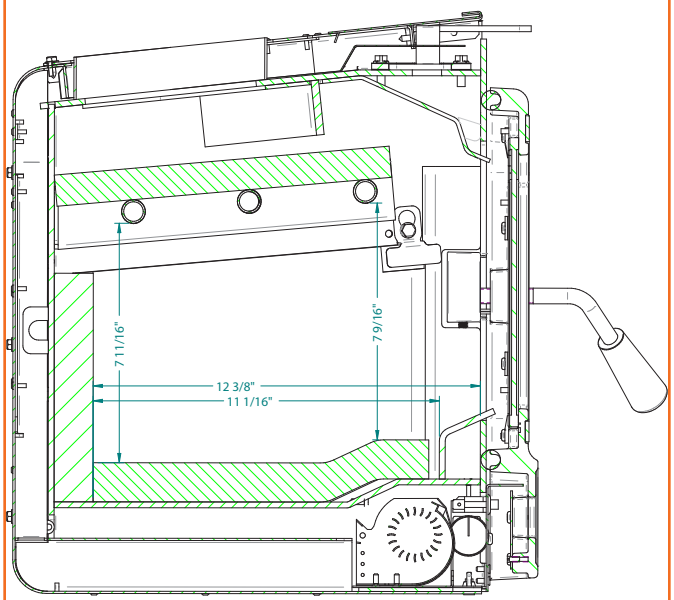
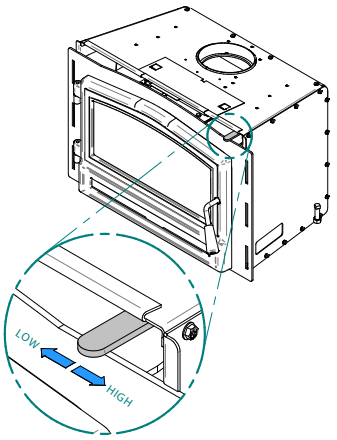


Figure 6 : Side View - Combustion Chamber

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

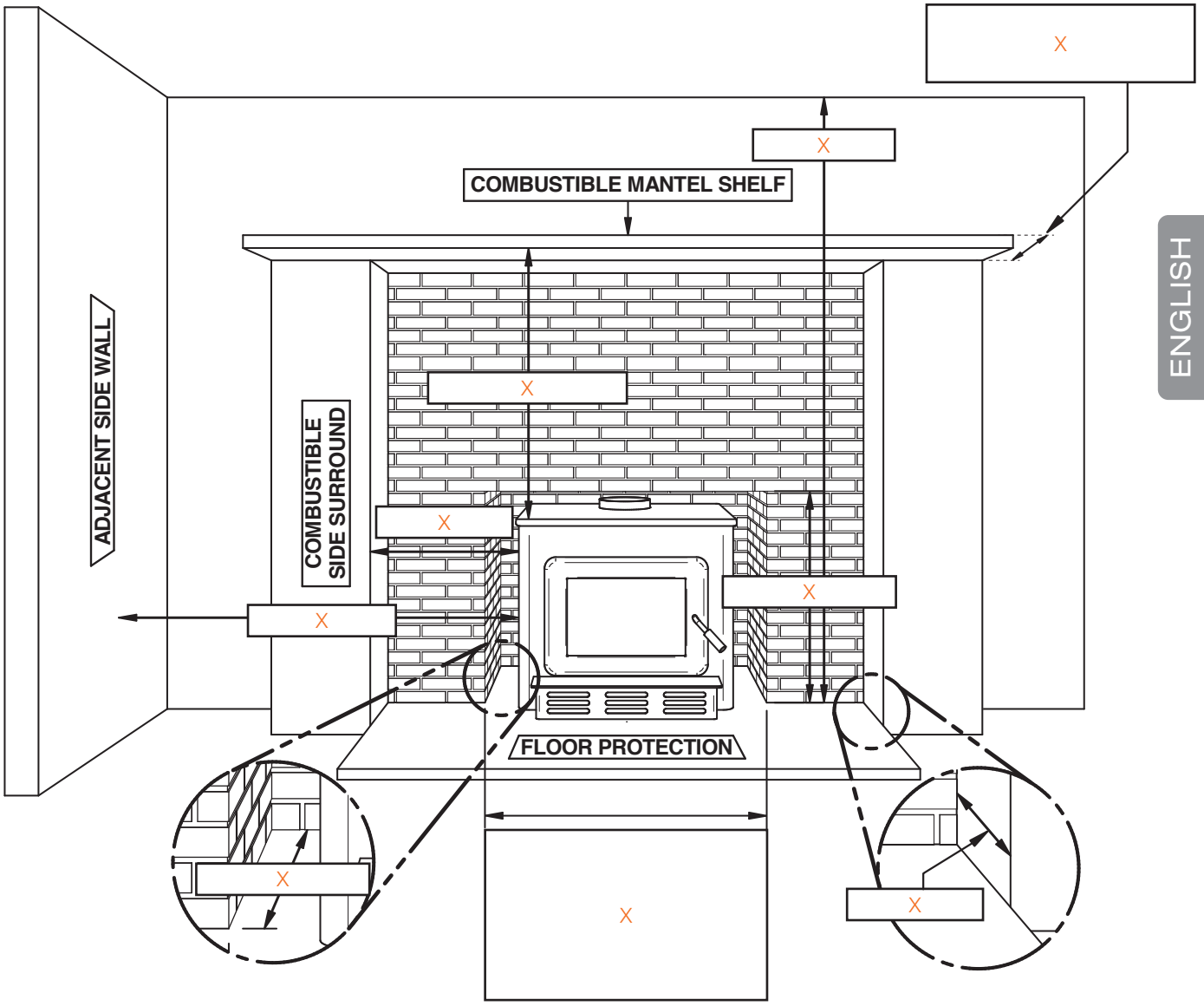
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

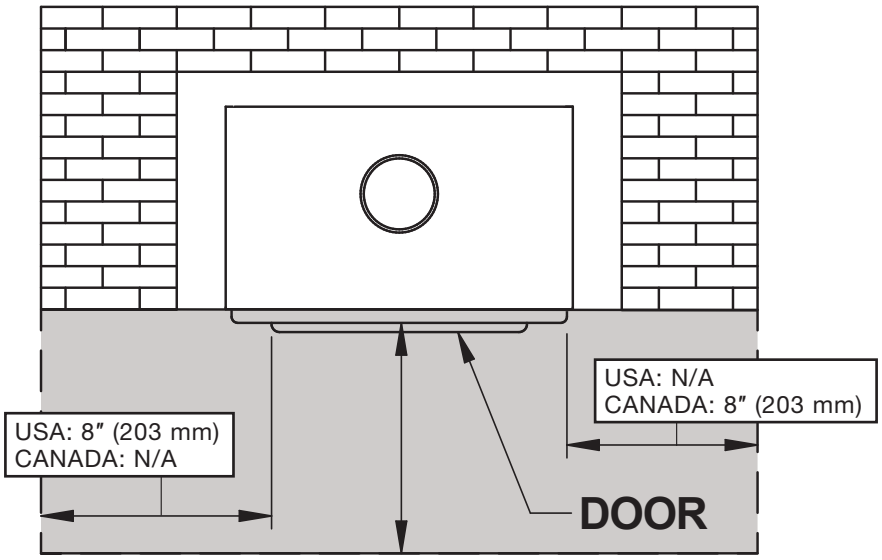
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles

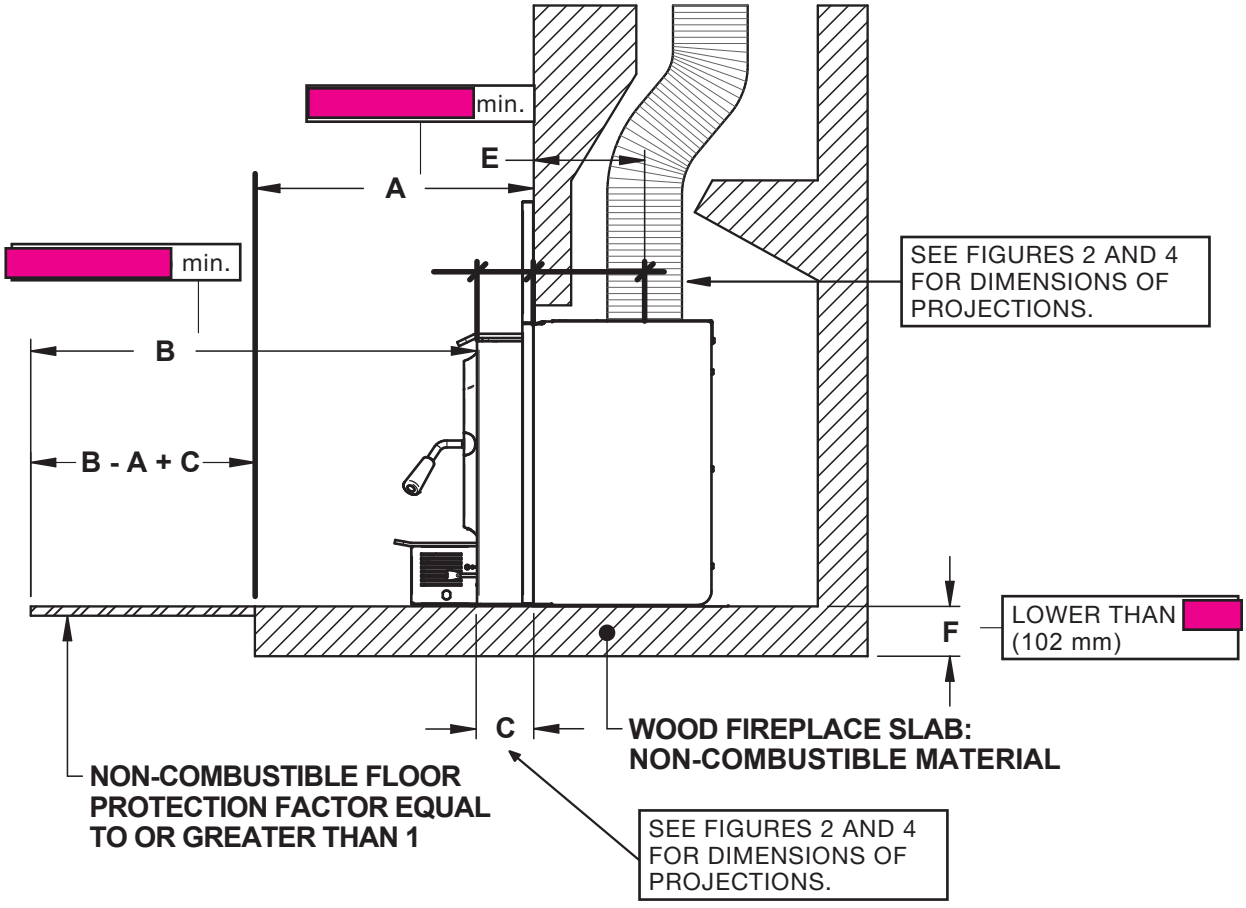


2.2 Floor Protection

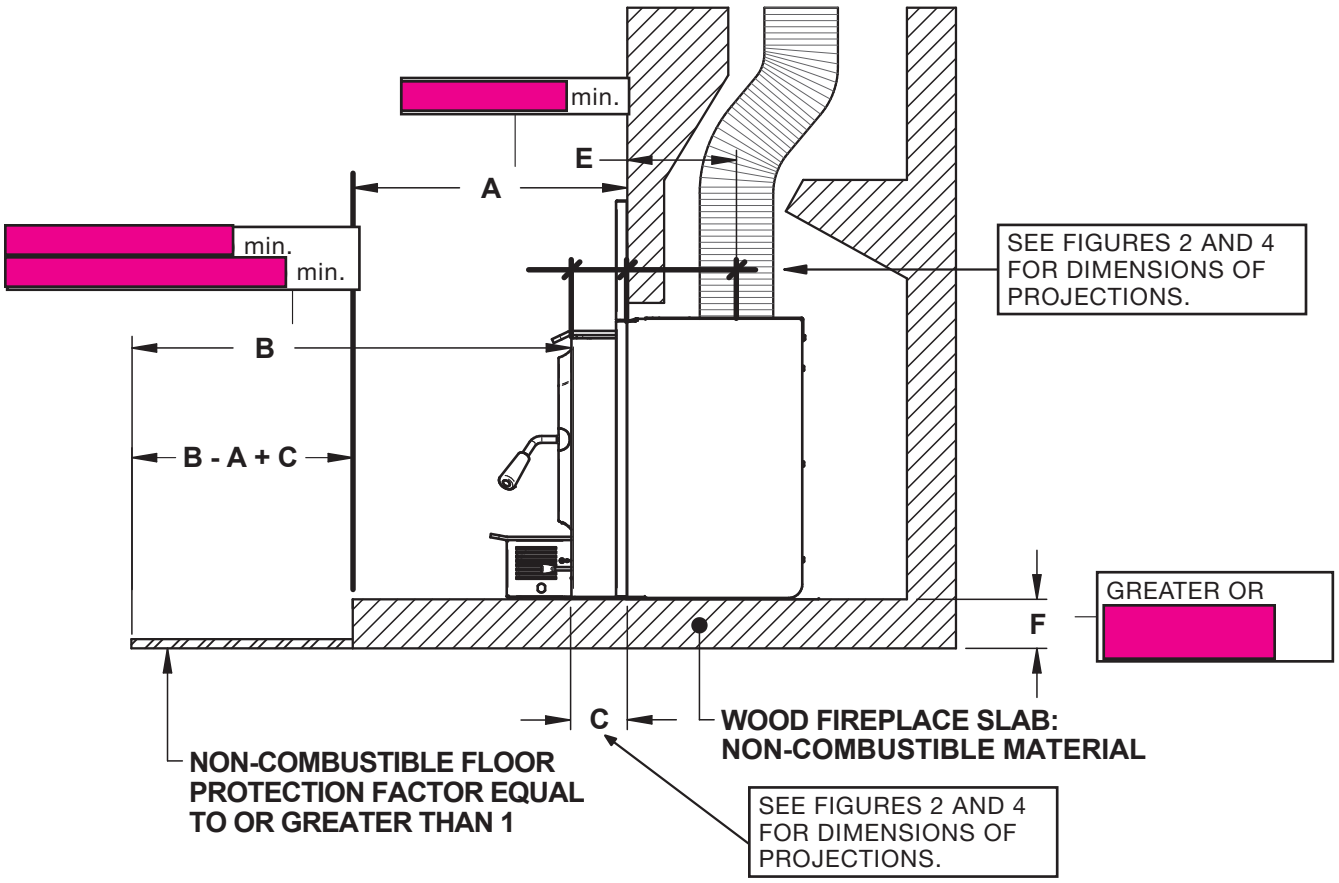
It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.



2.2.1 Installation Raised of [redacted] and Less



2.2.2 *Installation Raised of More Than*



ENGLISH

2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

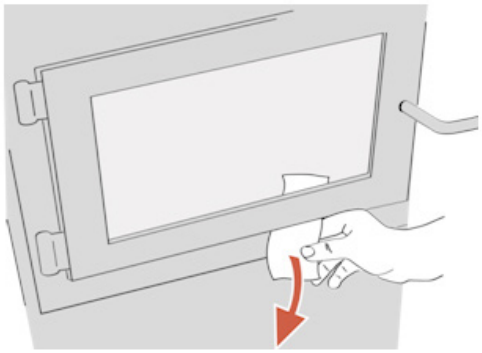
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

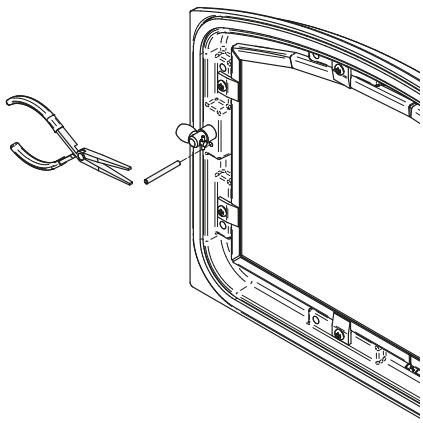


Figure 7 : Removing the split pin

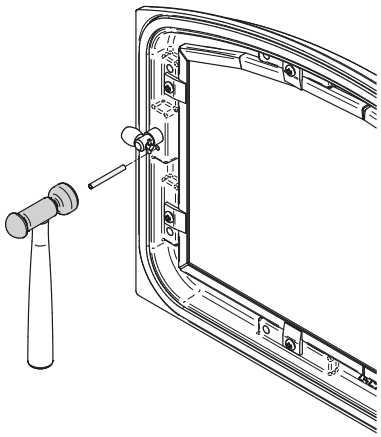
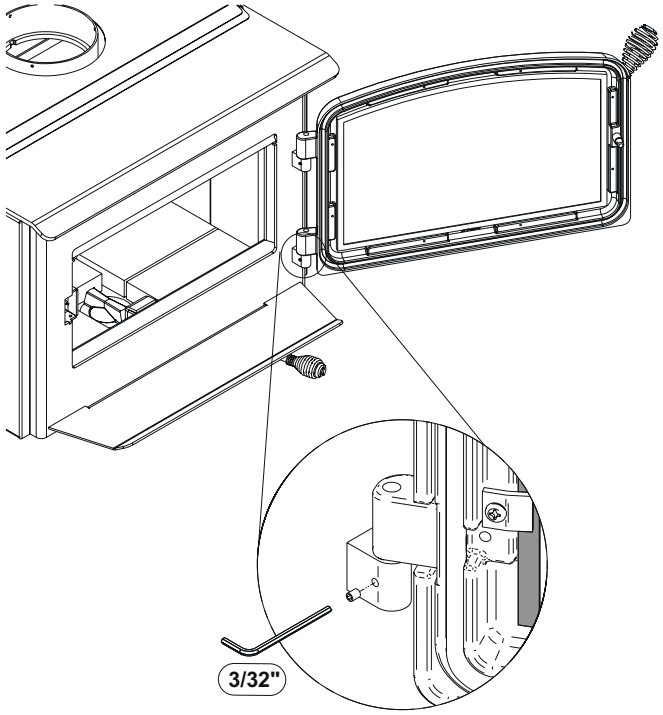
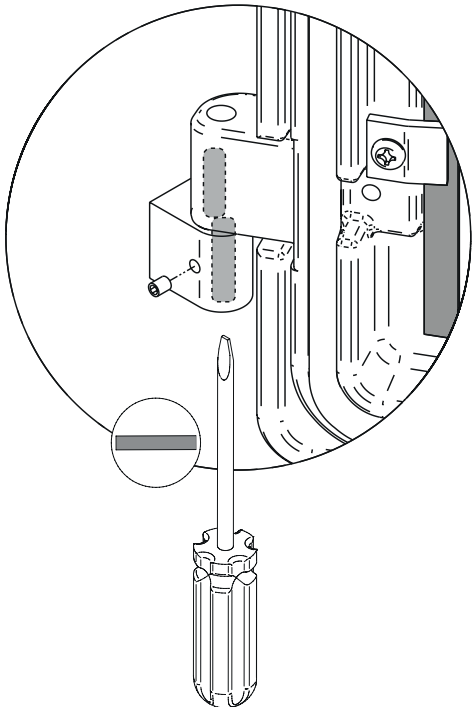


Figure 8 : Installing the split pin

3.1.3 Door Alignment

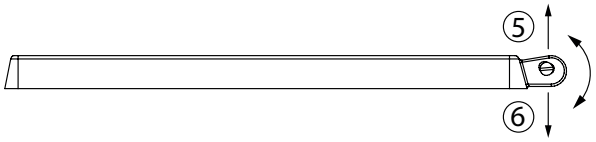
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

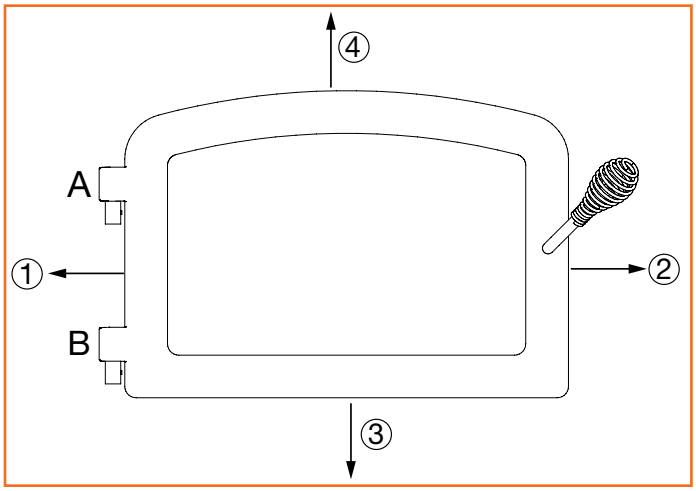


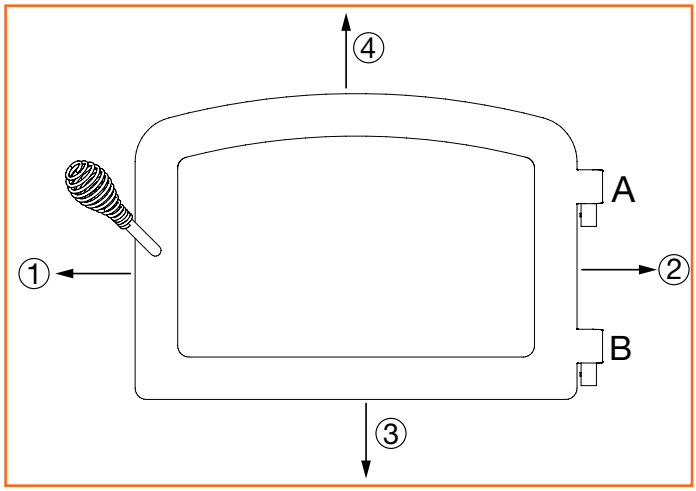


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



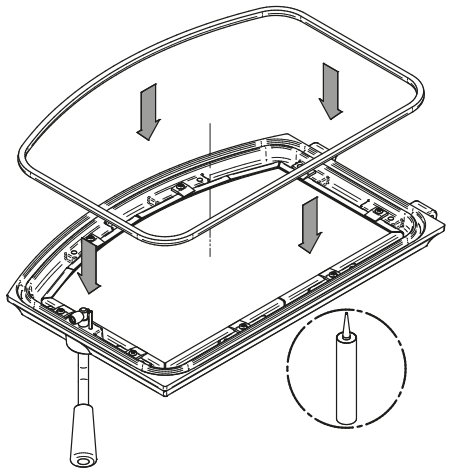




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

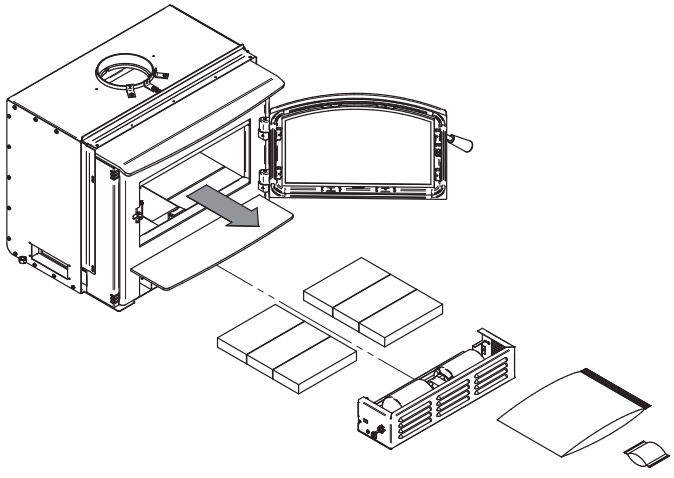


Figure 9 : Empty the combustion chamber

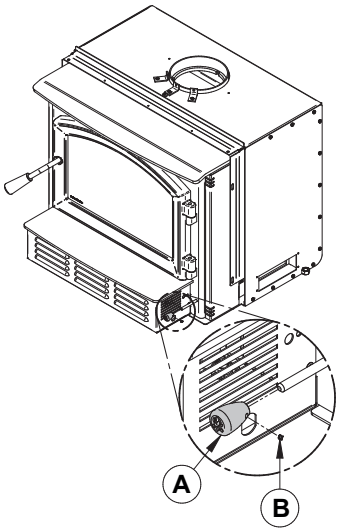


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

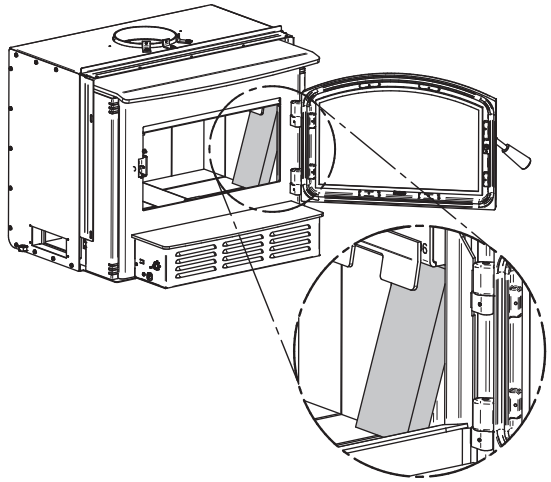


Figure 11 : Install the Combustion Chamber Bricks

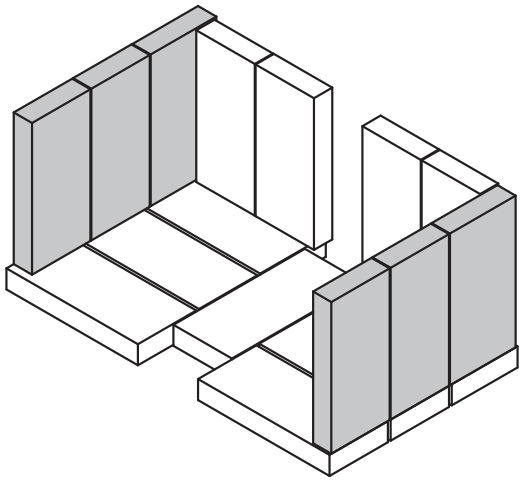
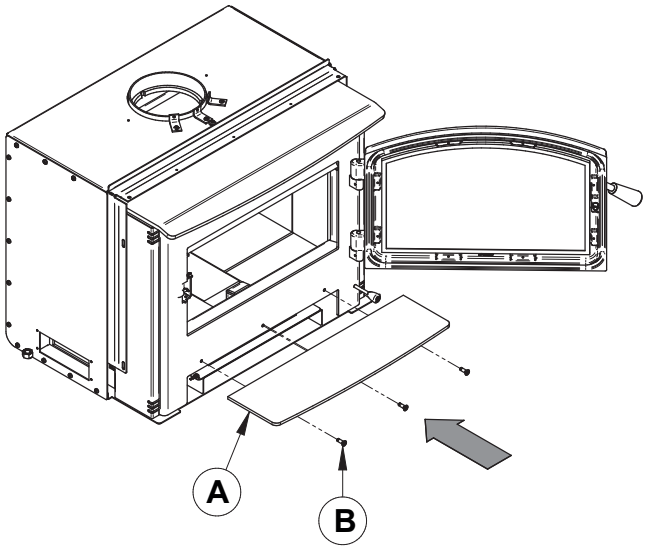


Figure 12 : Combustion Chamber Bricks Layout

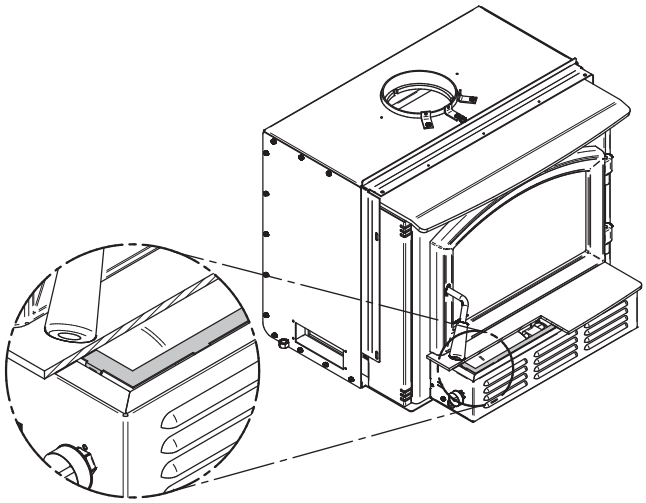
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



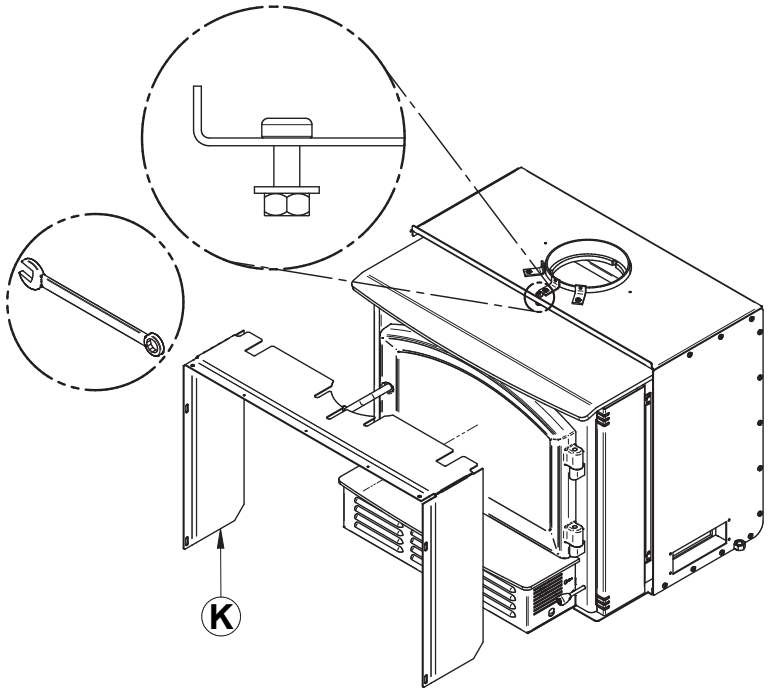
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



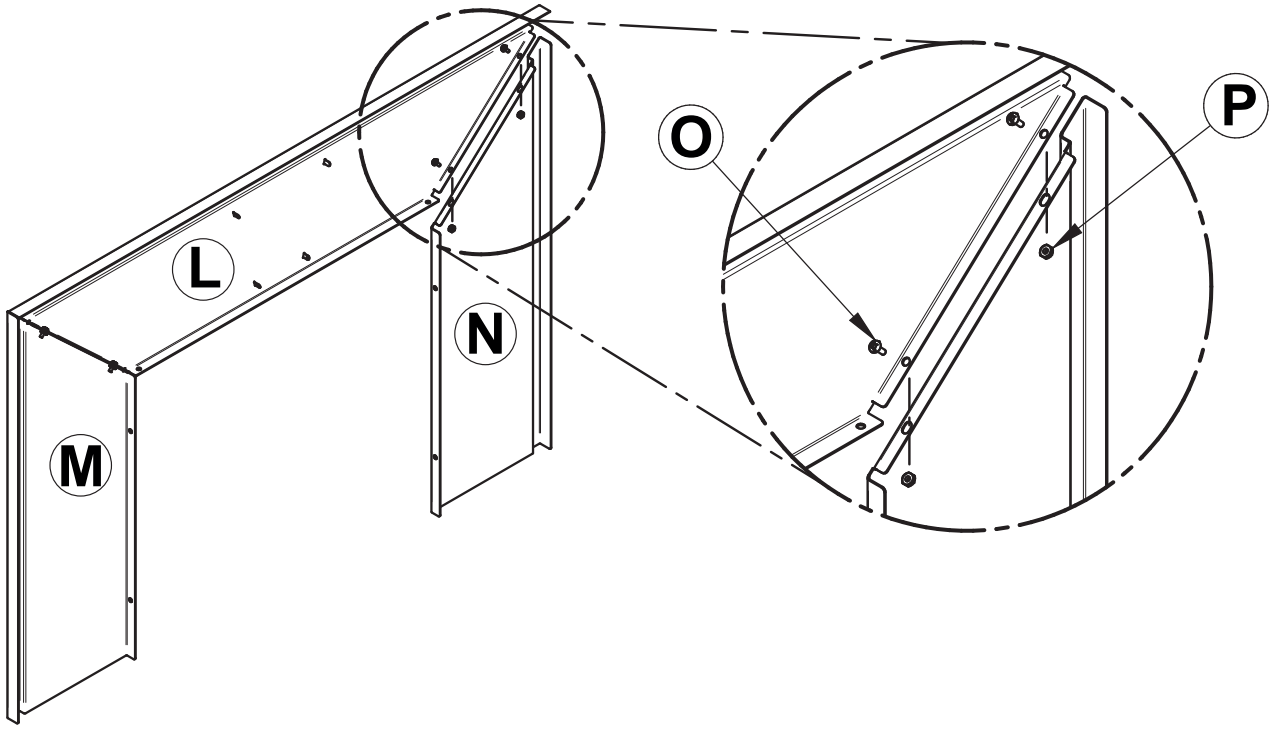
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

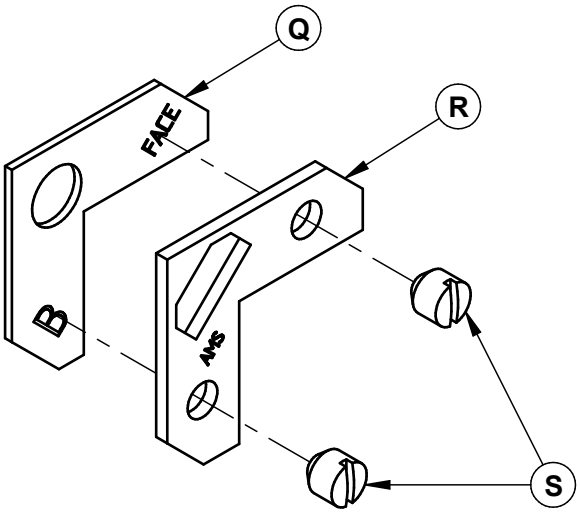
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



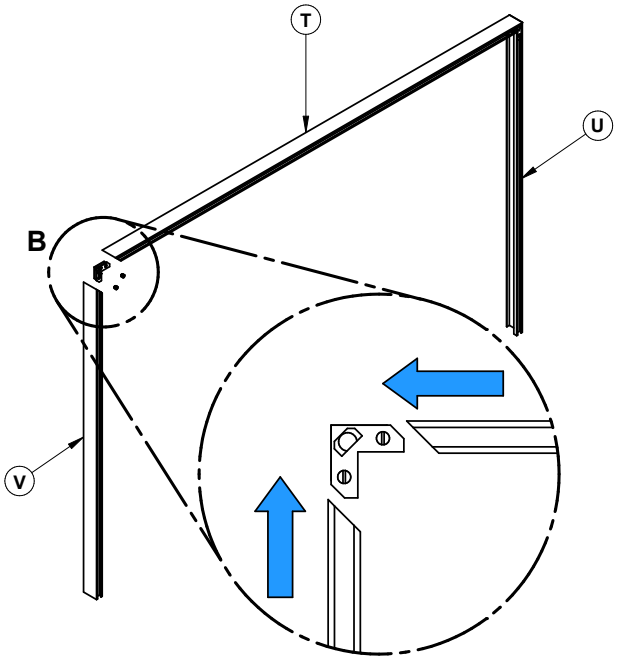
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

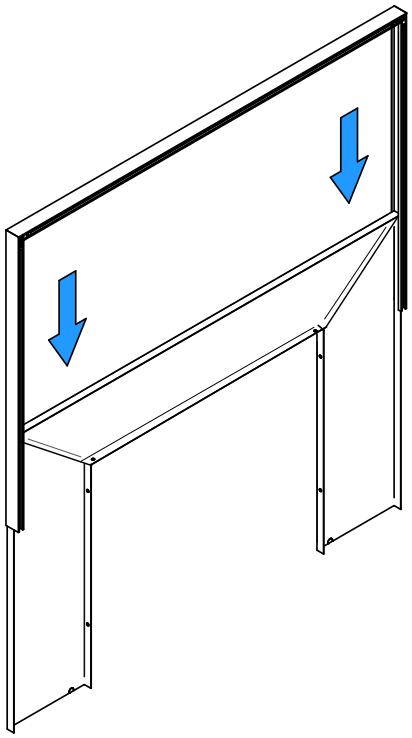


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

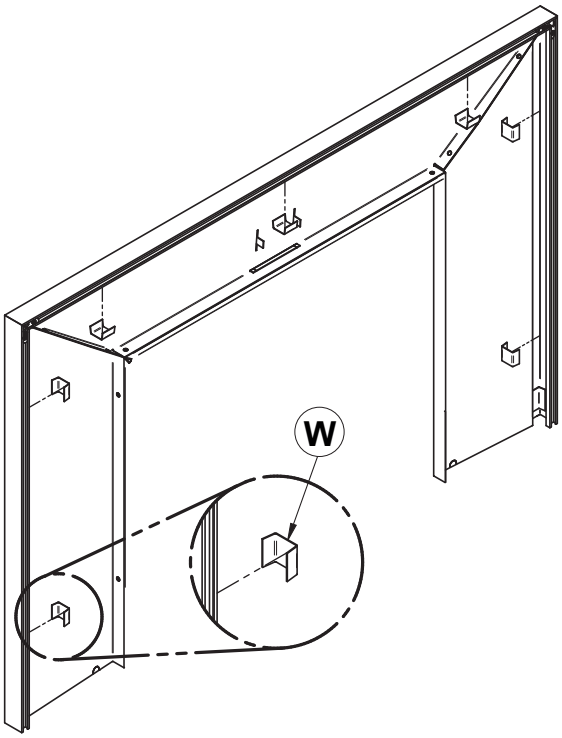


DETAIL B

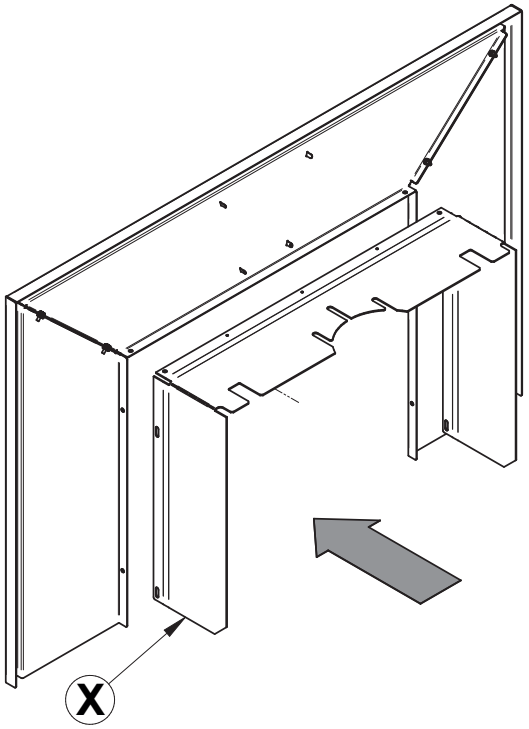
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



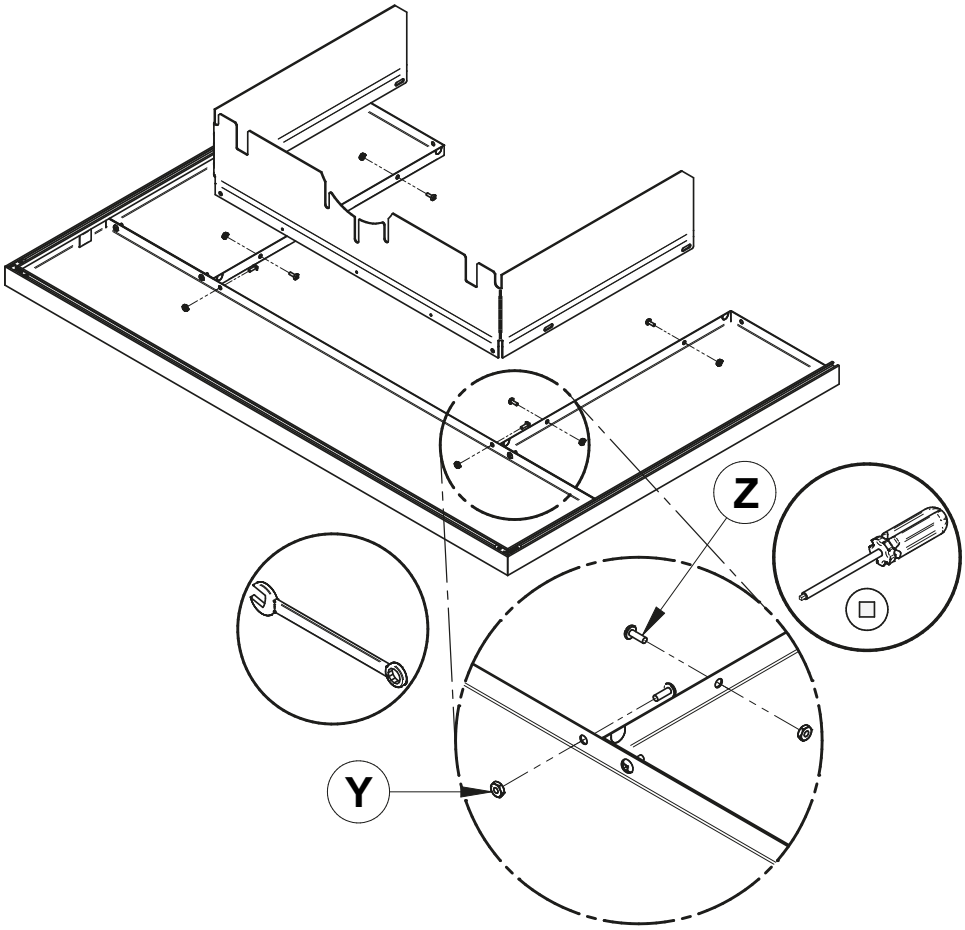
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

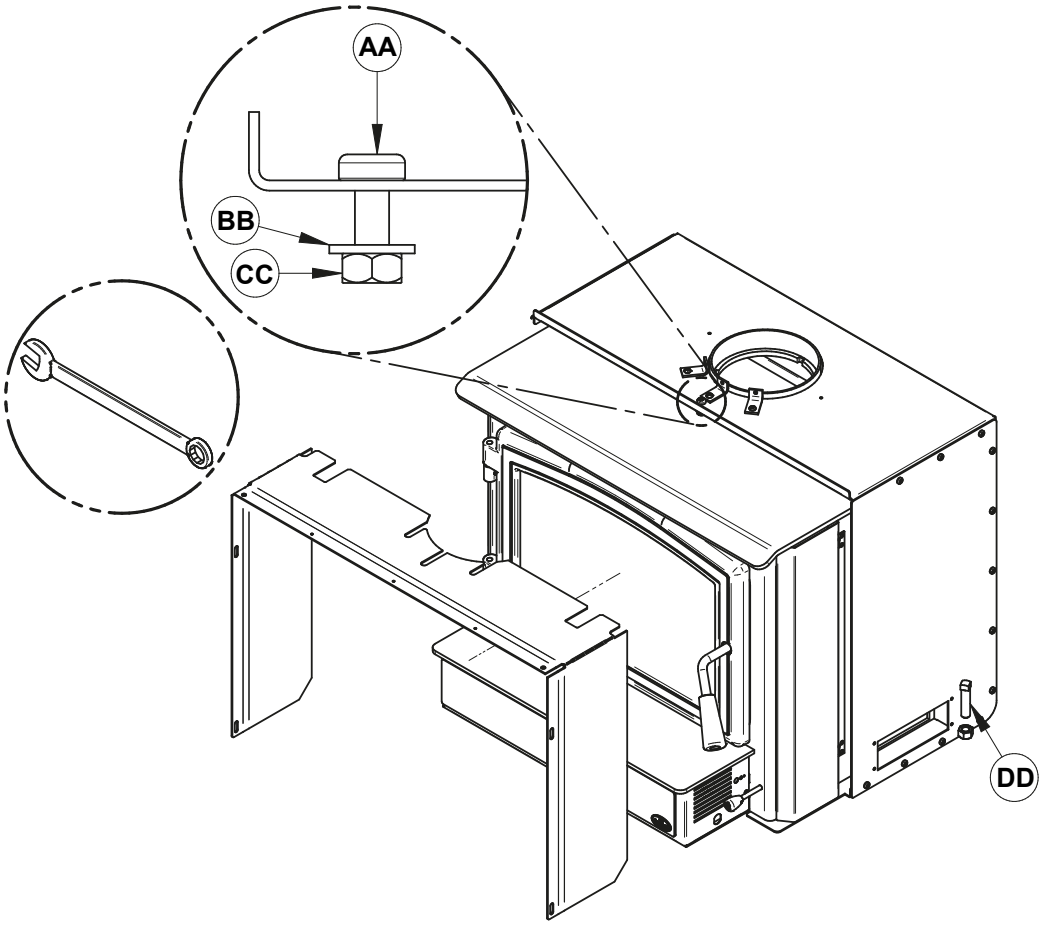


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

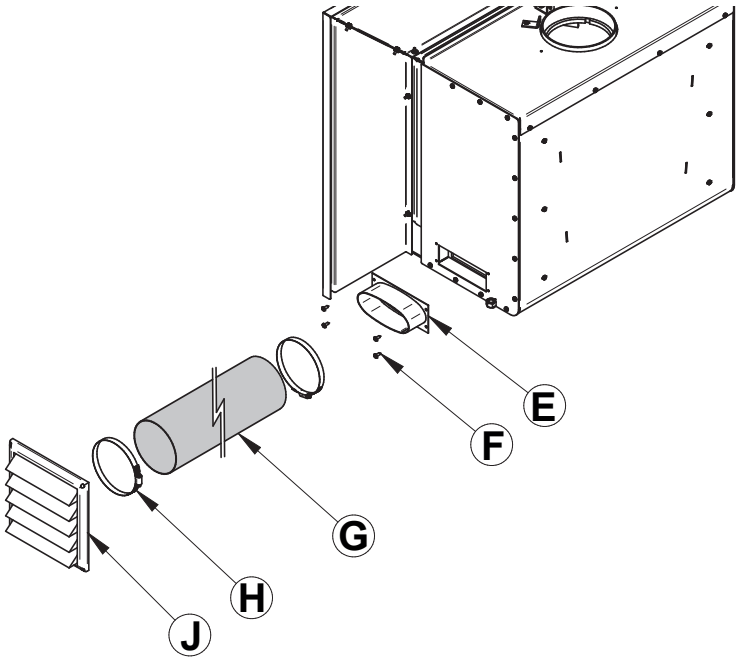


3.5 Optional Fresh Air Intake Kit Installation

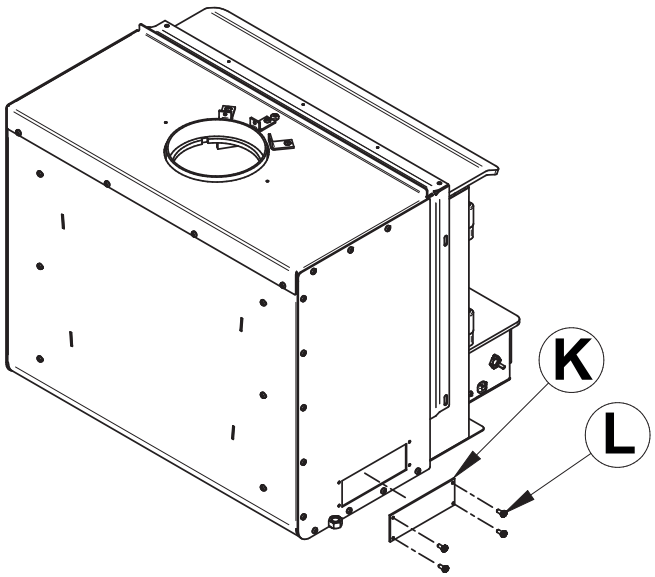
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



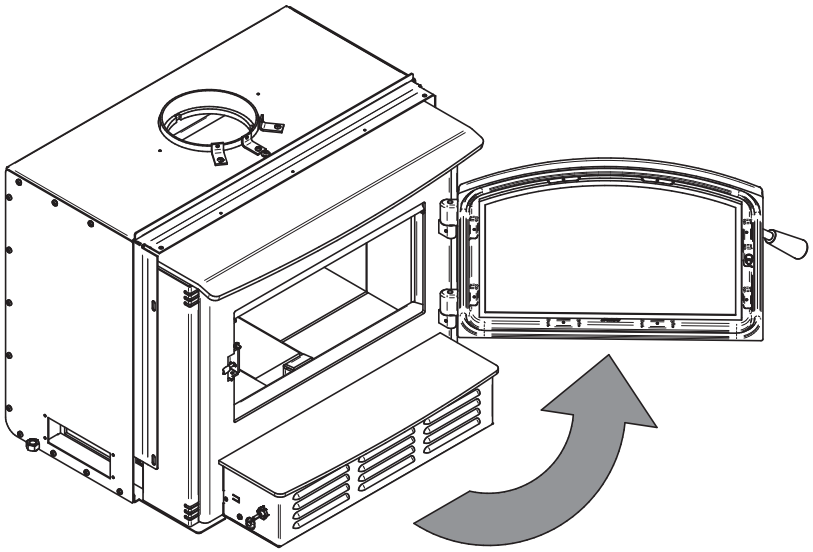
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

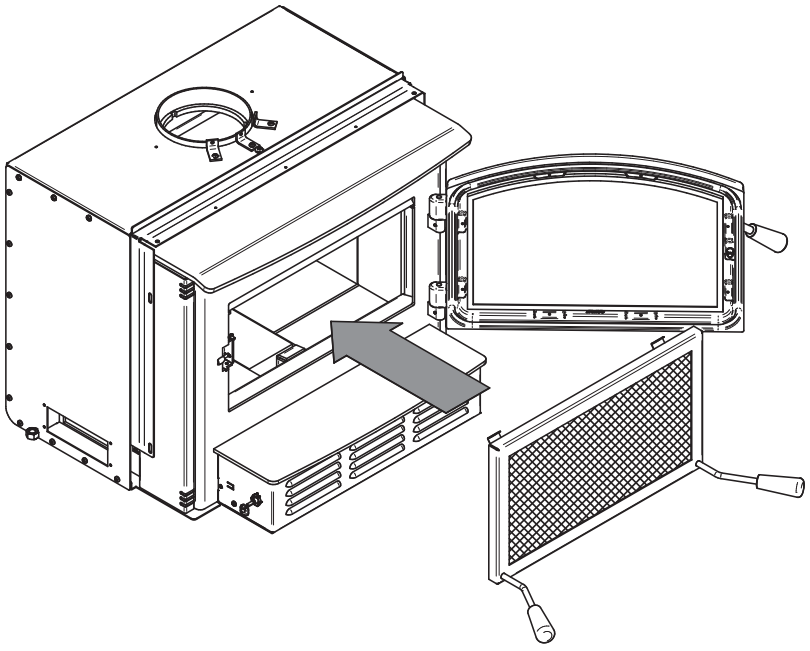
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



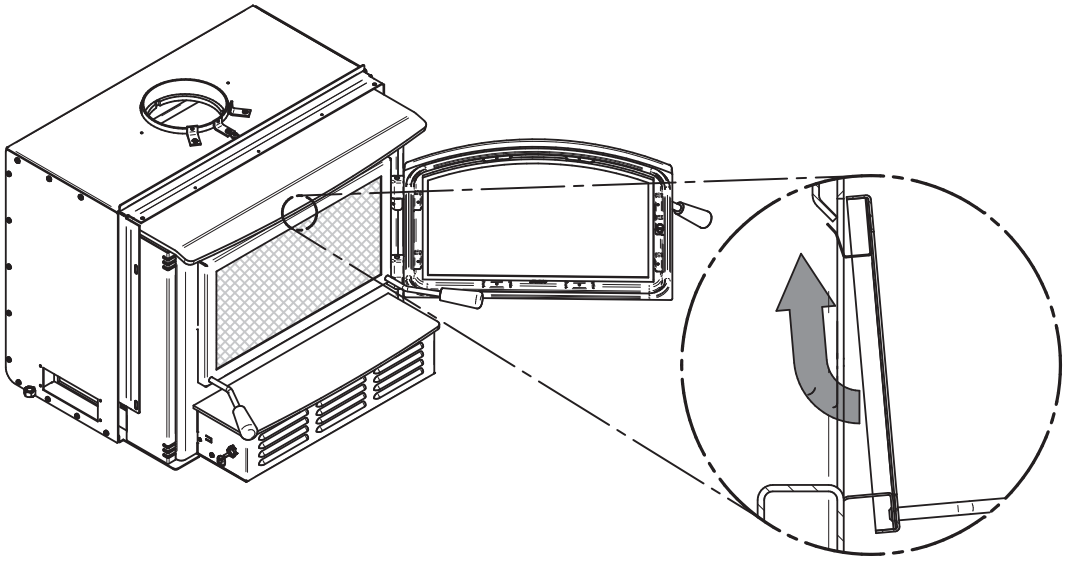
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

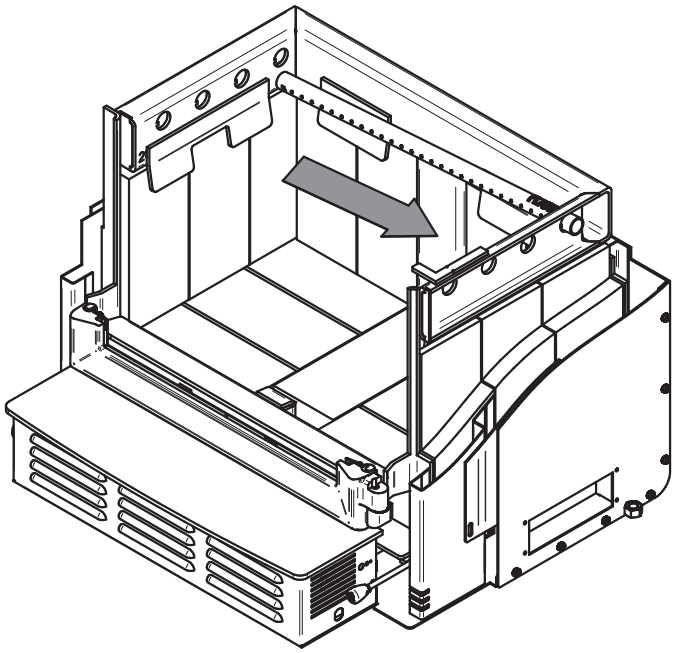
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.



3.7 Air Tubes and Baffle Installation

1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

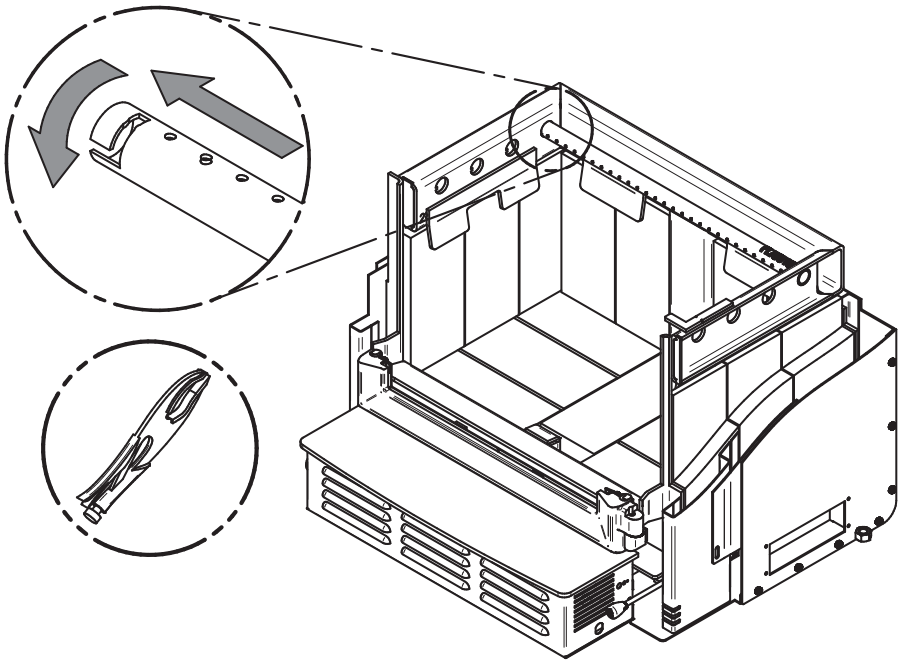


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.

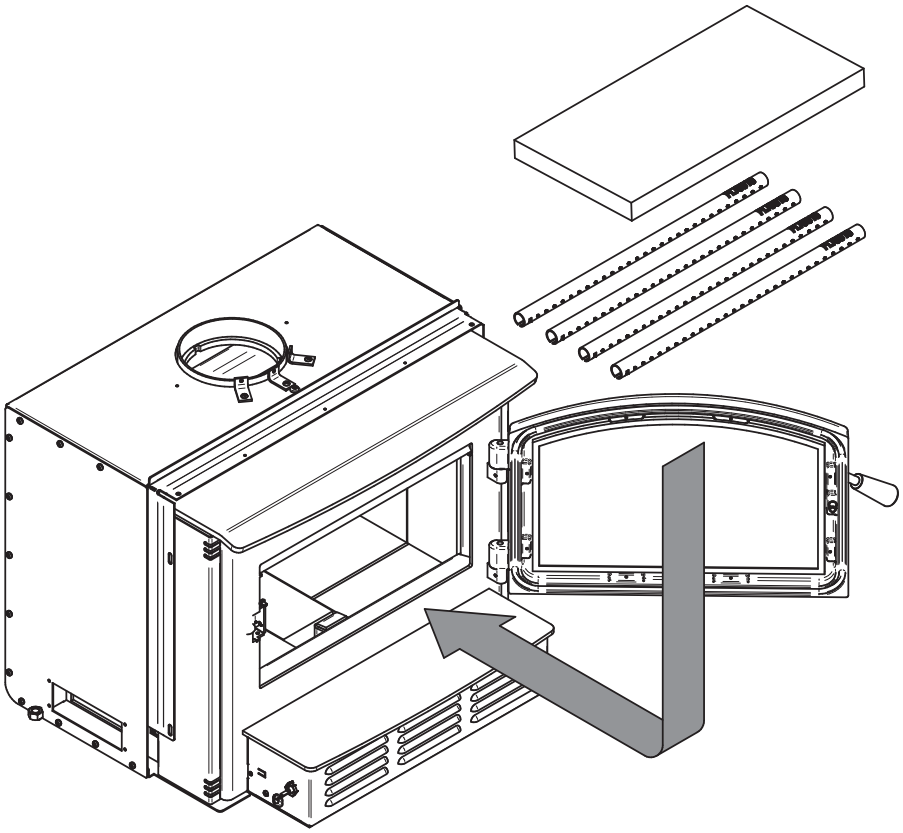
3. Install the baffle.

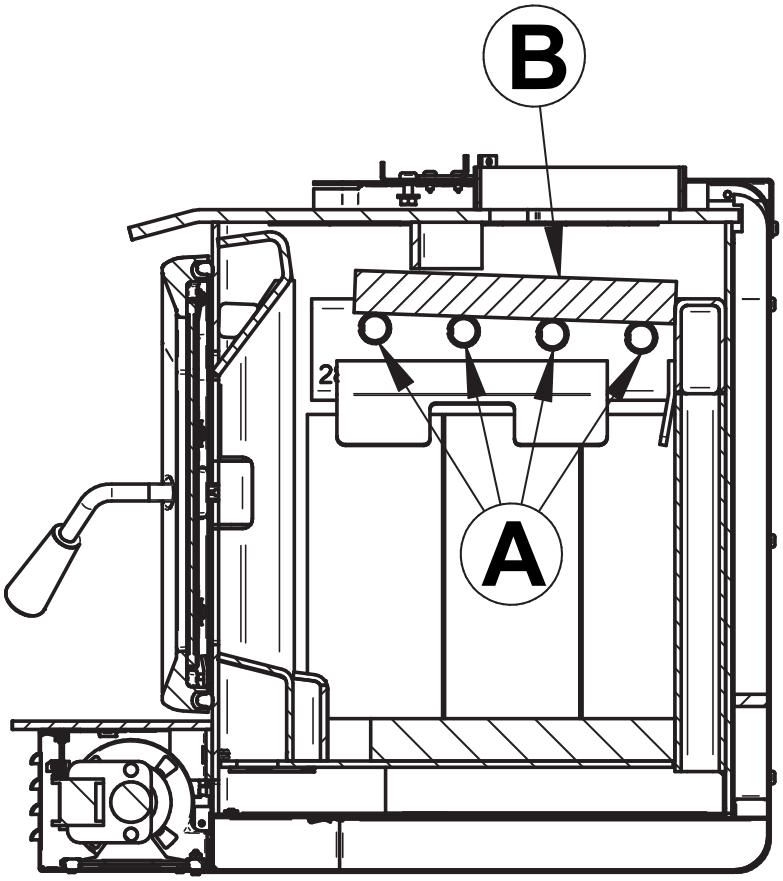
4. Repeat steps 1 and 2 for the three other tubes.

5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

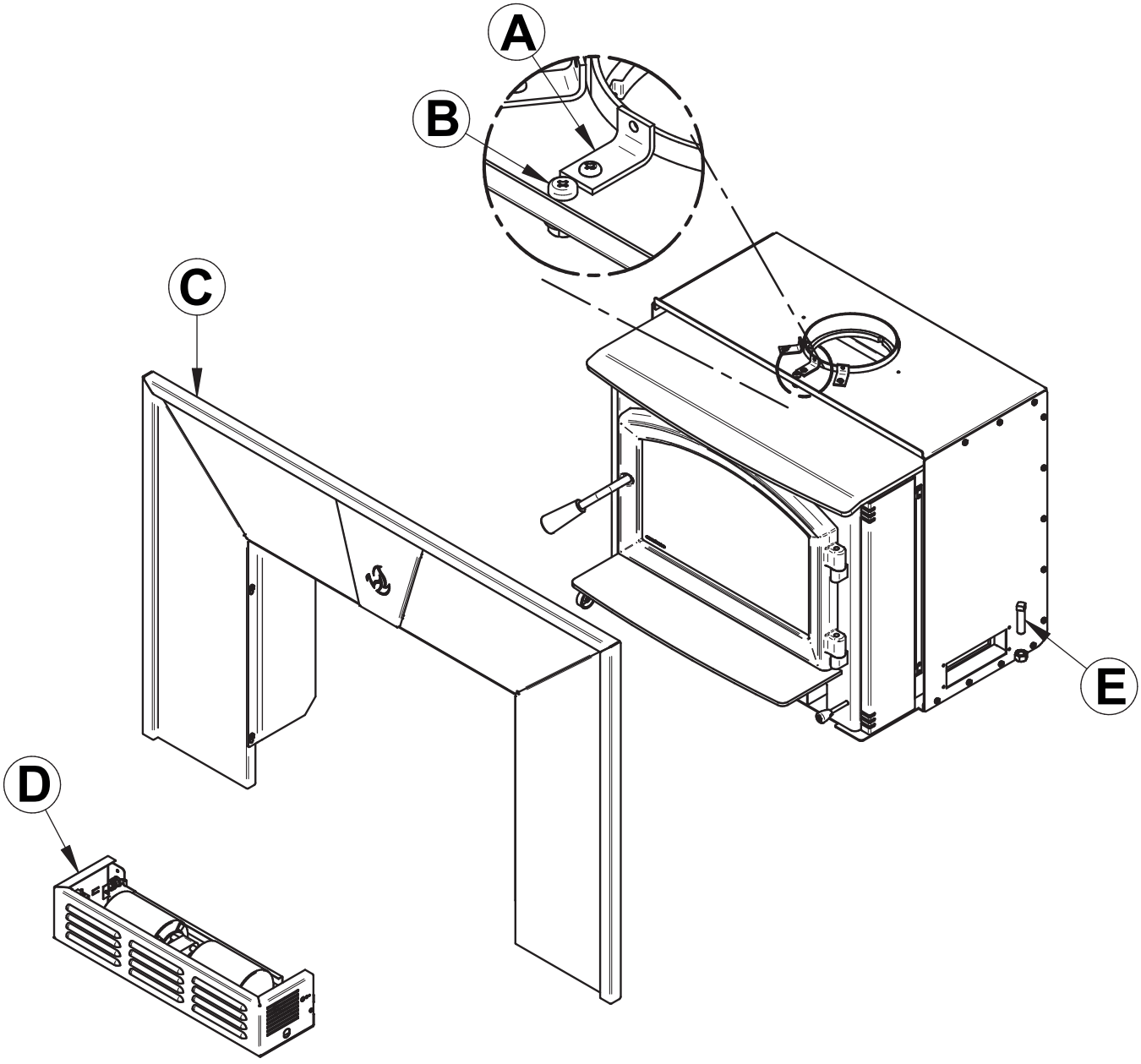



B
A

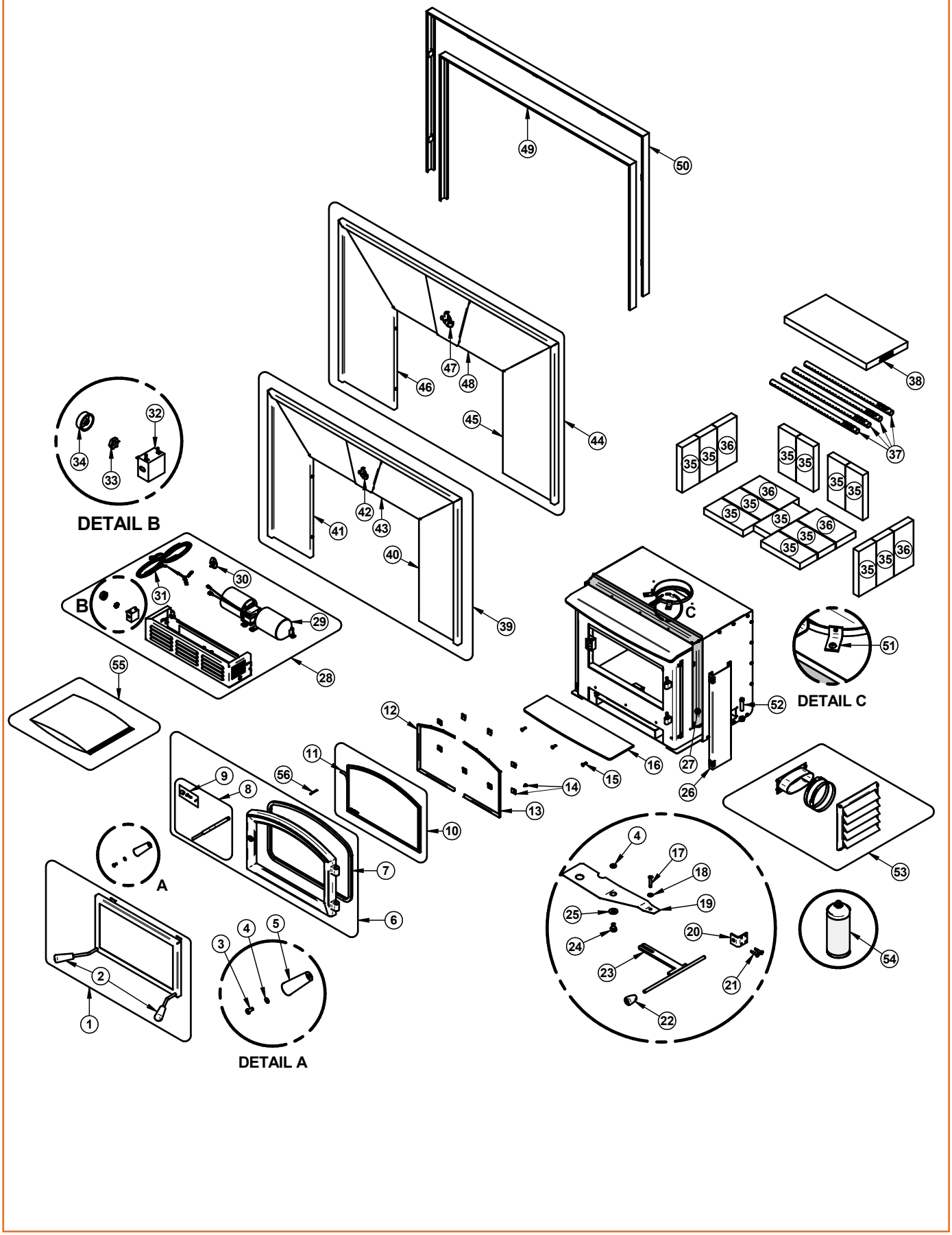
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

EMPIRE LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to the EMPIRE dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or under-estimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after March 1st 2019.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass**, plating (manufacturing defect**) and convector air-mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

*Subject to limitations above. **Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement part.

Shall your unit or a components be defective, contact immediately your EMPIRE dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your EMPIRE dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to sender.

This document is available for free download on the manufacturer's website. It is a copyrighted document. Resale is strictly prohibited. The manufacturer may update this document from time to time and cannot be responsible for problems, injuries, or damages arising out of the use of information contained in any document obtained from unauthorized sources.

EMPIRE STOVE

Empire Comfort Systems, Inc.
918 Freeburg Avenue
Belleville, IL 62220
618 233.7420
https://www.empirestove.com/

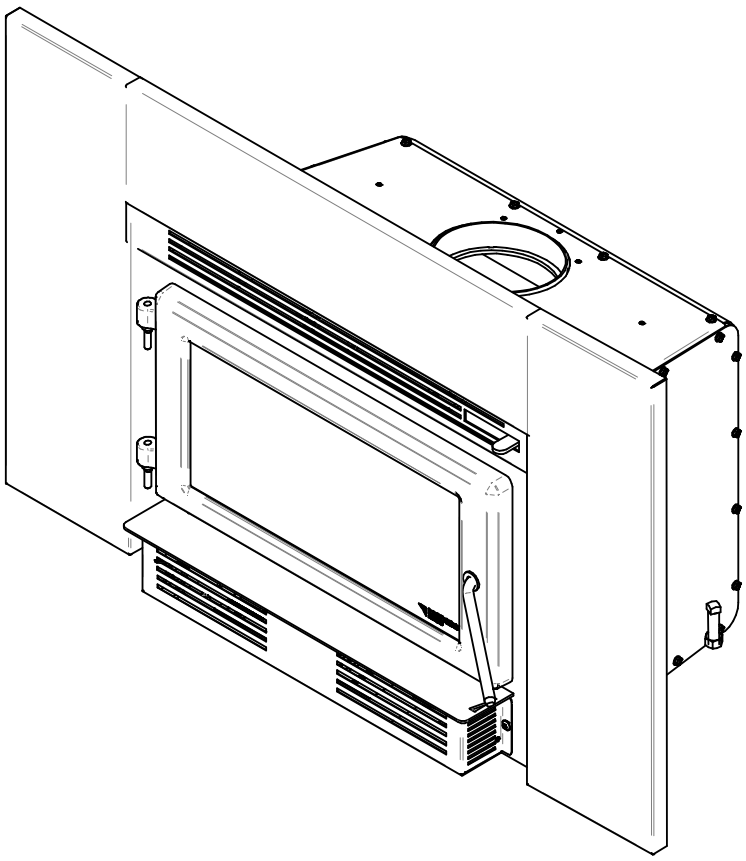
CENTURY HEATING

Product Specification Manual

CW2100 INSERT

(CB00027 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS MANUAL FOR REFERENCE

2021-03-29

Printed in Canada

45983A

ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at



https://www.century-heating.com/ca/en/warranty/warranty-registration

Registering the warranty will help to quickly find the information needed on the unit.

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

C ETL US LISTED
Intertek

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

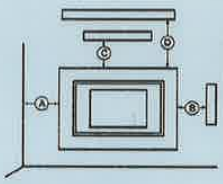
MODEL / MODÈLE :
CW2100

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number / No. de Série: 1

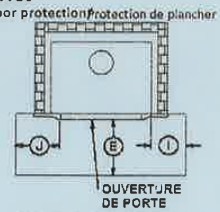
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/protection de plancher



E: 16 in./po.	(406 mm)	USA
18 in./po.	(457 mm)	CANADA
I: 8 in./po.	(203 mm)	CANADA
J: 8 in./po.	(203 mm)	USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27878

ENGLISH

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	CW2100 (CB00027)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft^3 and 12 lb/ft3. The moisture content is between 19% and 25%.

[3] As measured per CSA B415.1-10 stack loss method.

[4] Higher Heating Value of the fuel.

[5] Lower Heating Value of the fuel.

[6] Optimum overall efficiency at a specific burn rate (LHV).

[7] This appliance is officially tested and certified by an independent agency.

[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

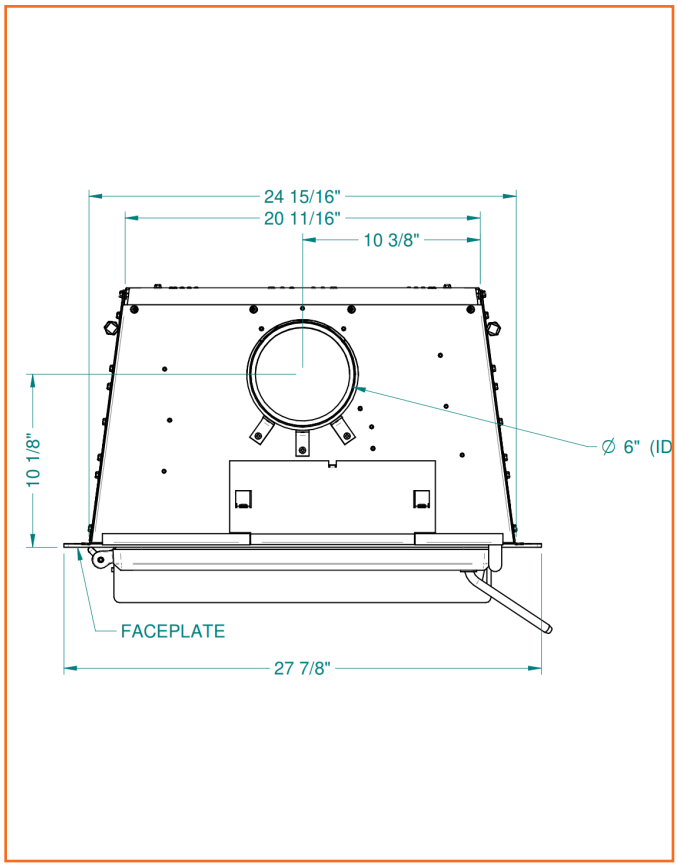


Figure 1 : Top View

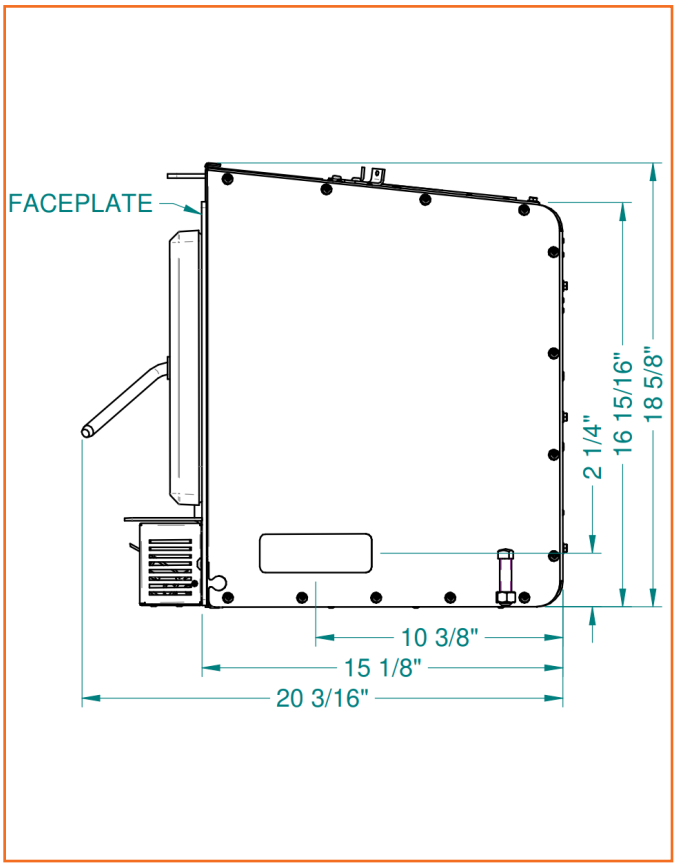


Figure 2 : Side View

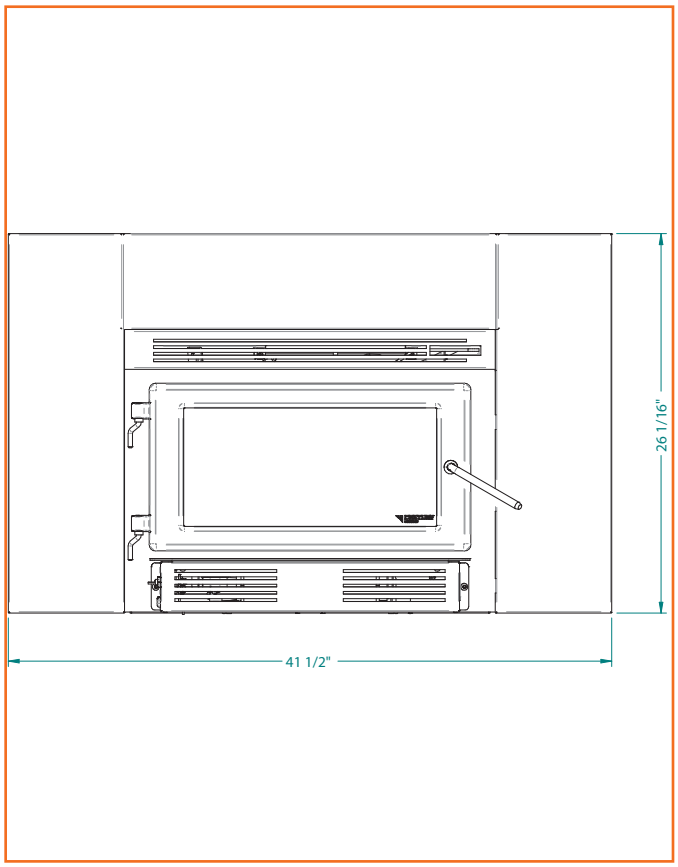


Figure 3 : Front View

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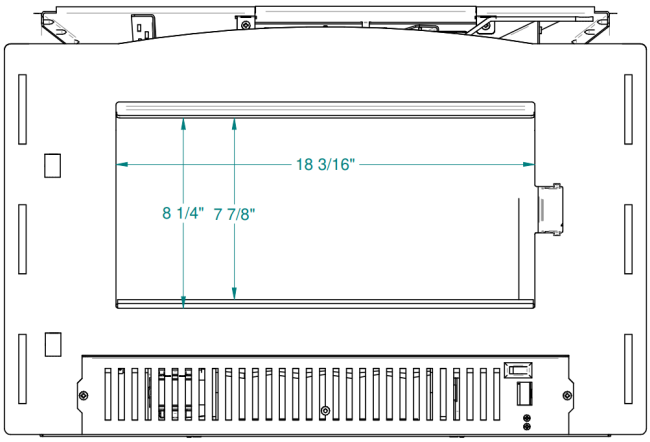


Figure 4 : Door Opening

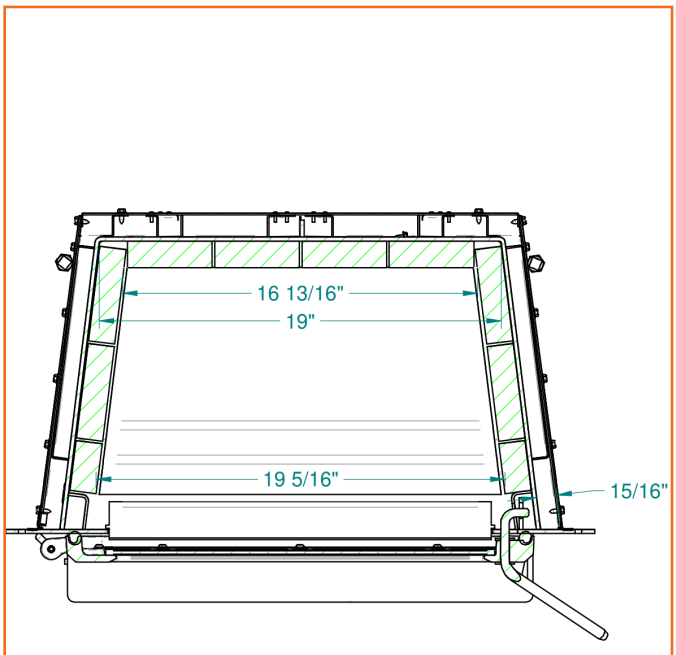


Figure 5 : Top View - Combustion Chamber

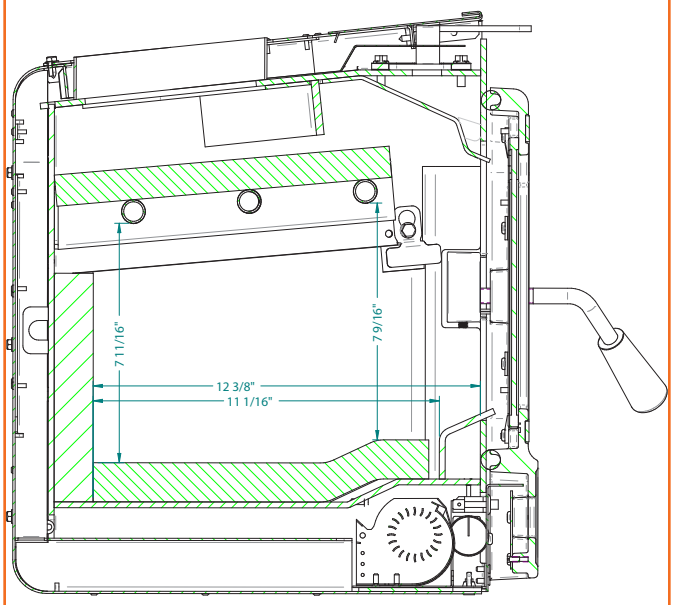
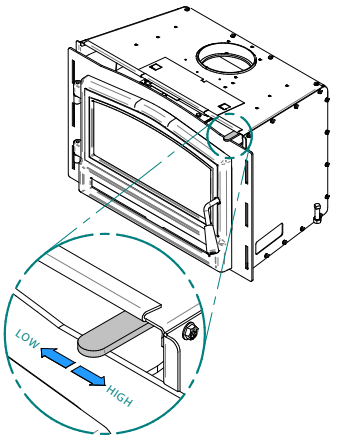


Figure 6 : Side View - Combustion Chamber

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

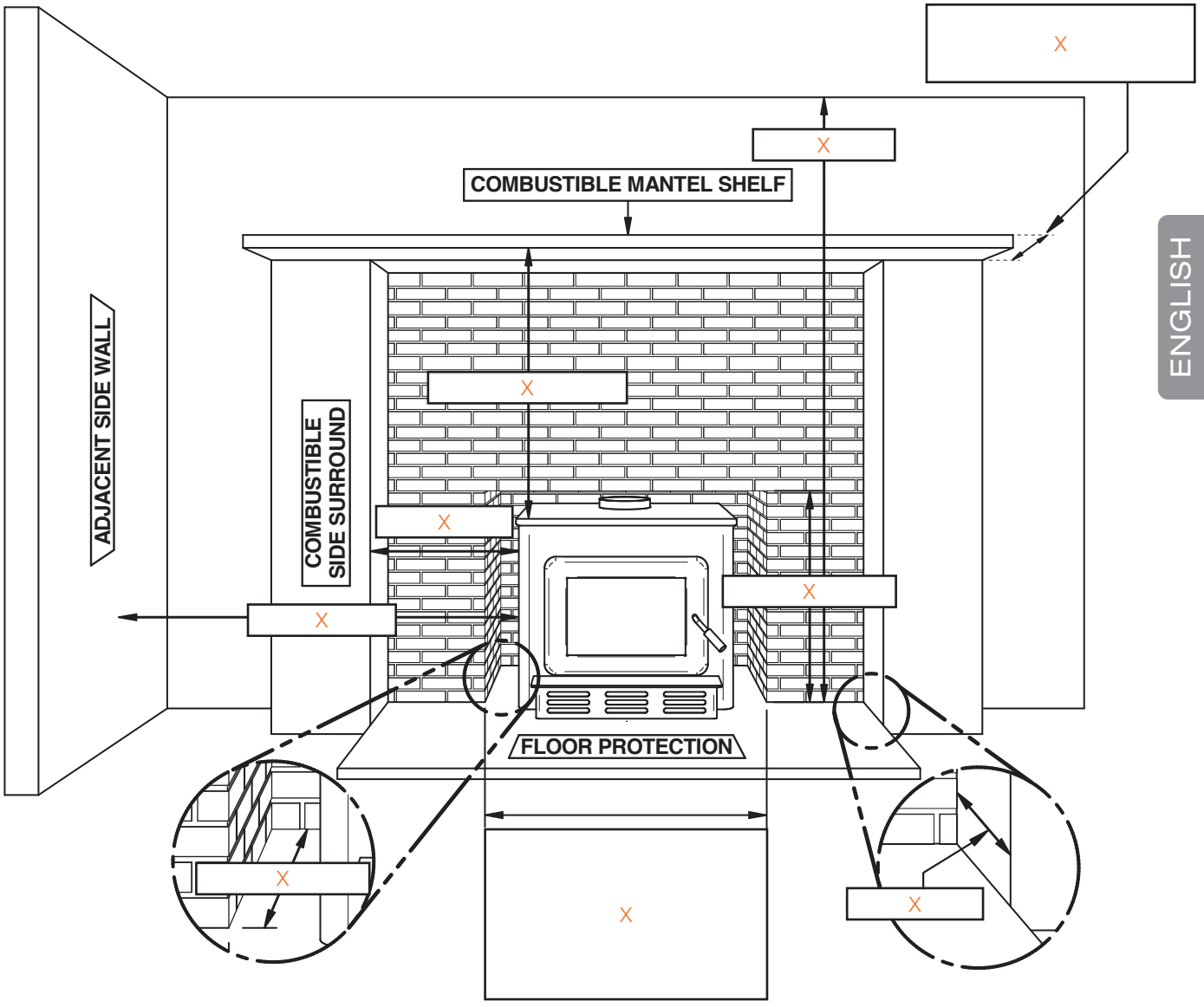
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

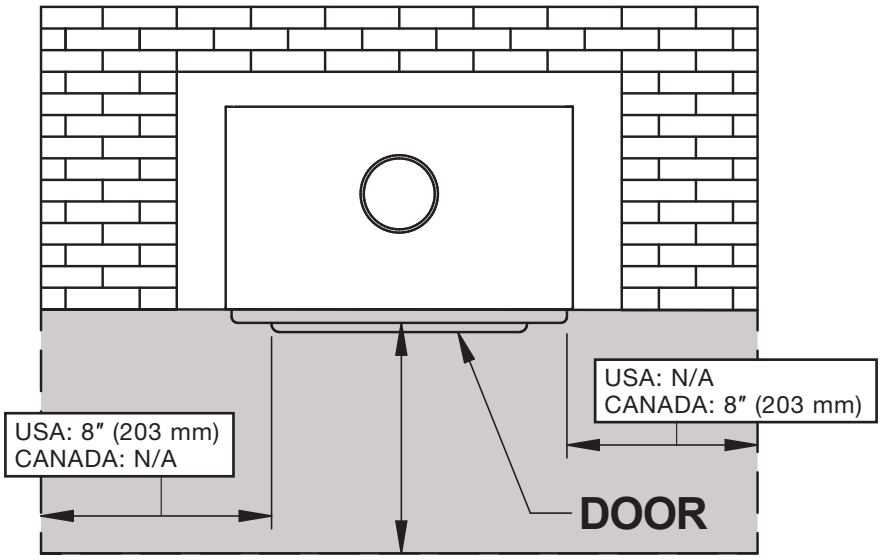
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles



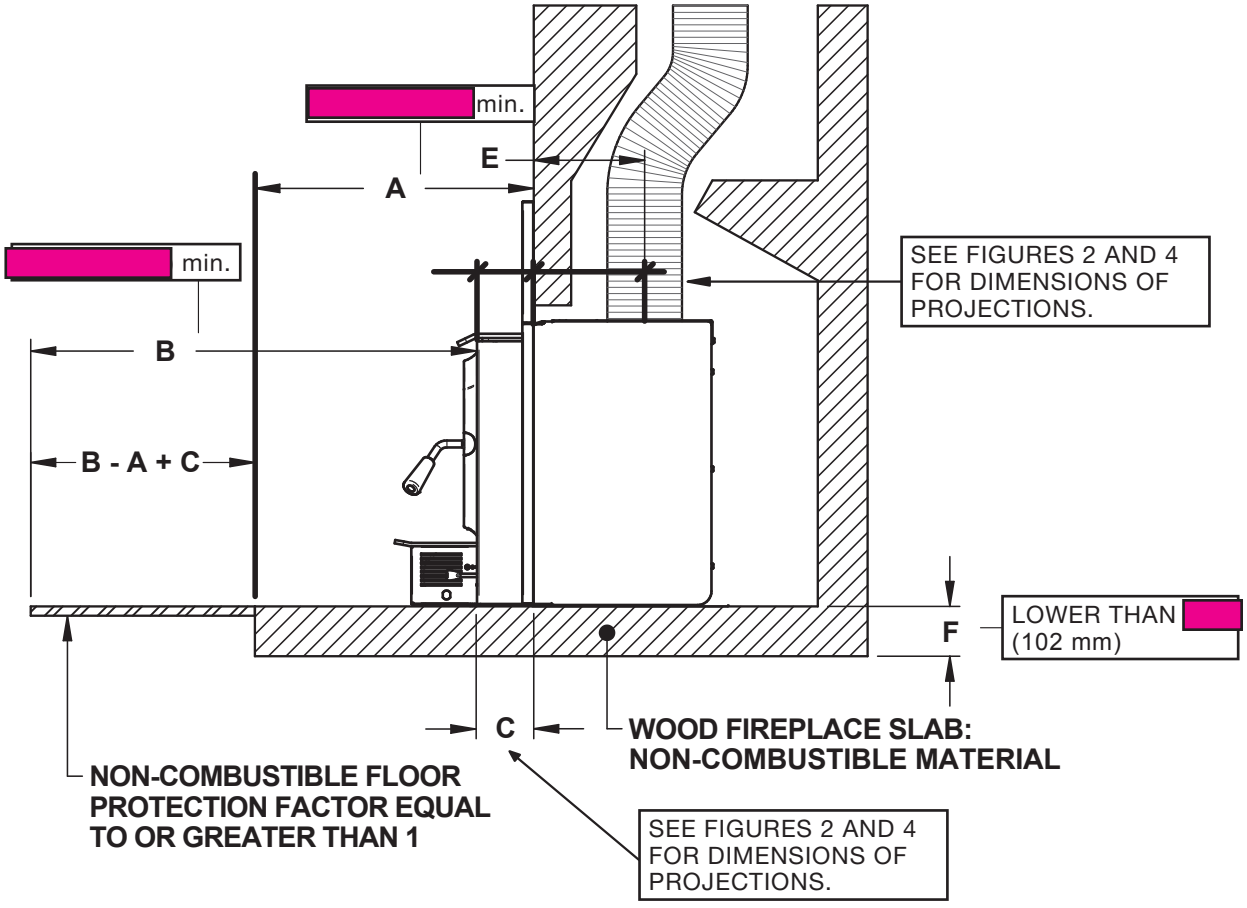
2.2 Floor Protection

It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.

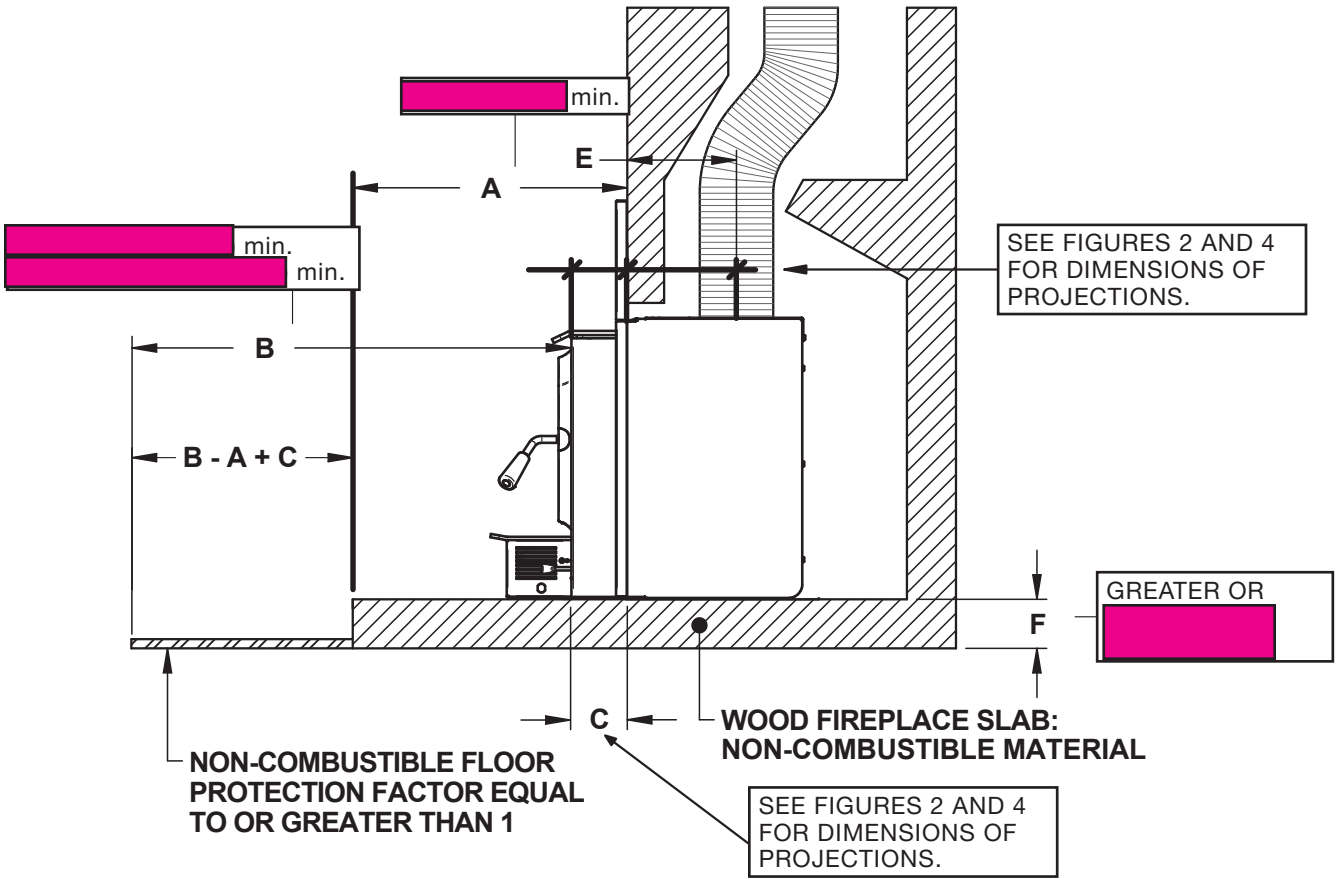


ENGLISH

2.2.1 Installation Raised of and Less



2.2.2 *Installation Raised of More Than*



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2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

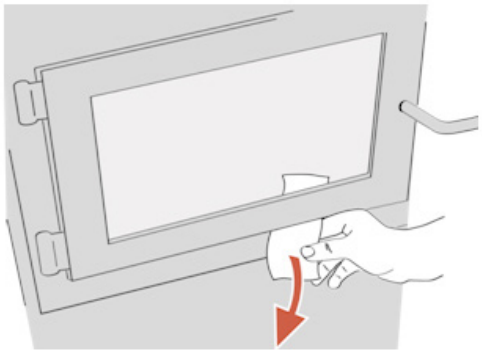
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

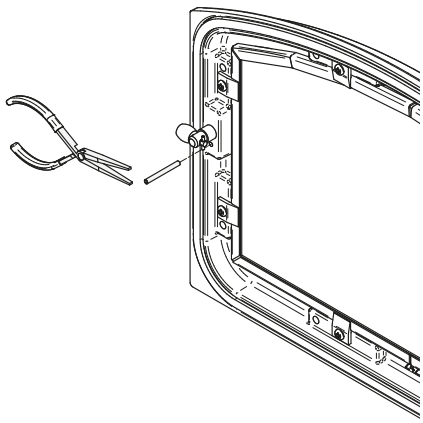


Figure 7 : Removing the split pin

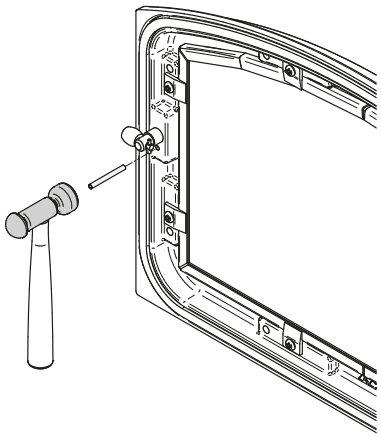
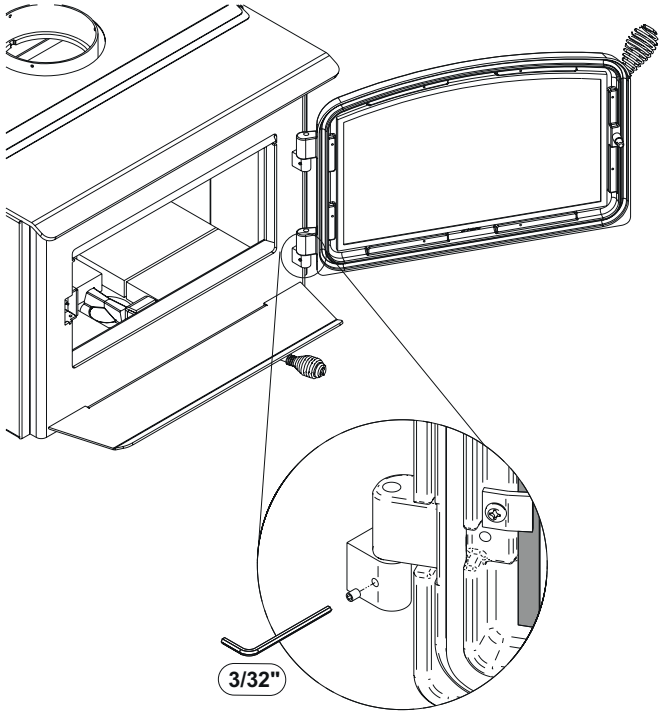
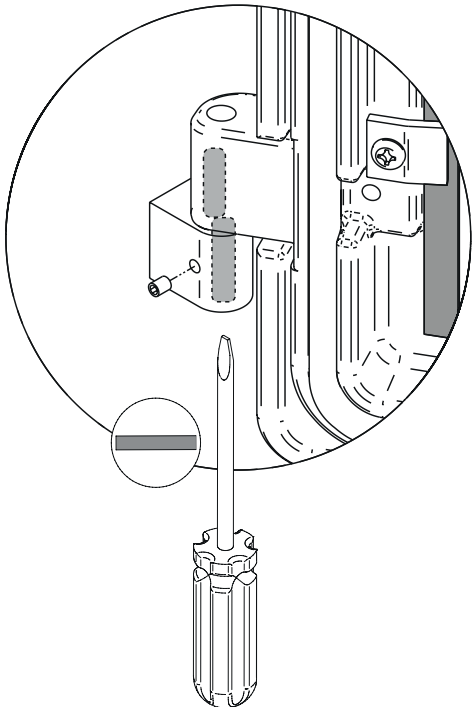


Figure 8 : Installing the split pin

3.1.3 Door Alignment

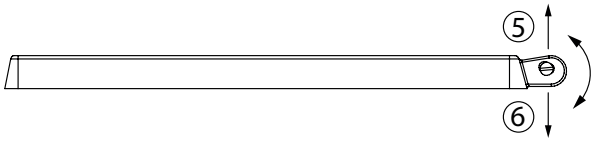
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

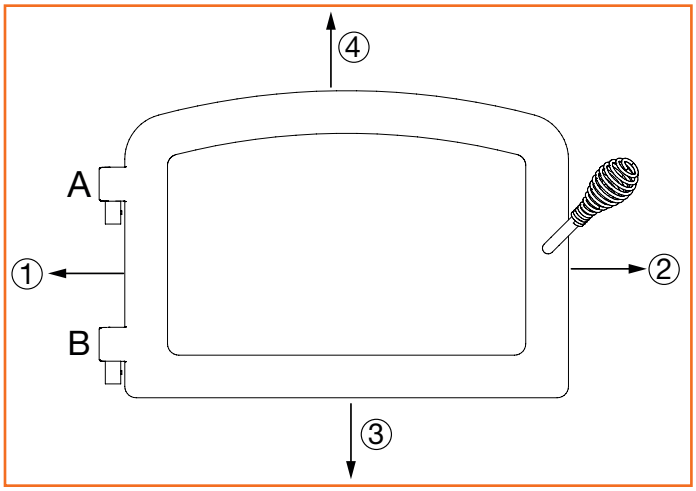


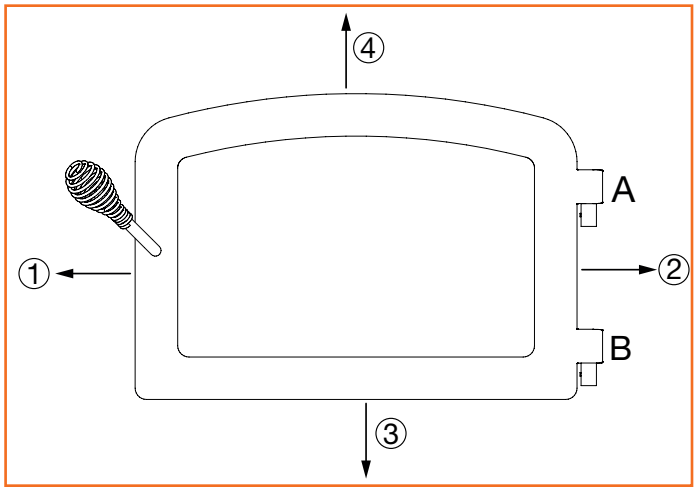


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



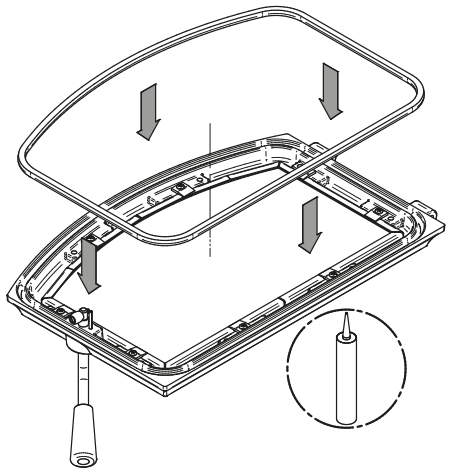




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

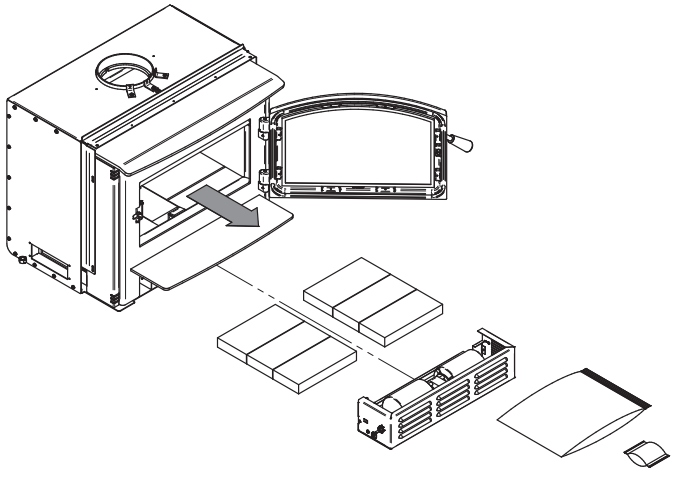


Figure 9 : Empty the combustion chamber

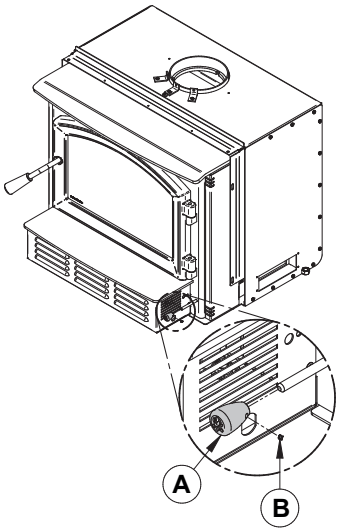


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

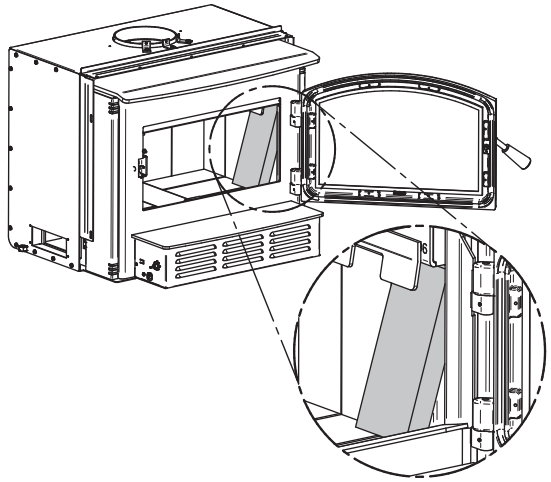


Figure 11 : Install the Combustion Chamber Bricks

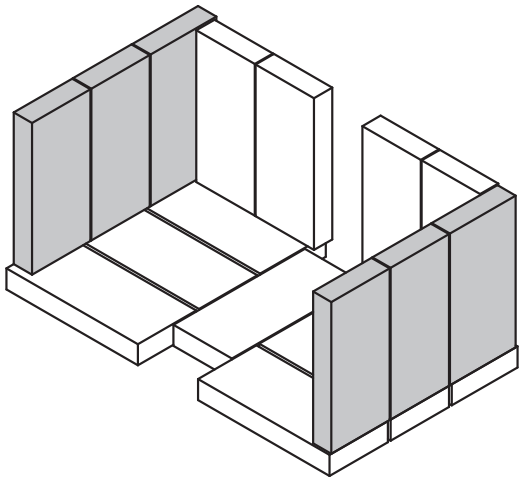
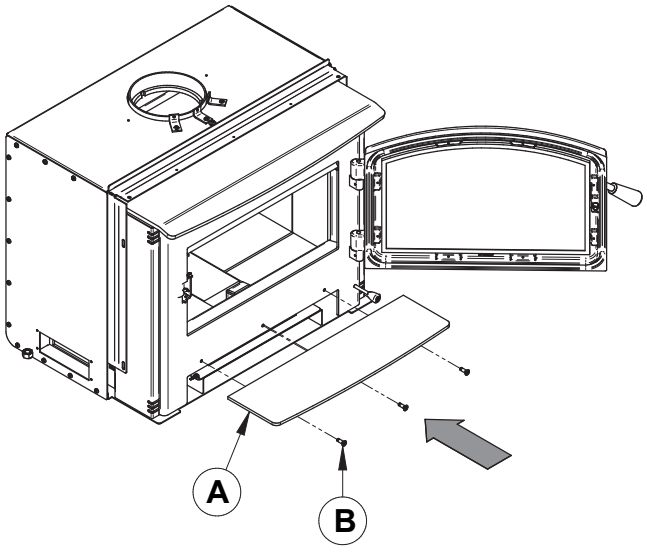


Figure 12 : Combustion Chamber Bricks Layout

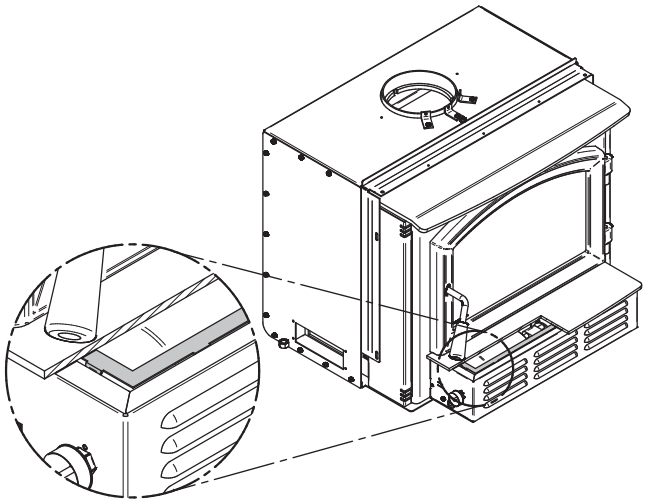
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



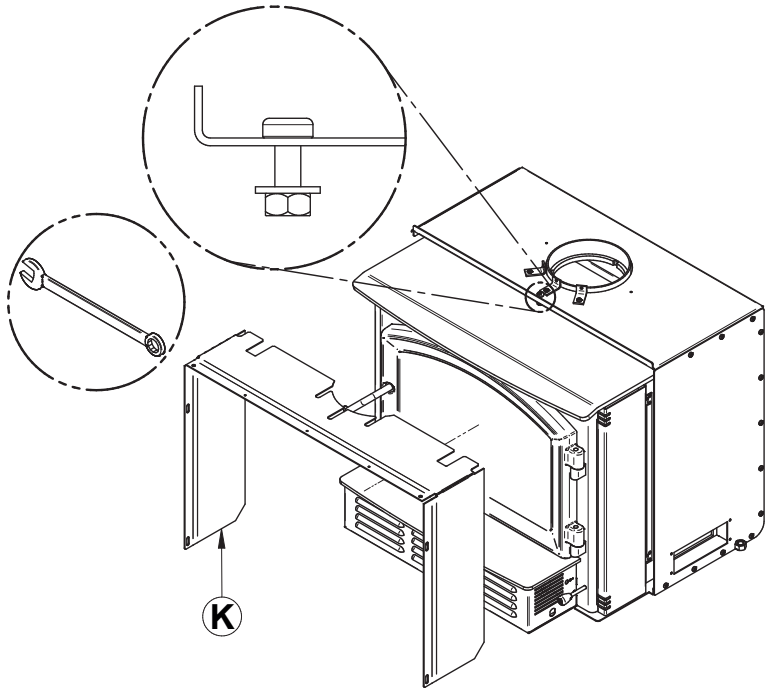
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



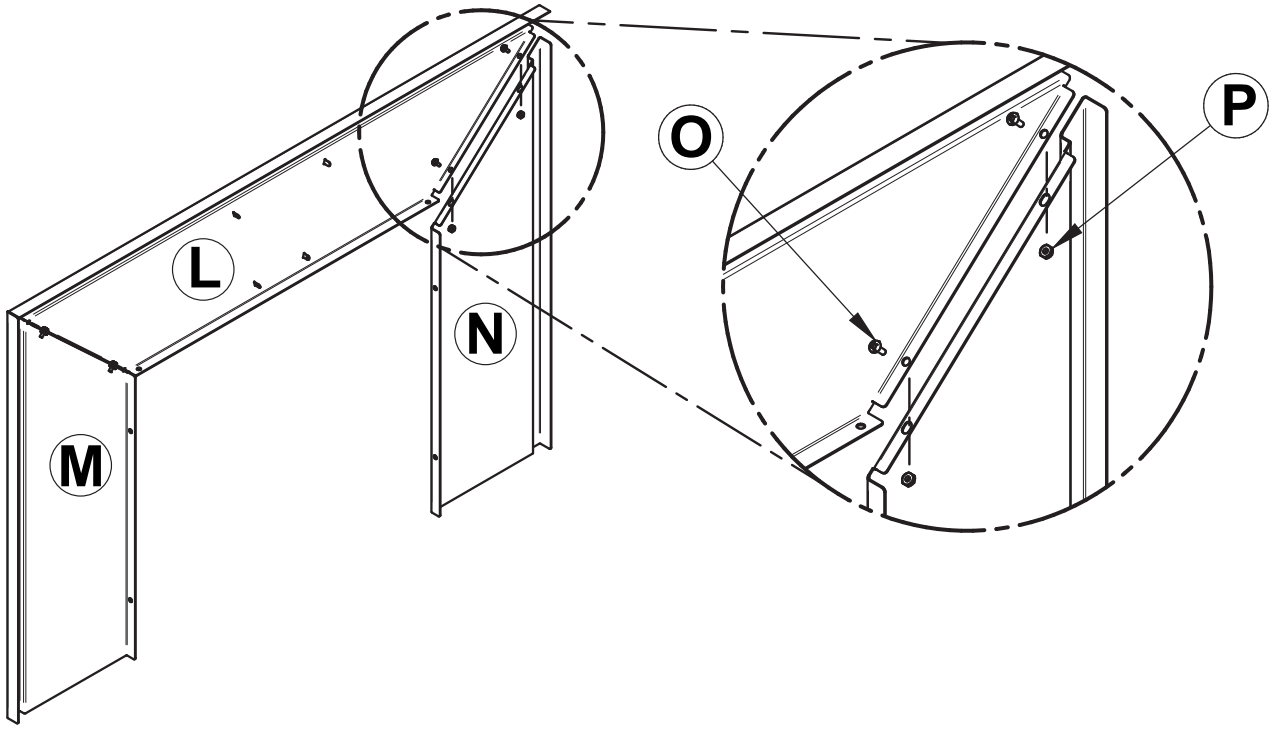
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

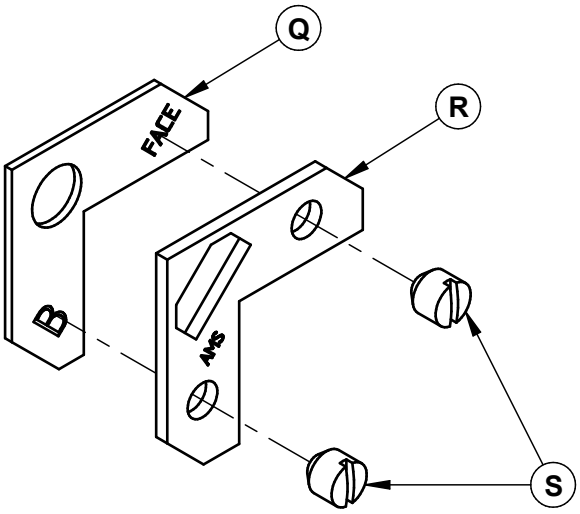
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



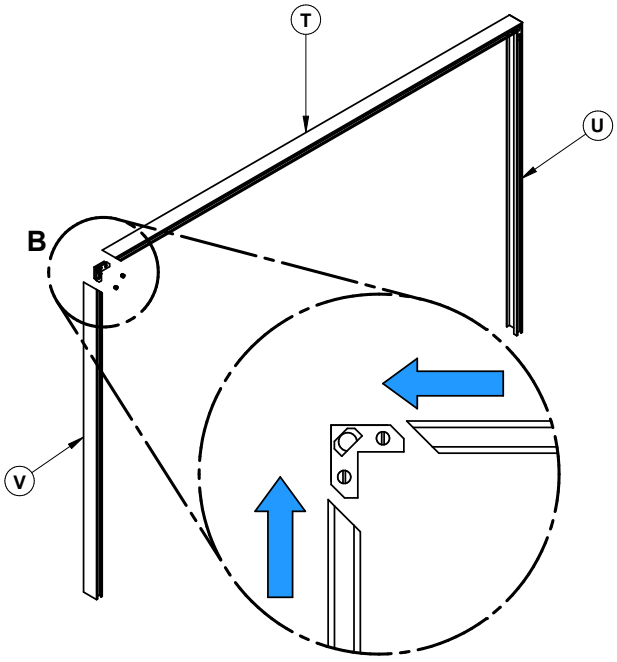
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

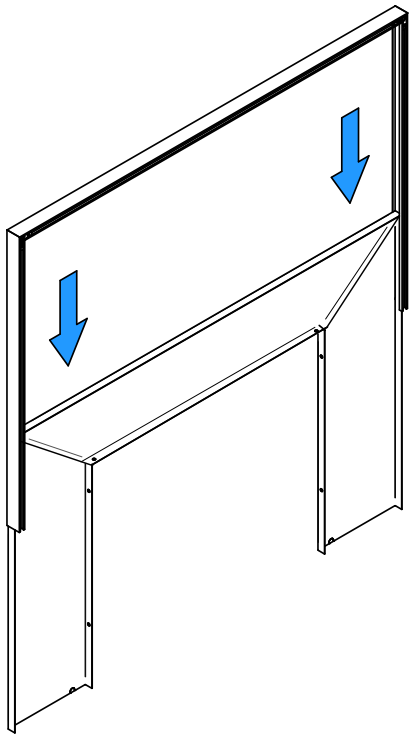


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

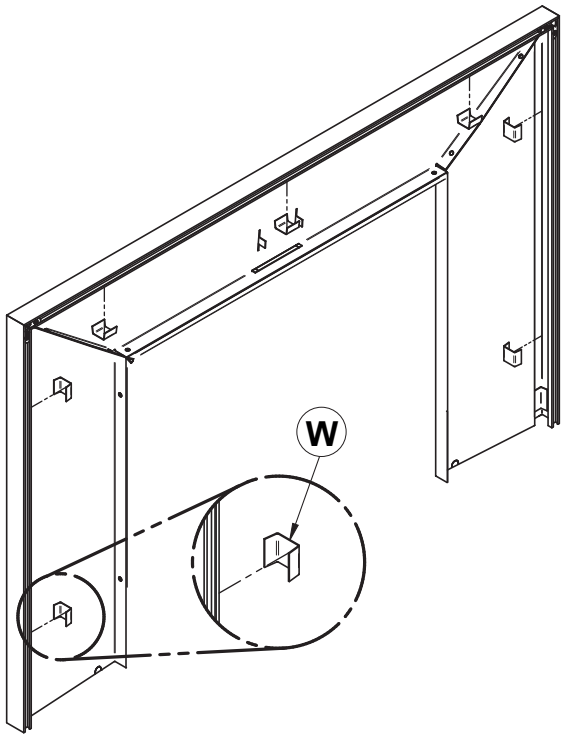


DETAIL B

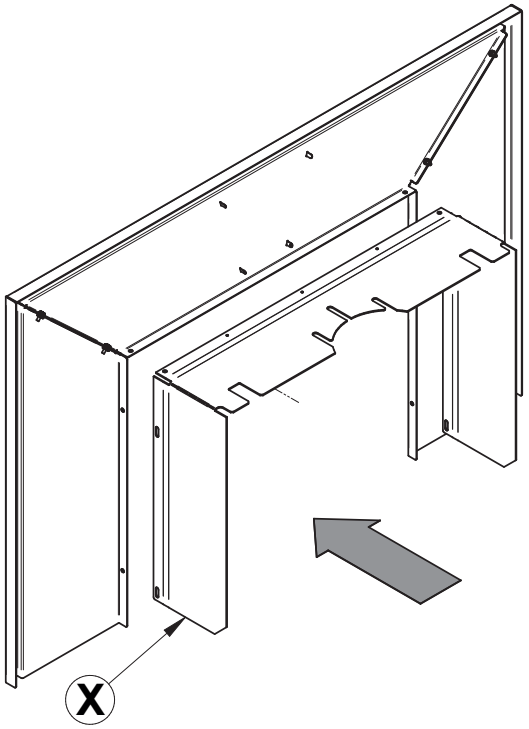
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



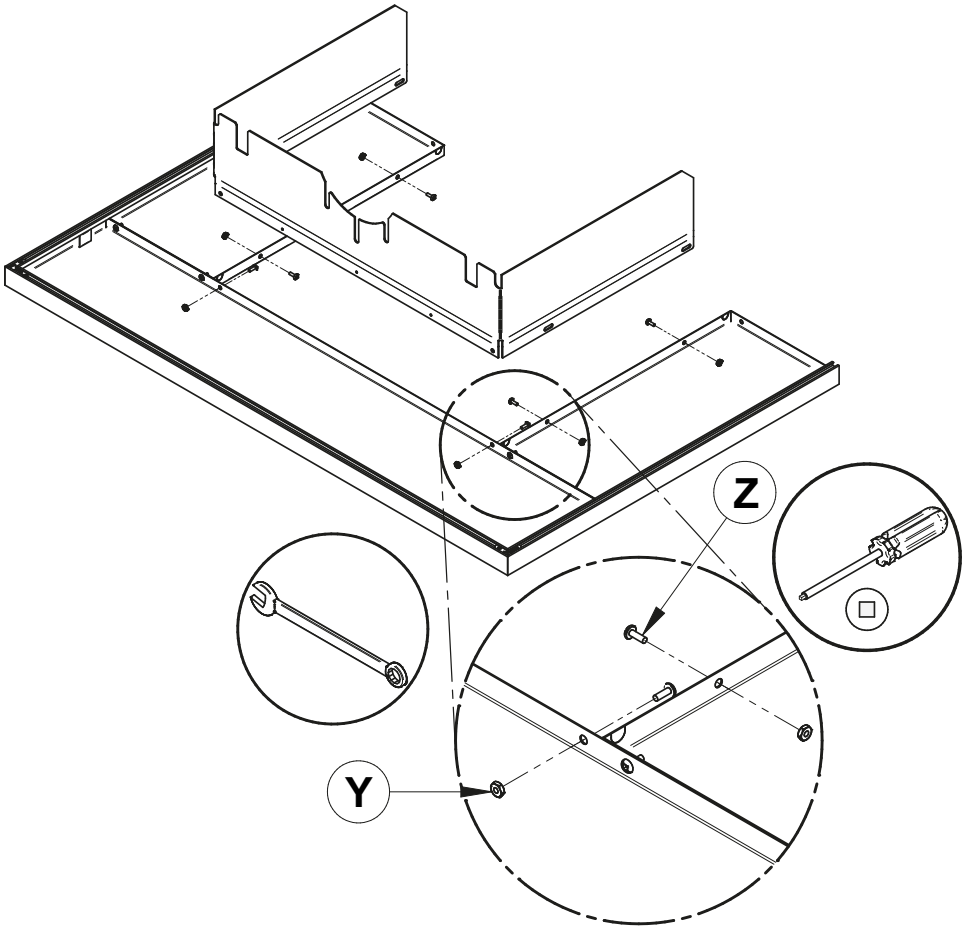
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

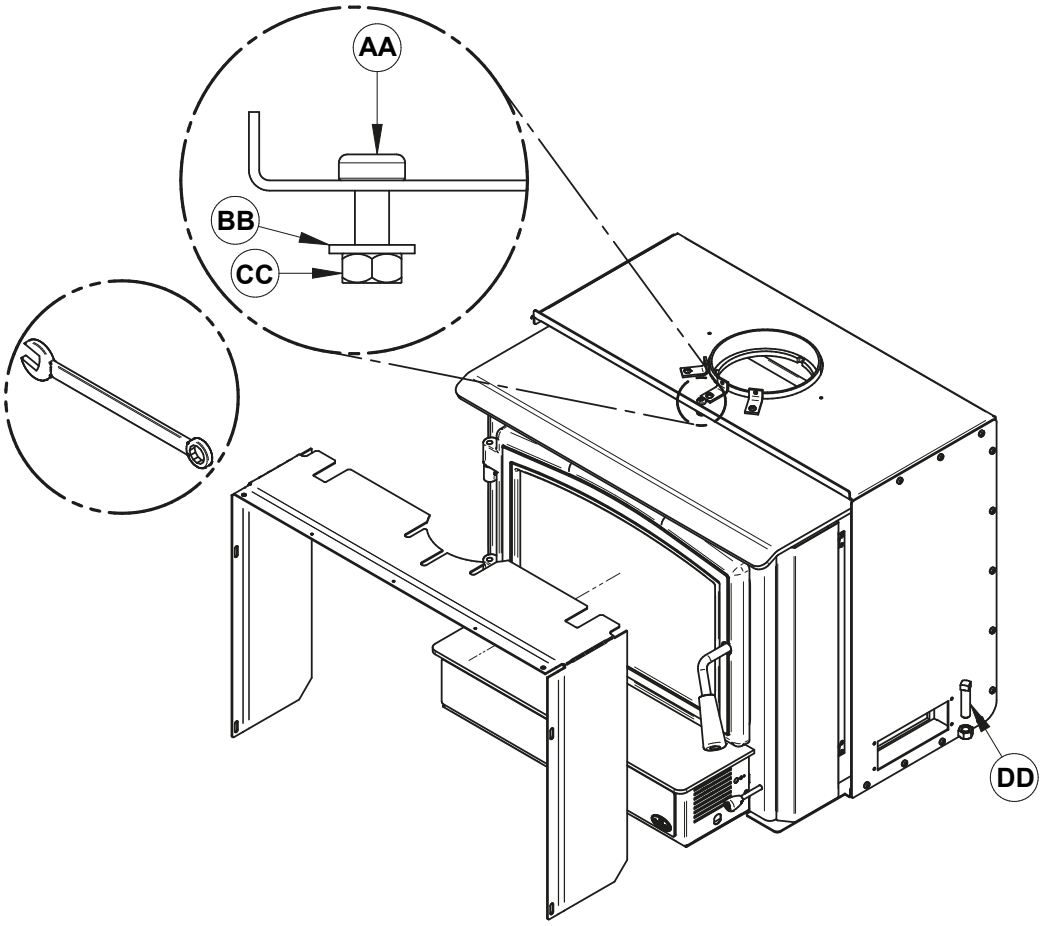


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

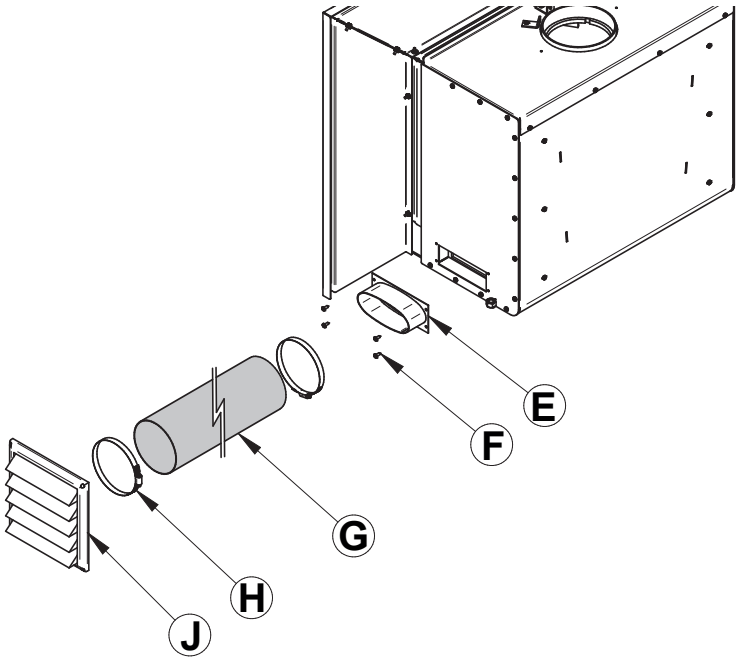


3.5 Optional Fresh Air Intake Kit Installation

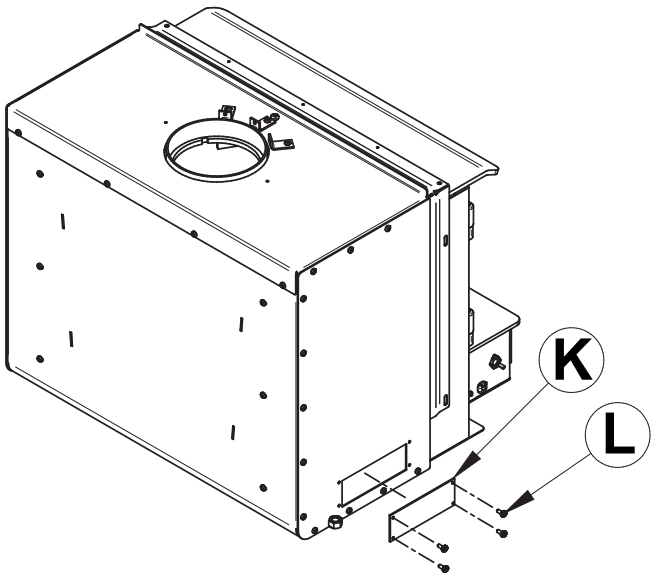
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



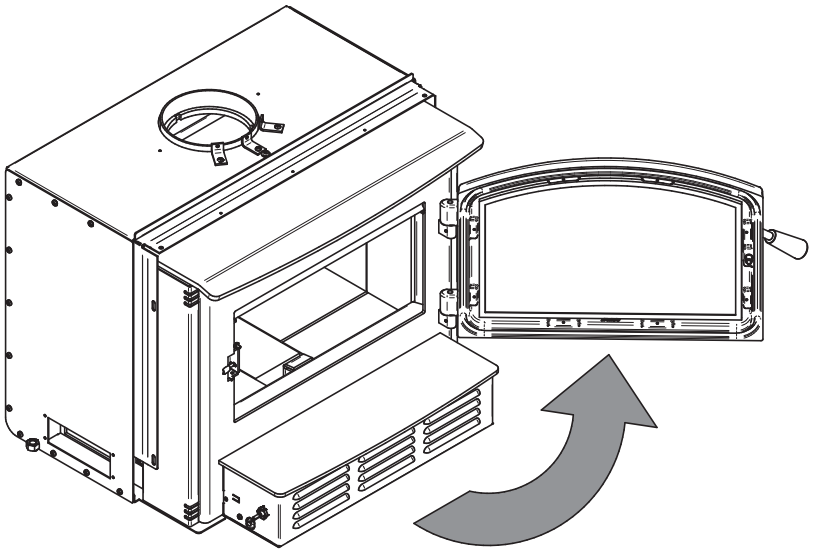
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

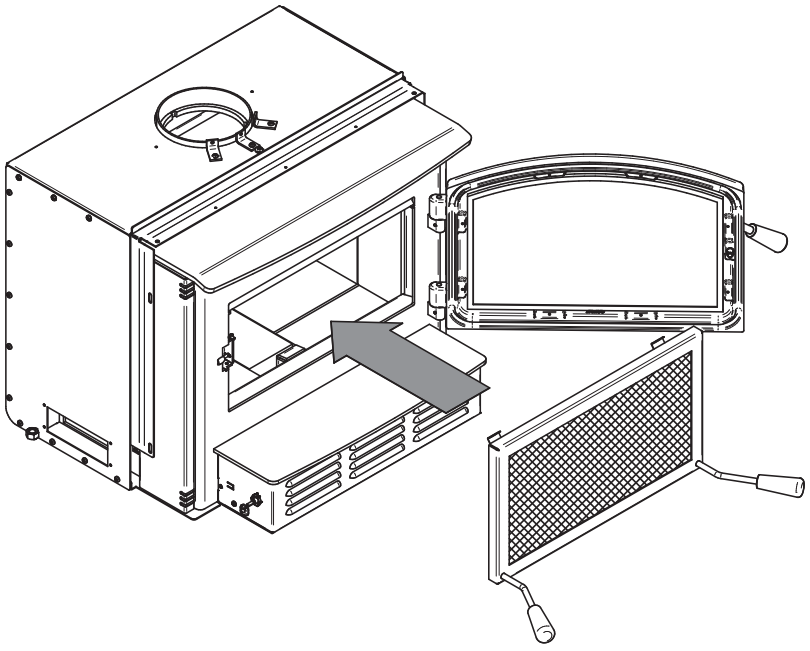
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



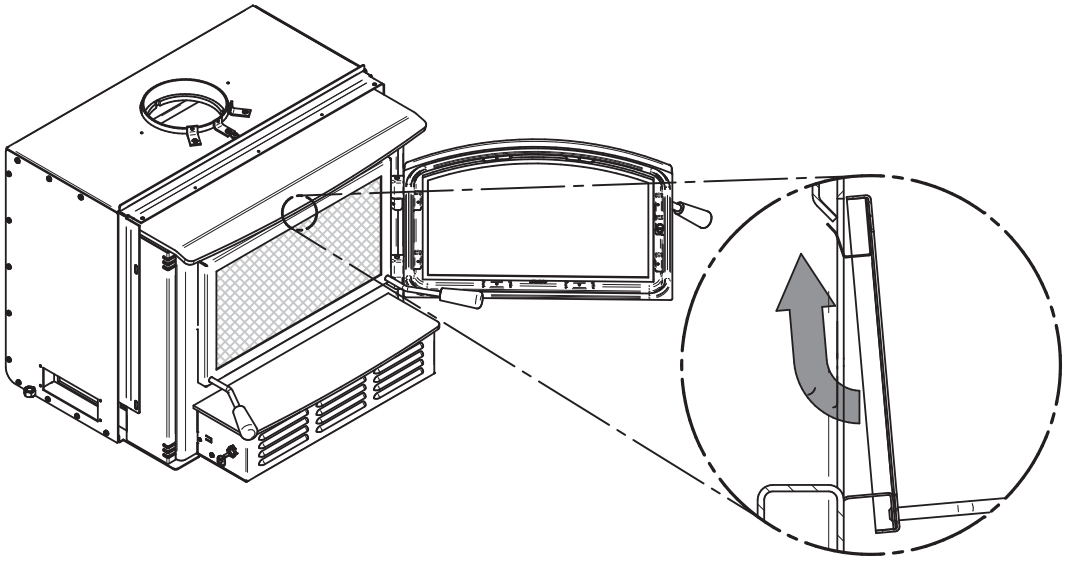
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

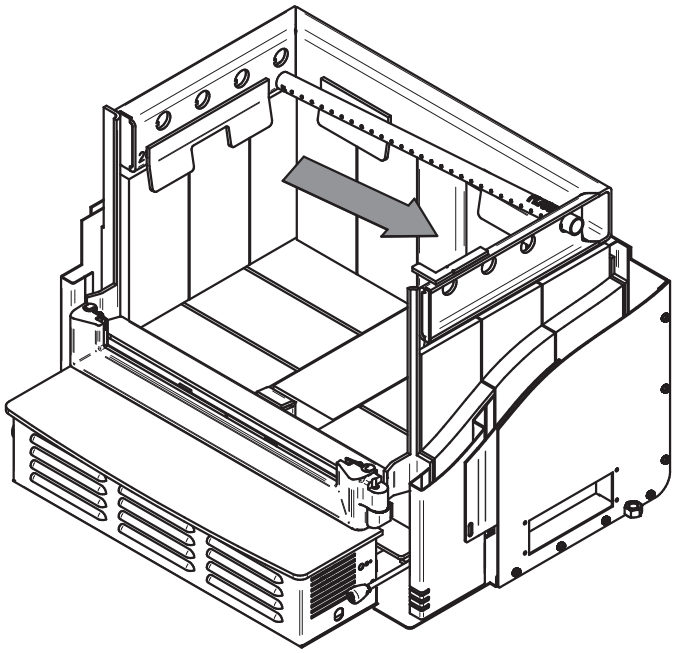
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.

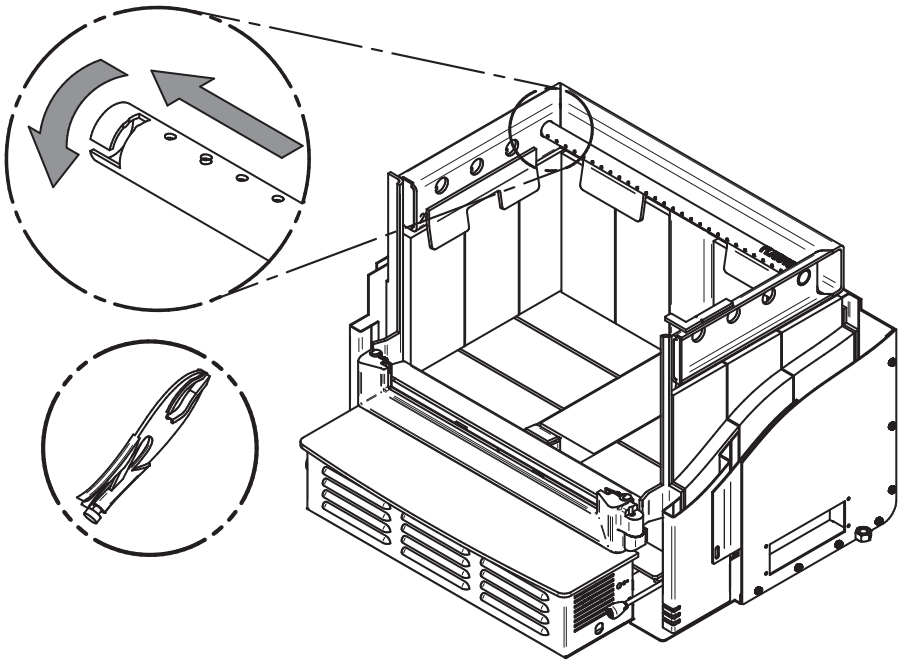


3.7 Air Tubes and Baffle Installation

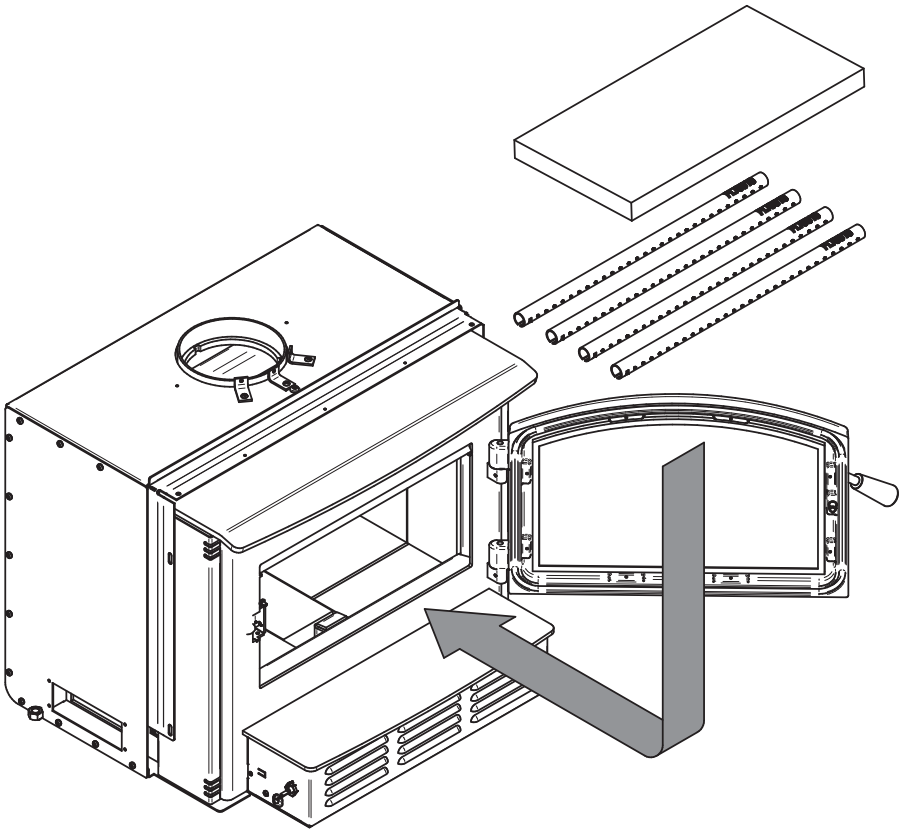
1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

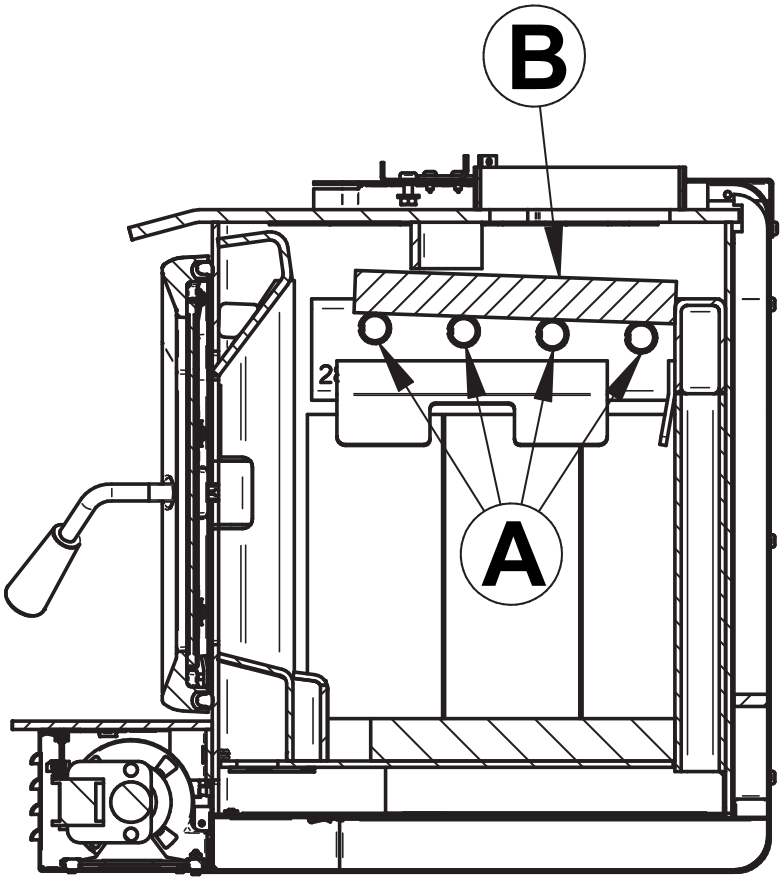


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.
3. Install the baffle.
4. Repeat steps 1 and 2 for the three other tubes.
5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

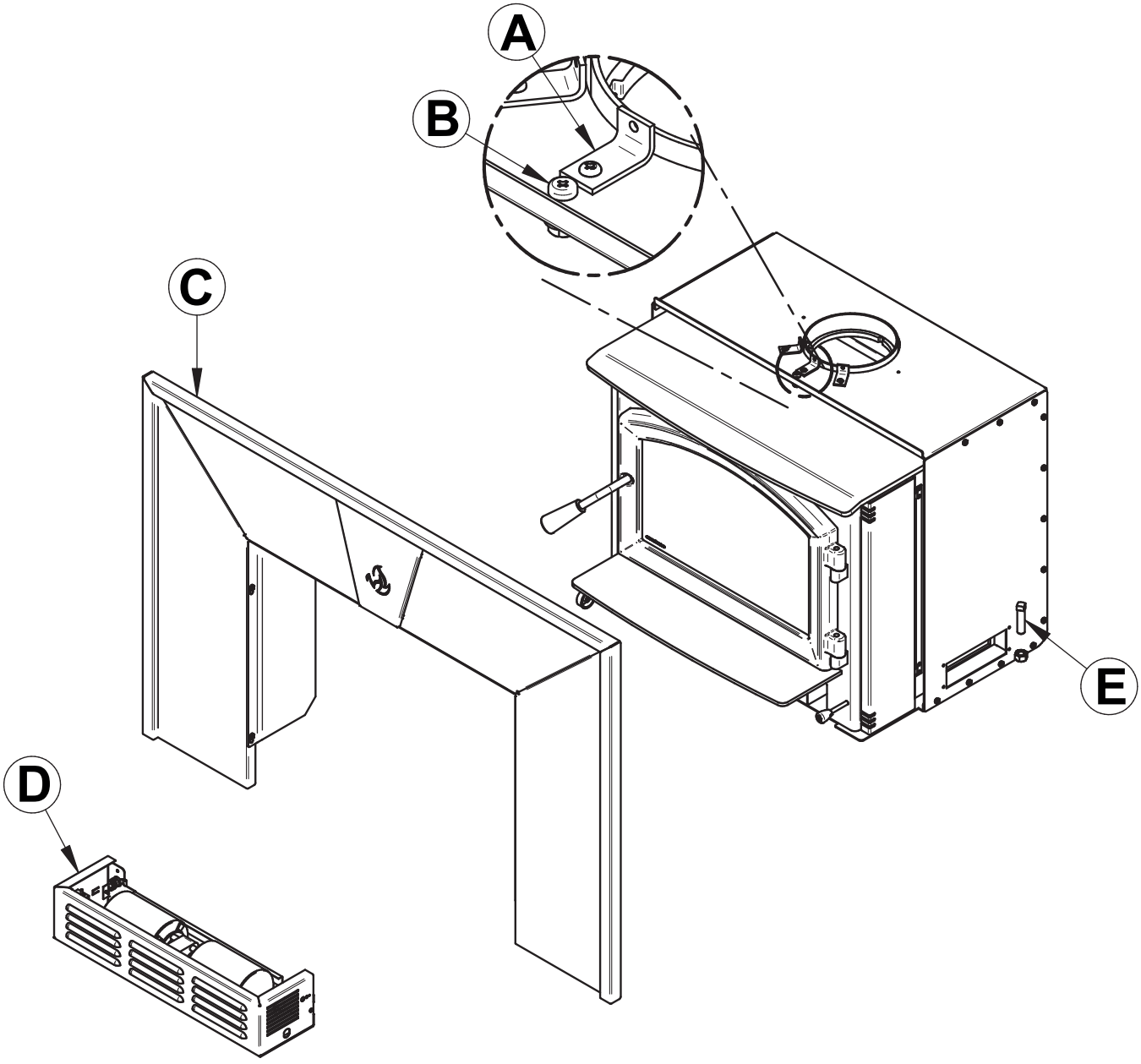



B
A

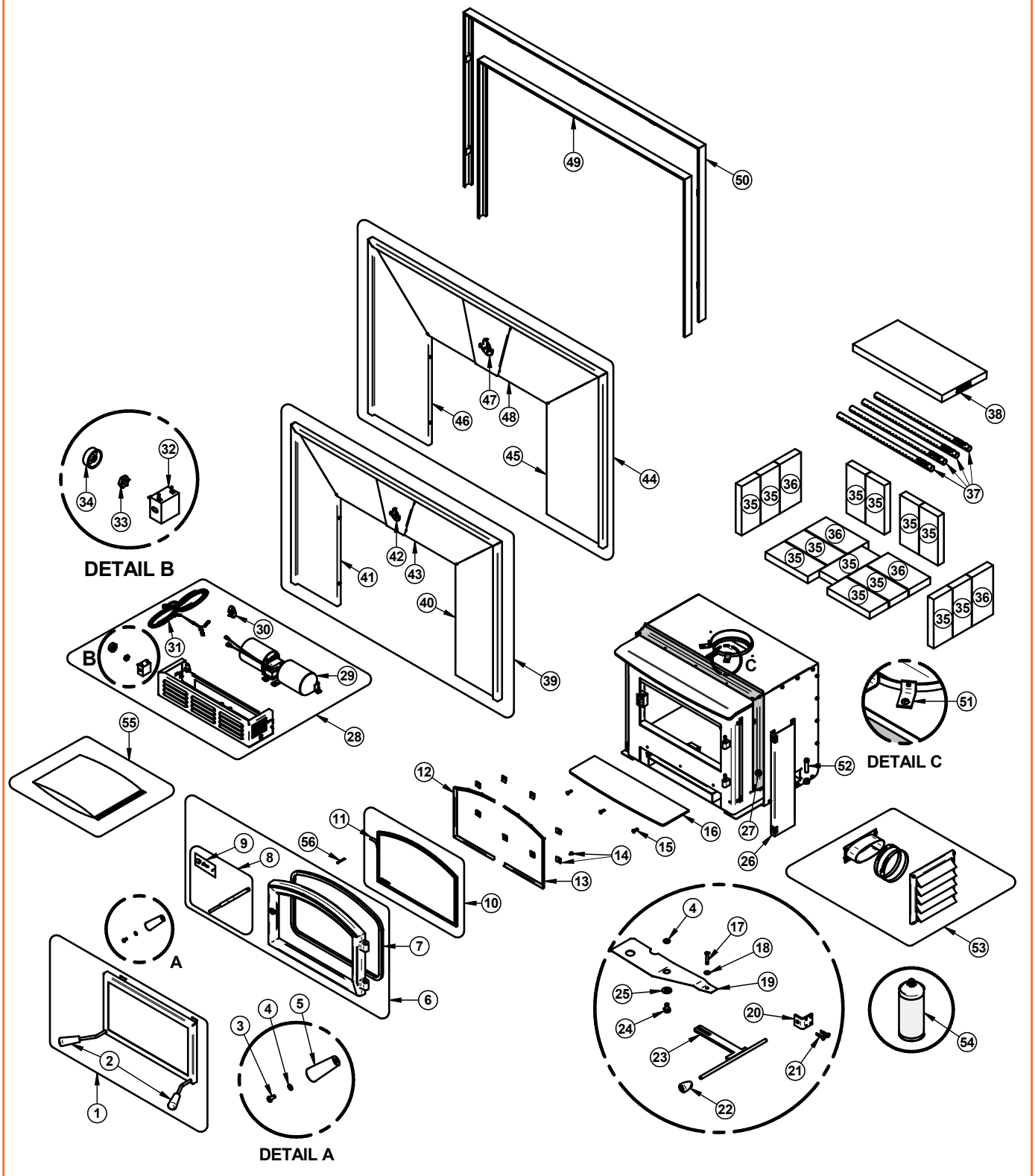
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

CENTURY LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from the factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to the dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or underestimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than the original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after March 1st 2019.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass**, plating (manufacturing defect**) and convector air mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

*Subject to limitations above. **Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement parts.

Shall your unit or a component be defective, contact immediately your dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to the sender.

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CENTURY HEATING

Stove Builder International inc.
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St-Augustin-de-Desmaures (Québec) Canada
G3A 2H3
418-908-8002
https://www.century-heating.com/ca/en/
tech@sbi-international.com

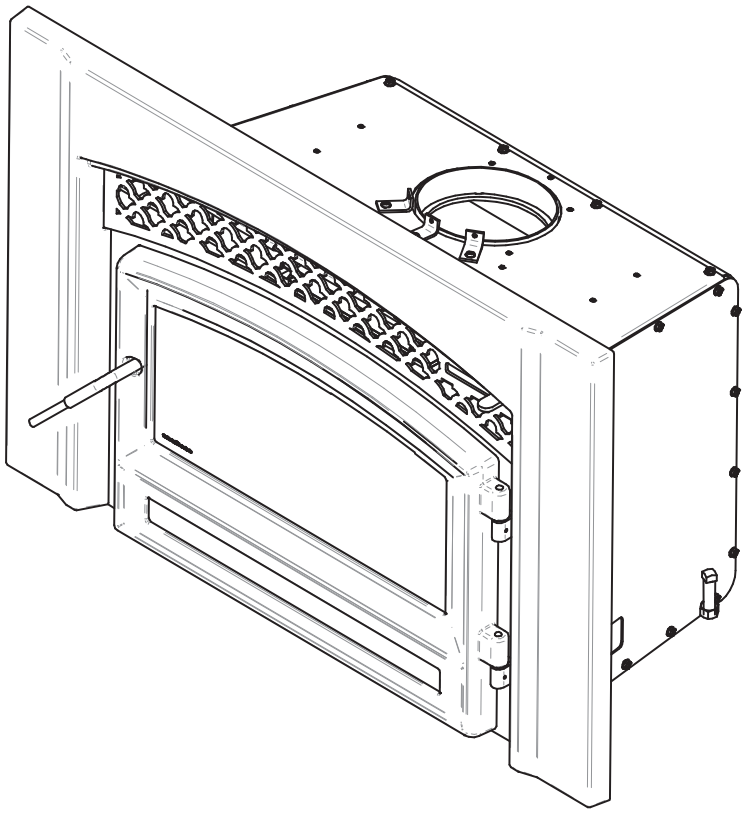
enerzone
More than just a heating solution

Product Specification Manual

DESTINATION 1.9 INSERT

(EB00066 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS MANUAL FOR REFERENCE

2021-03-29

Printed in Canada

45983A

ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at



https://www.enerzone-intl.com/en/warranty/warranty-registration/

Registering the warranty will help to quickly find the information needed on the unit.

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

C ETL LISTED US

Intertek

Control number: 4002461
(March/Mars 2021)

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

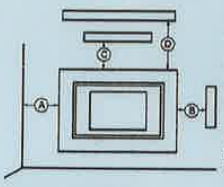
MODEL / MODÈLE :
DESTINATION 1.9

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number / No. de Série: 1

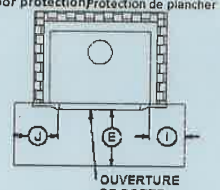
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E:	16 in./po.	(406 mm) USA
	18 in./po.	(457 mm) CANADA
I:	8 in./po.	(203 mm) CANADA
J:	8 in./po.	(203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii)

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27876

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	Destination 1.9 (EB00066)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft³ and 12 lb/ft3. The moisture content is between 19% and 25%.

[3] As measured per CSA B415.1-10 stack loss method.

[4] Higher Heating Value of the fuel.

[5] Lower Heating Value of the fuel.

[6] Optimum overall efficiency at a specific burn rate (LHV).

[7] This appliance is officially tested and certified by an independent agency.

[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

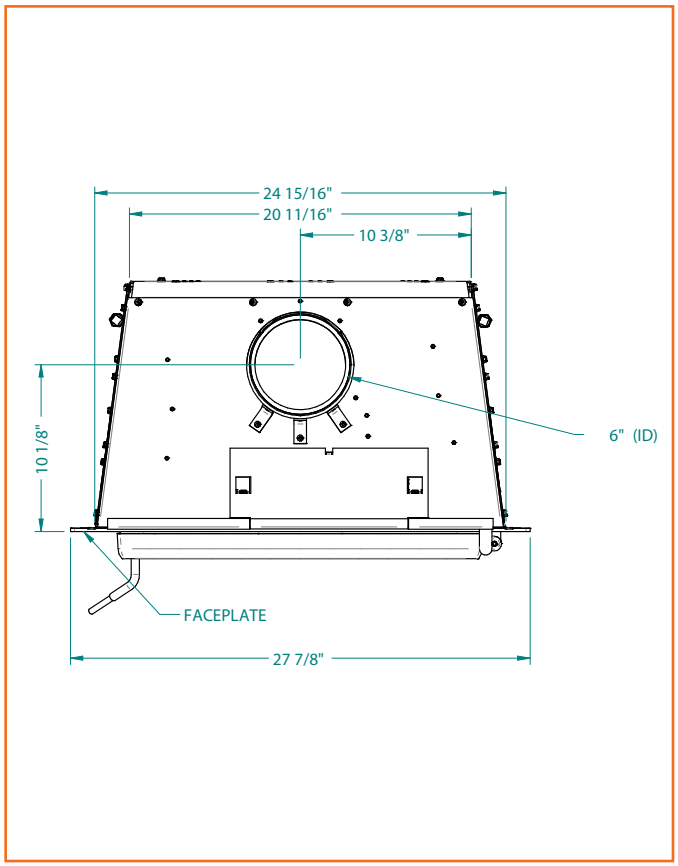


Figure 1 : Top View

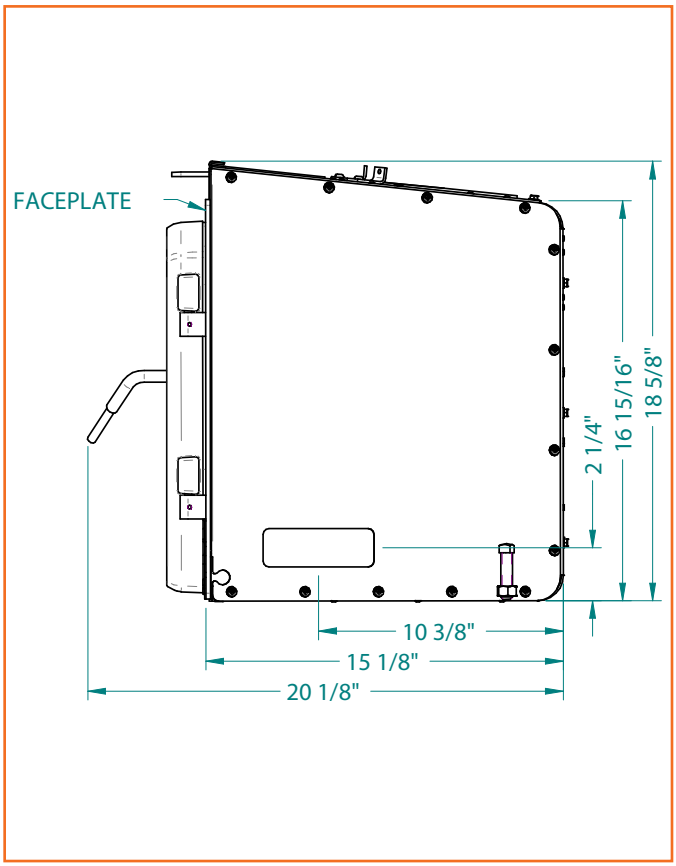


Figure 2 : Side View

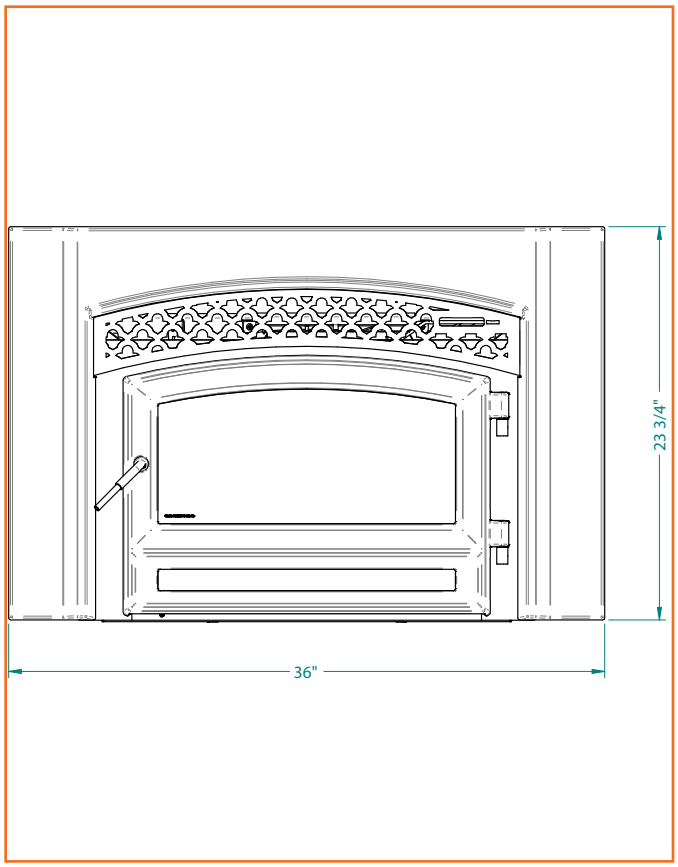


Figure 3 : Front View

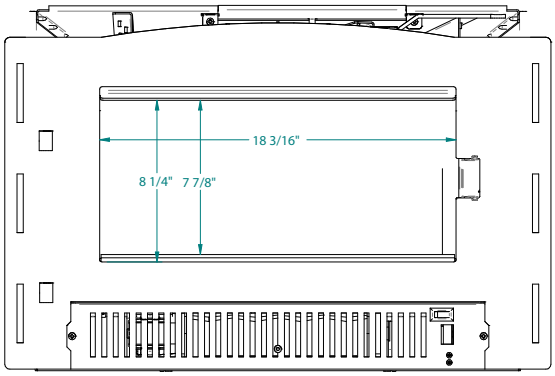


Figure 4 : Door Opening

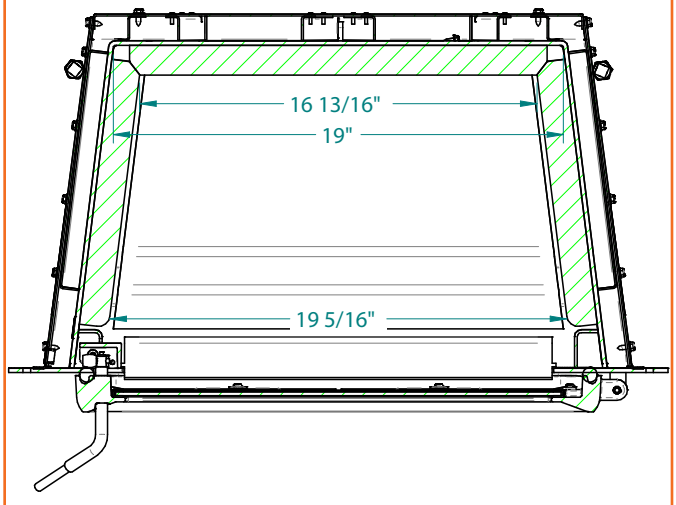


Figure 5 : Top View - Combustion Chamber

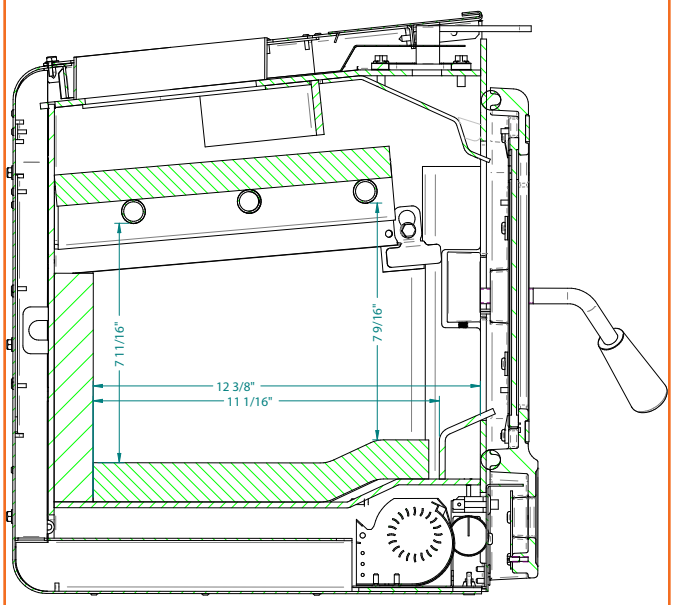
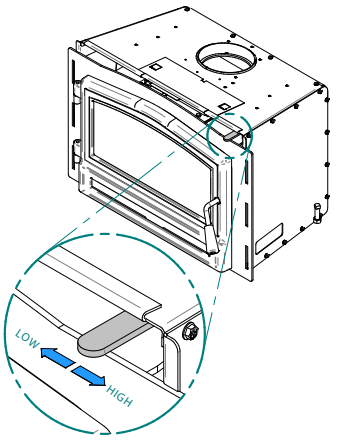


Figure 6 : Side View - Combustion Chamber

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

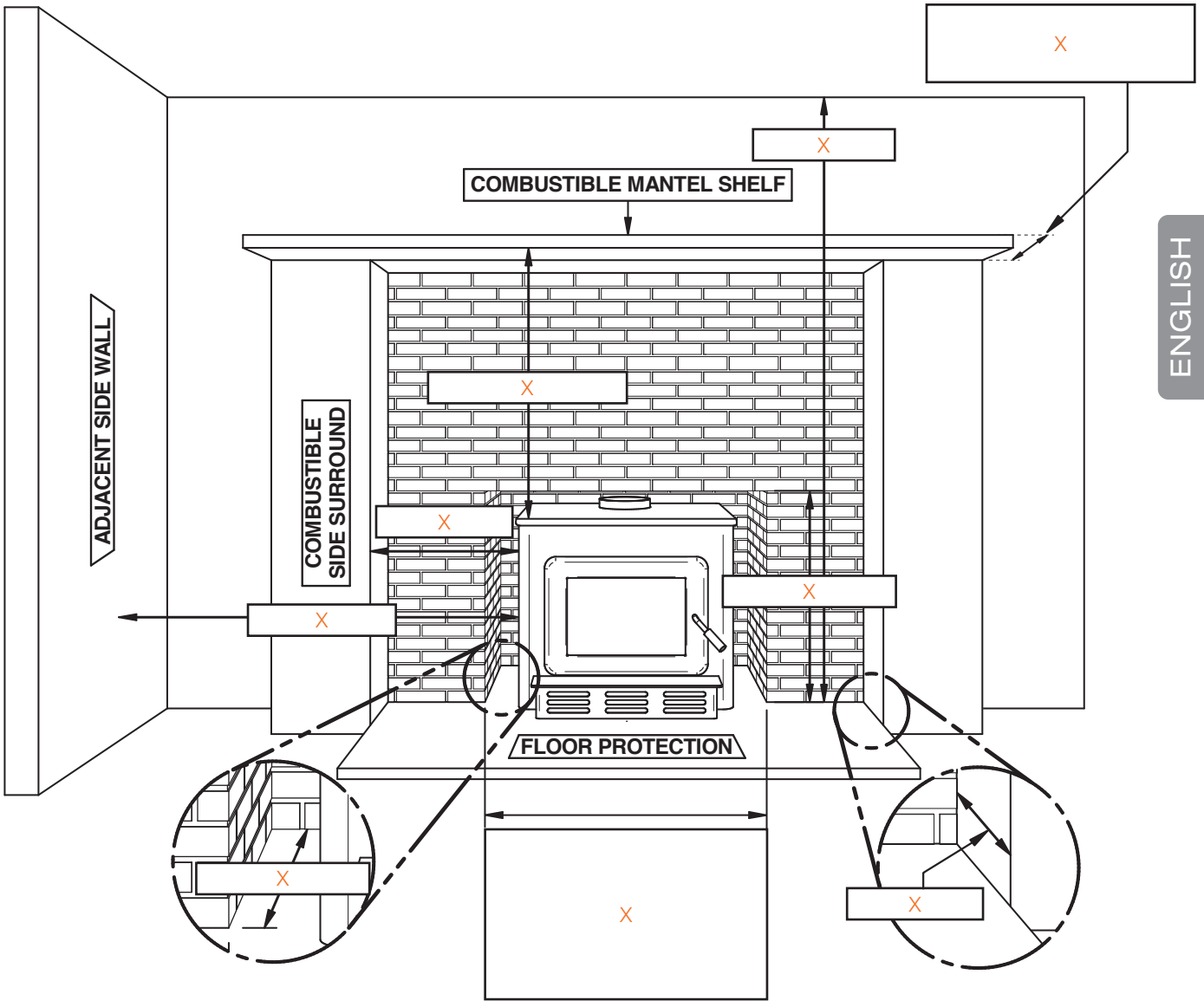
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

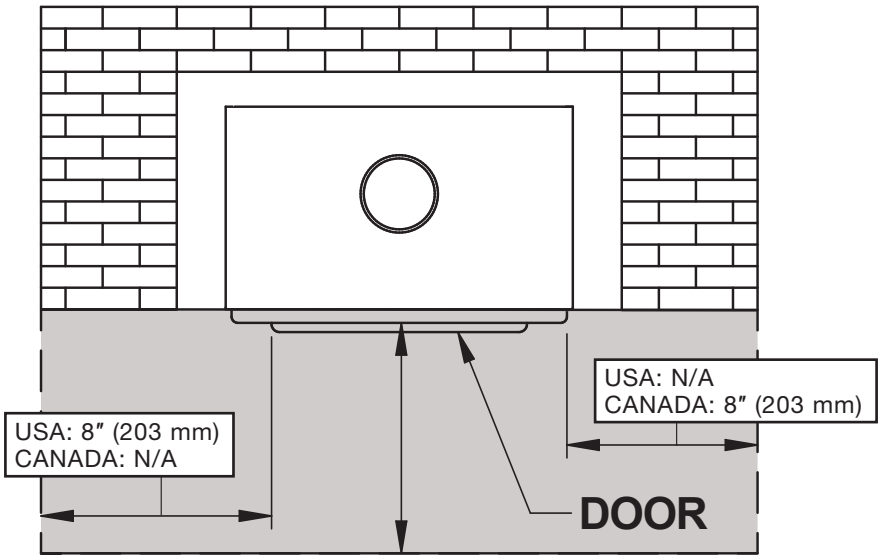
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles

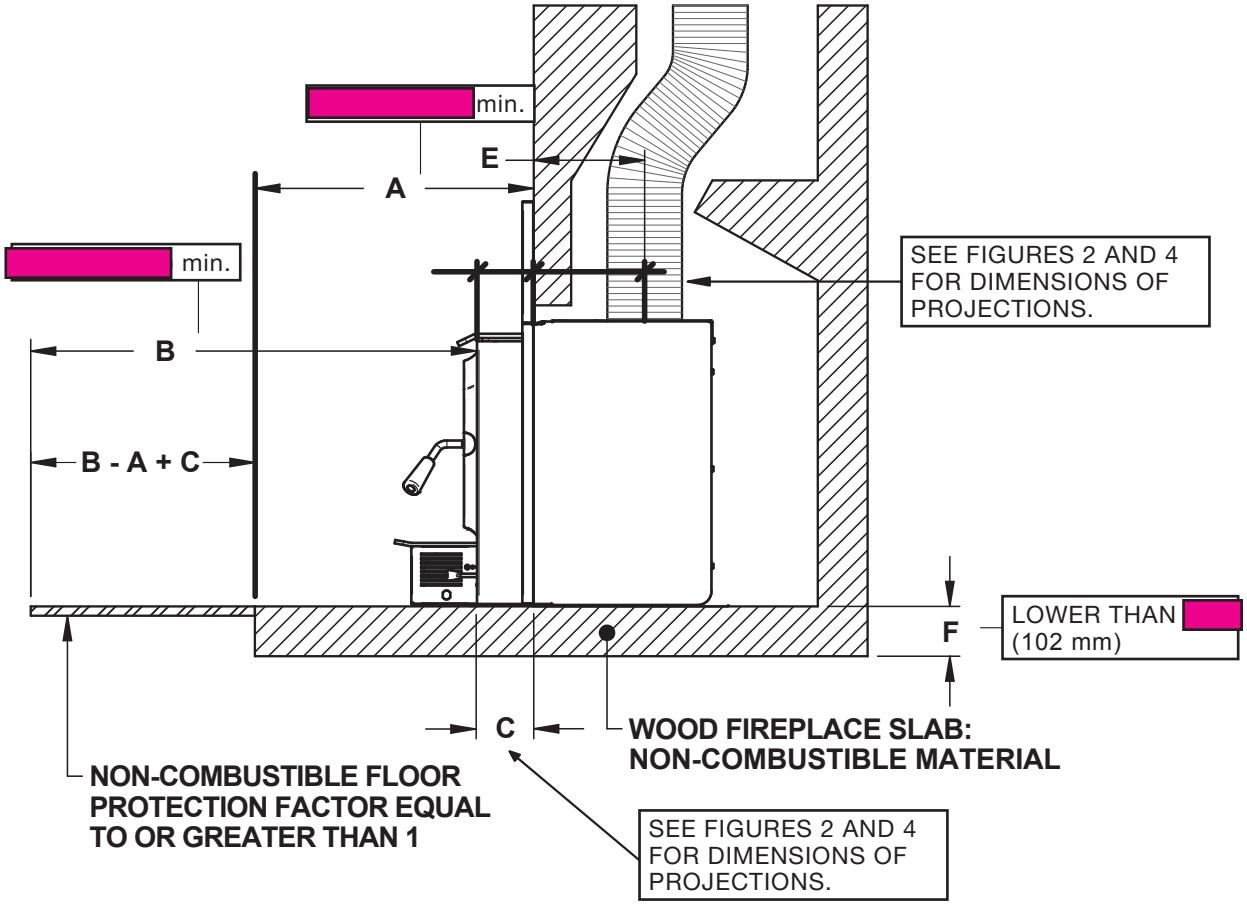


2.2 Floor Protection

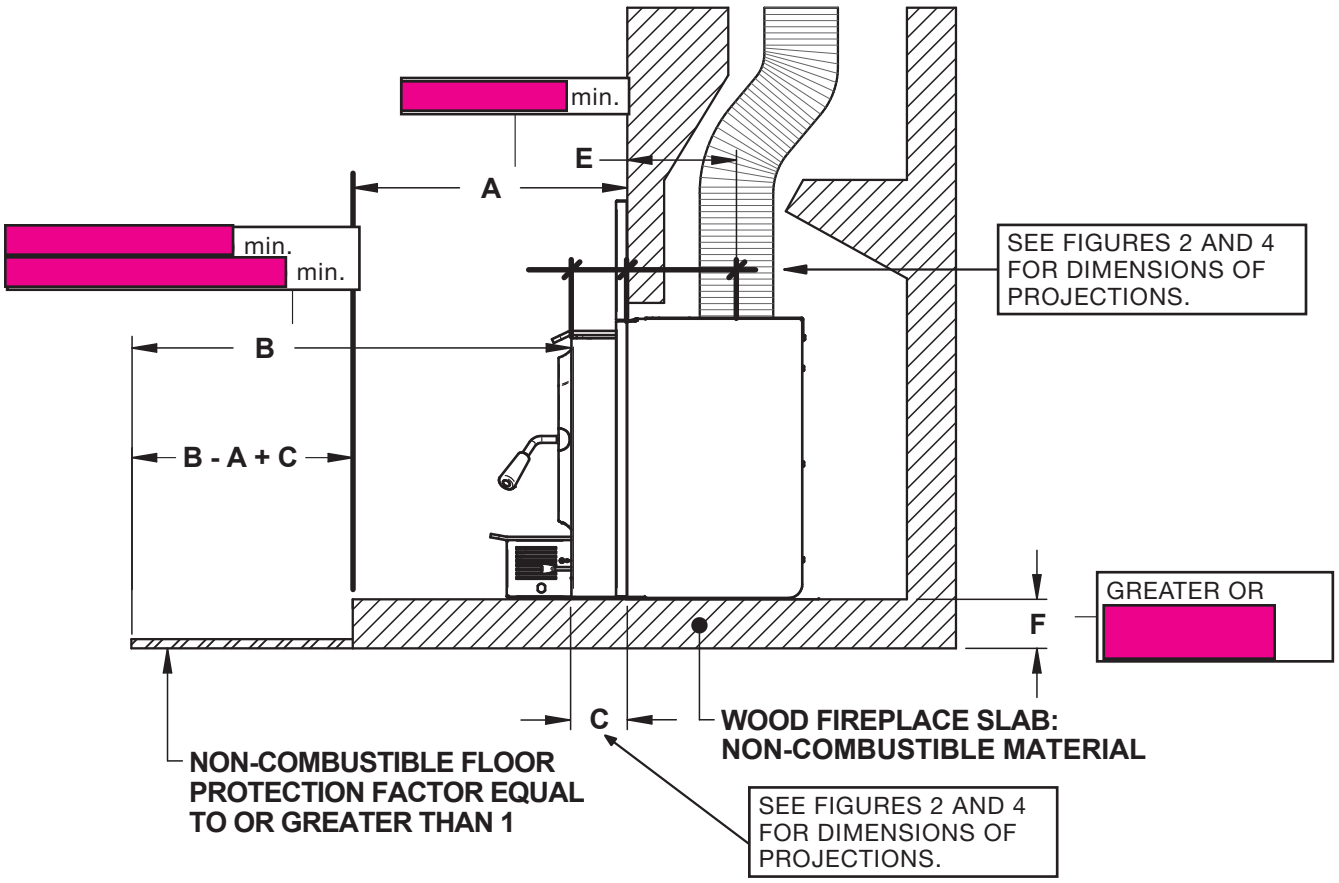
It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.



2.2.1 Installation Raised of and Less



2.2.2 *Installation Raised of More Than*



2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

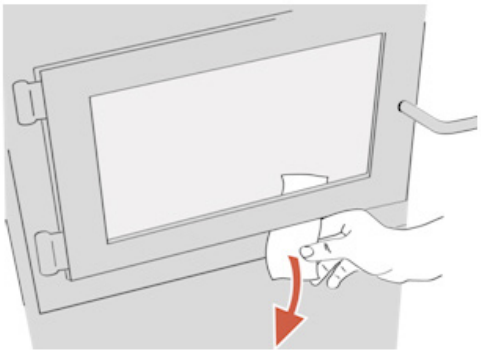
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

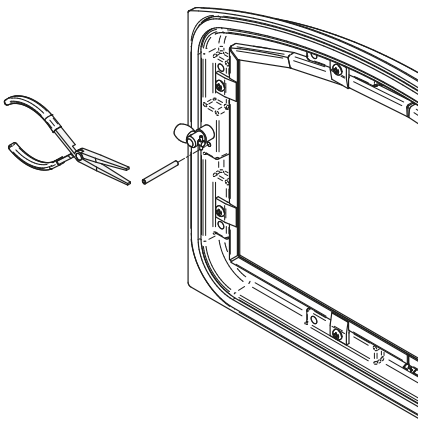


Figure 7 : Removing the split pin

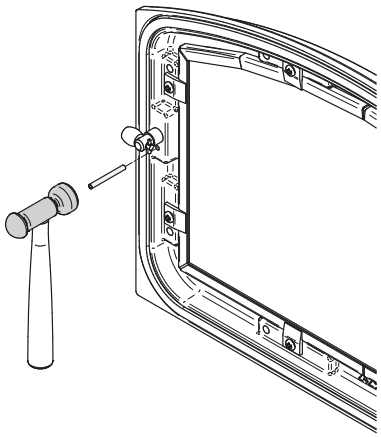
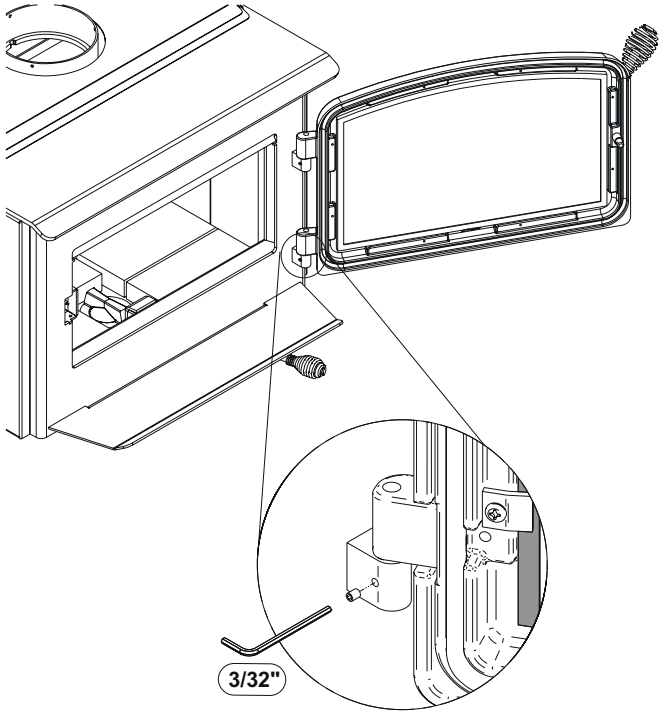
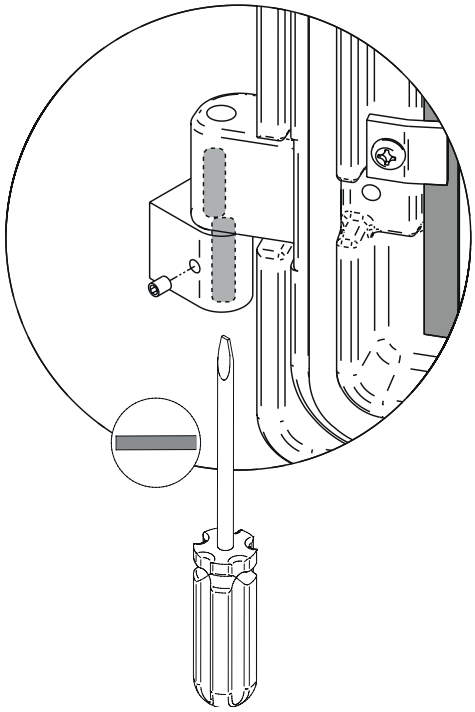


Figure 8 : Installing the split pin

3.1.3 Door Alignment

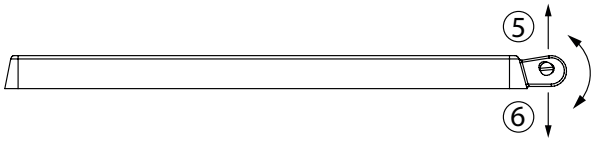
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

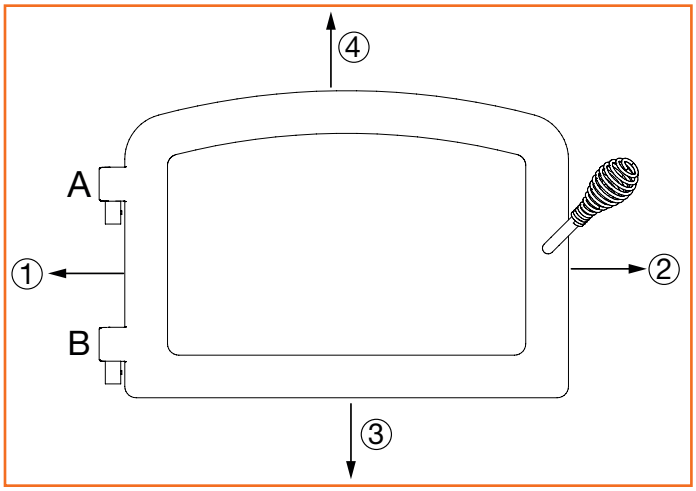


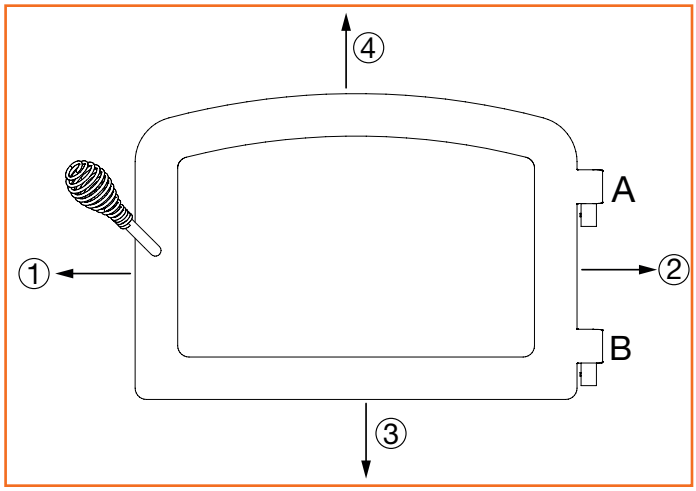


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



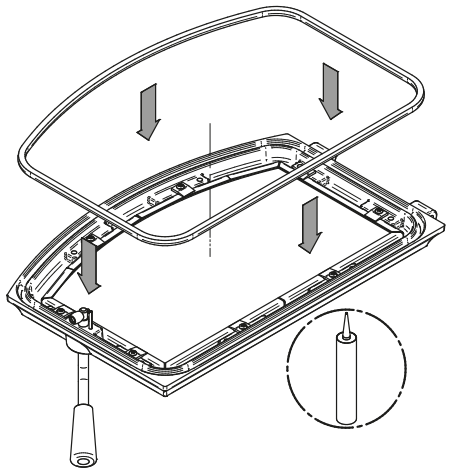




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

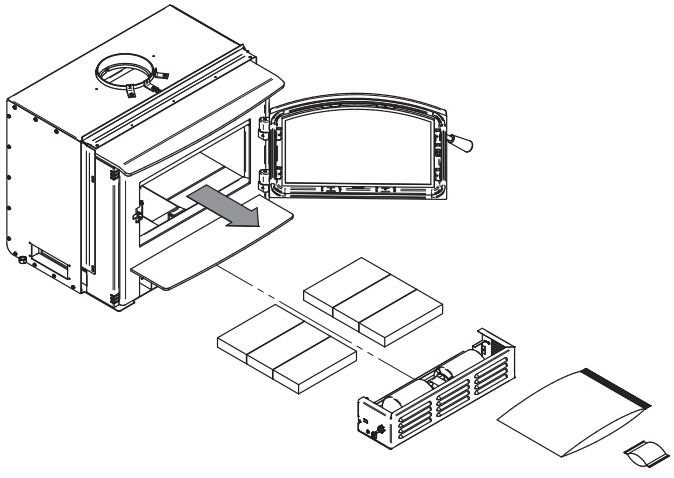


Figure 9 : Empty the combustion chamber

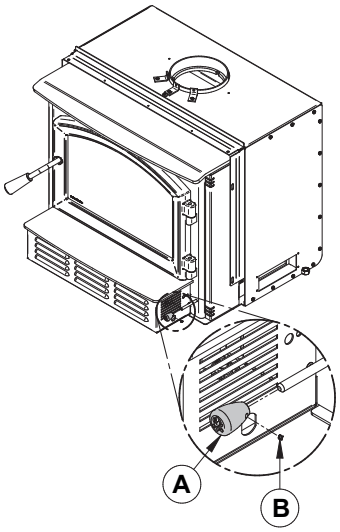


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

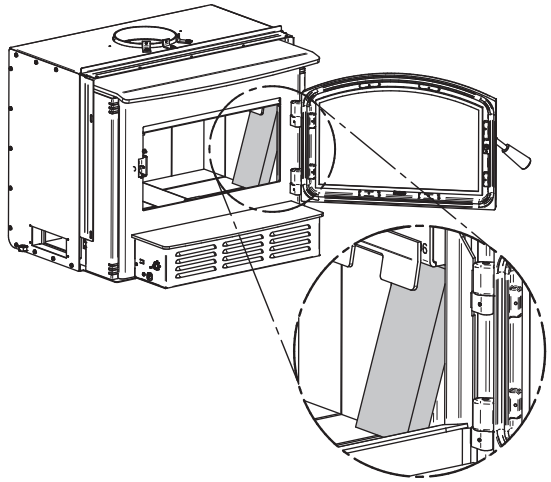


Figure 11 : Install the Combustion Chamber Bricks

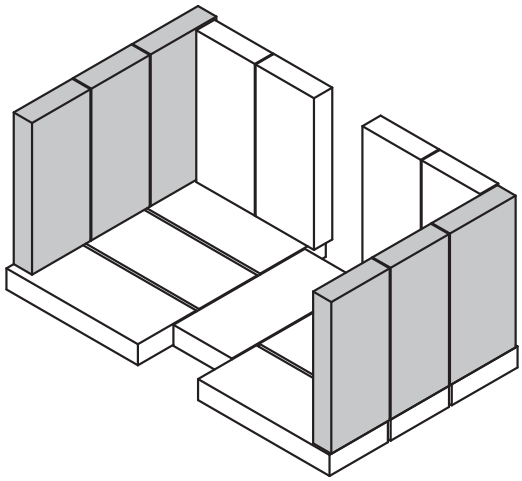
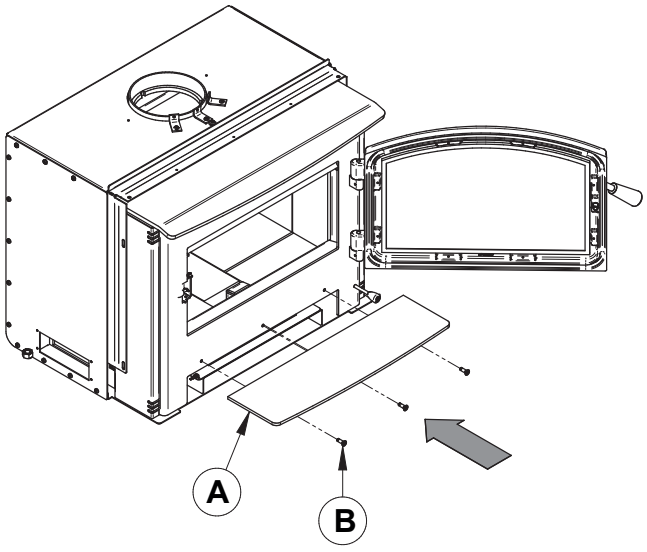


Figure 12 : Combustion Chamber Bricks Layout

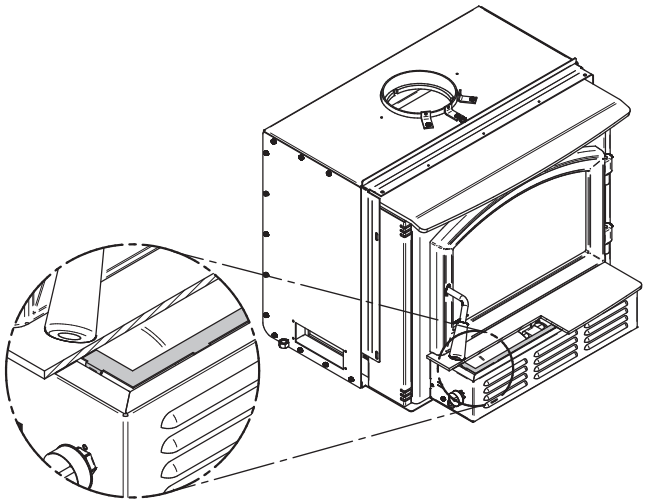
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



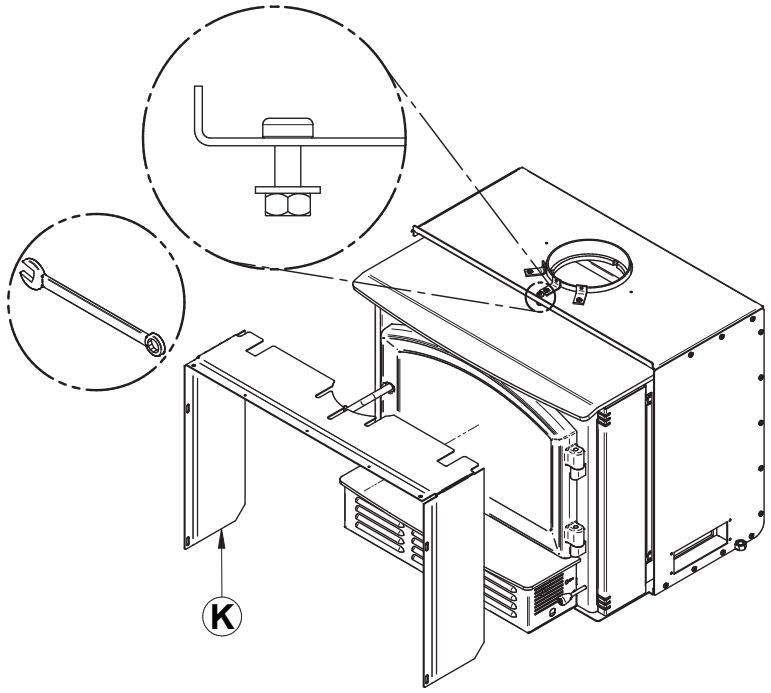
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



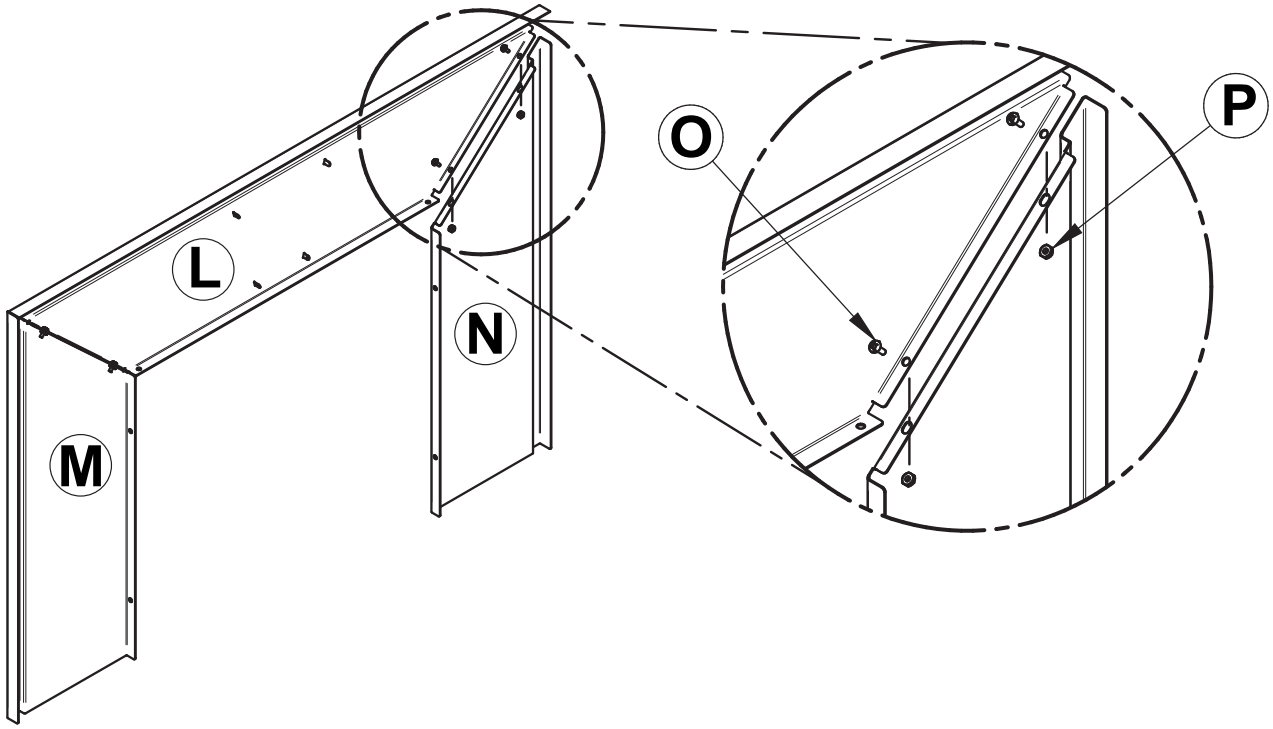
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

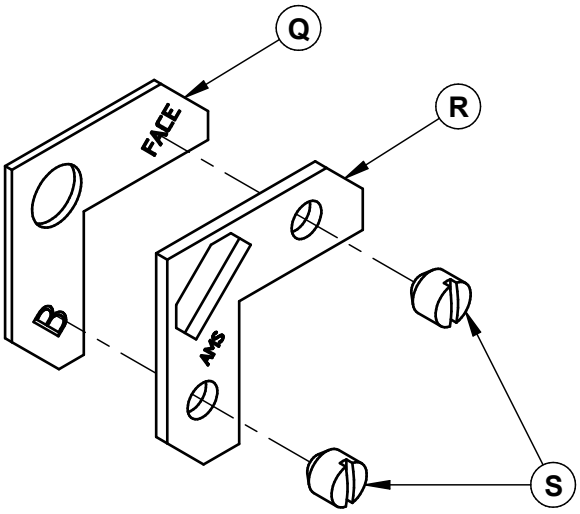
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



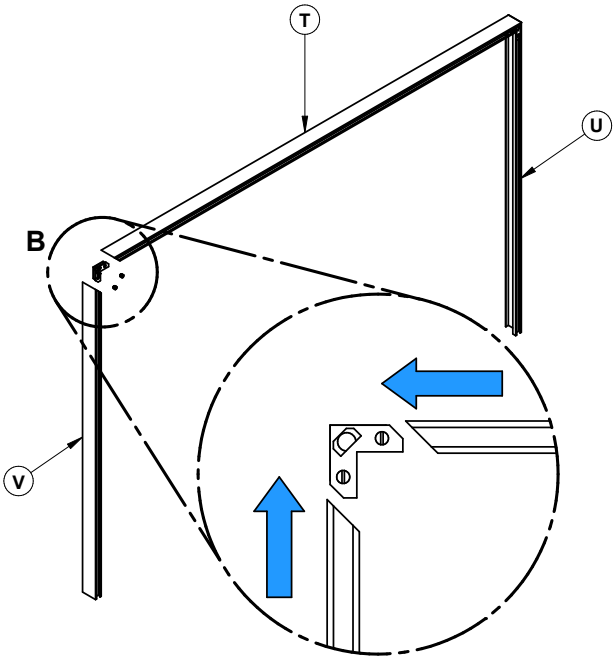
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

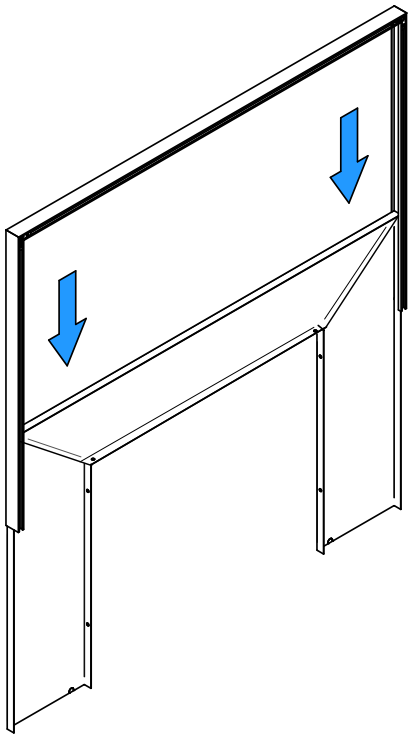


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

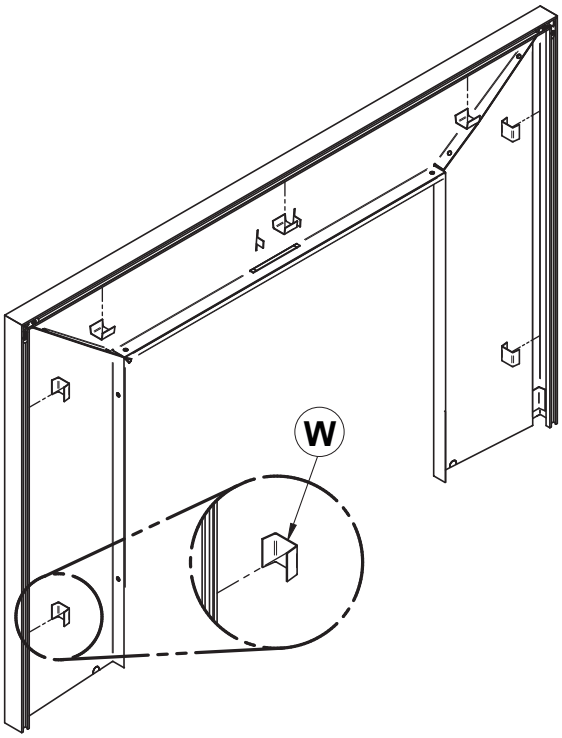


DETAIL B

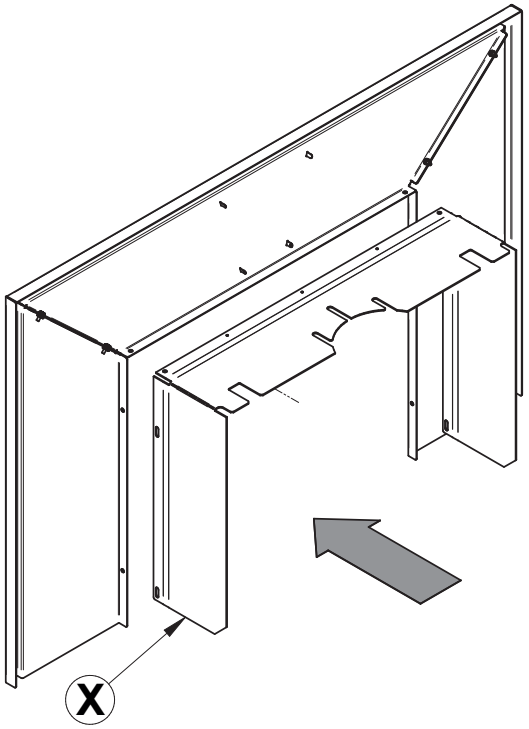
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



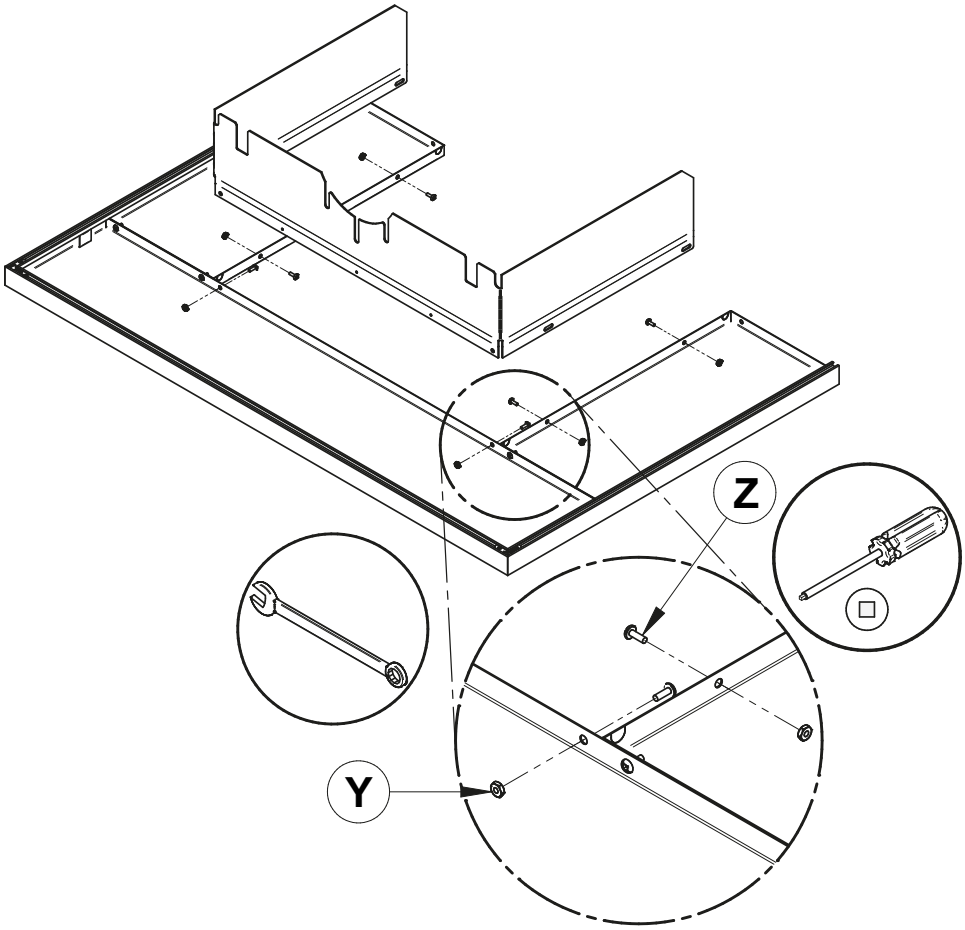
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

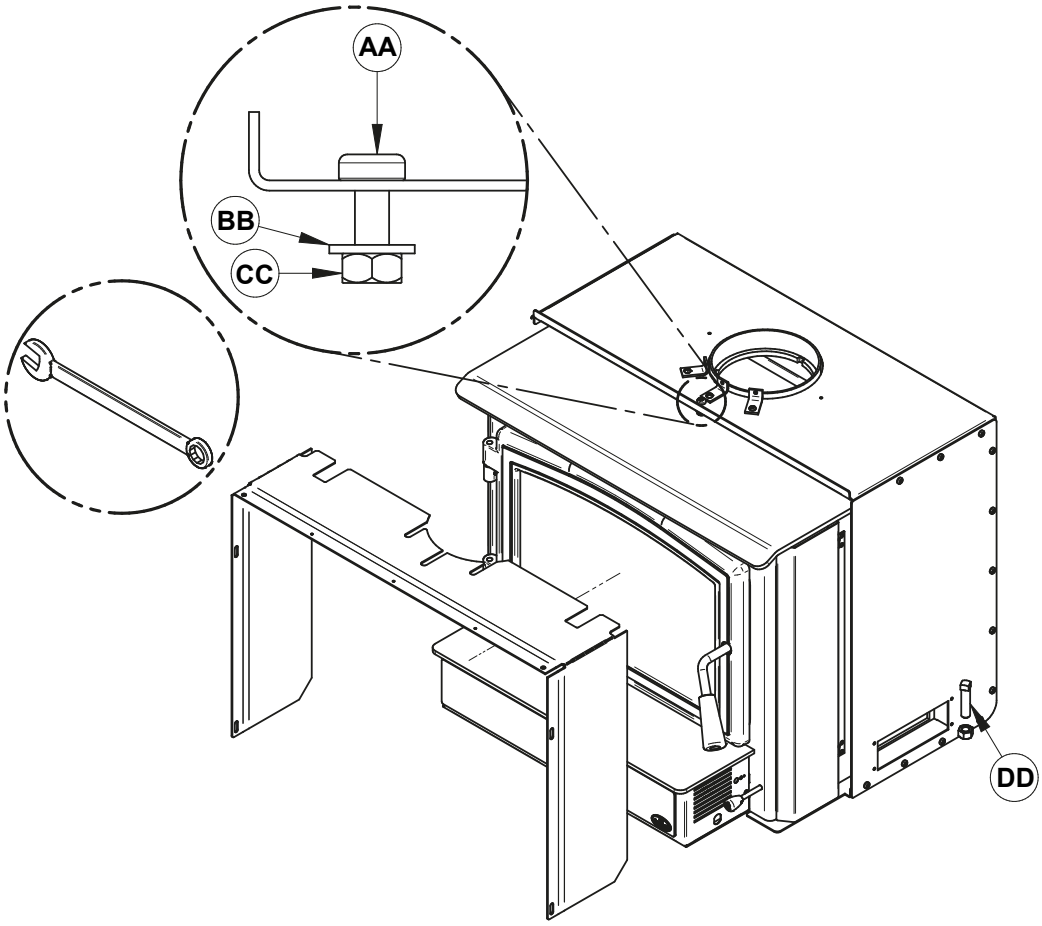


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

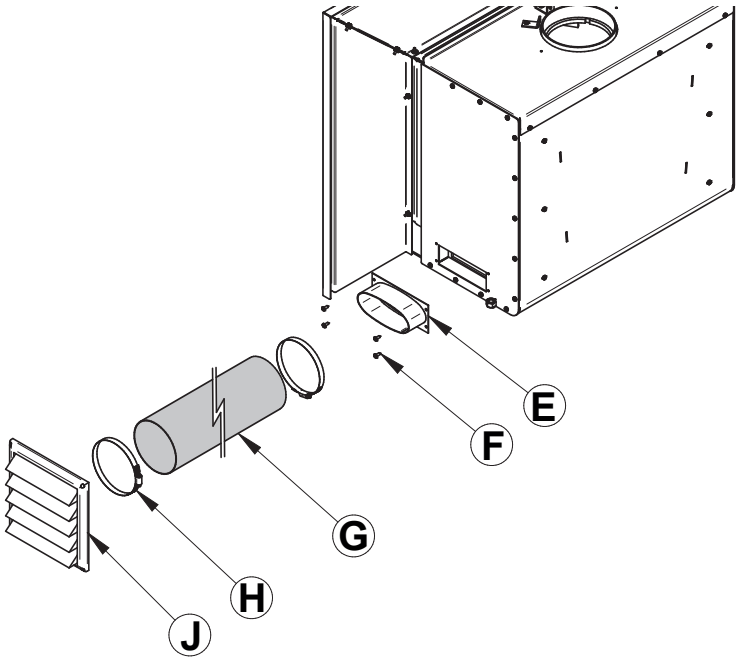


3.5 Optional Fresh Air Intake Kit Installation

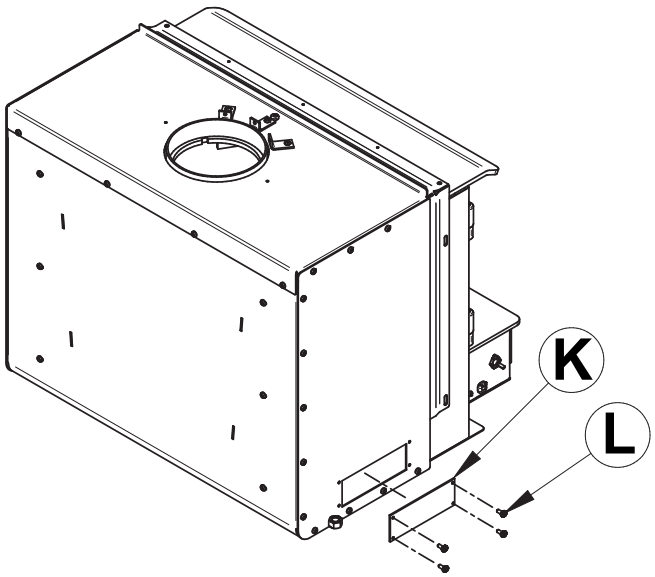
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



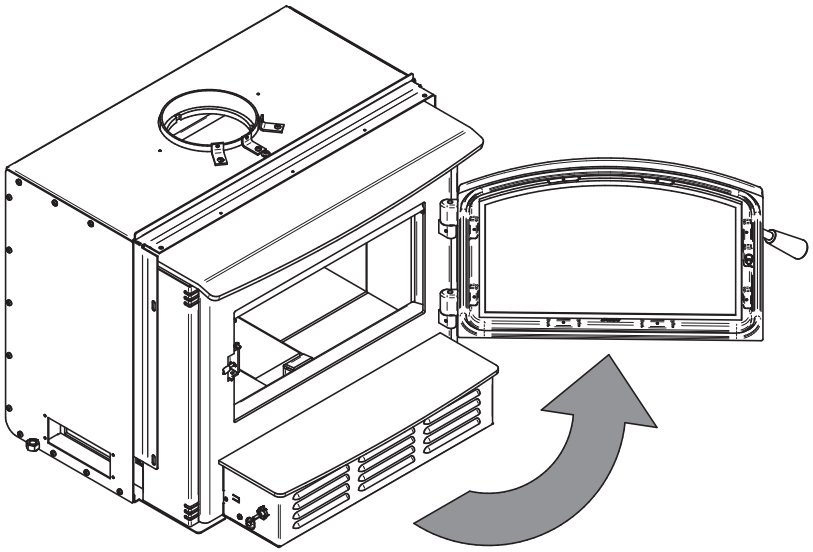
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

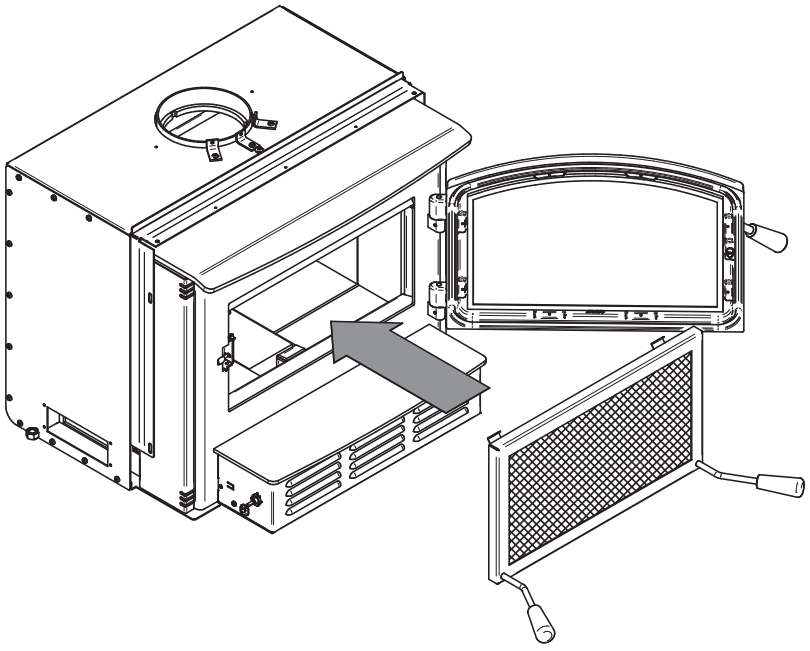
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



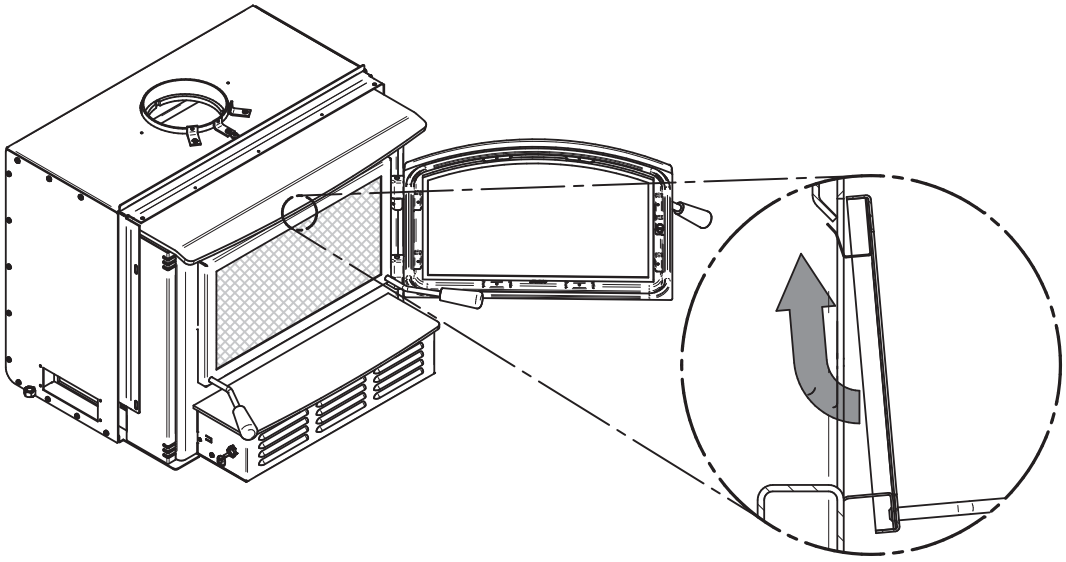
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

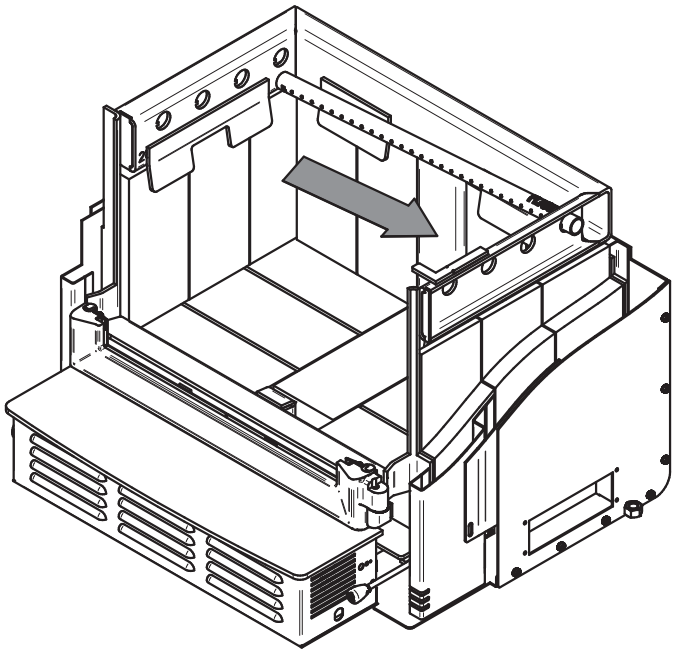
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.



3.7 Air Tubes and Baffle Installation

1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

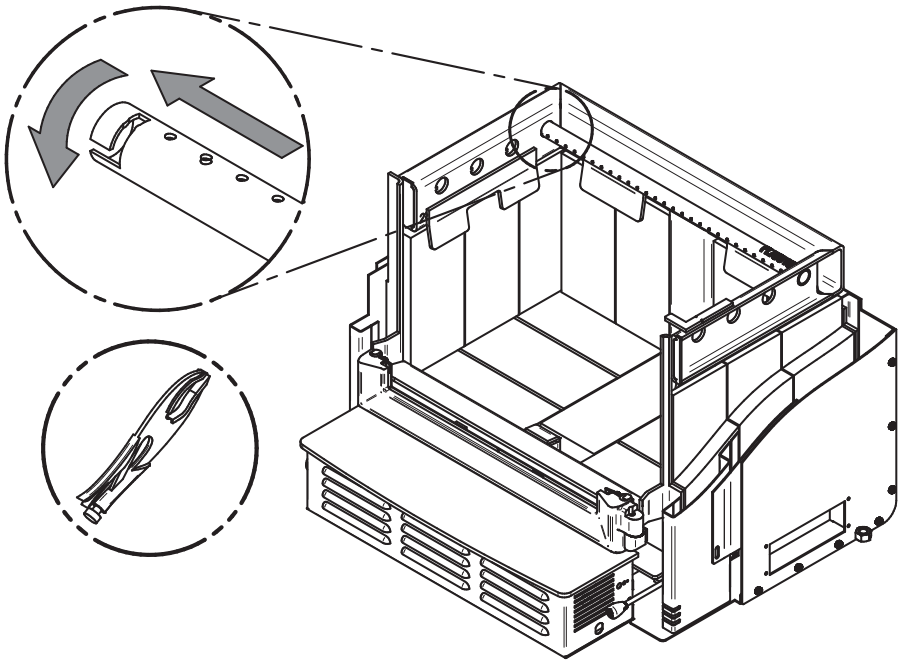


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.

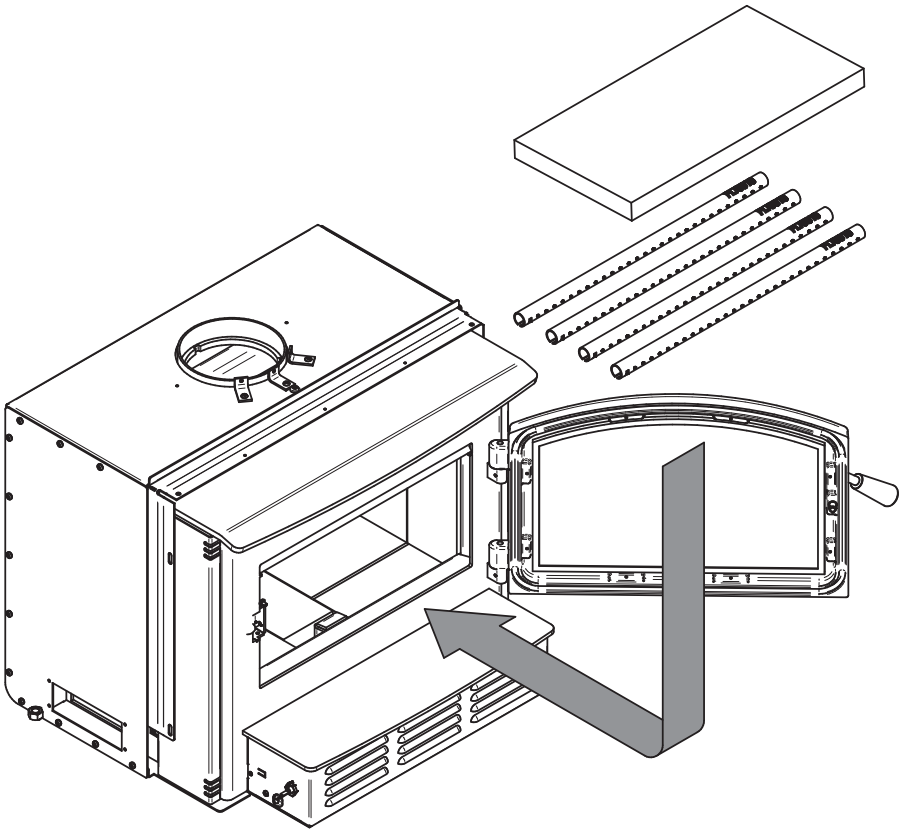
3. Install the baffle.

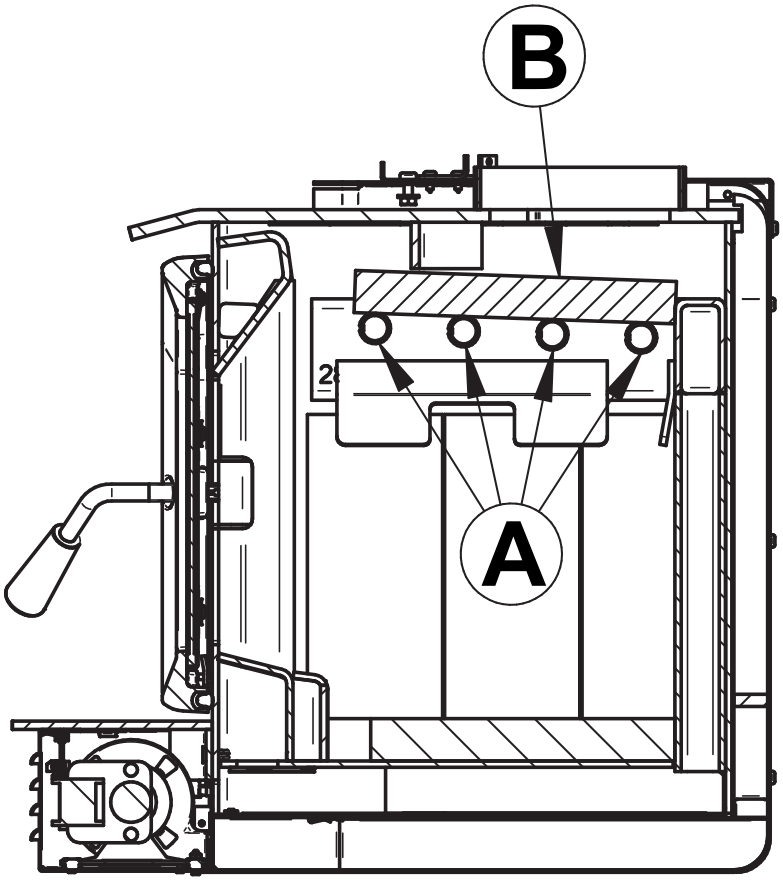
4. Repeat steps 1 and 2 for the three other tubes.

5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

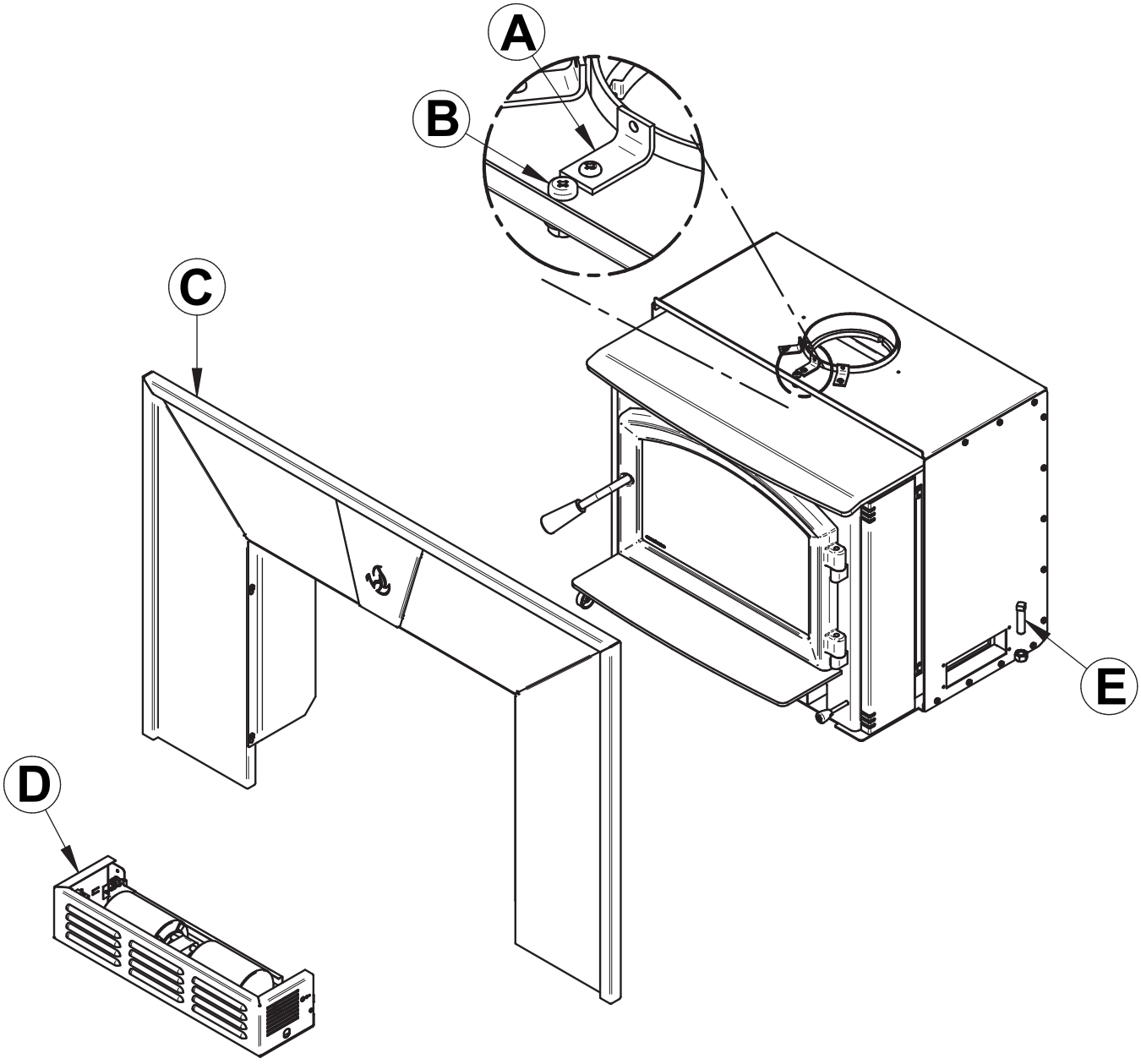



B
A

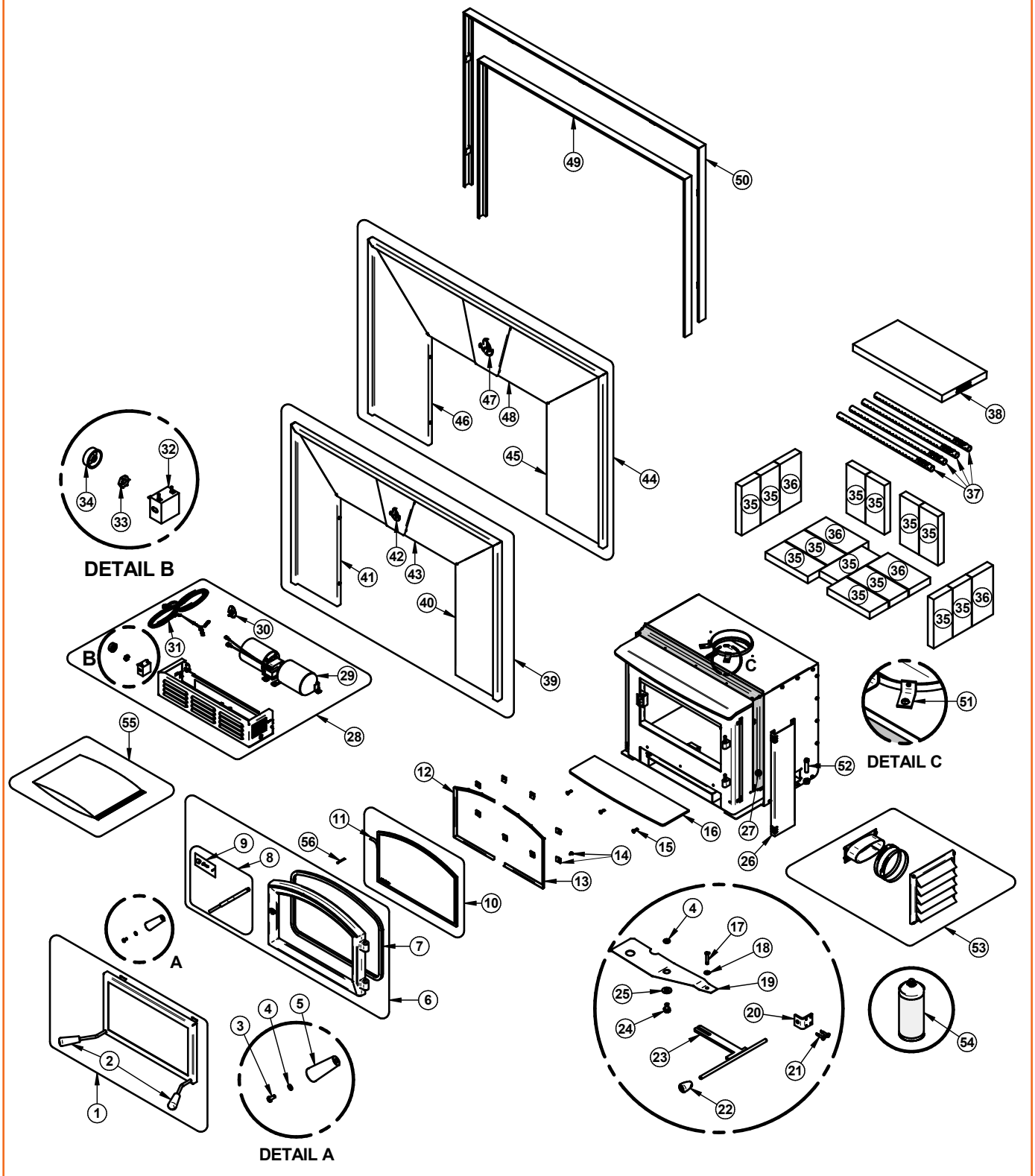
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

ENERZONE LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to your ENERZONE dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or under-estimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after September 1st, 2015.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass (thermal breakage only**), plating (manufacturing defect**) and convector air-mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

Subject to limitations above.** ****Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement part.

Shall your unit or a components be defective, contact immediately your **ENERZONE** dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your ENERZONE dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to sender.

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St-Augustin-de-Desmaures (Québec) Canada
G3A 2H3
418-908-8002
www.enerzone-intl.com/en/
tech@sbi-international.com

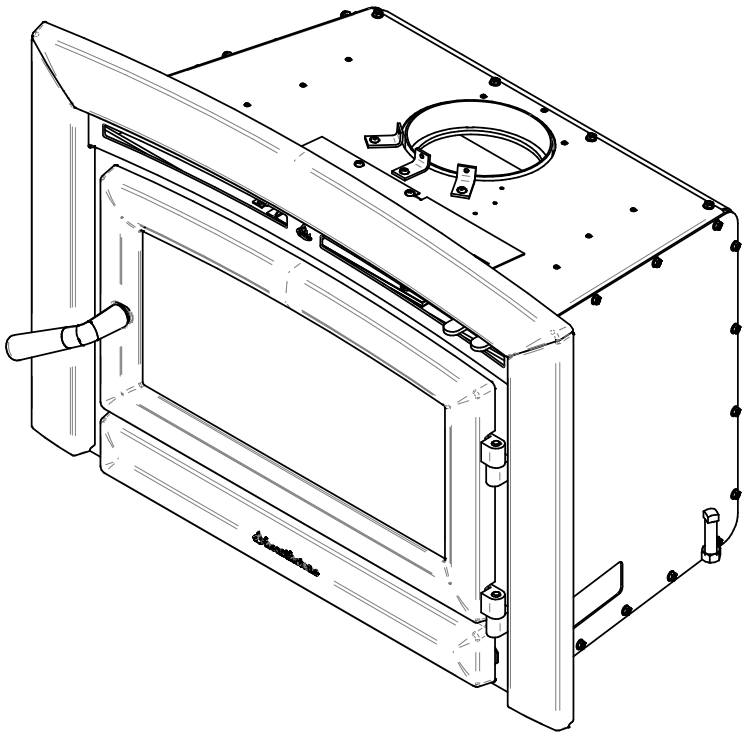
hearthstone

Product Specification Manual

GREEN MOUNTAIN INSERT 50

(SF00330 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS MANUAL FOR REFERENCE

2021-03-29

Printed in Canada

45983A

ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at



https://www.hearthstonestoves.com/warranty-registration/

Registering the warranty will help to quickly find the information needed on the unit.

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

C ETL LISTED US

Intertek

Control number: 4002461
(March/Mars 2021)

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

LISTED SOLID FUEL BURNING INSERT APPLIANCE

APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

MODEL / MODÈLE :

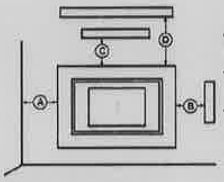
GREEN MOUNTAIN

INSERT 50

Serial Number / No. de Série: 1

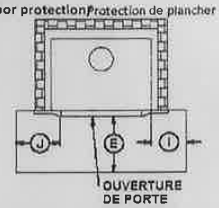
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E: 16 in./po. (406 mm) USA
18 in./po. (457 mm) CANADA
I: 8 in./po. (203 mm) CANADA
J: 8 in./po. (203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc) Canada
26/03/2021 (# test)

hearthstone

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27879

ENGLISH

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	Green Mountain Insert 50 (SF00330)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft³ and 12 lb/ft3. The moisture content is between 19% and 25%.

[3] As measured per CSA B415.1-10 stack loss method.

[4] Higher Heating Value of the fuel.

[5] Lower Heating Value of the fuel.

[6] Optimum overall efficiency at a specific burn rate (LHV).

[7] This appliance is officially tested and certified by an independent agency.

[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

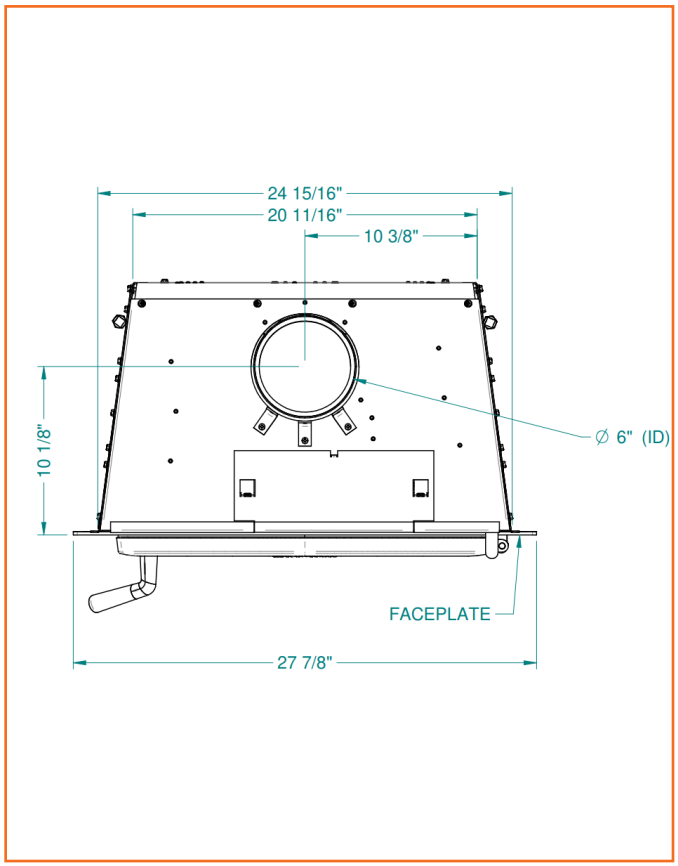


Figure 1 : Top View

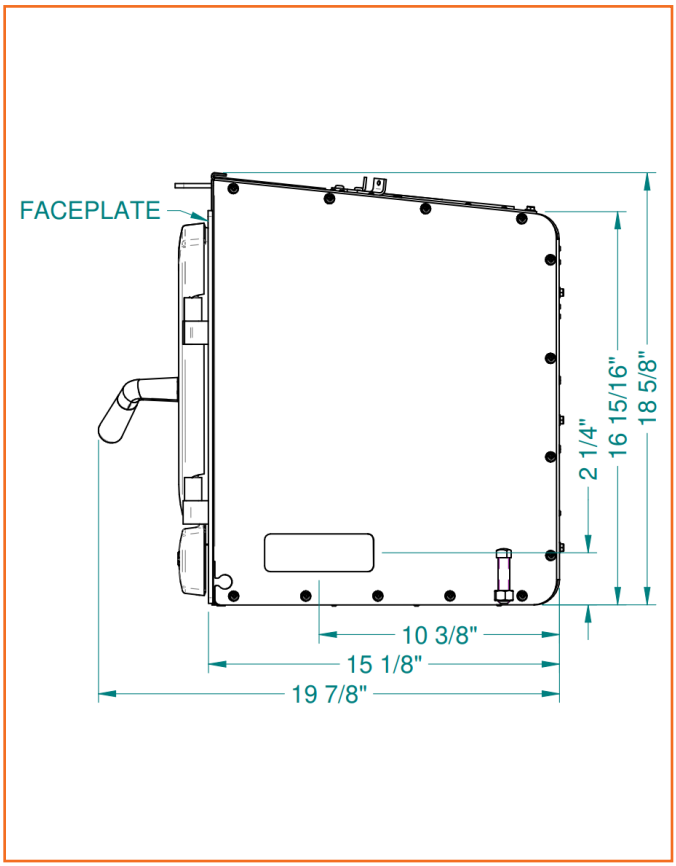


Figure 2 : Side View

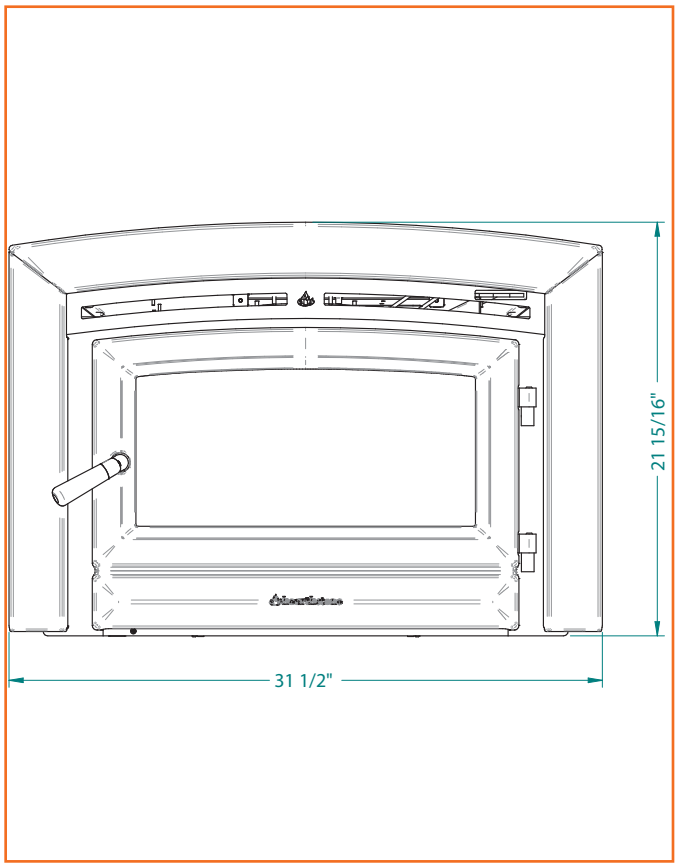


Figure 3 : Front View

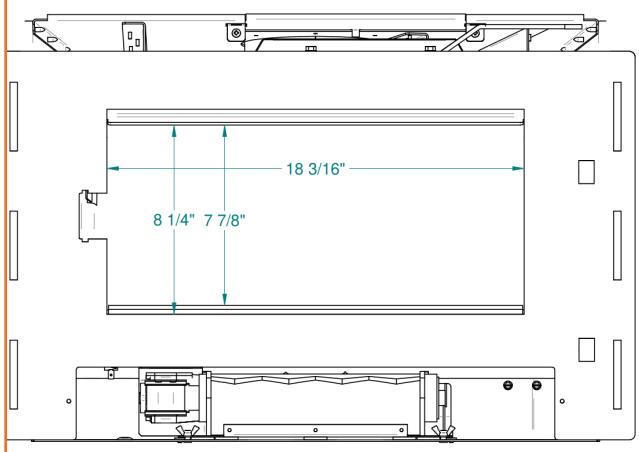


Figure 4 : Door Opening

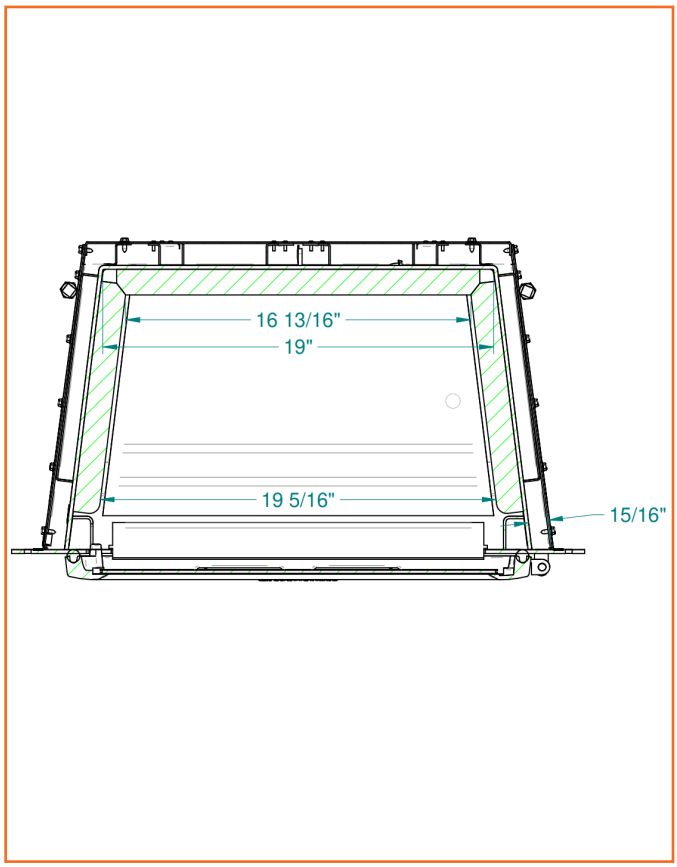


Figure 5 : Top View - Combustion Chamber

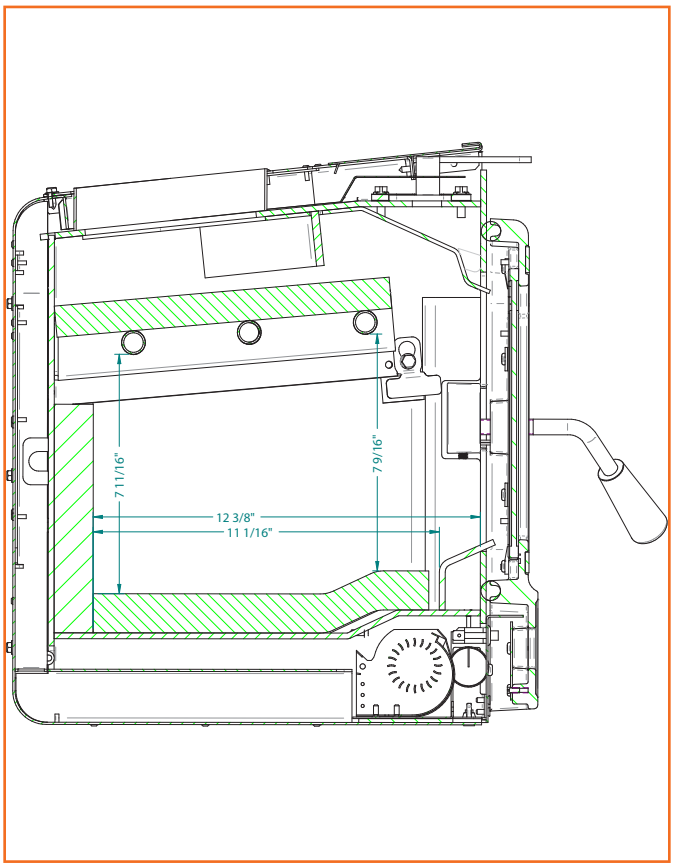


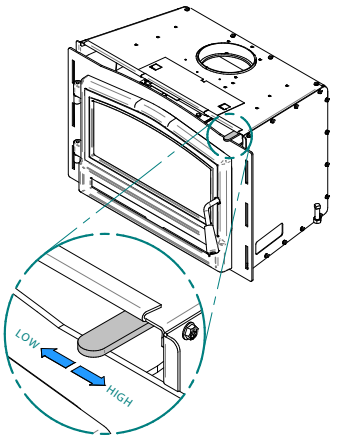
Figure 6 : Side View - Combustion Chamber

ENGLISH

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

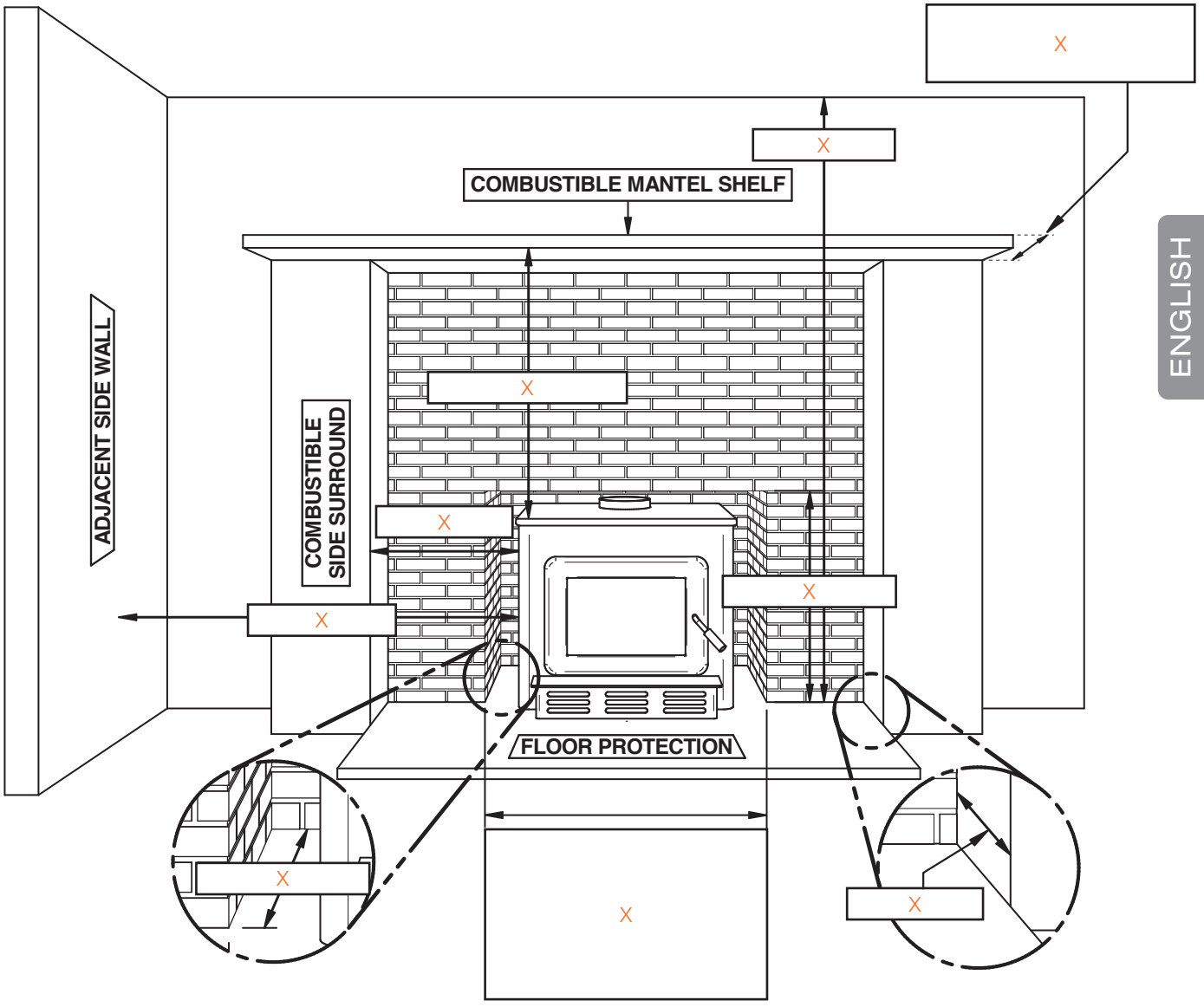
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

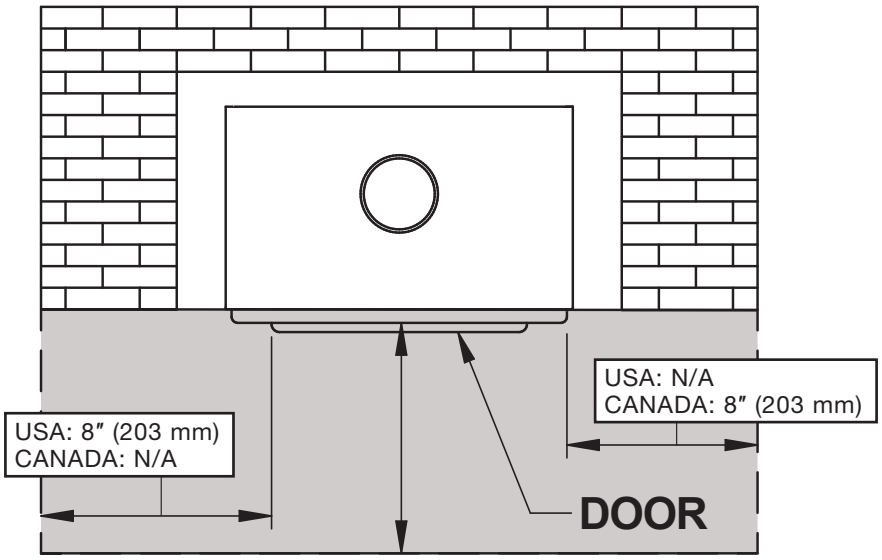
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles



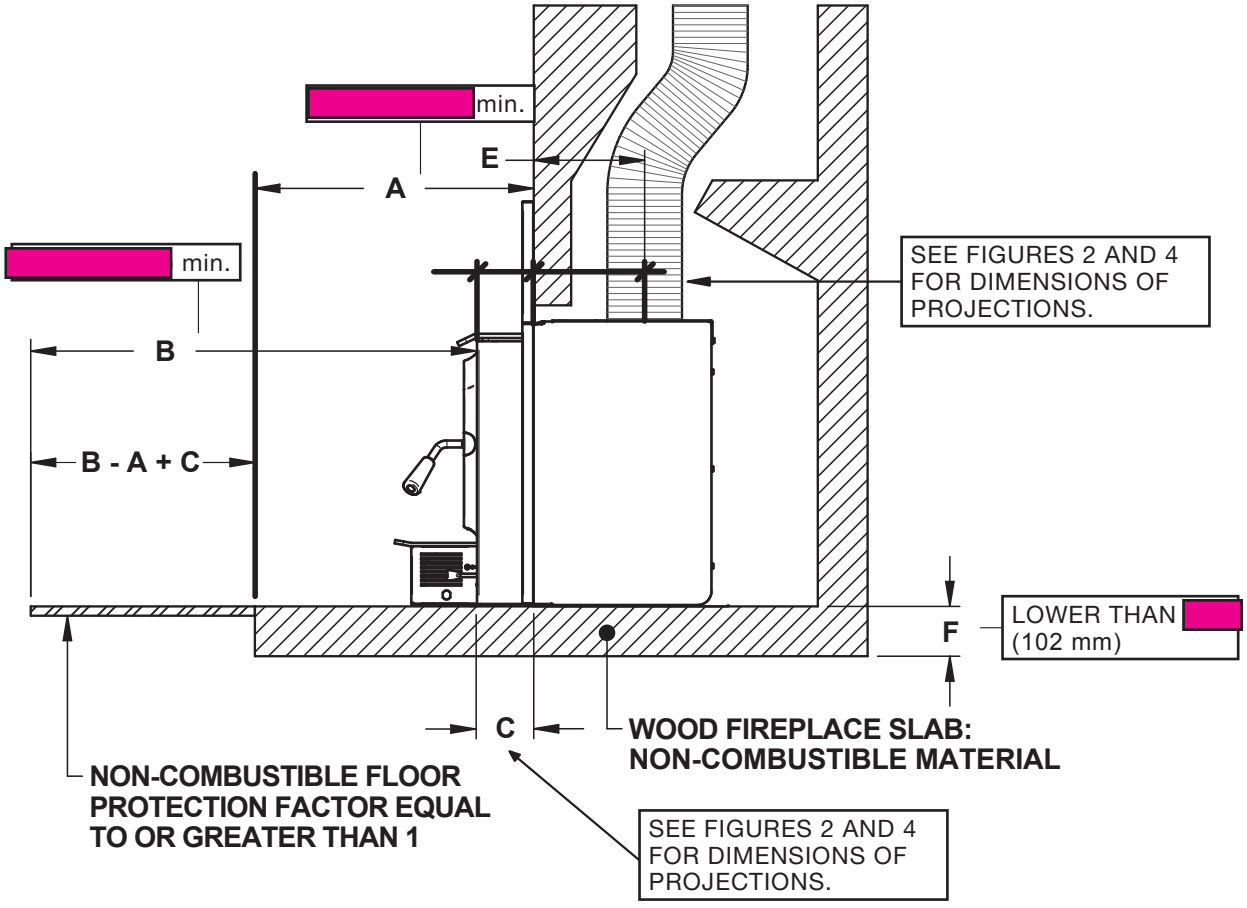
2.2 Floor Protection

It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.

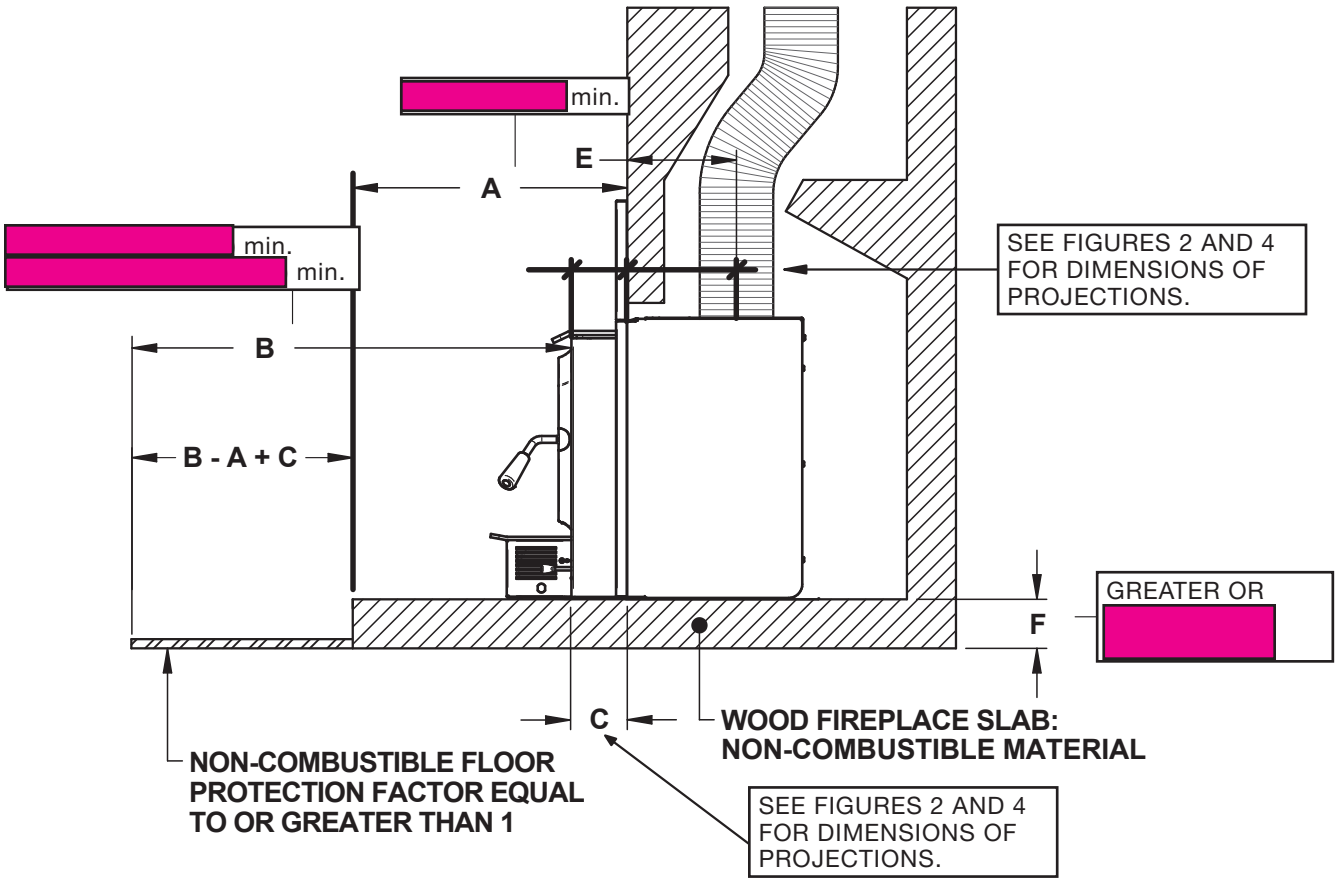


ENGLISH

2.2.1 Installation Raised of and Less



2.2.2 *Installation Raised of More Than*



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2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

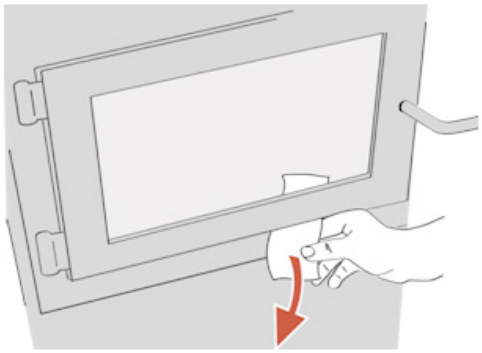
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

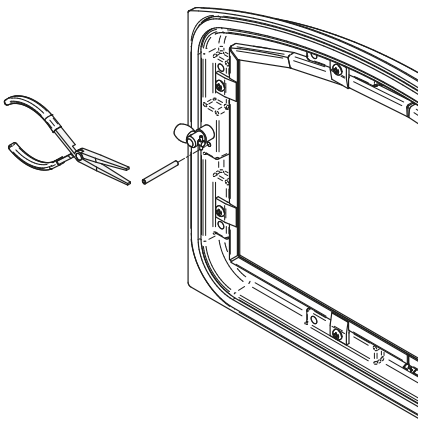


Figure 7 : Removing the split pin

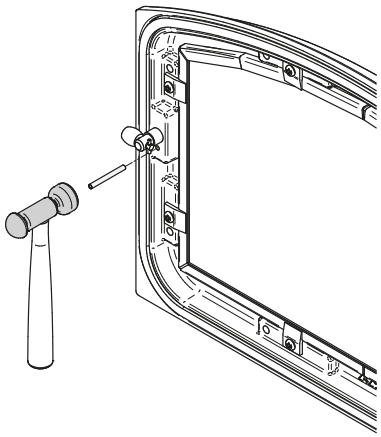
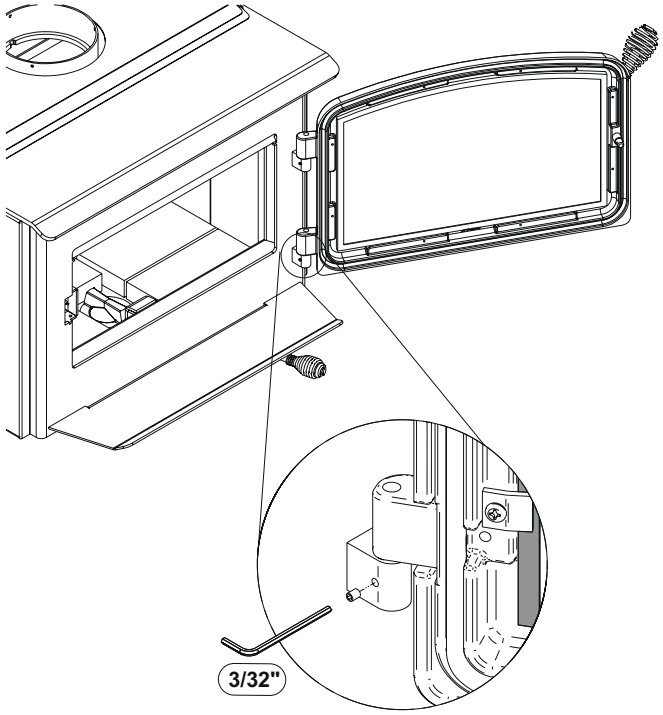
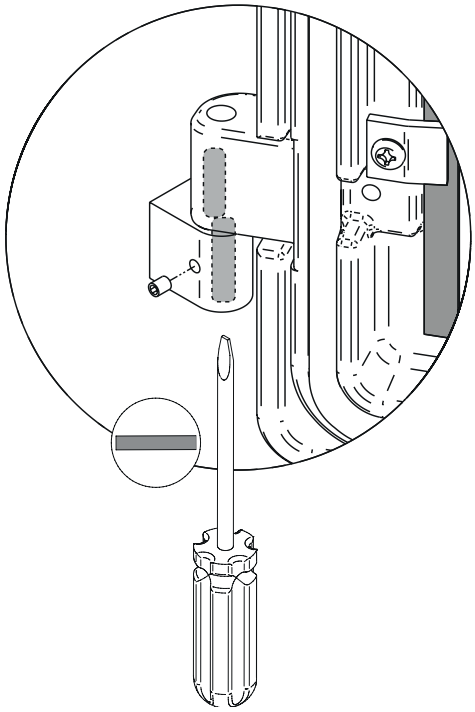


Figure 8 : Installing the split pin

3.1.3 Door Alignment

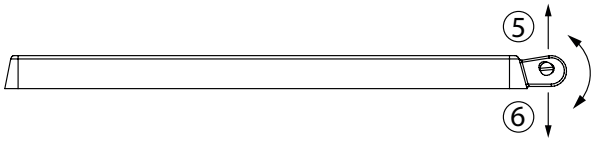
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

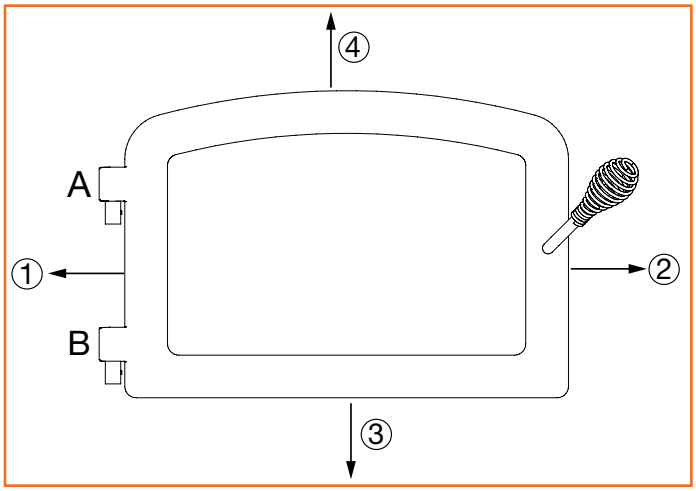


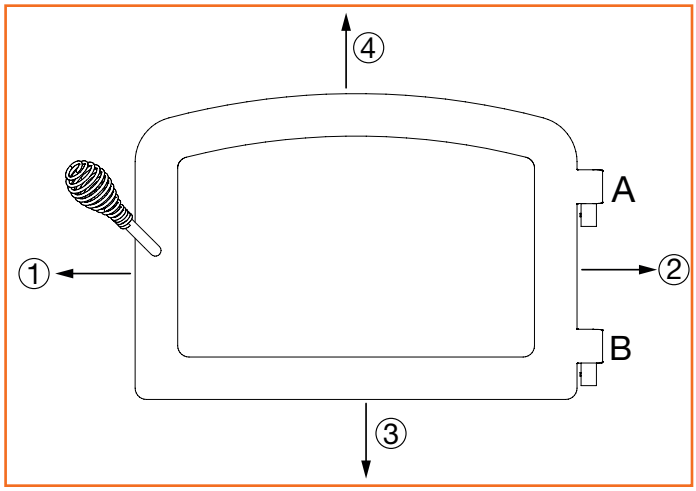


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



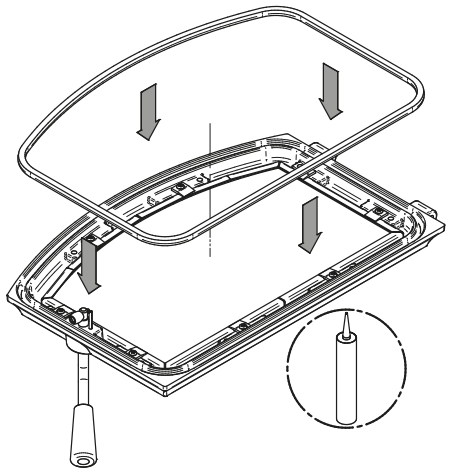




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

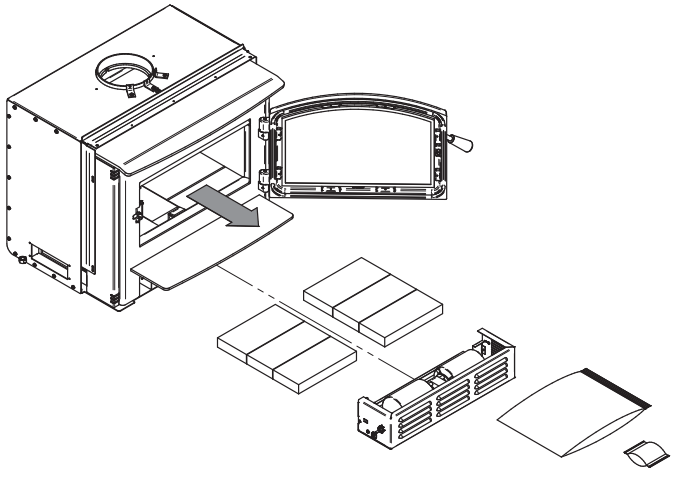


Figure 9 : Empty the combustion chamber

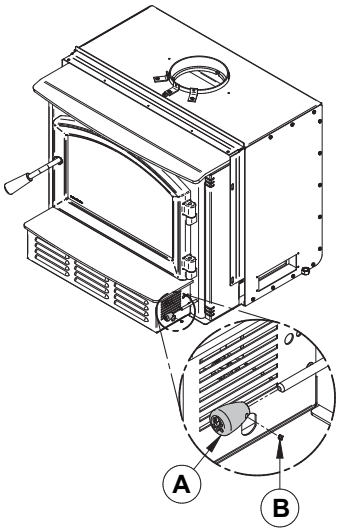


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

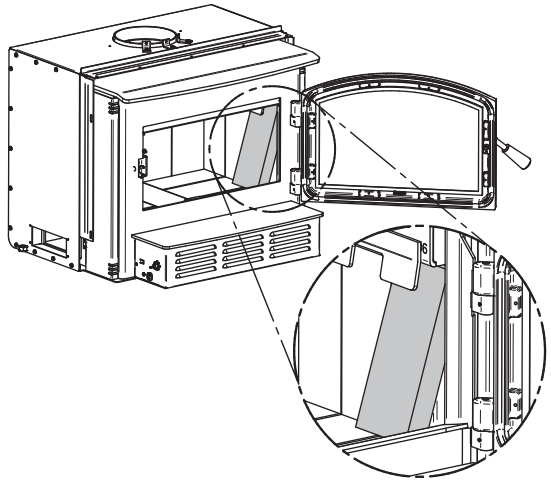


Figure 11 : Install the Combustion Chamber Bricks

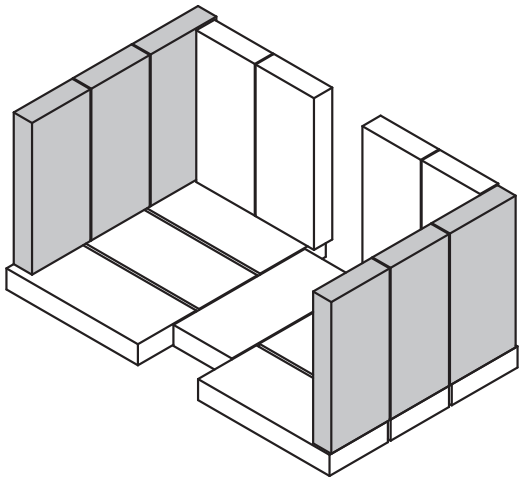
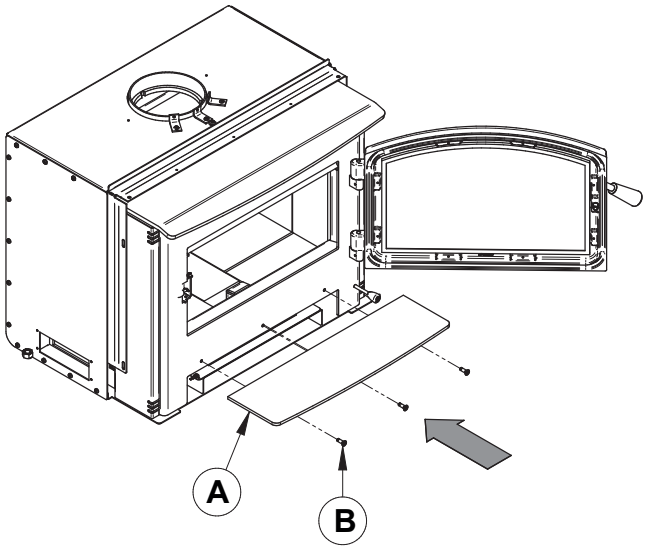


Figure 12 : Combustion Chamber Bricks Layout

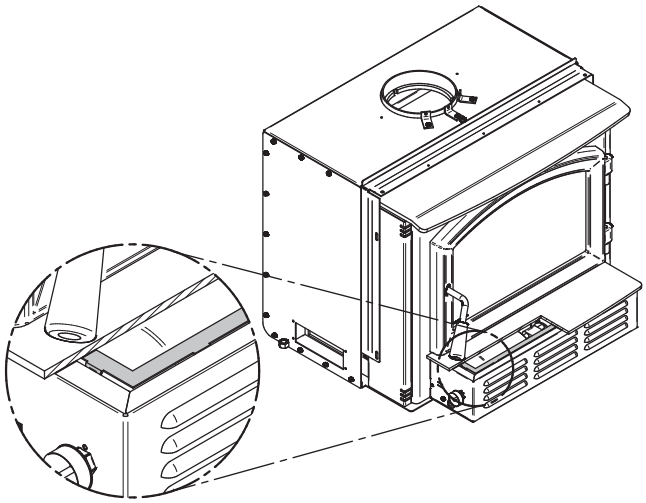
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



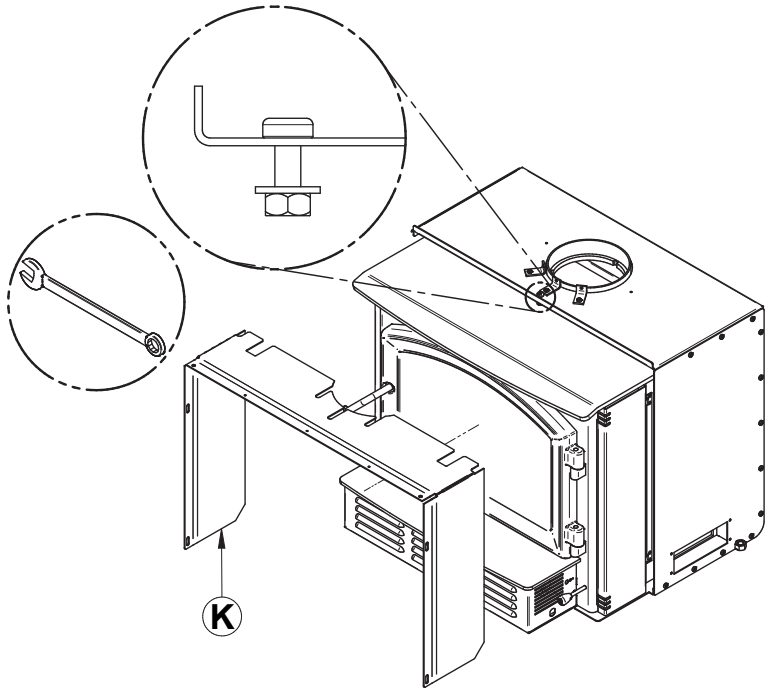
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



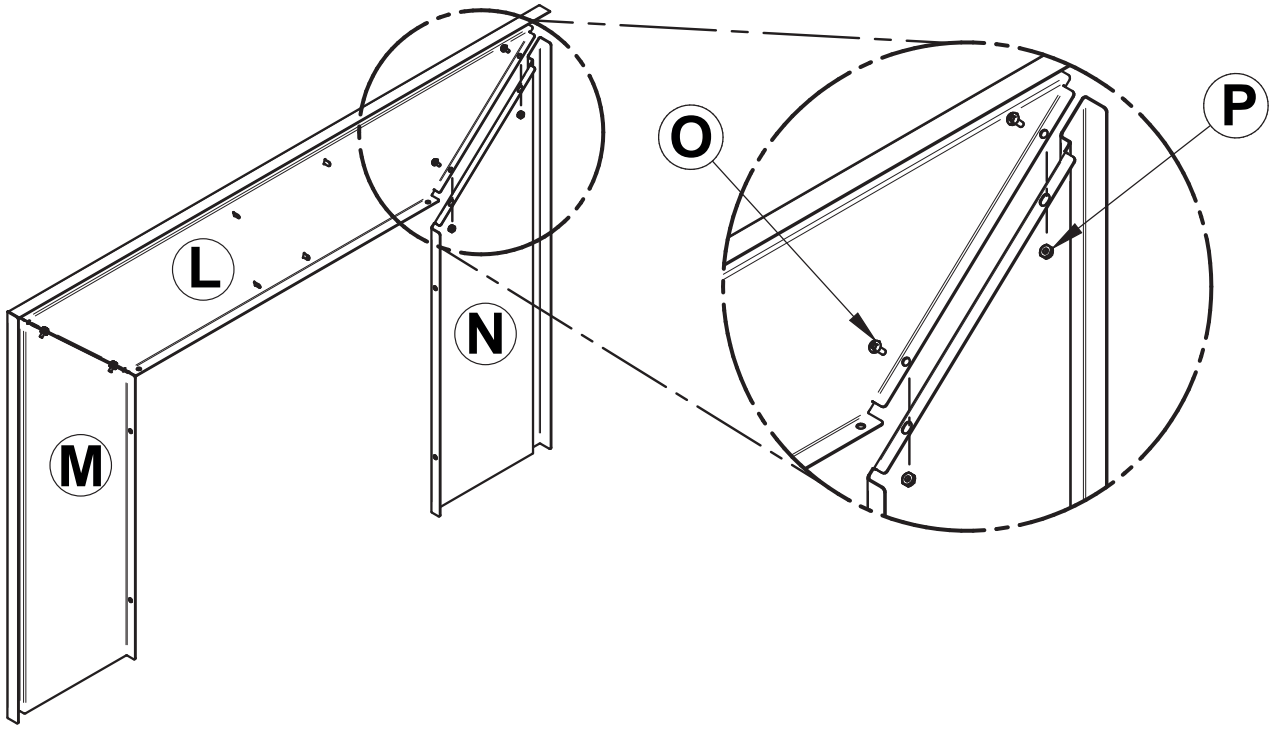
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

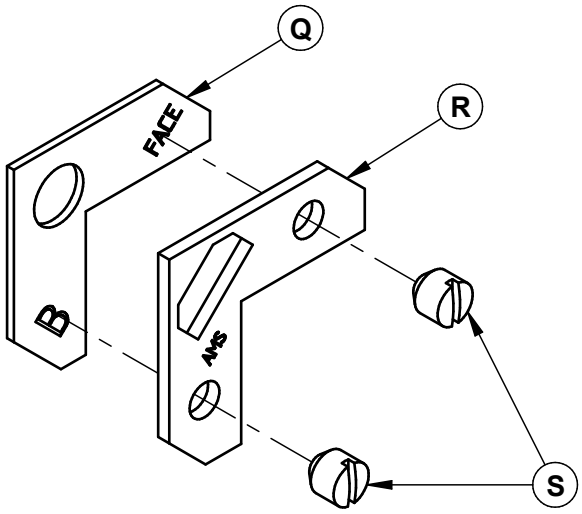
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



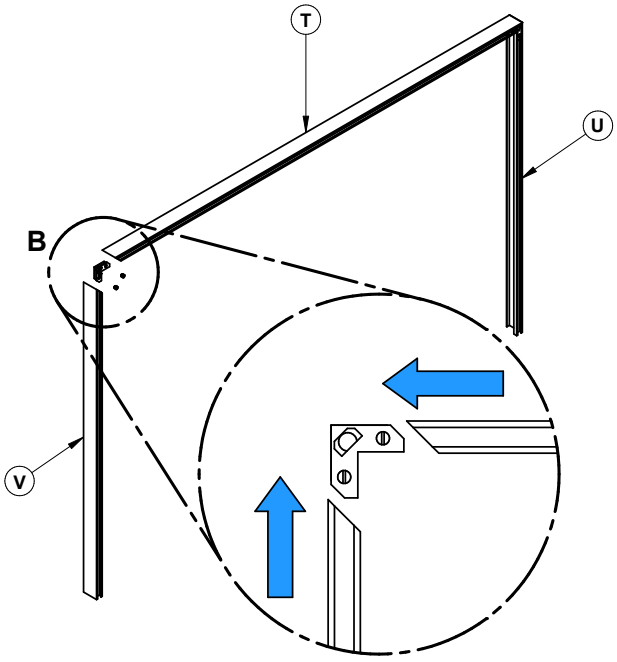
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

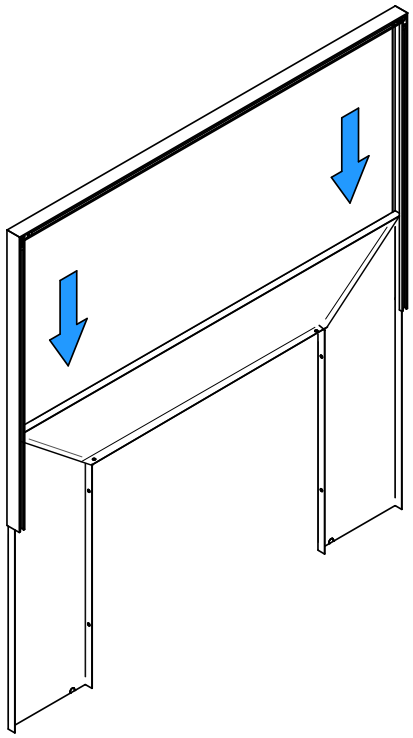


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

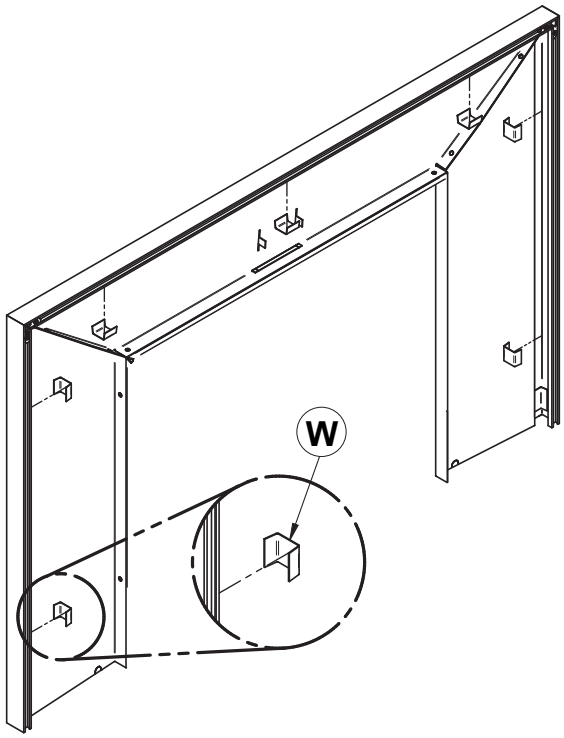


DETAIL B

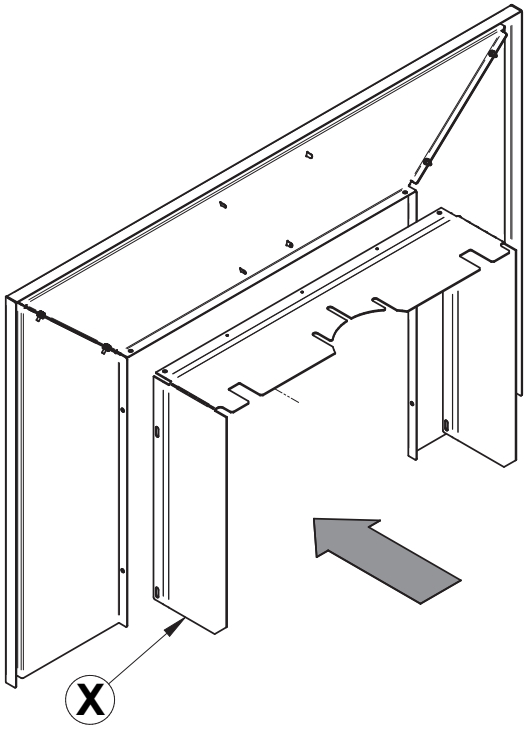
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



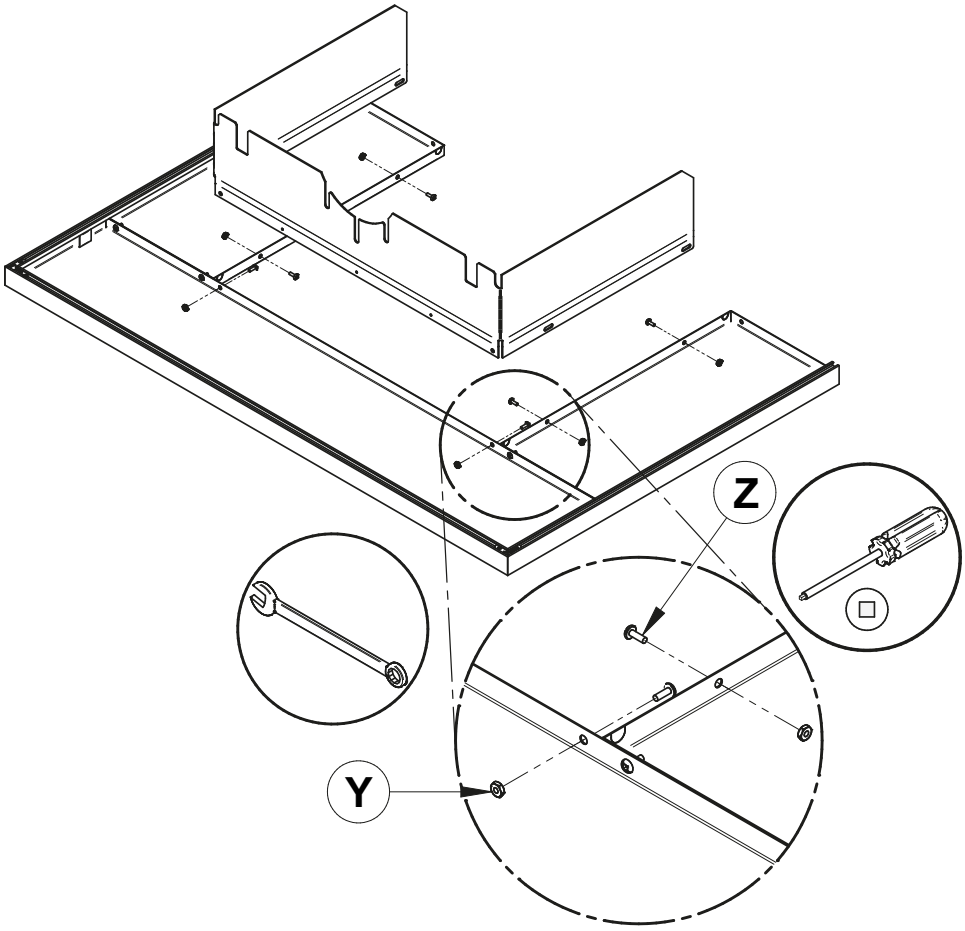
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

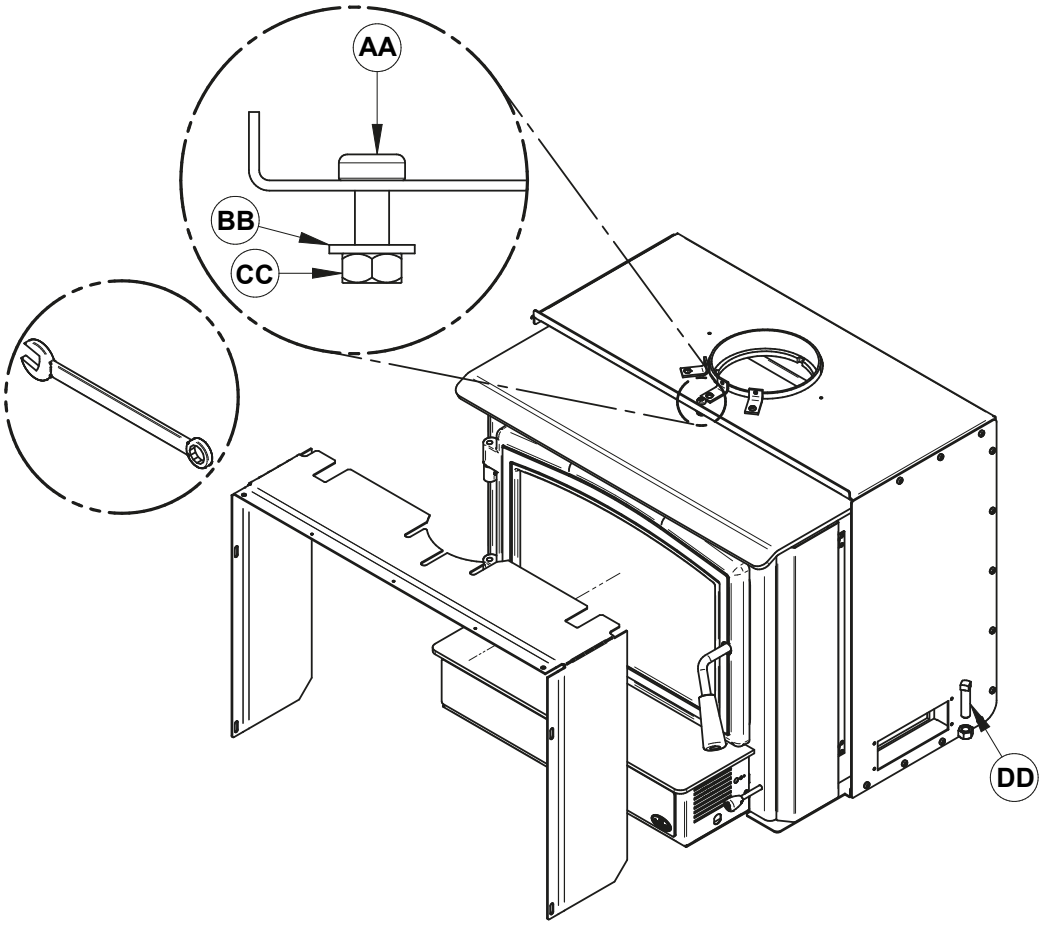


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

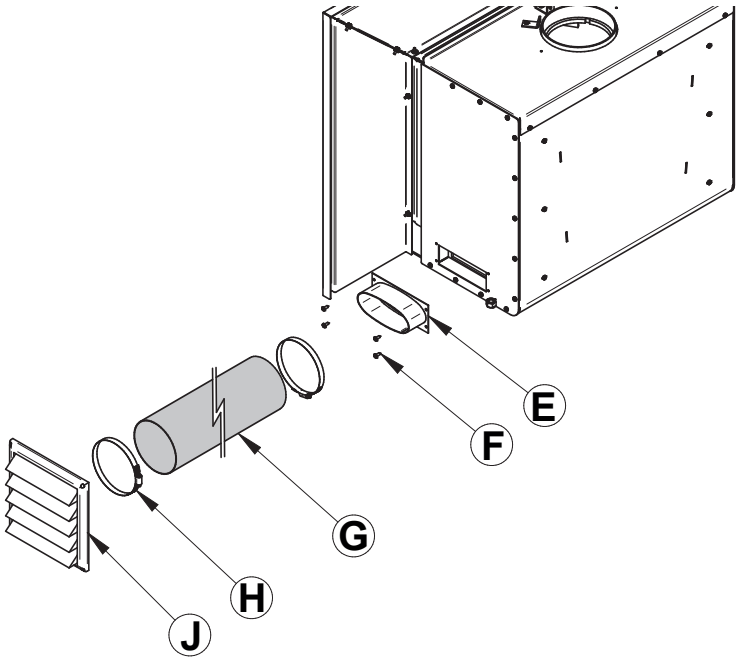


3.5 Optional Fresh Air Intake Kit Installation

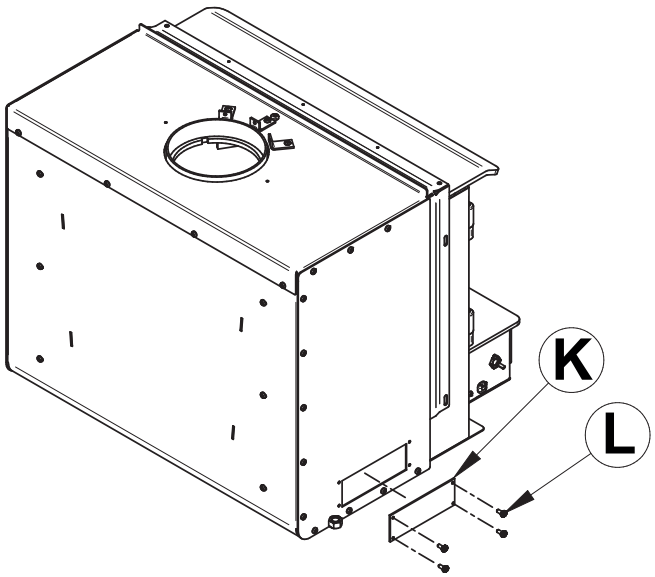
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



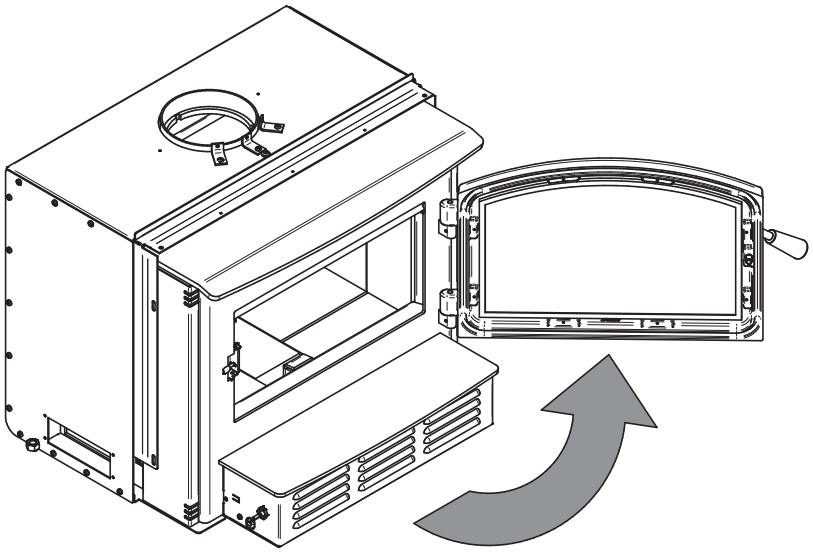
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

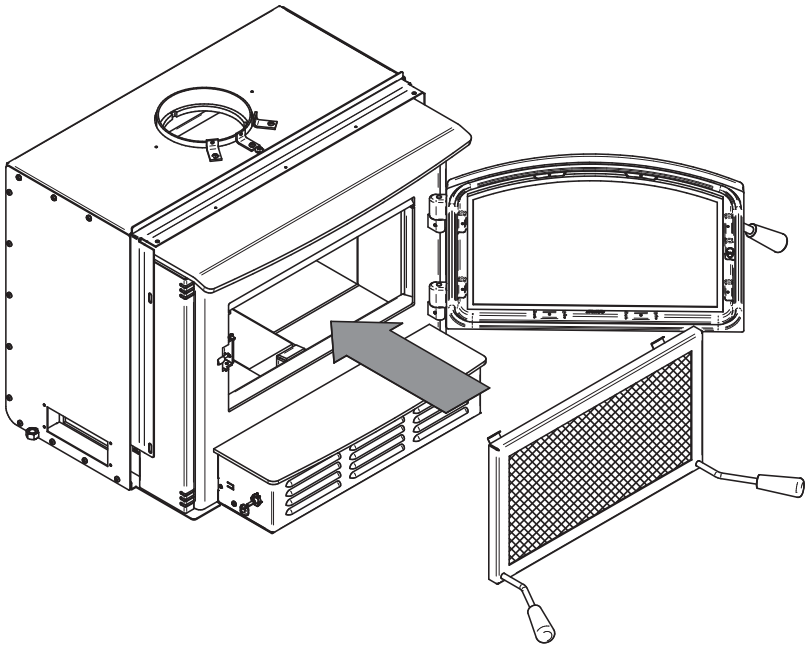
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



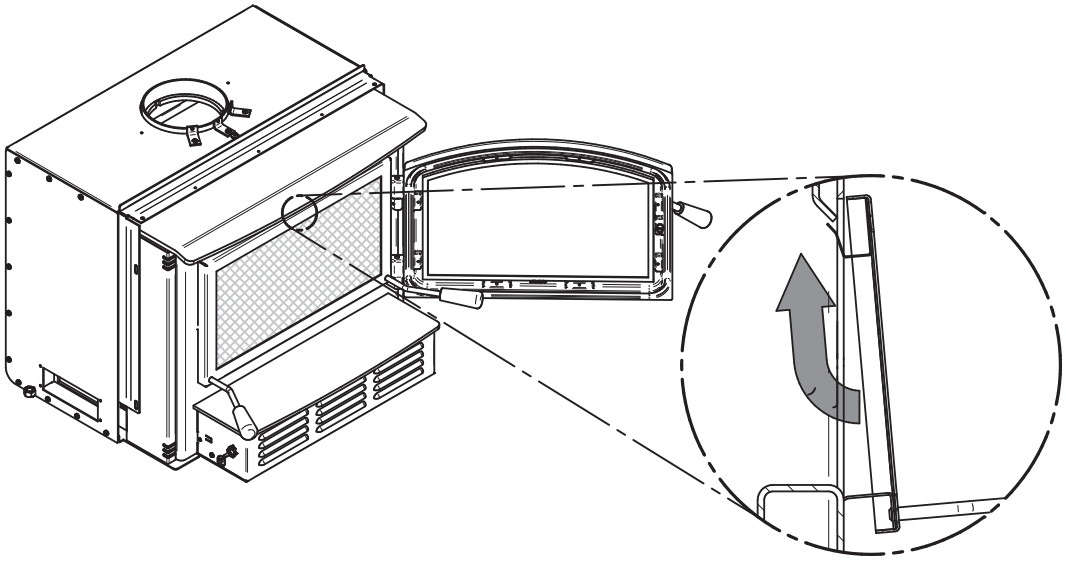
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

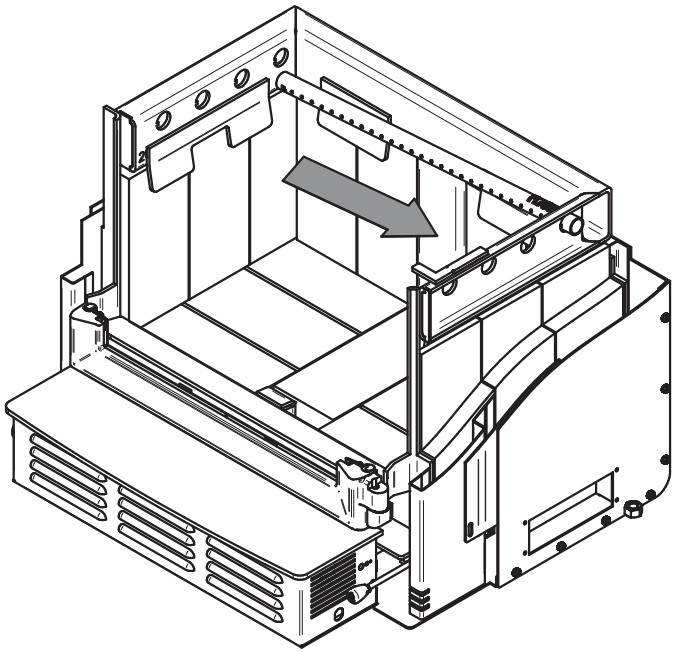
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.



3.7 Air Tubes and Baffle Installation

1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

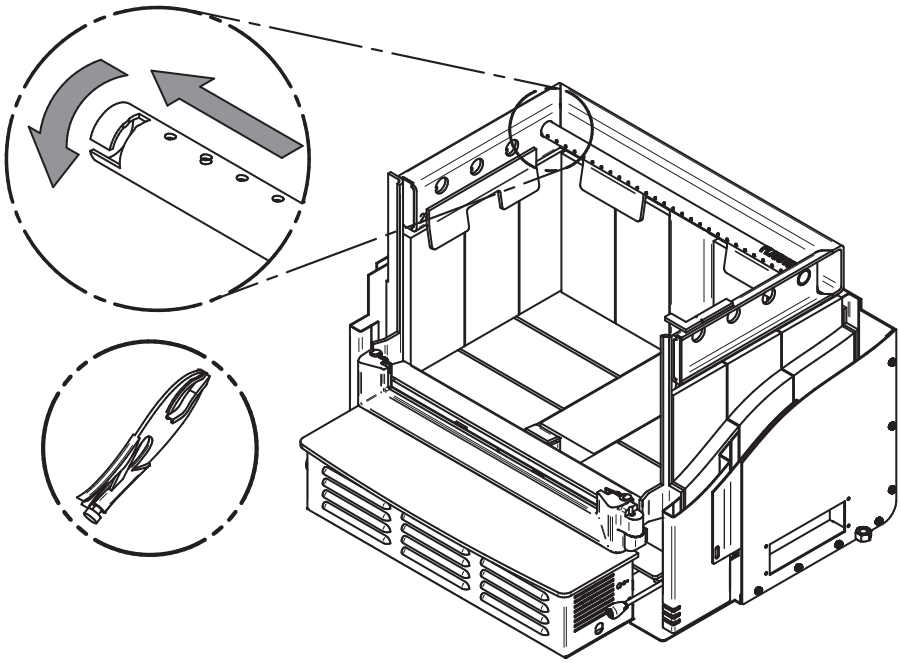


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.

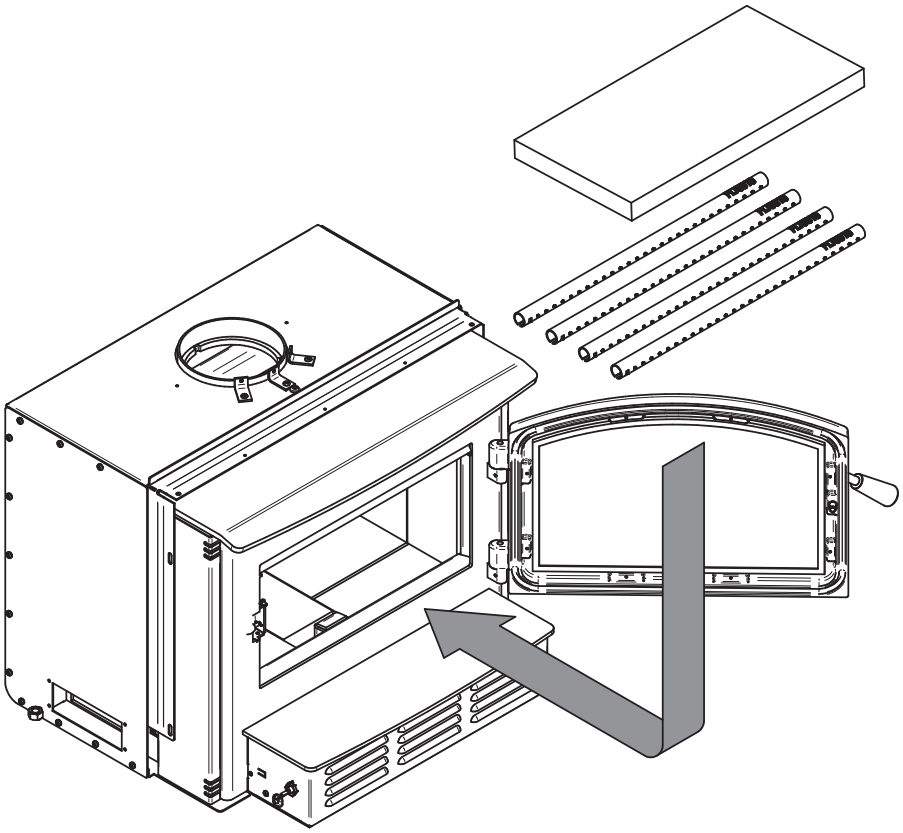
3. Install the baffle.

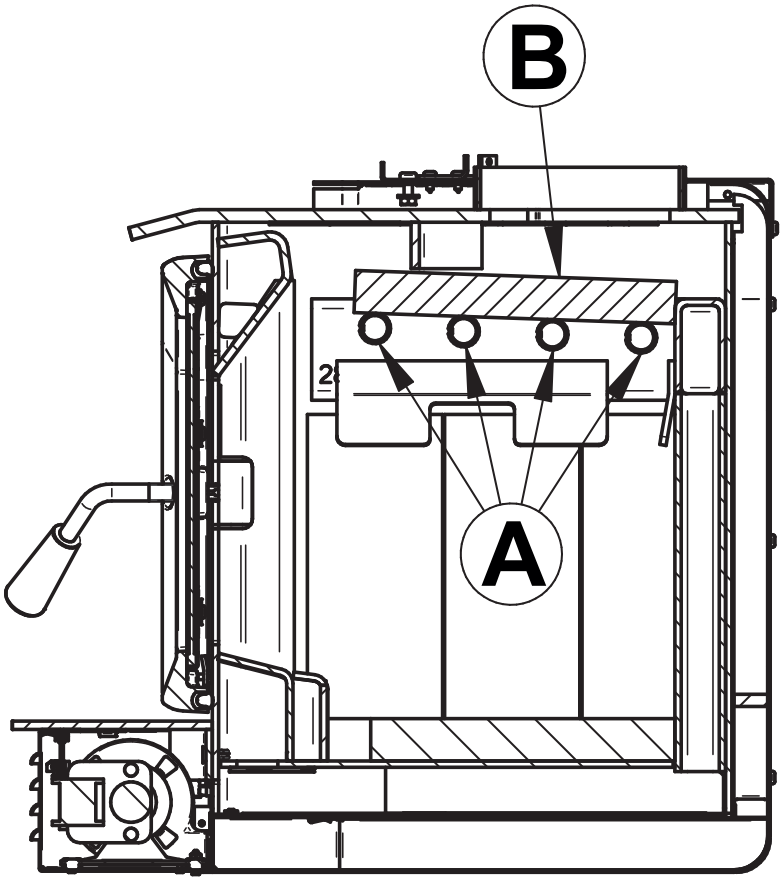
4. Repeat steps 1 and 2 for the three other tubes.

5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

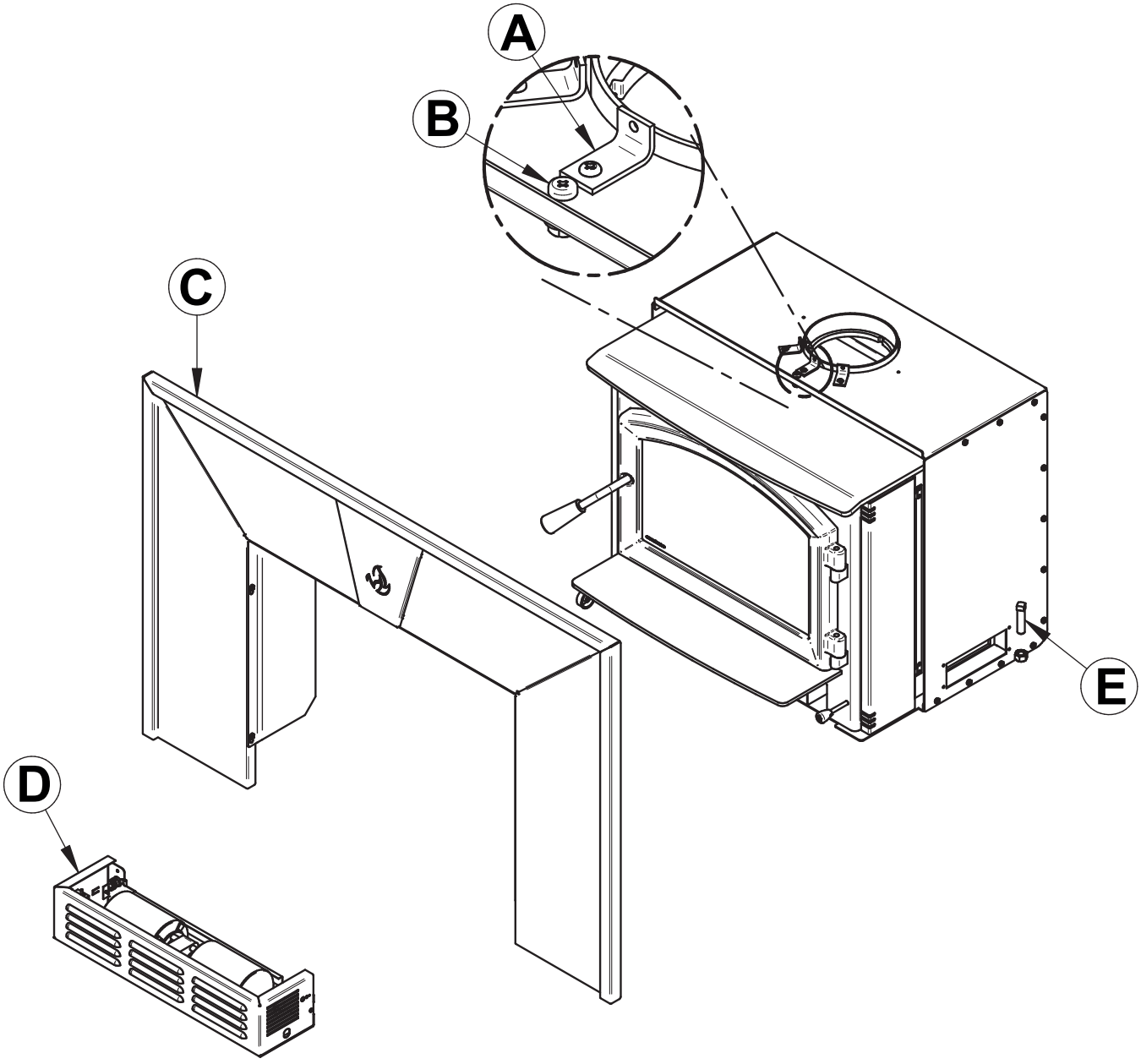



B
A

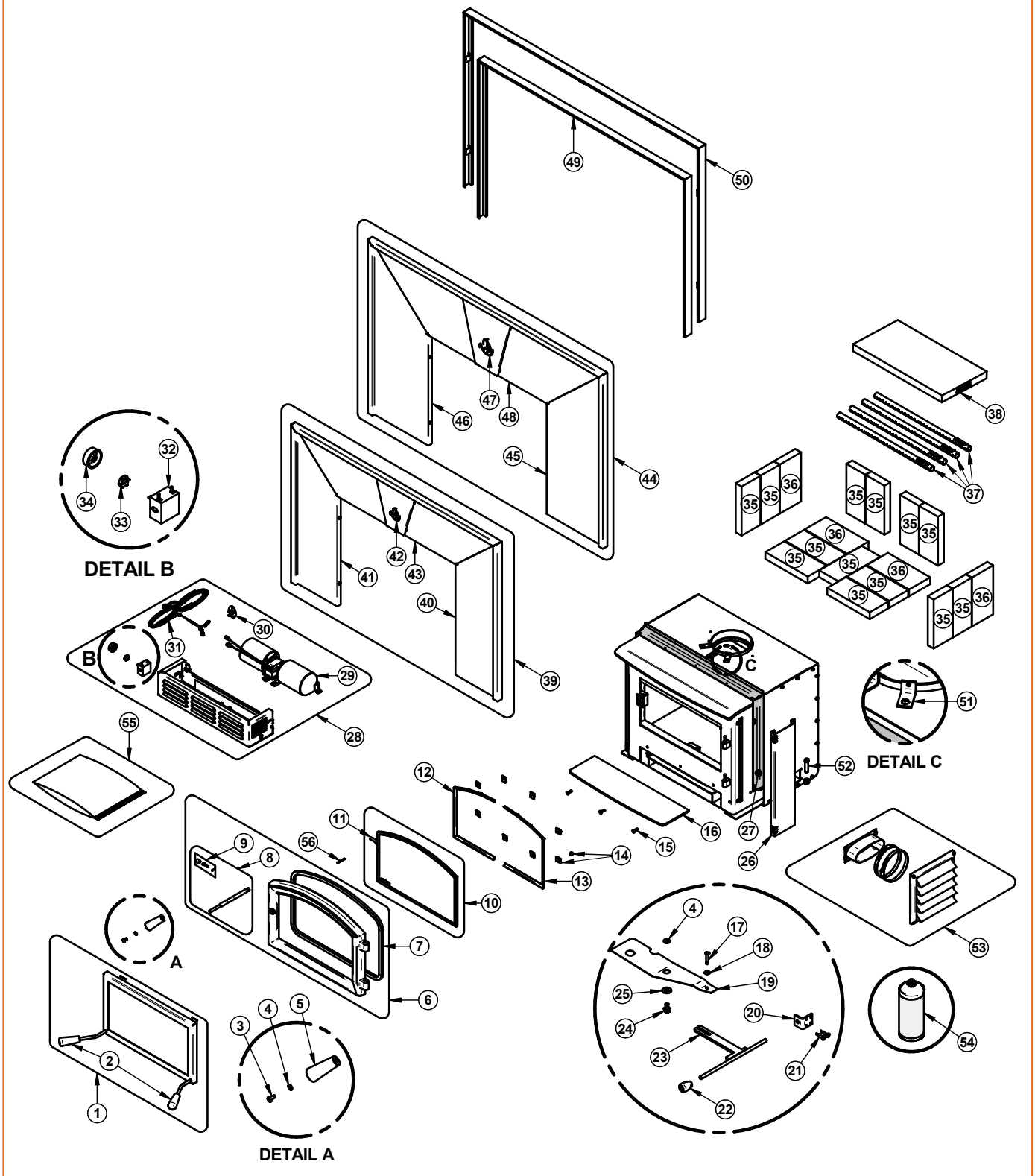
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

HEARTHSTONE LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from the factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to the dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or underestimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than the original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after March 1st 2019.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass**, plating (manufacturing defect**) and convector air mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

*Subject to limitations above. **Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement parts.

Shall your unit or a component be defective, contact immediately your dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to the sender.

This document is available for free download on the manufacturer's website. It is a copyrighted document. Resale is strictly prohibited. The manufacturer may update this document from time to time and cannot be responsible for problems, injuries, or damages arising out of the use of information contained in any document obtained from unauthorized sources.

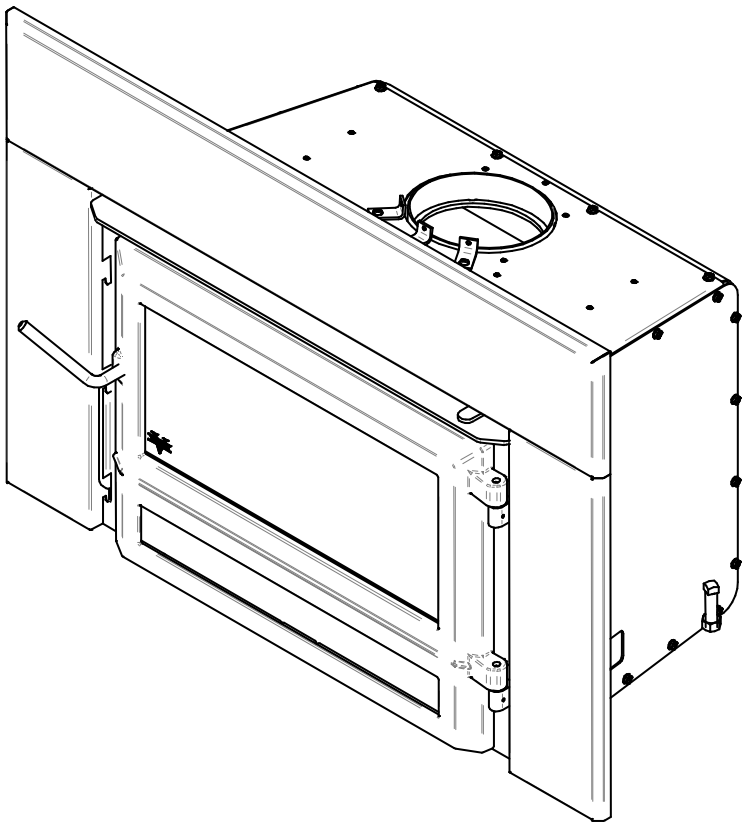
HearthStone Quality Home Heating Products, Inc.
Warranty Department
317 Stafford Avenue
Morrisville, VT 05661
https://www.hearthstonestoves.com/

Product Specification Manual

HEI90 INSERT

(VB00024 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS MANUAL FOR REFERENCE

2021-03-29

Printed in Canada

45983A

ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at



http://www.occanada.com/en/service-support/warranty/warranty-registration

Registering the warranty will help to quickly find the information needed on the unit.

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

C ETL US LISTED

Intertek

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

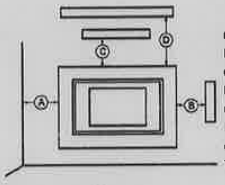
LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

MODEL / MODÈLE :
HEI90

Serial Number / No. de Série: 1

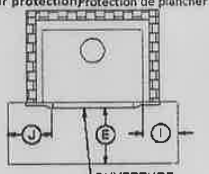
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E:	16 in./po.	(406 mm) USA
	18 in./po.	(457 mm) CANADA
I:	8 in./po.	(203 mm) CANADA
J:	8 in./po.	(203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii)

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

VENTIS

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27880

ENGLISH

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	HEI90 (VB00024)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft³ and 12 lb/ft3. The moisture content is between 19% and 25%.

[3] As measured per CSA B415.1-10 stack loss method.

[4] Higher Heating Value of the fuel.

[5] Lower Heating Value of the fuel.

[6] Optimum overall efficiency at a specific burn rate (LHV).

[7] This appliance is officially tested and certified by an independent agency.

[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

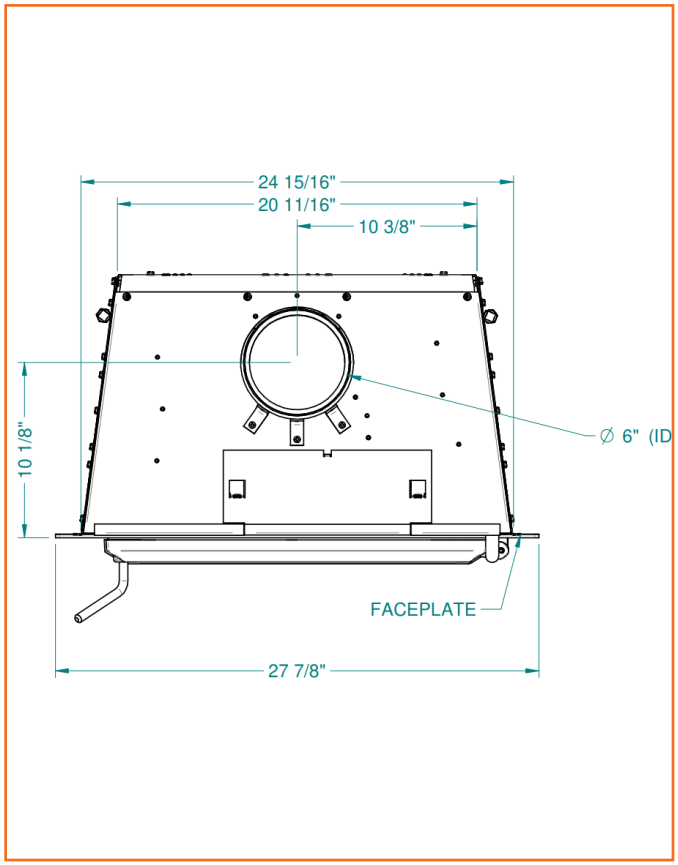


Figure 1 : Top View

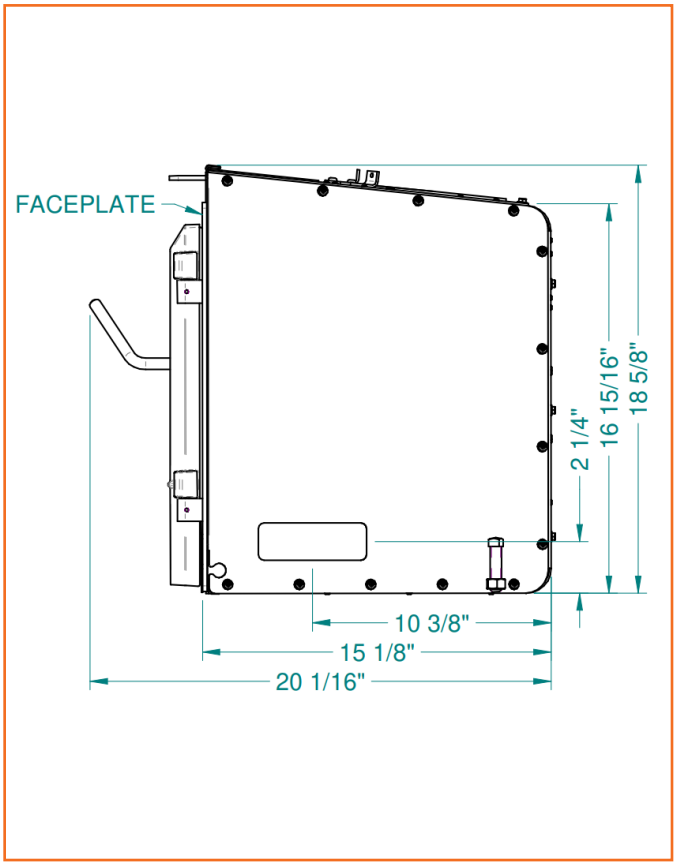


Figure 2 : Side View

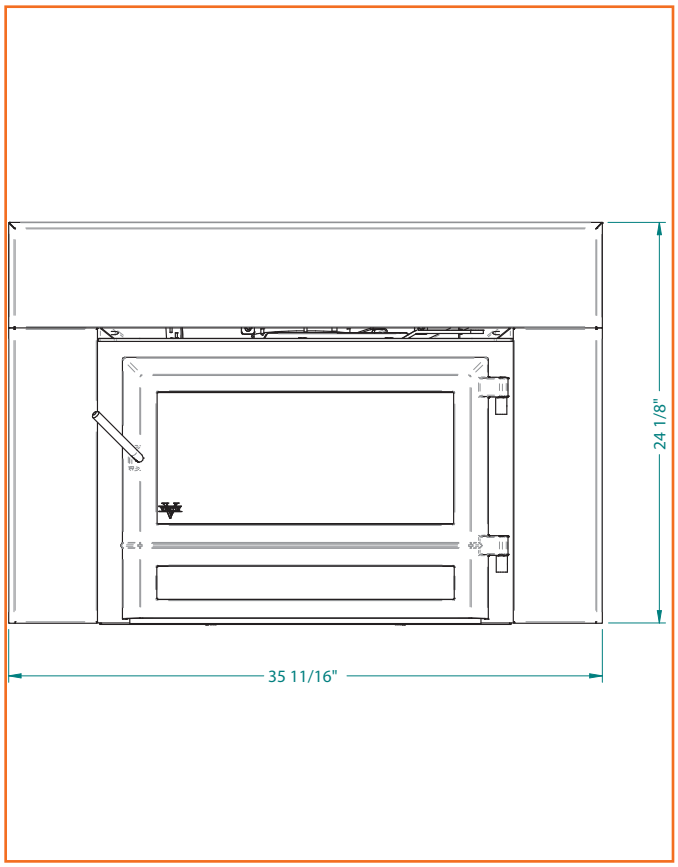


Figure 3 : Front View

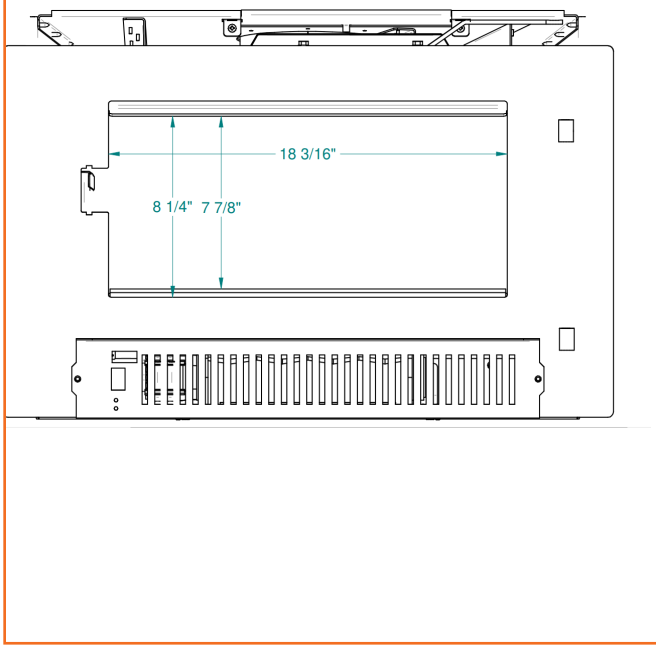


Figure 4 : Door Opening

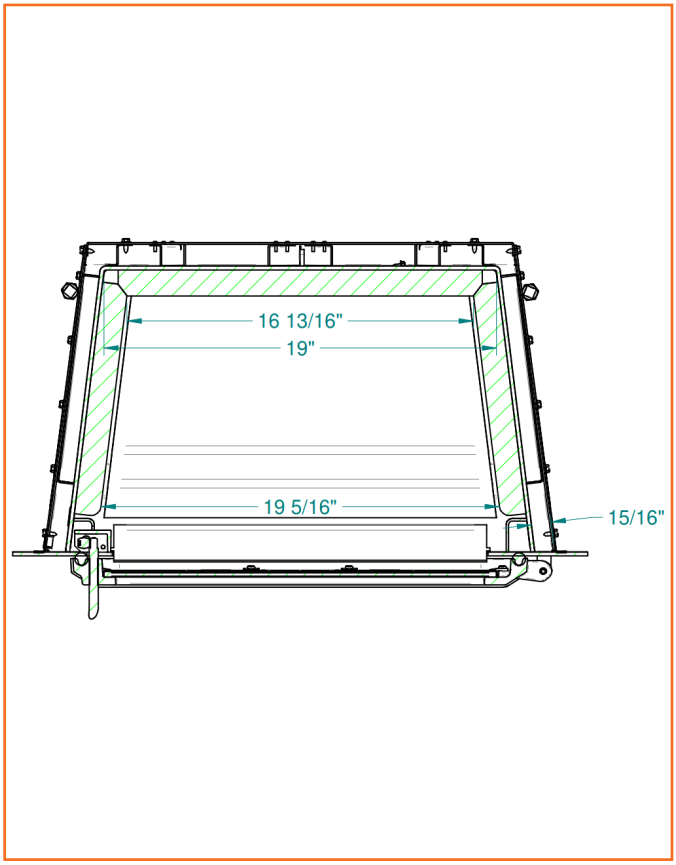


Figure 5 : Top View - Combustion Chamber

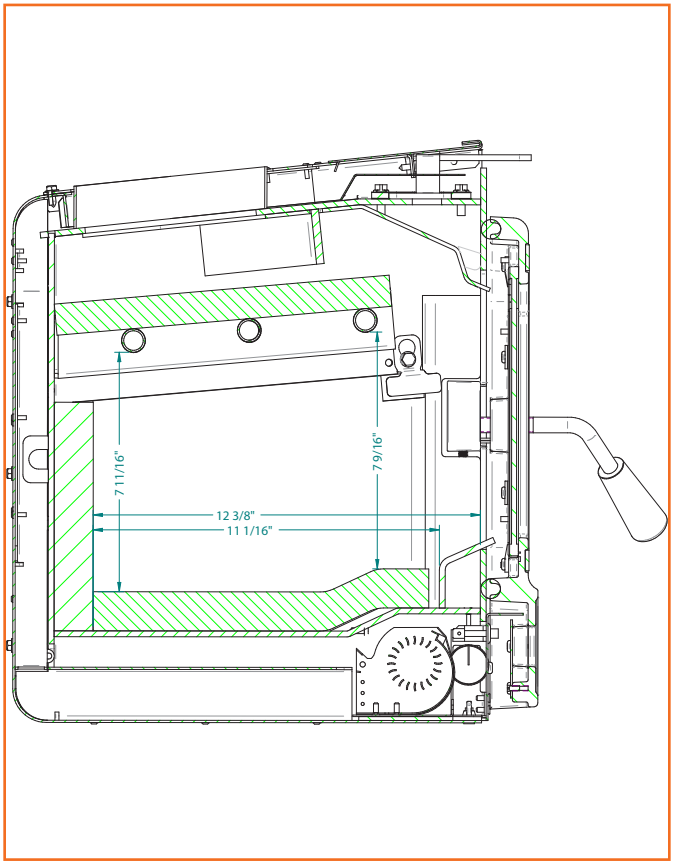
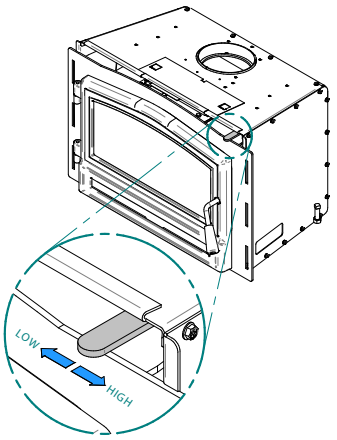


Figure 6 : Side View - Combustion Chamber

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

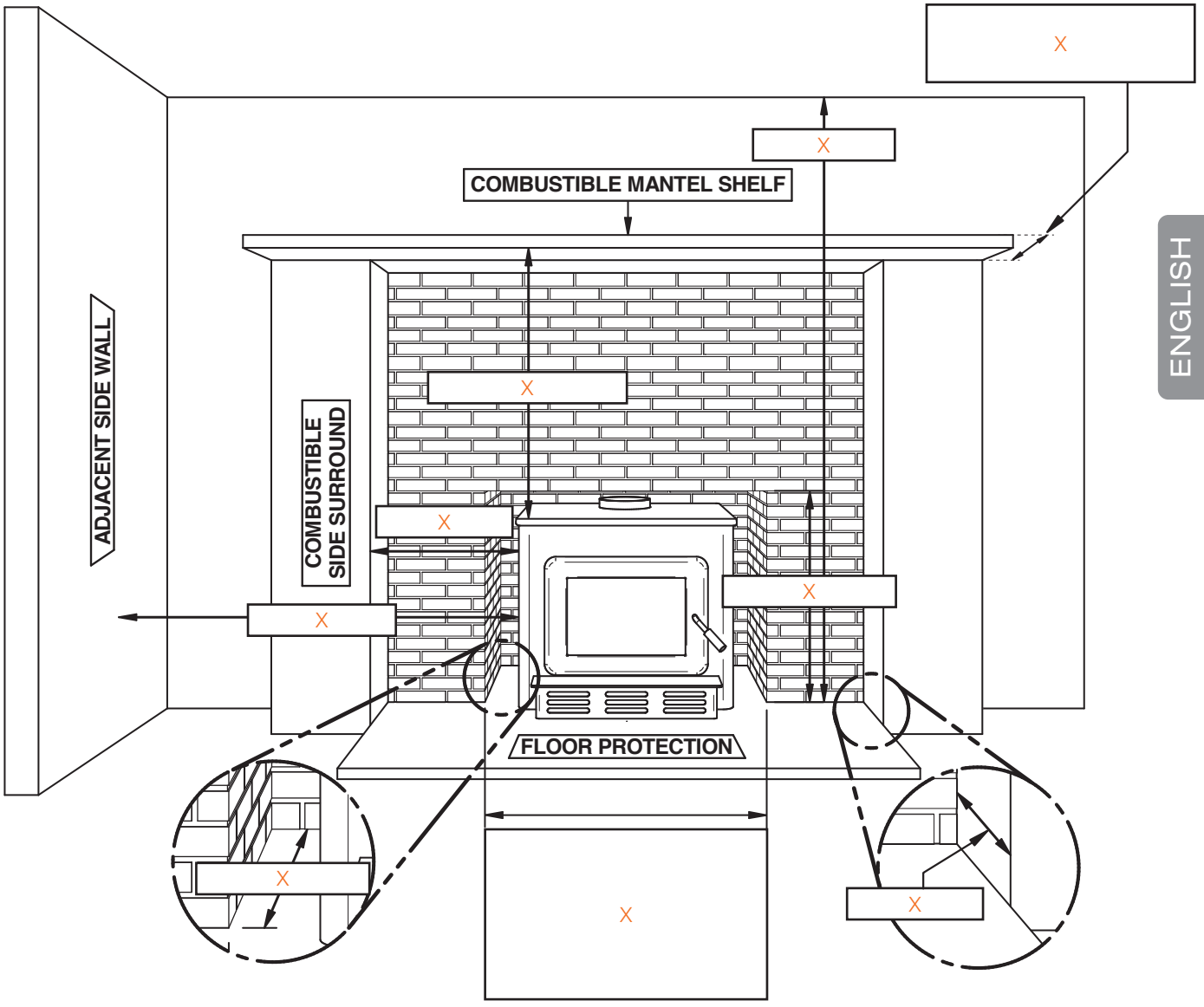
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

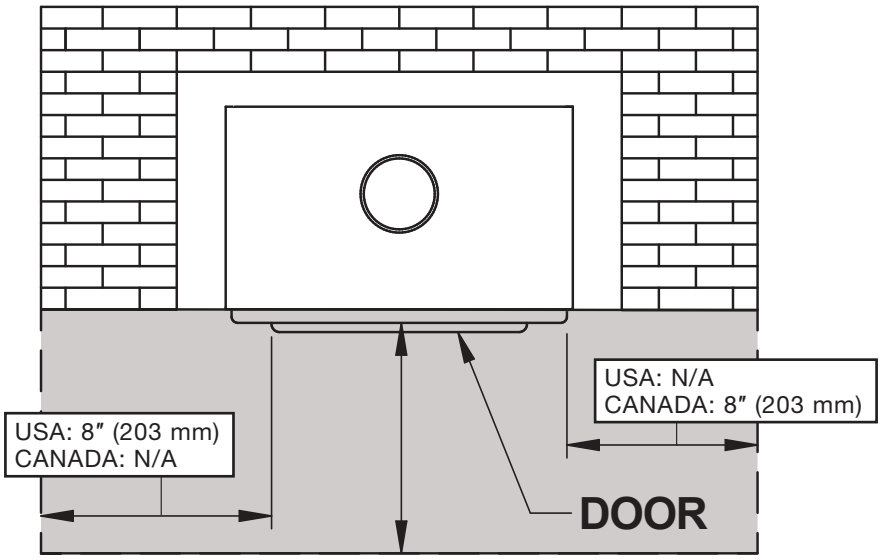
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles



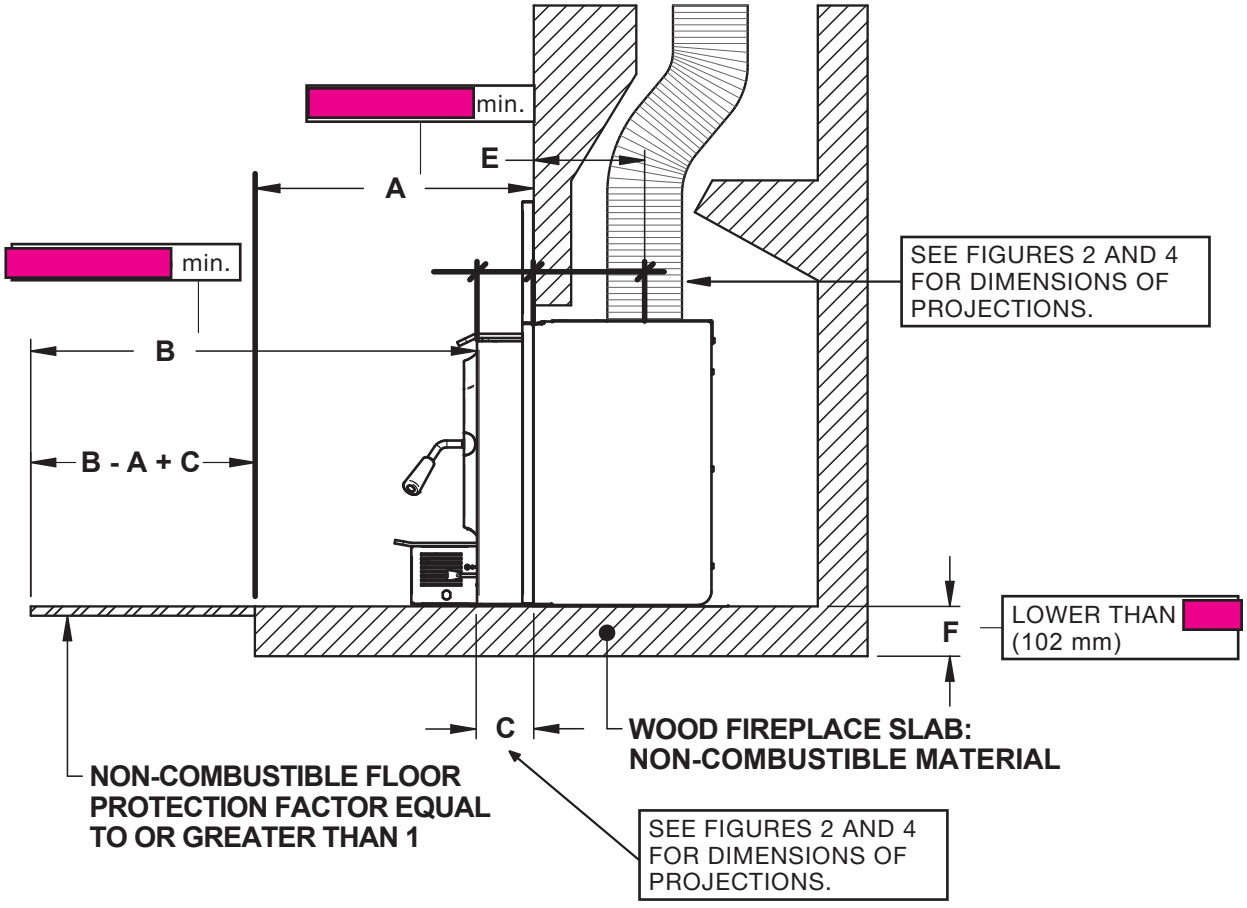
2.2 Floor Protection

It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.

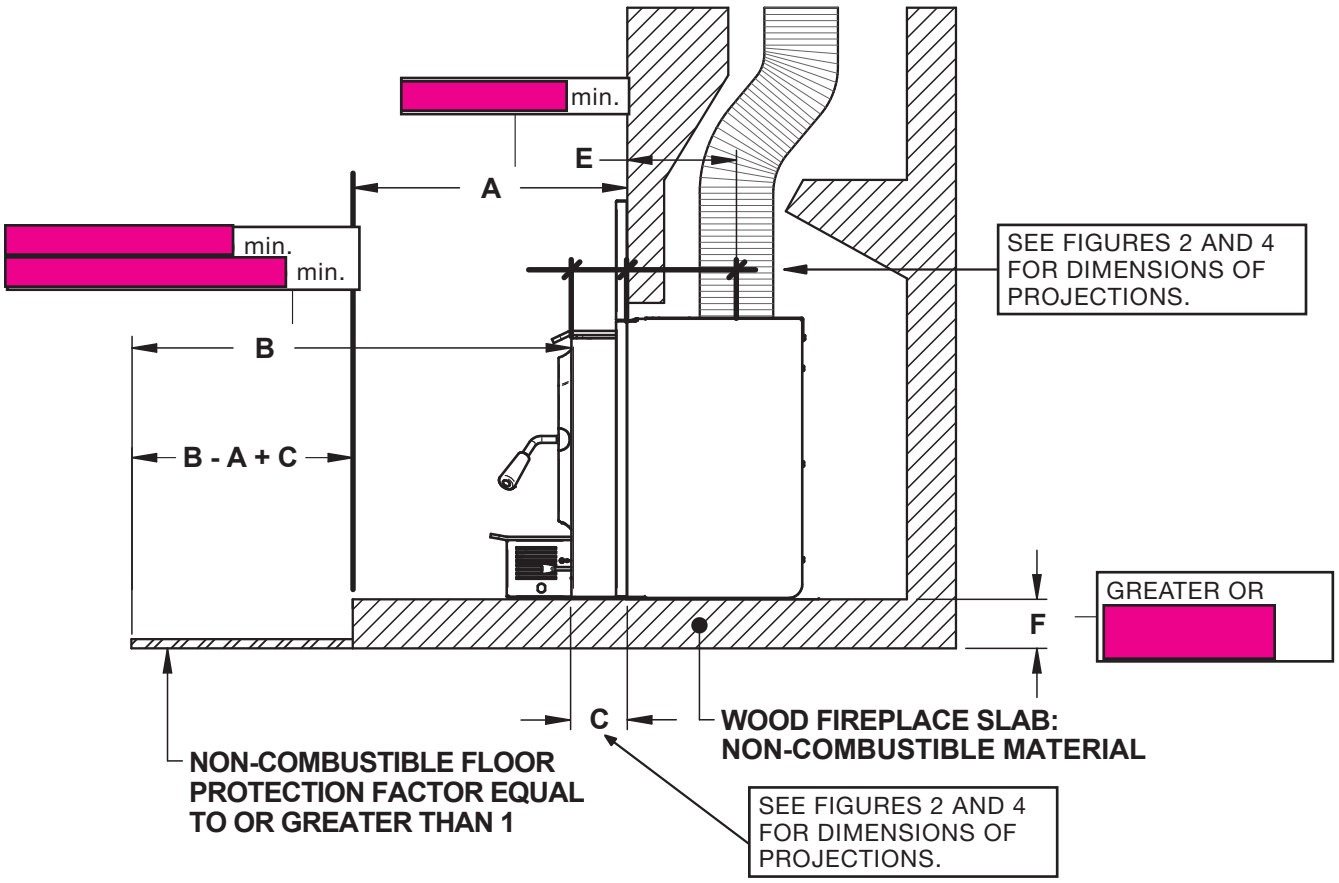


ENGLISH

2.2.1 Installation Raised of [redacted] and Less



2.2.2 *Installation Raised of More Than*



ENGLISH

2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

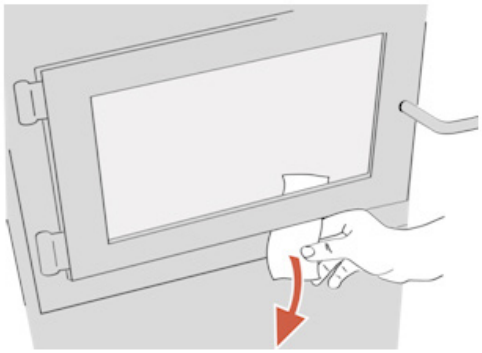
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

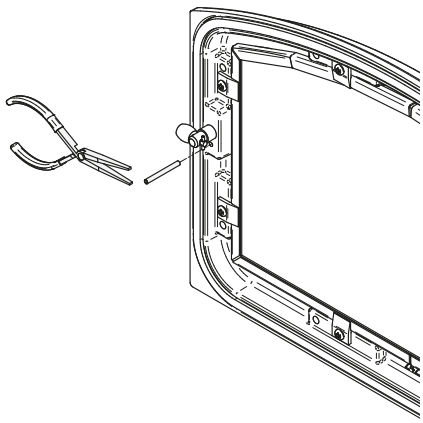


Figure 7 : Removing the split pin

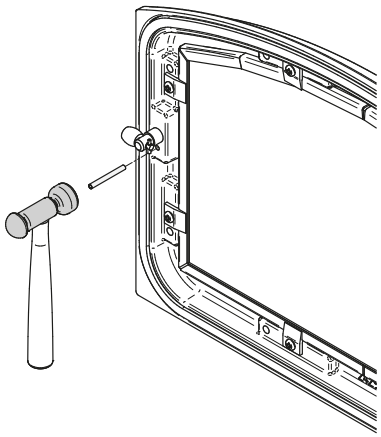
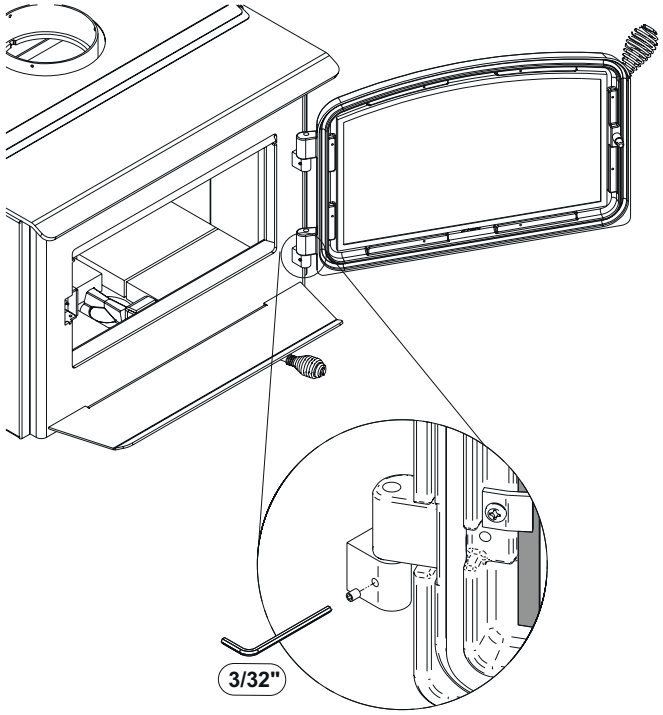
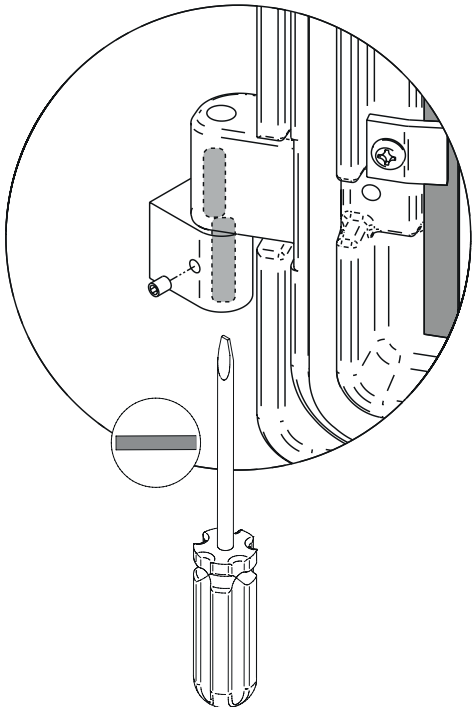


Figure 8 : Installing the split pin

3.1.3 Door Alignment

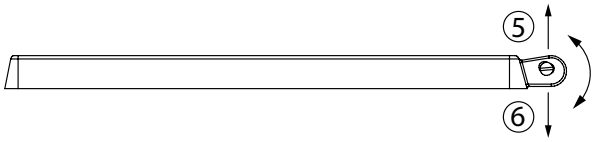
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

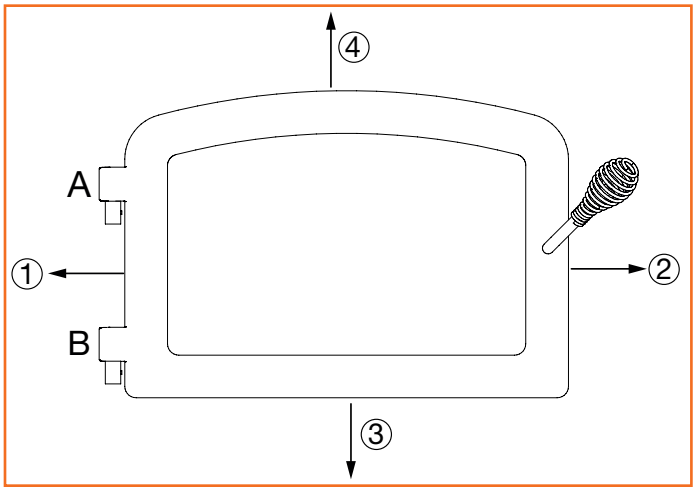


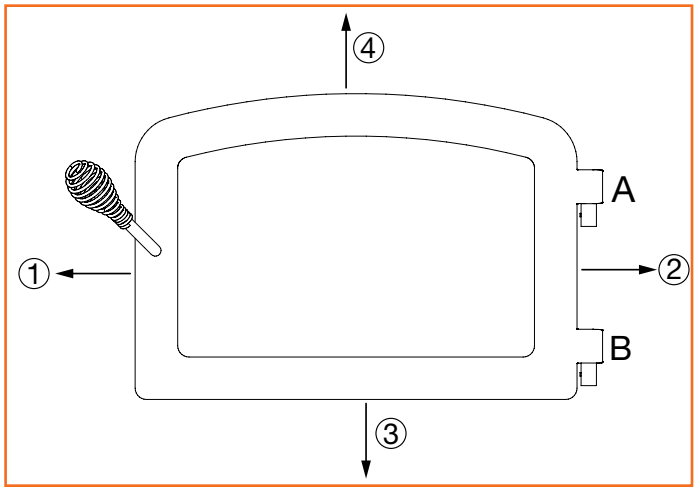


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



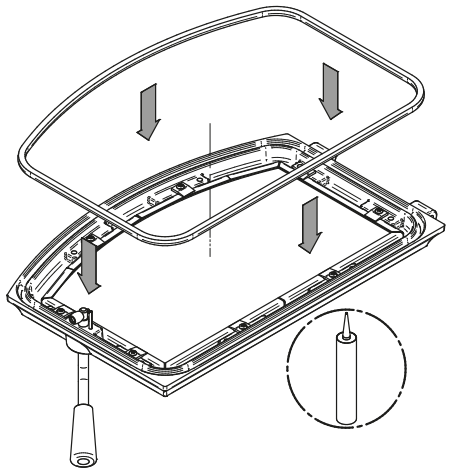




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

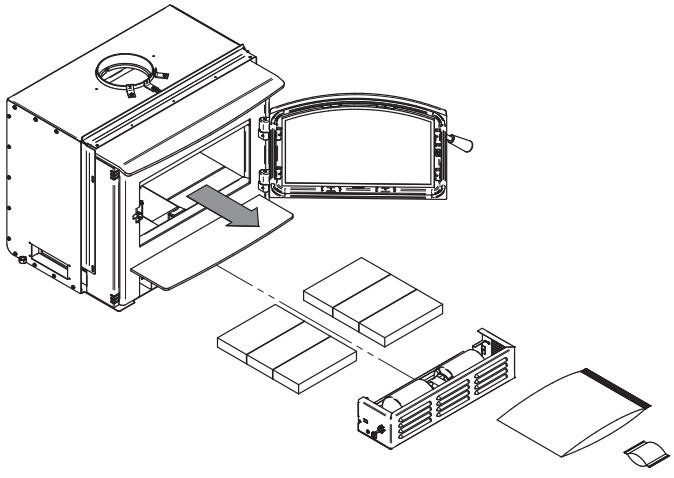


Figure 9 : Empty the combustion chamber

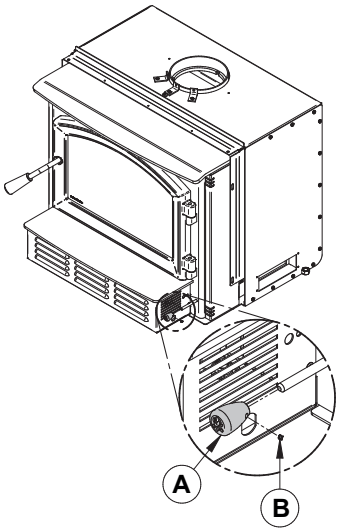


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

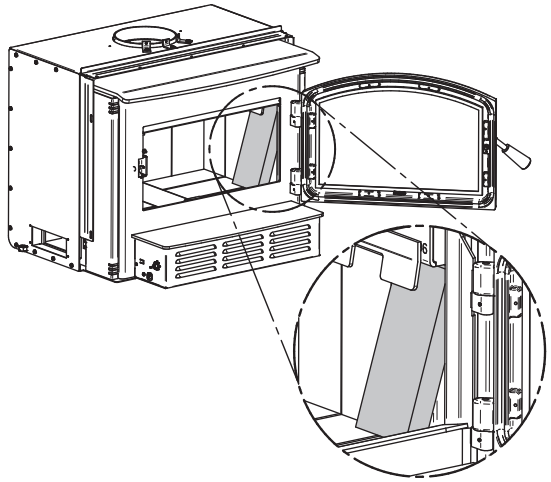


Figure 11 : Install the Combustion Chamber Bricks

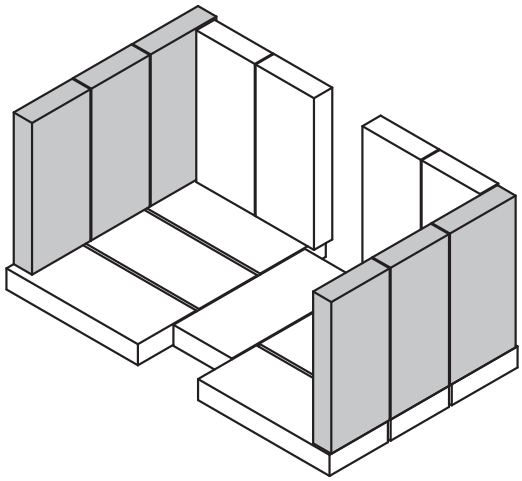
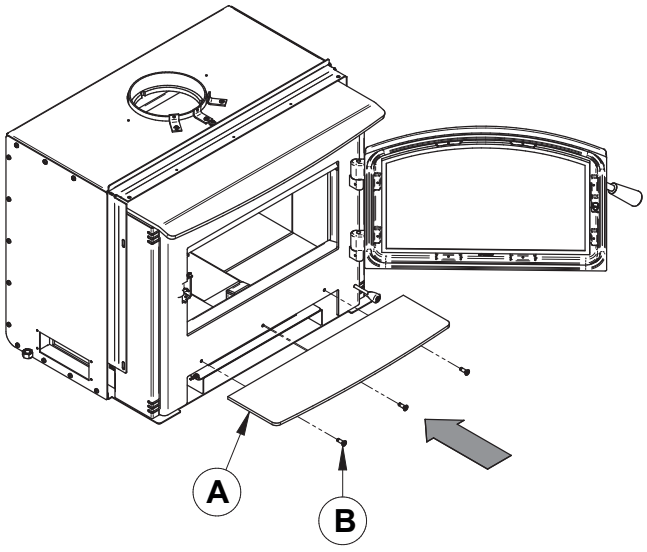


Figure 12 : Combustion Chamber Bricks Layout

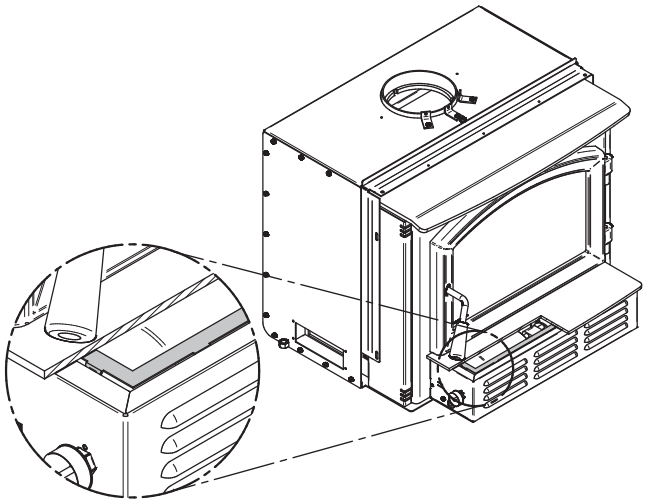
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



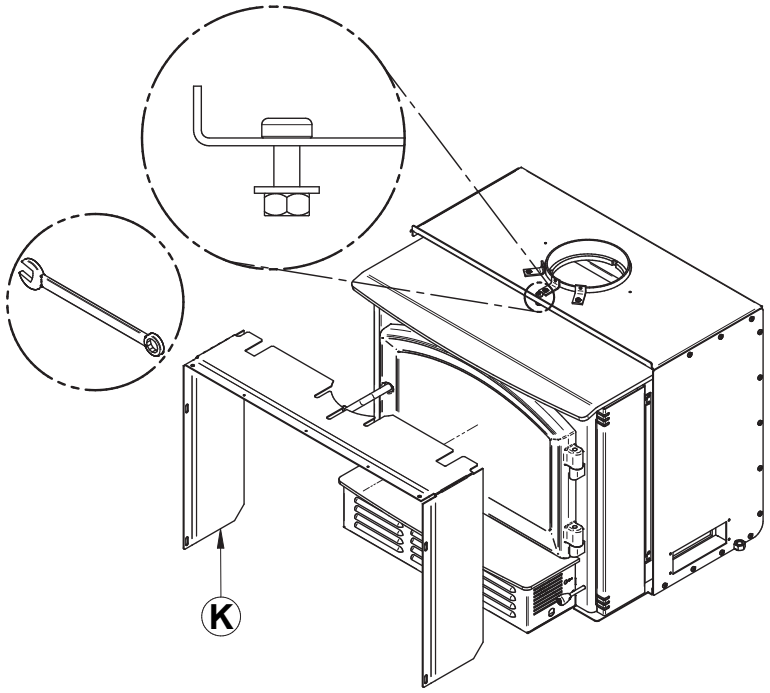
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



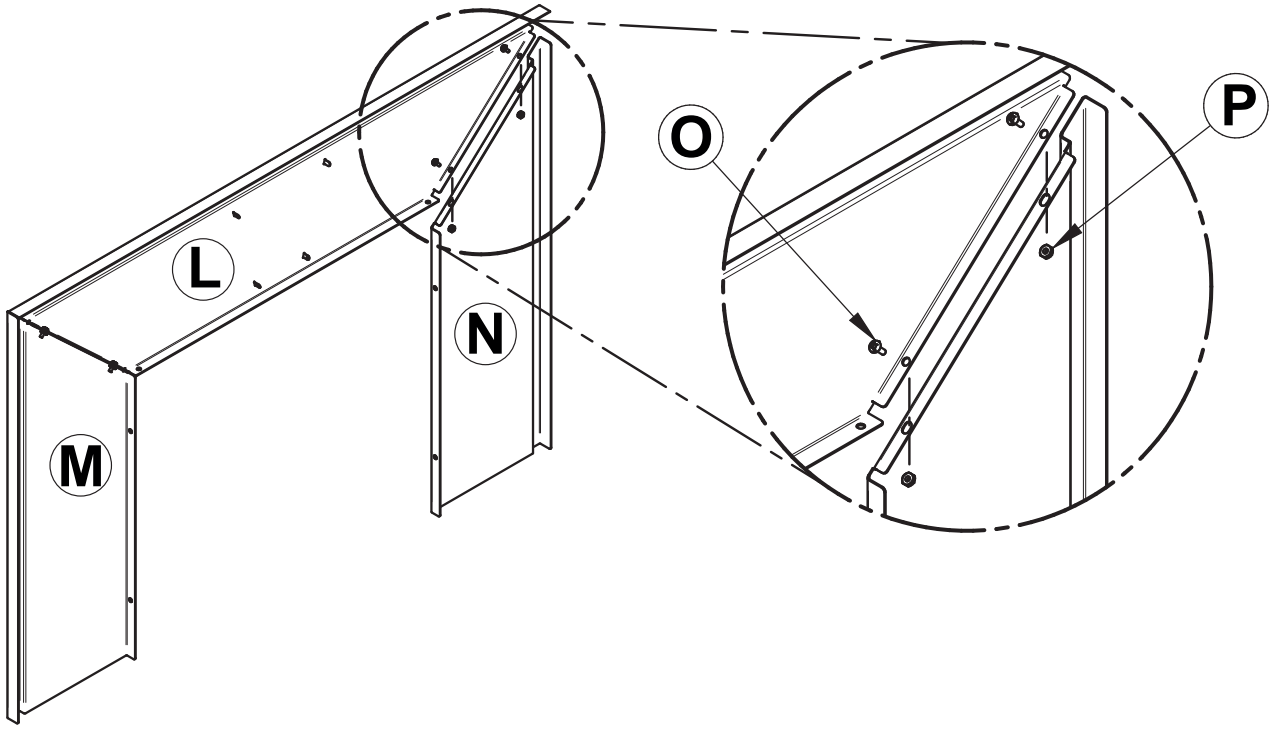
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

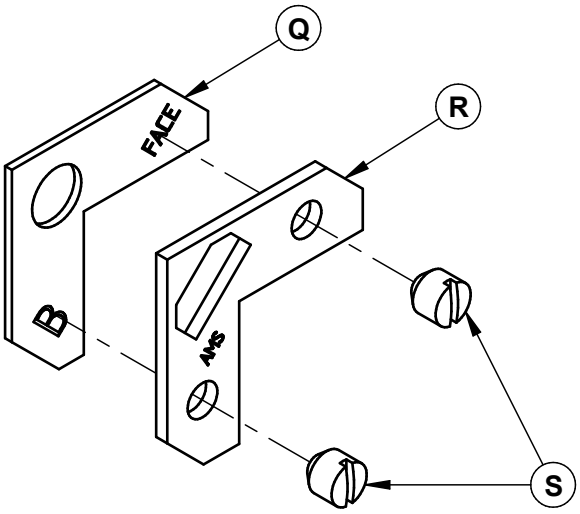
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



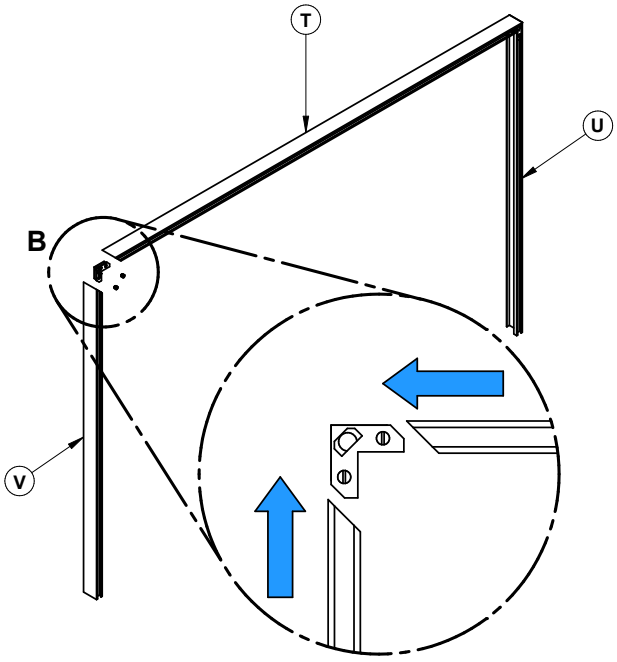
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

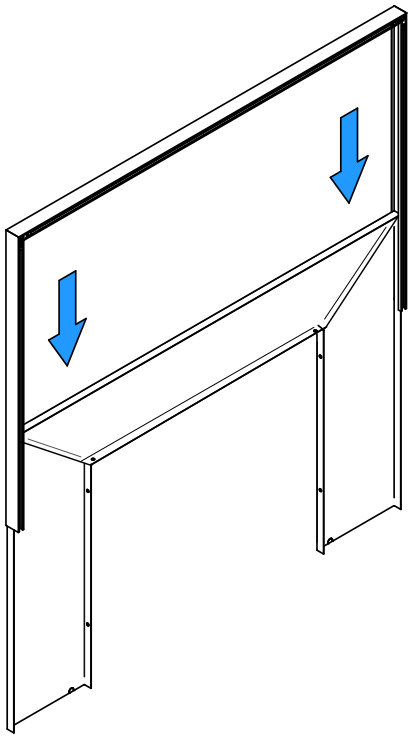


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

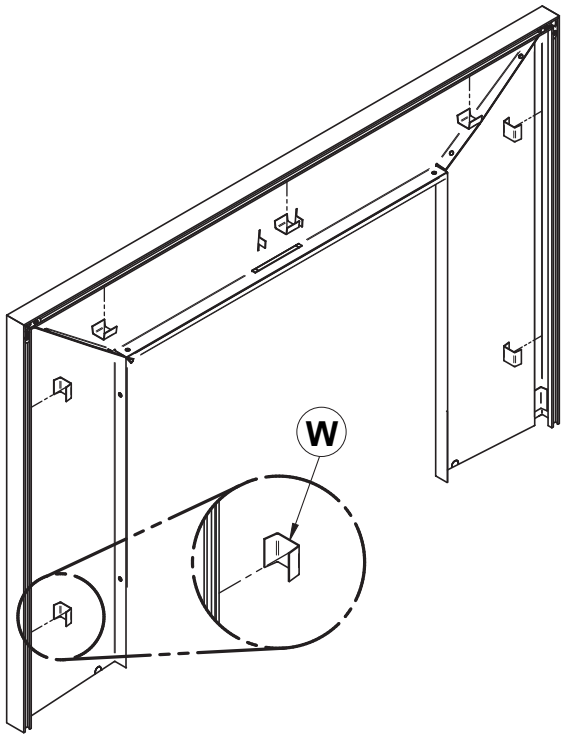


DETAIL B

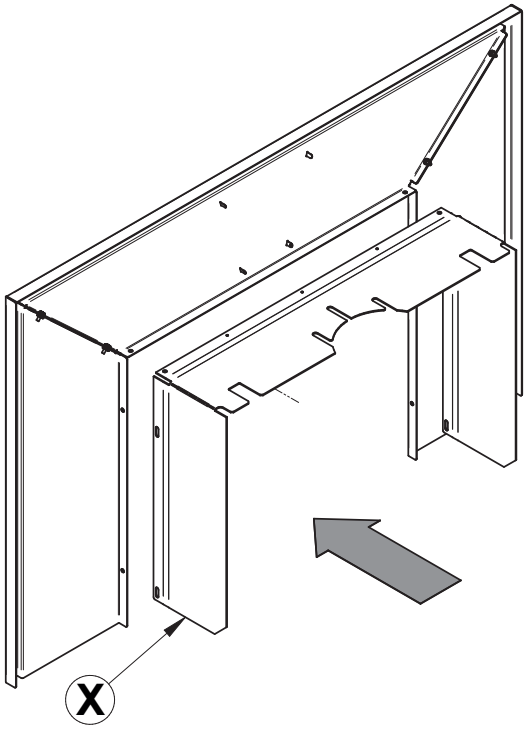
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



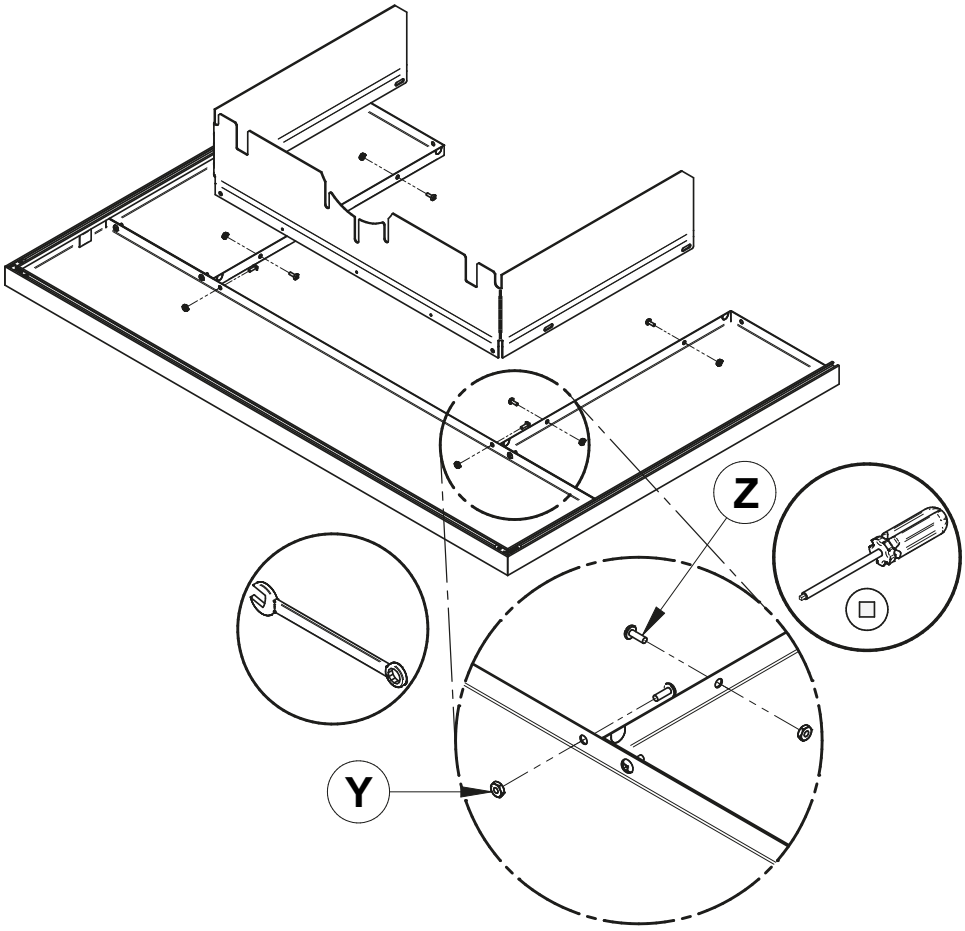
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

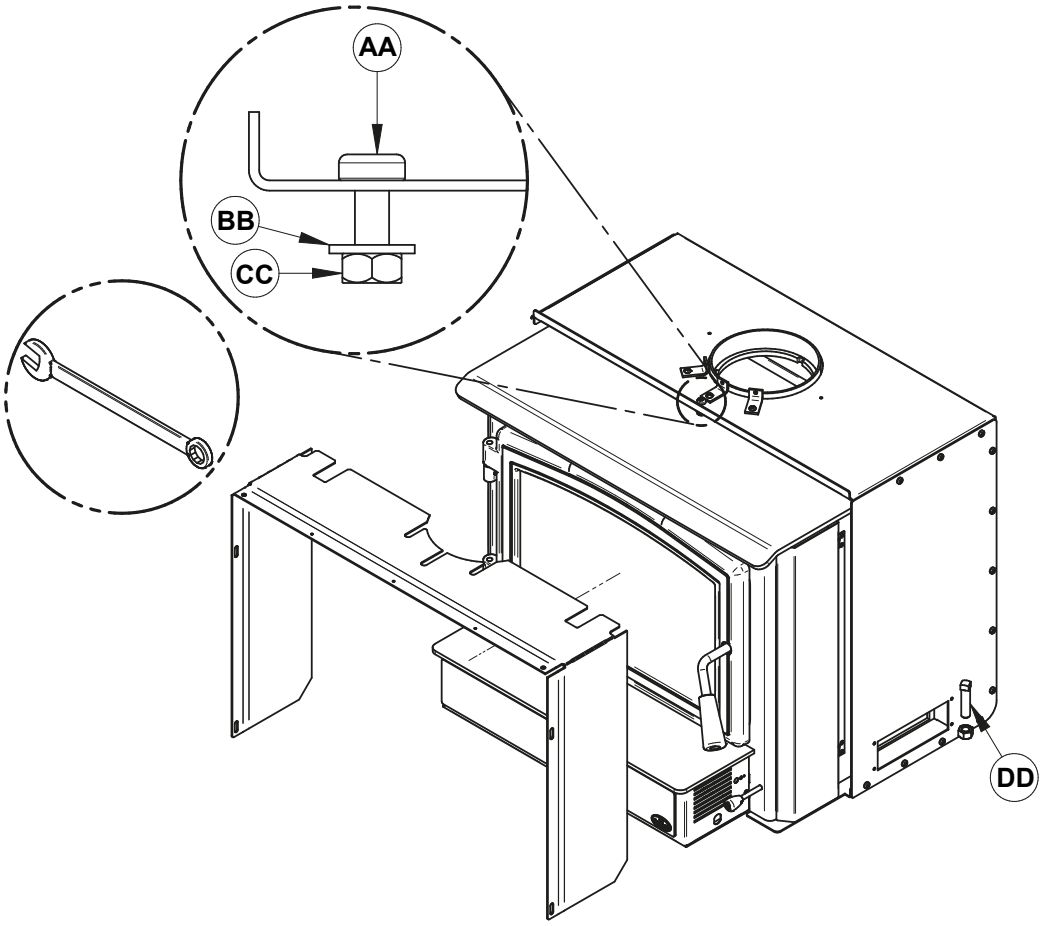


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

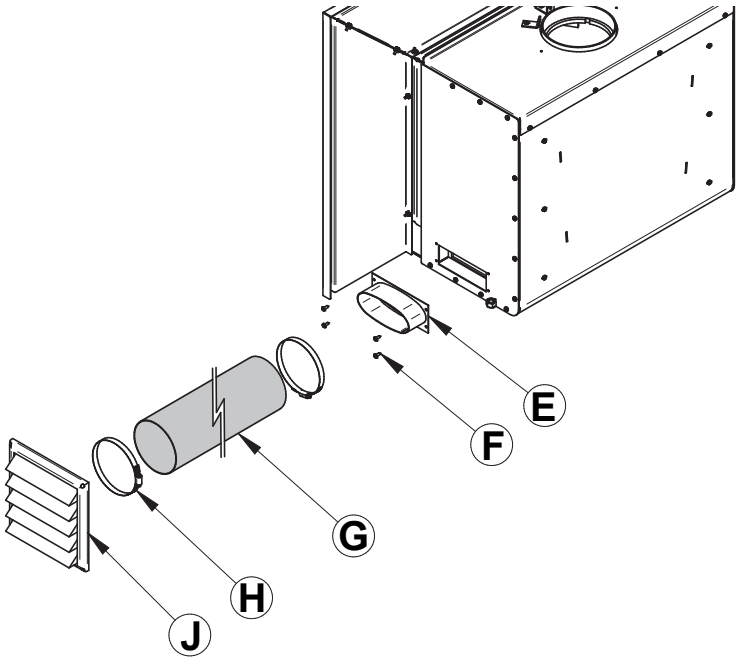


3.5 Optional Fresh Air Intake Kit Installation

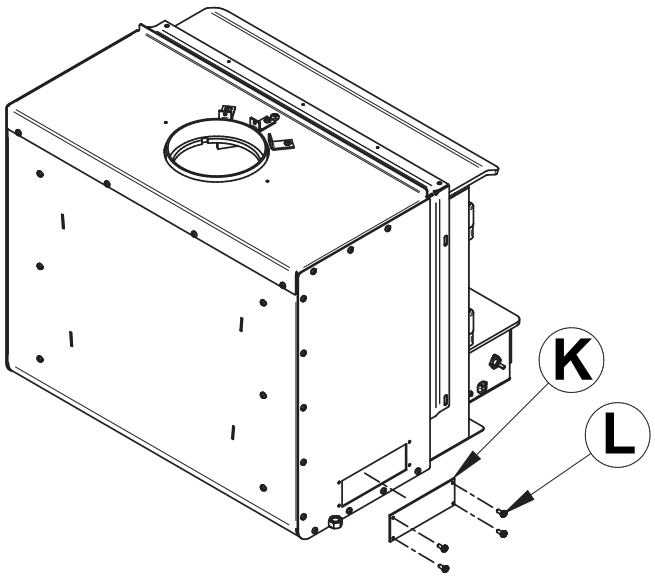
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



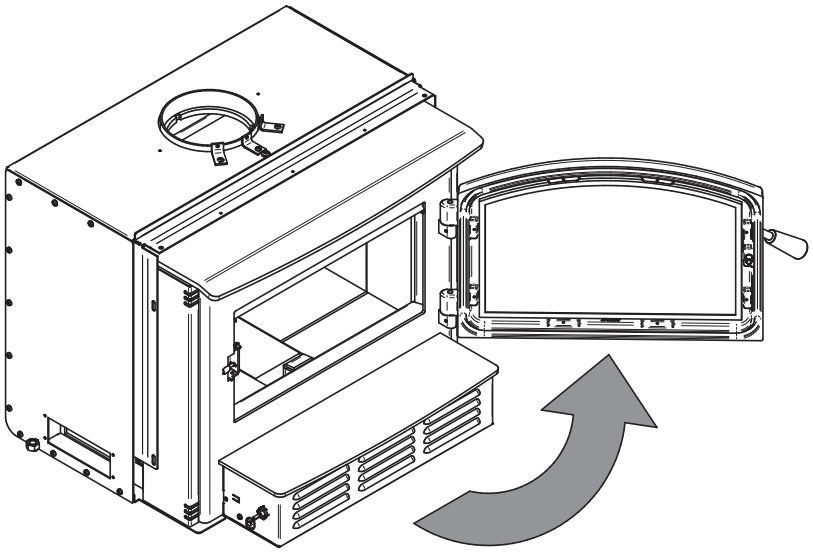
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

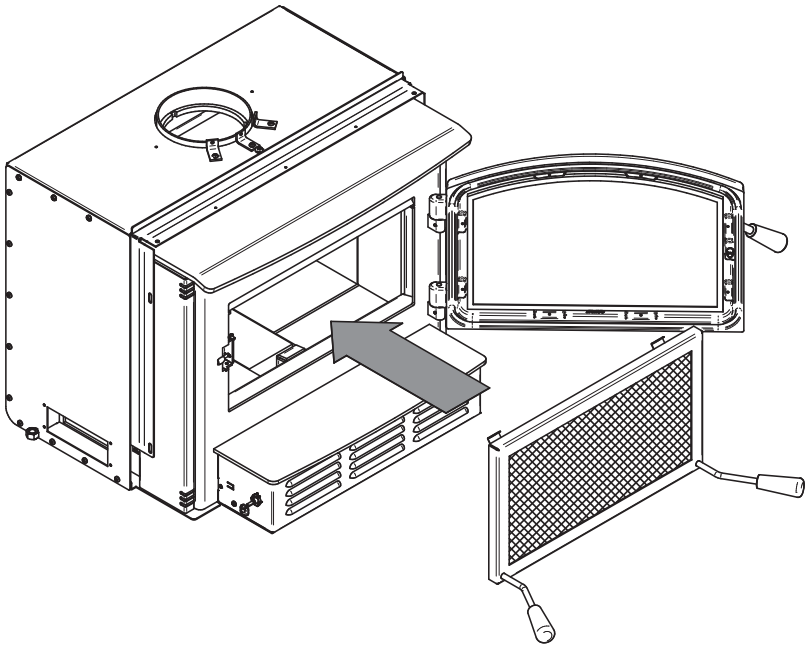
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



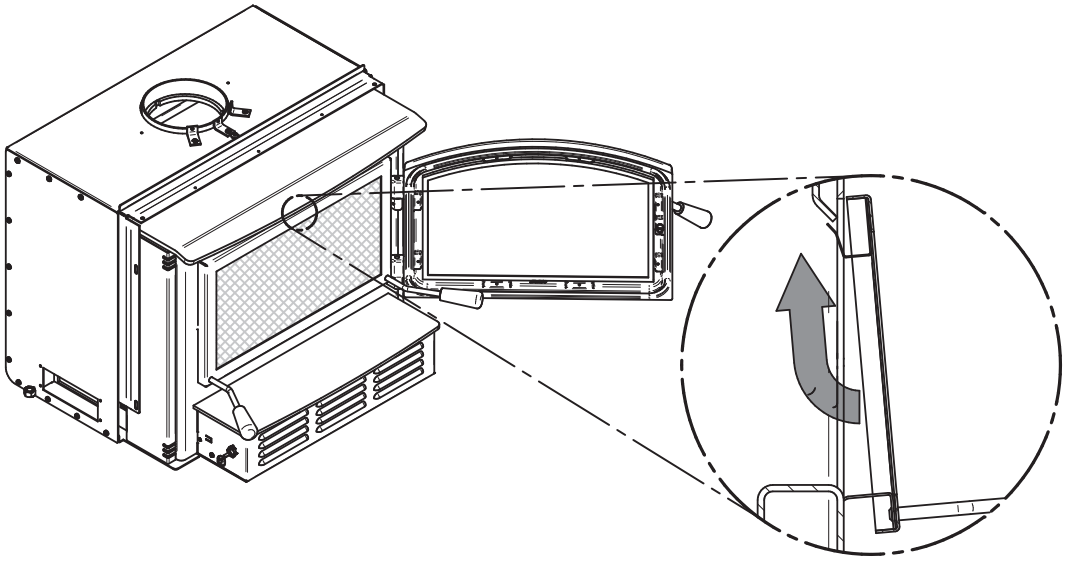
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

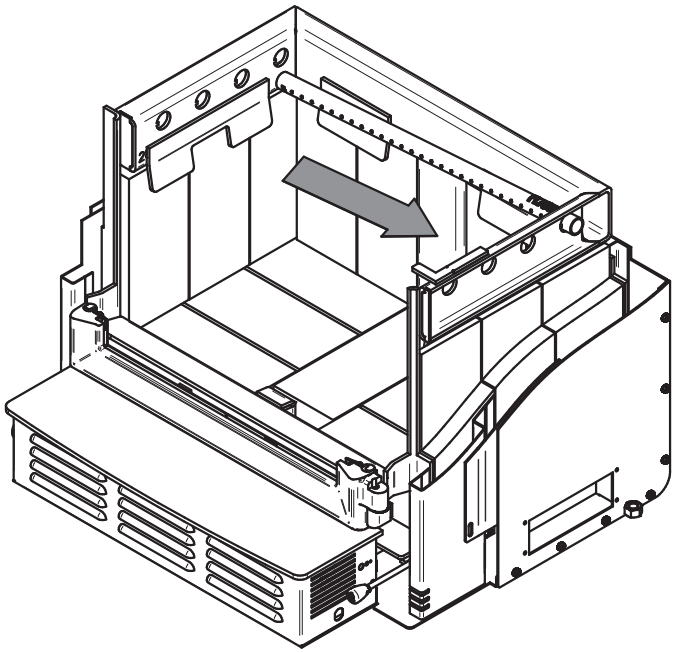
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.



3.7 Air Tubes and Baffle Installation

1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

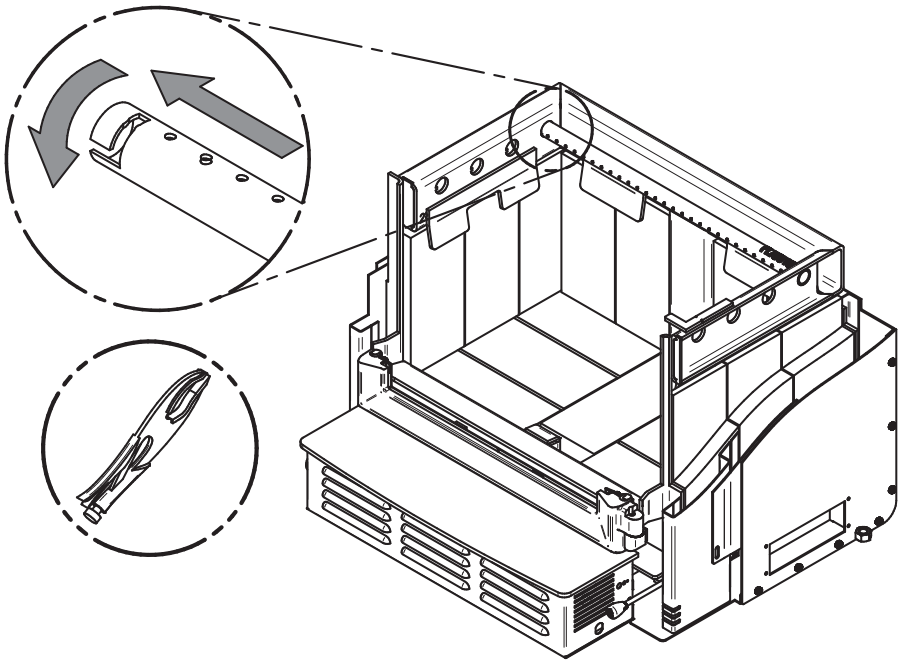


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.

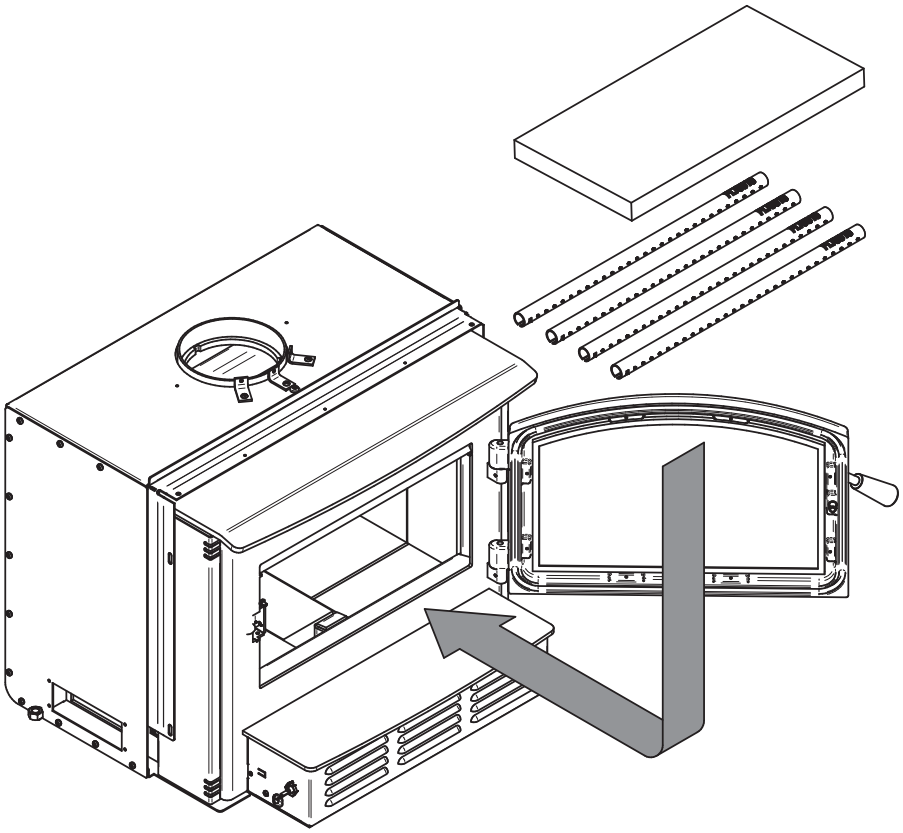
3. Install the baffle.

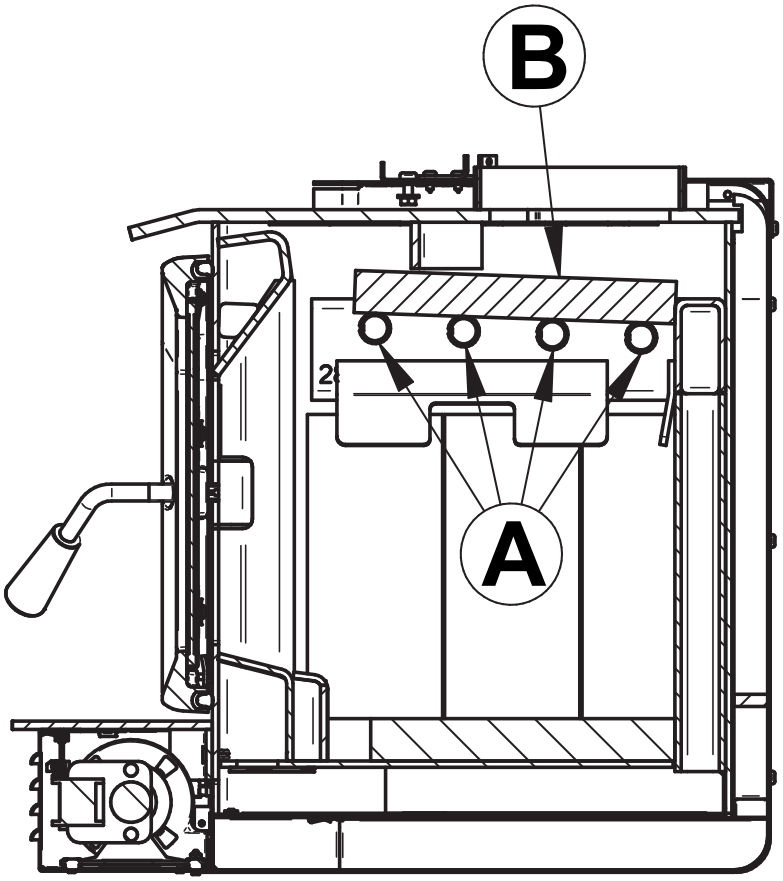
4. Repeat steps 1 and 2 for the three other tubes.

5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

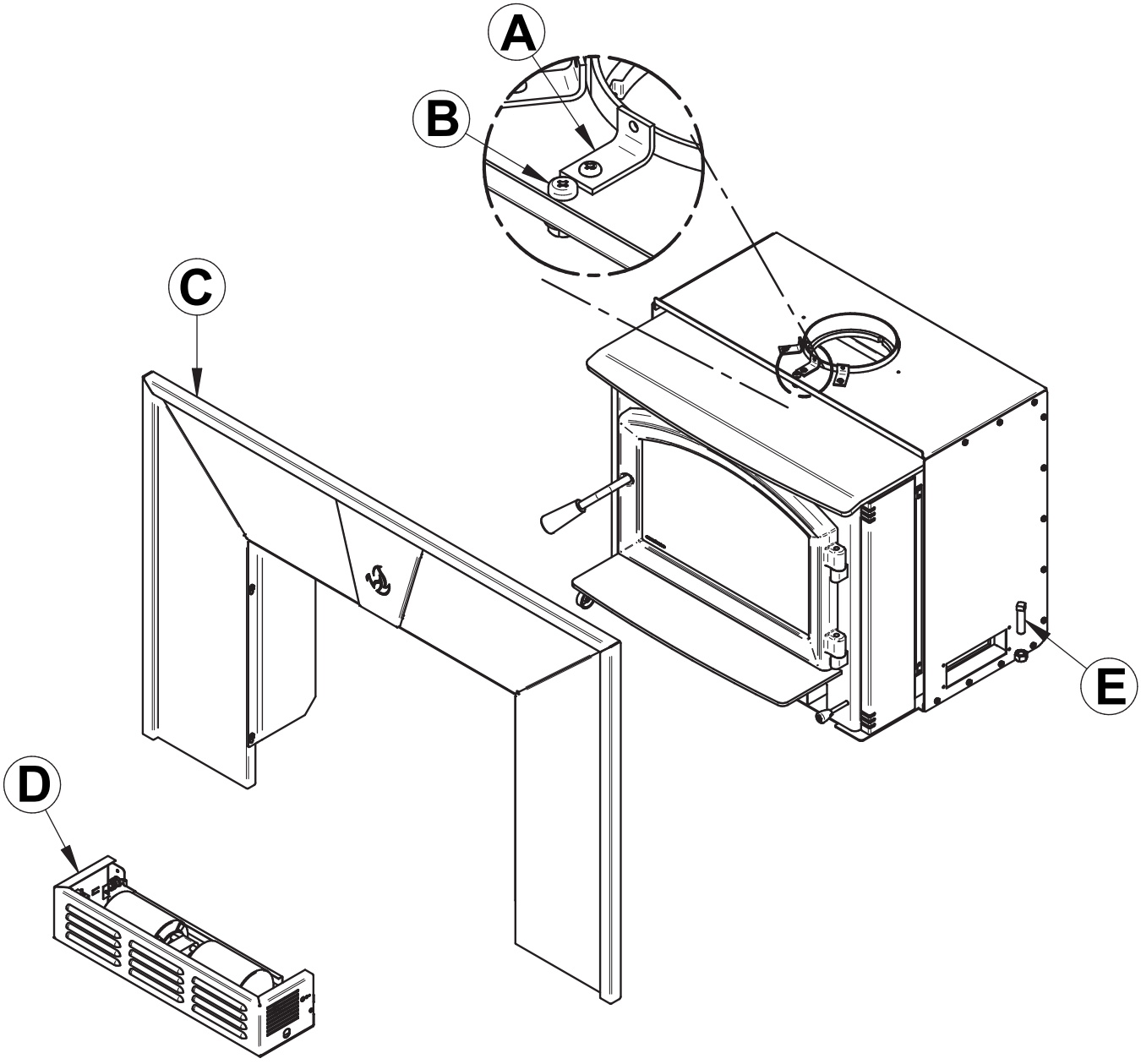



B
A

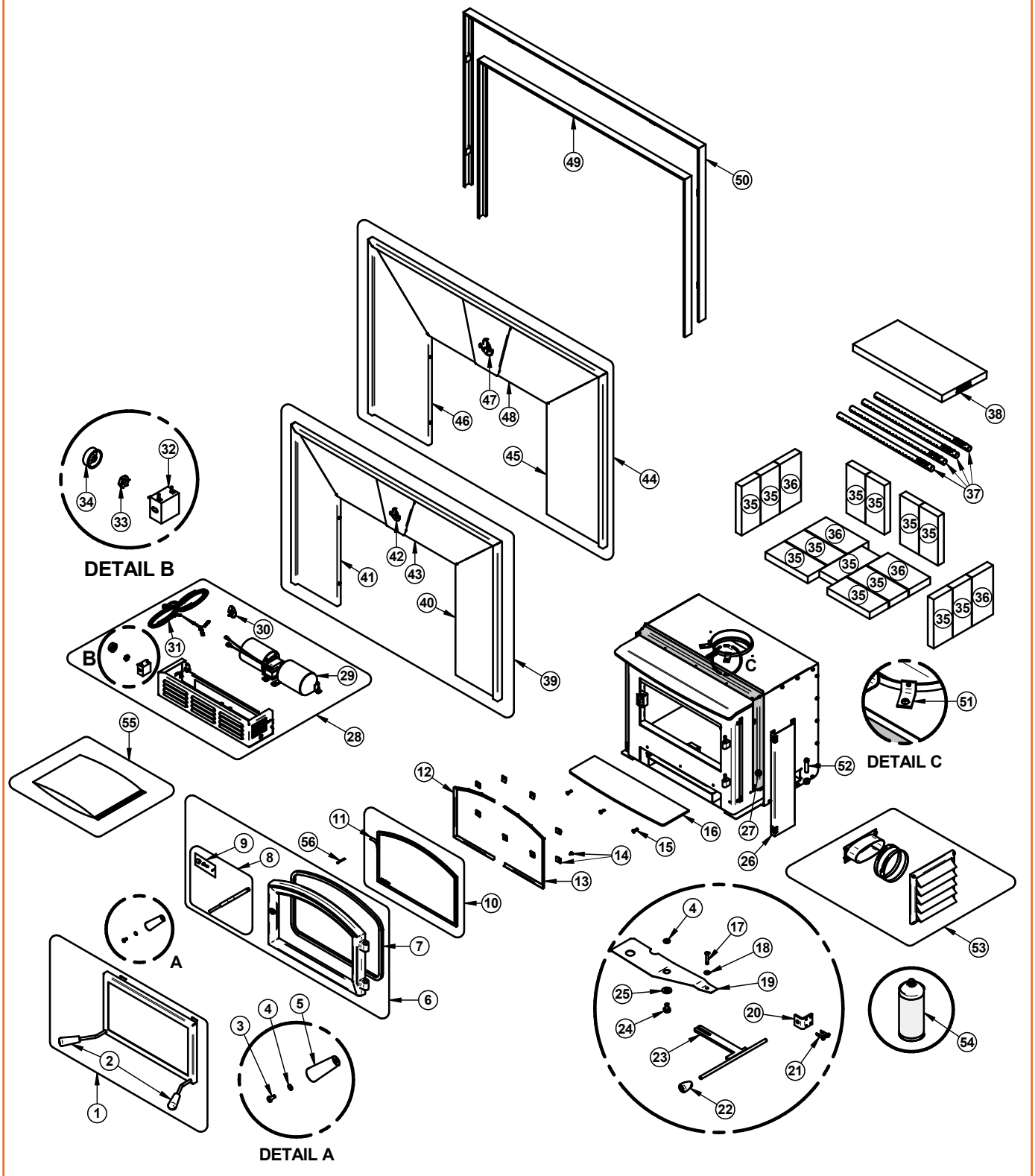
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

VENTIS LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from the factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to the dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or underestimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than the original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after March 1st 2019.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass**, plating (manufacturing defect**) and convector air mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

*Subject to limitations above. **Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement parts.

Shall your unit or a component be defective, contact immediately your dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to the sender.

This document is available for free download on the manufacturer's website. It is a copyrighted document. Resale is strictly prohibited. The manufacturer may update this document from time to time and cannot be responsible for problems, injuries, or damages arising out of the use of information contained in any document obtained from unauthorized sources.



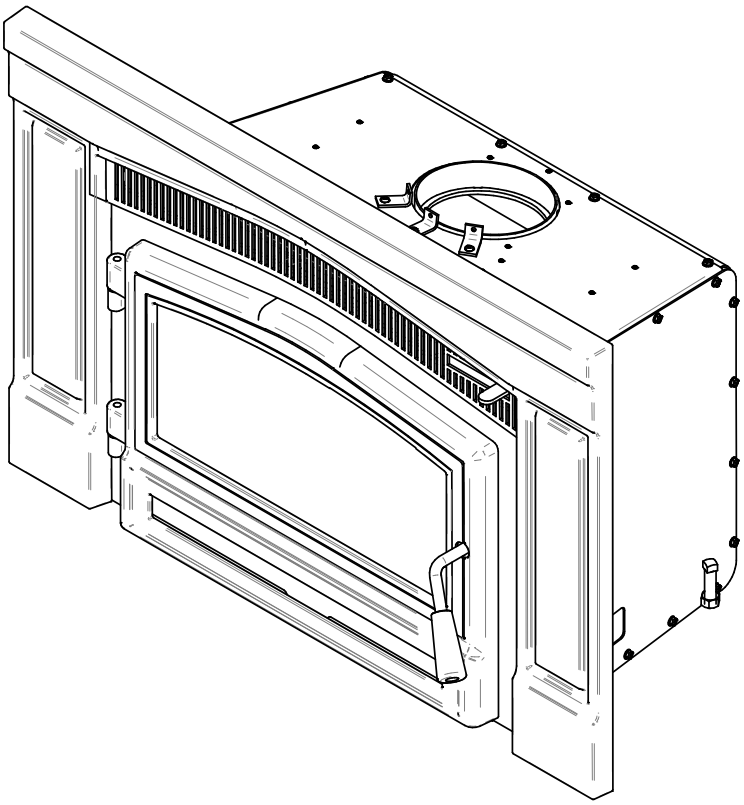
Stove Builder International inc.
250, rue de Copenhague,
St-Augustin-de-Desmaures (Québec) Canada
G3A 2H3
418-908-8002
http://www.occanada.com/en
tech@sbi-international.com

Product Specification Manual

MATRIX 1900 INSERT

(OB01900 Model)

ENGLISH



US Environmental Protection Agency phase II certified wood insert compliant with 2020 cord wood standard.

EPA ≤2.5 g/h

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

2021-03-29

READ AND KEEP THIS MANUAL FOR REFERENCE

Printed in Canada

45983A

ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at



https://www.osburn-mfg.com/en/warranty/warranty-registration/

Registering the warranty will help to quickly find the information needed on the unit.

Dealer: _____

_____

Installer: _____

_____

Phone Number: _____

Serial Number: _____

CERTIFICATION PLATE

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

Intertek

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

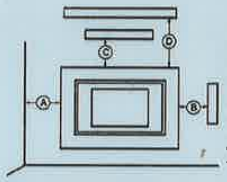
MODEL / MODÈLE :
MATRIX 1900

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number
No. de Série
1

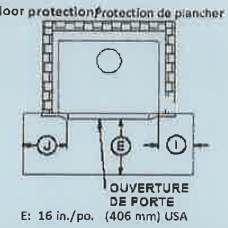
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E: 16 in./po. (406 mm) USA
18 in./po. (457 mm) CANADA
I: 8 in./po. (203 mm) CANADA
J: 8 in./po. (203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27877

ENGLISH

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ENGLISH

1. General Information

1.1 Performances

Values are as measured per test method, except for the recommended heating area, firebox volume, maximum burn time and maximum heat output.

Models	Matrix 1900 (OB01900)	
Fuel Type	Dry Cordwood	
Recommended heating area (sq. ft..)[1]	250 to 1,500 ft^2 (23 to 139 m^2)	
Nominal firebox volume	1.2 ft^3 (0.034 m^3)	
Loading volume EPA	1.03 ft^3 (0.0292 m^3)	
Maximum burn time[1]	7 hours	
Overall heat output rate (min. to max.)[2] [3]	8,471 BTU/h to 31,893 BTU/h (2.48 kW to 9.35 kW)	
Average overall efficiency[3] - Dry cordwood	75 % (HHV)[4]	80 % (LHV)[5]
Optimum efficiency[6]	82 %	
Average particulate emissions rate[7]	1.5 g/h (EPA / CSA B415.1-10)[8]	
Average CO[9]	35 g/h	

ENGLISH

[1] Recommended heating area and maximum burn time may vary subject to location in home, chimney draft,heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.
[2] The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft3 and 20 lb/ft3. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft³ and 12 lb/ft3. The moisture content is between 19% and 25%.
[3] As measured per CSA B415.1-10 stack loss method.
[4] Higher Heating Value of the fuel.
[5] Lower Heating Value of the fuel.
[6] Optimum overall efficiency at a specific burn rate (LHV).
[7] This appliance is officially tested and certified by an independent agency.
[8] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.
[9] Carbon monoxide.

1.2 Specifications

Maximum log length[10]	17 in (432 mm) east-west
Flue outlet diameter	6 in (150 mm)
Recommended connector pipe diameter	6 in (150 mm)
Type of chimney	ULC S635, CAN/ULC-S640, UL 1777
Baffle material	C-Cast or Vermiculite
Approved for alcove installation	X
Approved for mobile home installation[11]	X
Type of door	Simple, glazed, with cast iron frame
Type of glass	Ceramic glass
Blower	Included or Optional (up to XXX CFM)
Particulate emission standard[12]	EPA / CSA B415.1-10

ENGLISH

[10] North-south: ends of the logs visible, East-west: sides of the logs visible.
[11] Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSAZ240 MH standard.
[12] Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii) and ASTM E3053-17 based on the ALT-125 send by EPA on February 28th, 2018.

1.3 Dimensions

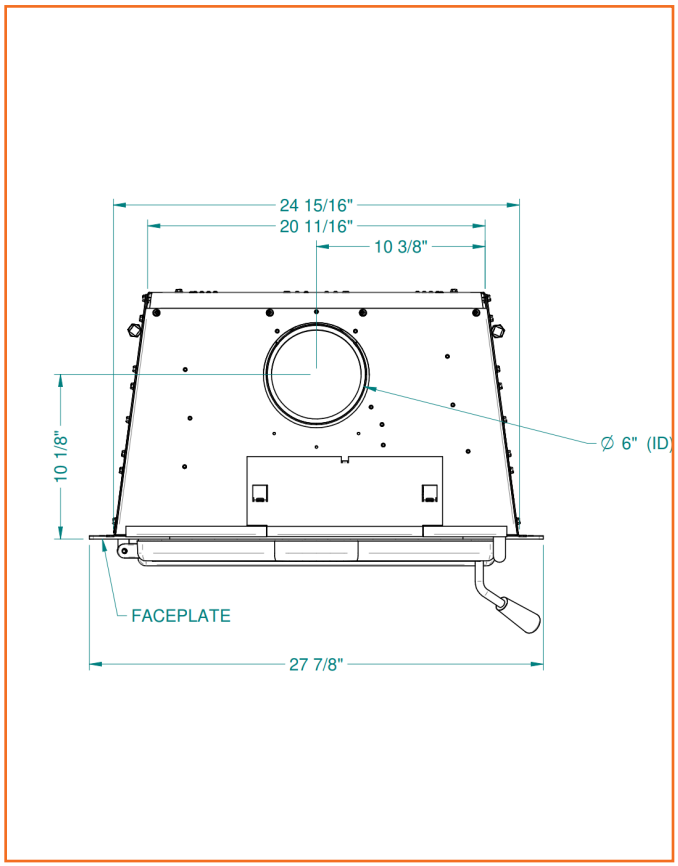


Figure 1 : Top View

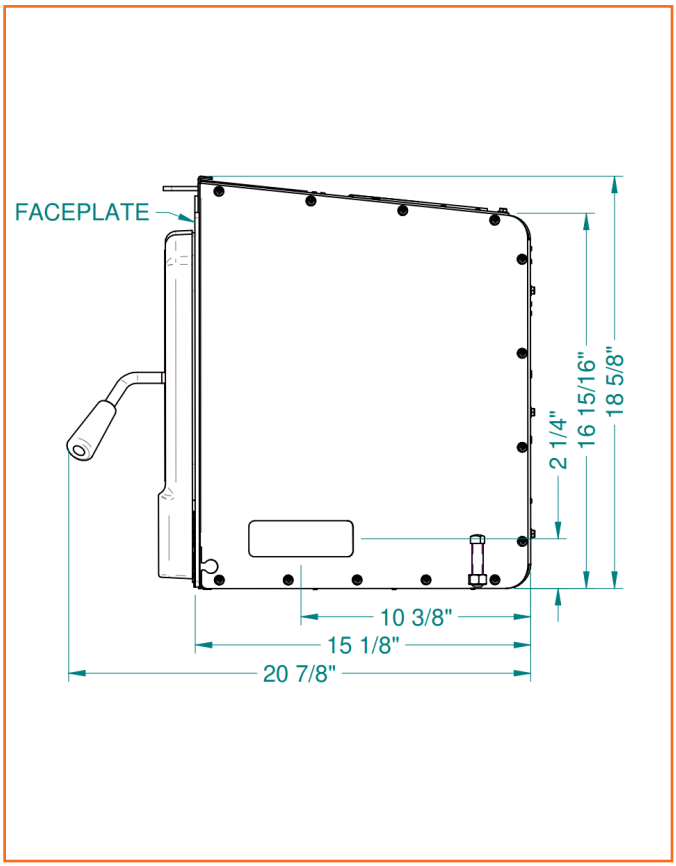


Figure 2 : Side View

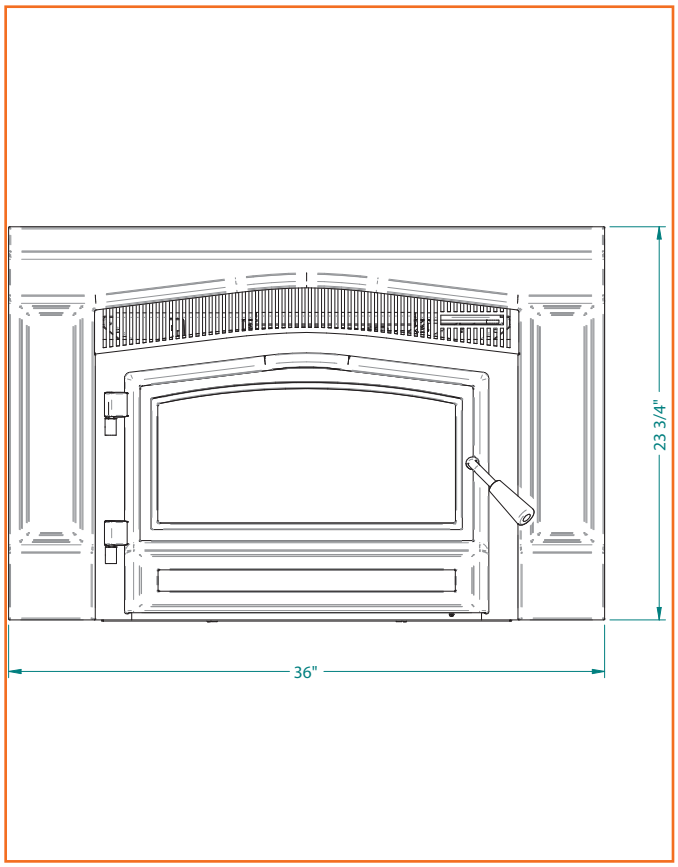


Figure 3 : Front View

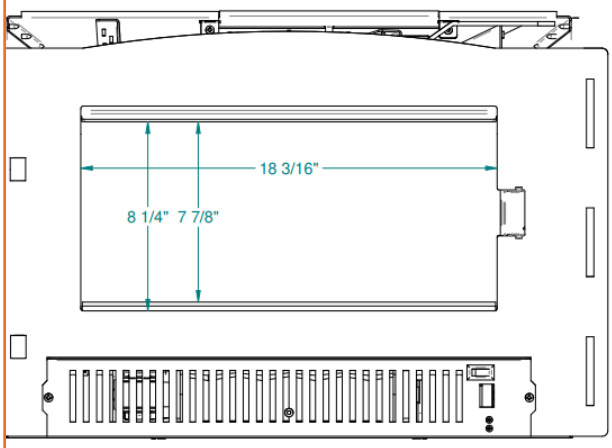


Figure 4 : Door Opening

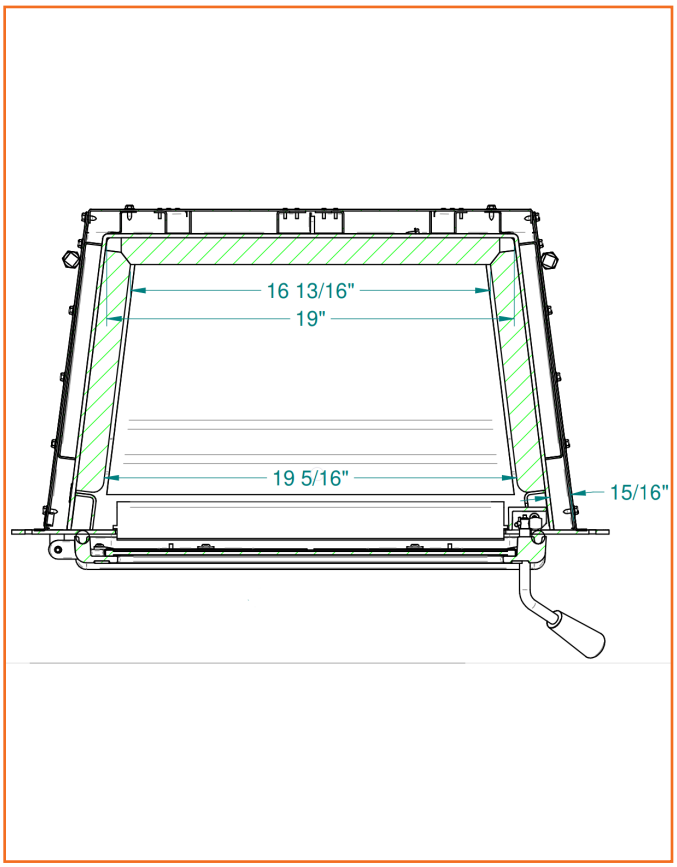


Figure 5 : Top View - Combustion Chamber

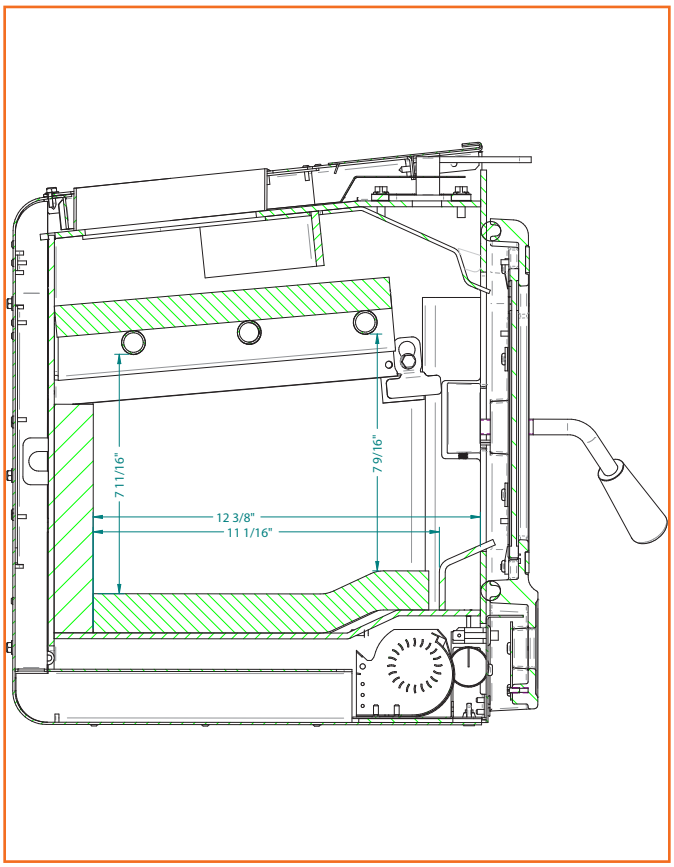
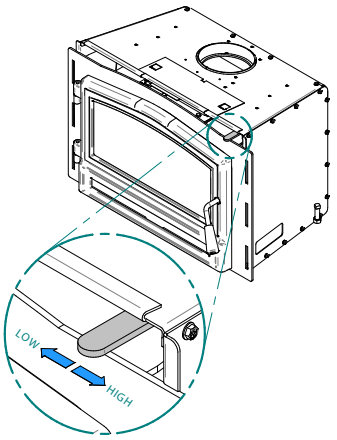


Figure 6 : Side View - Combustion Chamber

1.4 EPA Loading

The charging methods shown below are those that were used during emissions certification.

1.4.1 Air control



The air control is located above the door on the right. To open the air control, push the air control handle completely to the right (High). This will increase the burn rate. To close the air control, push the air control handle completely to the left (Low). This will decrease the burn rate.

1.4.2 High burn rate (primary air control open)

Open the air control completely. Criss cross 6 kindling wood pieces in the back of the firebox. Then, place six small pieces (2”x2”) of wood on the kindling crossing them at the greatest possible angle. Criss cross ten others kindling wood pieces on the small pieces of wood. Tie knot with five sheets of paper and place them on top of the kindling wood. Light up the paper and let the door completely open for two minutes. Close the door.

When the kindling and the small pieces of wood are almost completely burnt out and it is possible to break them into pieces, level the coal bed and put four logs in the firebox in an east-west orientation. Place a medium log (about 4”x4”) in front of the combustion chamber and the biggest log (about 5”x5”) in the back of the combustion chamber. Place the last two medium pieces on top of the two others in an orientation that points to the right. Do not leave space between the pieces. Let the door open ajar at 90° for 5 minutes and close the door.

1.4.3 Medium and low burn rate

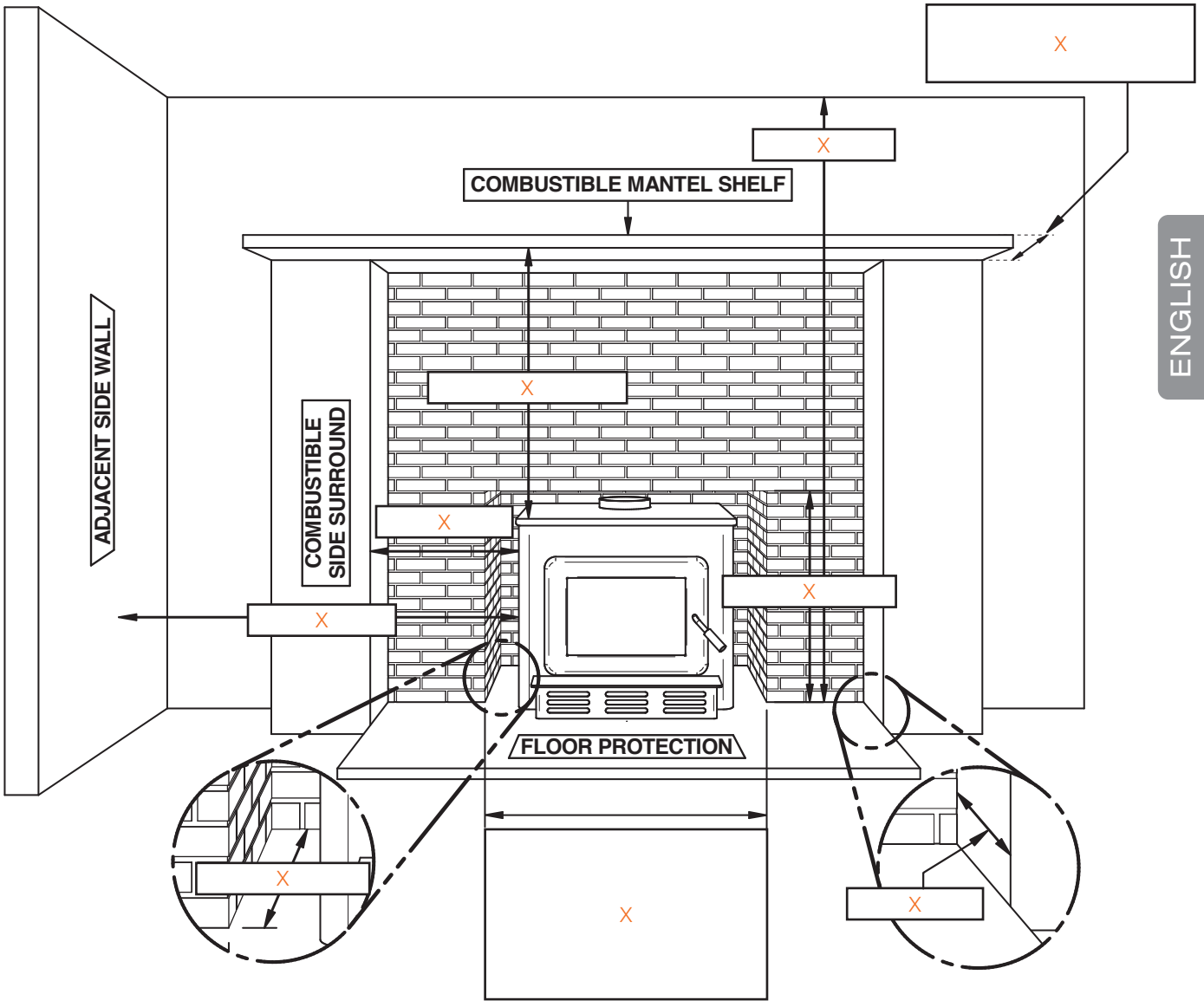
On a 2” coal bed that is still red, place five logs of approximatively 4”x4” or 3”x3” with an east-west orientation. Place two logs on the coal bed with approximatively 4” between them and the other three on top. There should be air space between each logs and between the logs and the bricks. Let the door ajar at 90° for 5 minutes and then close the door with the primary air control fully open. Leave to burn with the primary air control open for approximately 10 minutes and then close the primary air control completely for the low burn rate and halfway for the medium burn rate.

2. Clearances to Combustible Material

When the insert is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

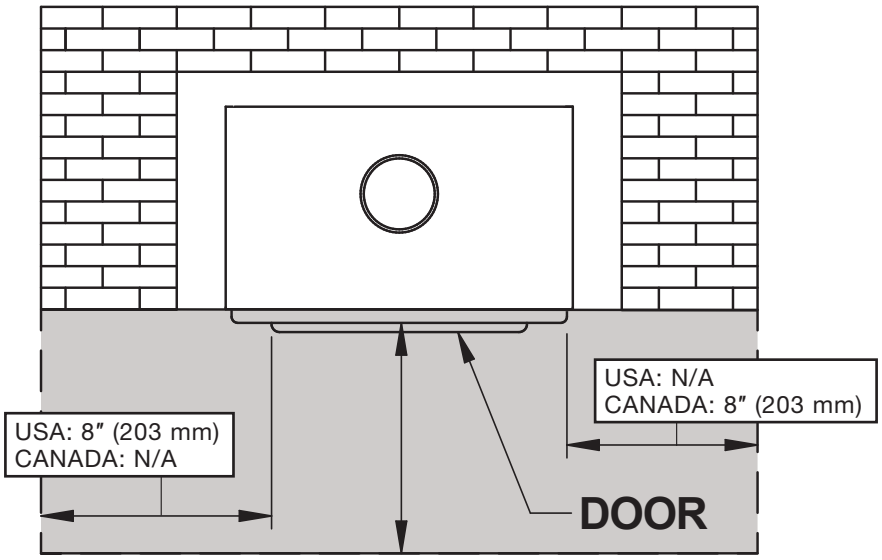
NO PART OF THE INSERT MAY BE LOCATED CLOSER TO THE COMBUSTIBLE THAN THE MINIMUM CLEARANCE FIGURES GIVEN.

2.1 Minimum Masonry Opening and Clearances to Combustibles



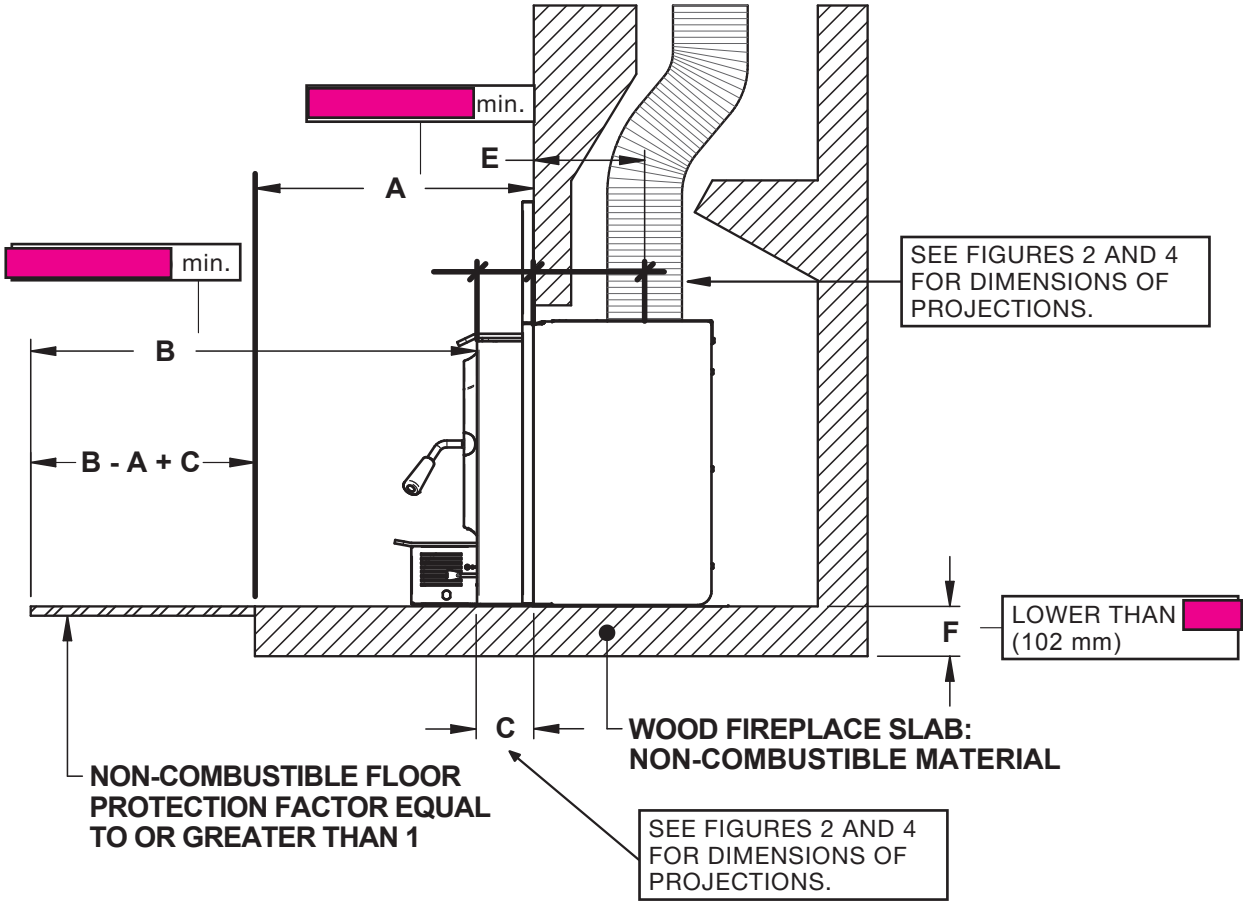
2.2 Floor Protection

It is necessary to have a floor protection made of non-combustible materials that meets the measurements specified below.

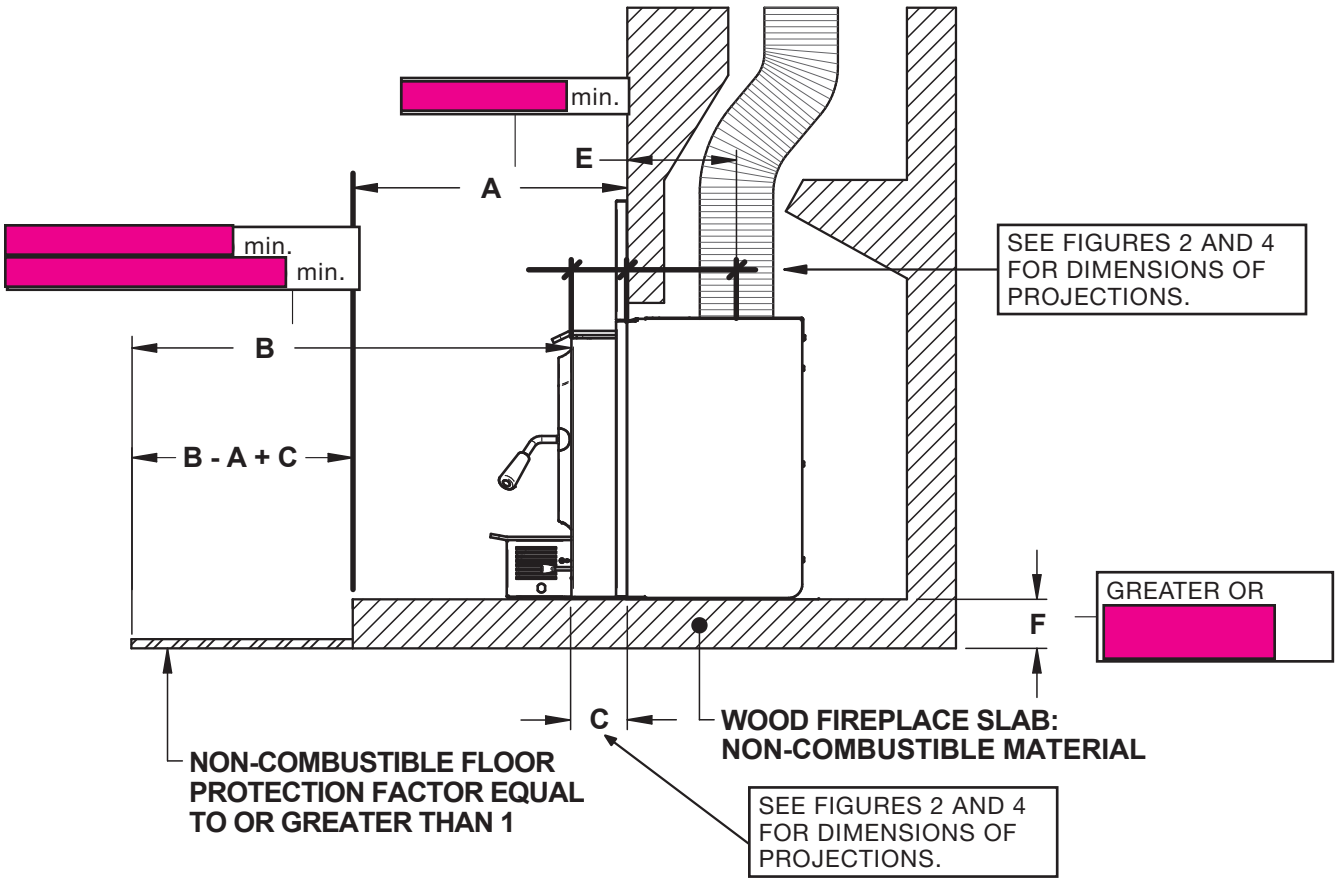


ENGLISH

2.2.1 Installation Raised of [redacted] and Less



2.2.2 *Installation Raised of More Than*



2.3 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below.

Table 1 : Thermal Characteristics of Common Floor Protection Materials[13]

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160	0.39	2.54
Micore® 300	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2

MATERIAL	CONDUCTIVITY (K) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air (1/8" thick)[14]	0.135	0,920**

Exemple:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board:

Four inches of brick (R = 4 x 0,2 = 0,8) plus 1 inch of Durock® (R = 1 x 0.52 = 0.52).

0.8 + 0.52 = 1.32.

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Exemple:

K value = 0.75
Thickness = 1
R value = Thickness/K = 1/0.75 = 1.33

[14] Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

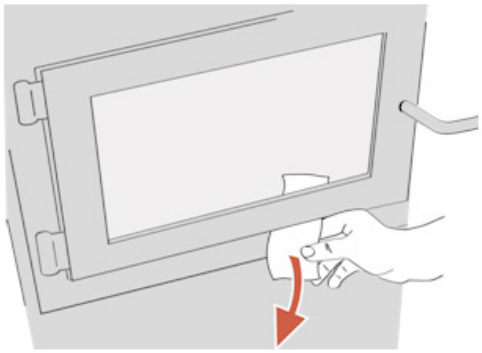
3. Installing Options on Your Product and Replacing Parts

3.1 Replacement and Adjustment

3.1.1 Door

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In order for the insert to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.



3.1.2 Adjustment

The gasket seal may be improved with a simple latch mechanism adjustment:

1. Remove the split pin by pulling and turning it using pliers.
2. Turn the handle one counterclockwise turn to increase pressure.
3. Reinstall the split pin with a small hammer.

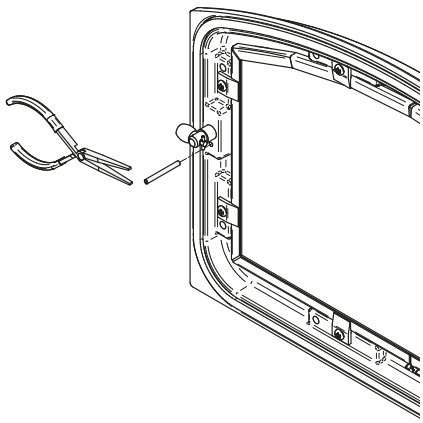


Figure 7 : Removing the split pin

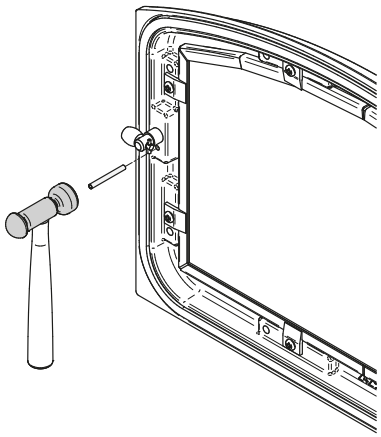
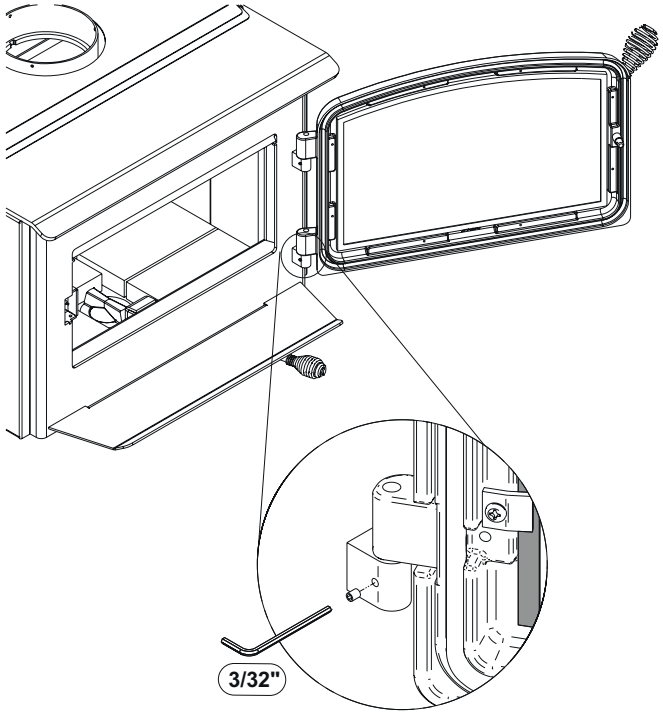
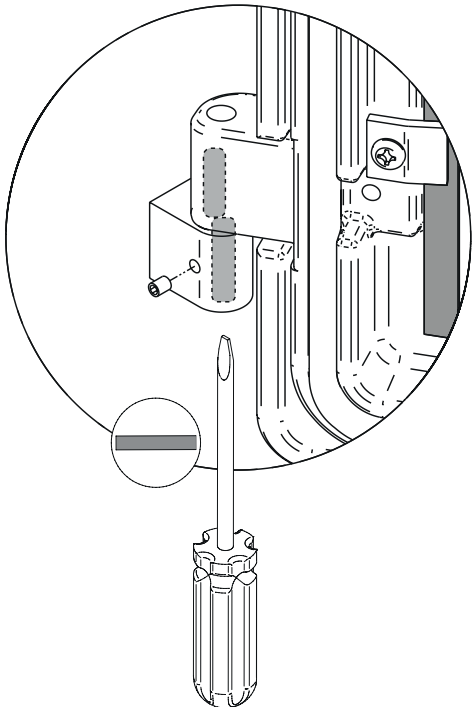


Figure 8 : Installing the split pin

3.1.3 Door Alignment

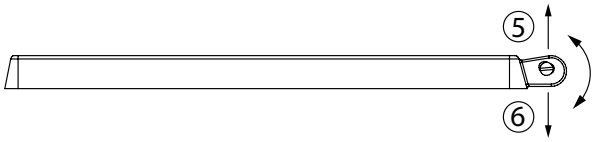
To align, open the door and loosen the pressures screws located on the lower and upper hinges of the door using a 3/32” Allen key to free the adjustable hinge rods.

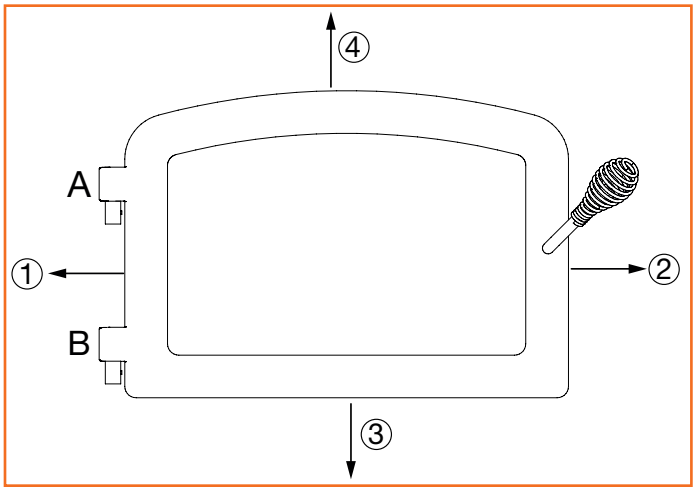


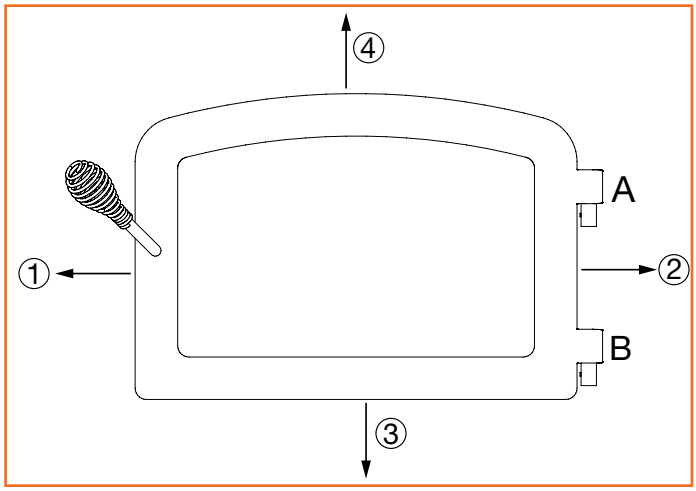


Using a flat screwdriver, turn the adjustable hinge rods in the direction shown to adjust the doors. Tighten all door hinge pressure screws when they are at the desired positions. Configurations 1-2-3-4-5-6, show in which direction these act on the adjustment of the door.

①	②	③	④
A	A	A	A
B	B	B	B



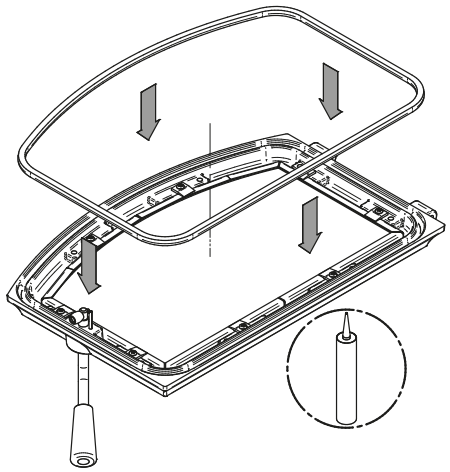




3.1.4 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft like a cushion of rags or a piece of carpet.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about ½" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the insert for 24 hours.



3.2 Mandatory Installation

- Empty the combustion chamber and install the air control handle **(A)** with the set screw **(B)** as shown below:

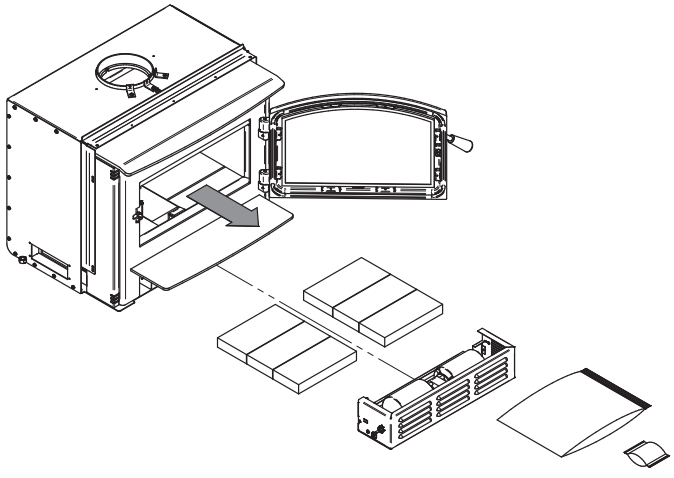


Figure 9 : Empty the combustion chamber

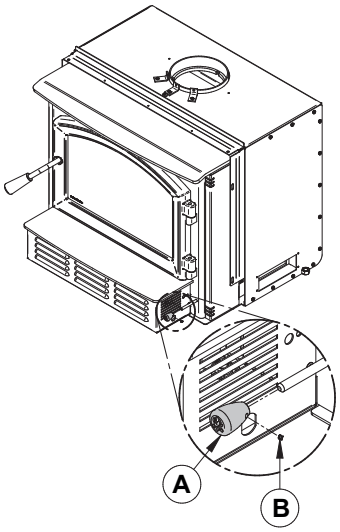


Figure 10 : Installing the air control wood handle

- Install the combustion chamber side bricks as shown below.

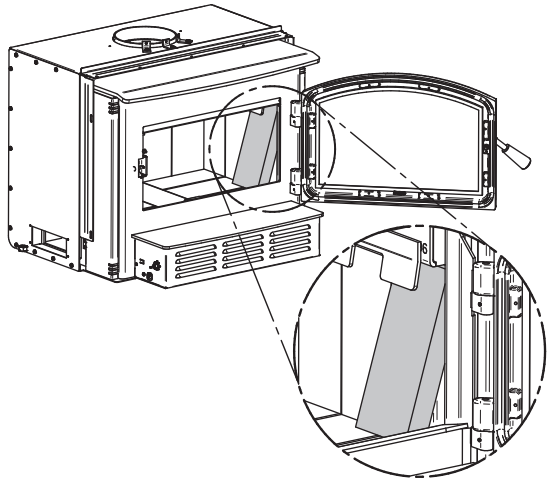


Figure 11 : Install the Combustion Chamber Bricks

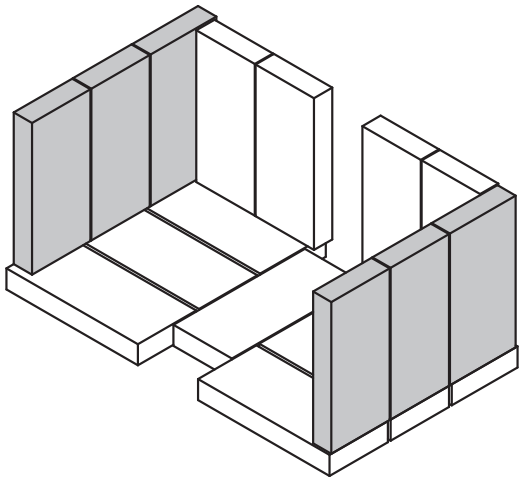
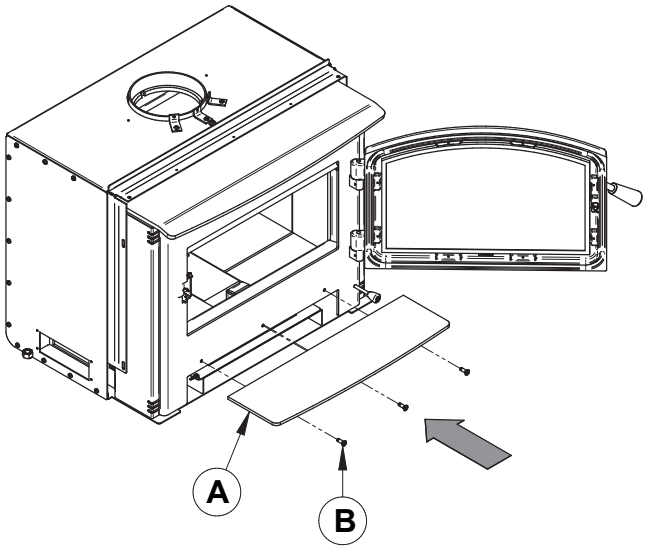


Figure 12 : Combustion Chamber Bricks Layout

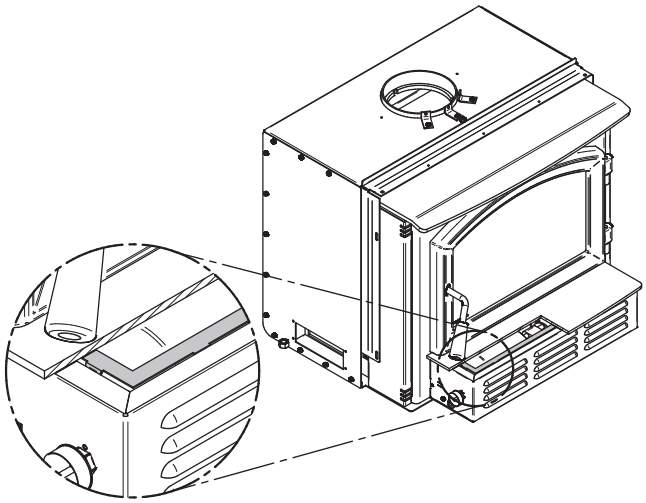
3.3 Blower and Ash Lip Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

1. Install the ash lip **(A)** on the insert with three screws **(B)**.



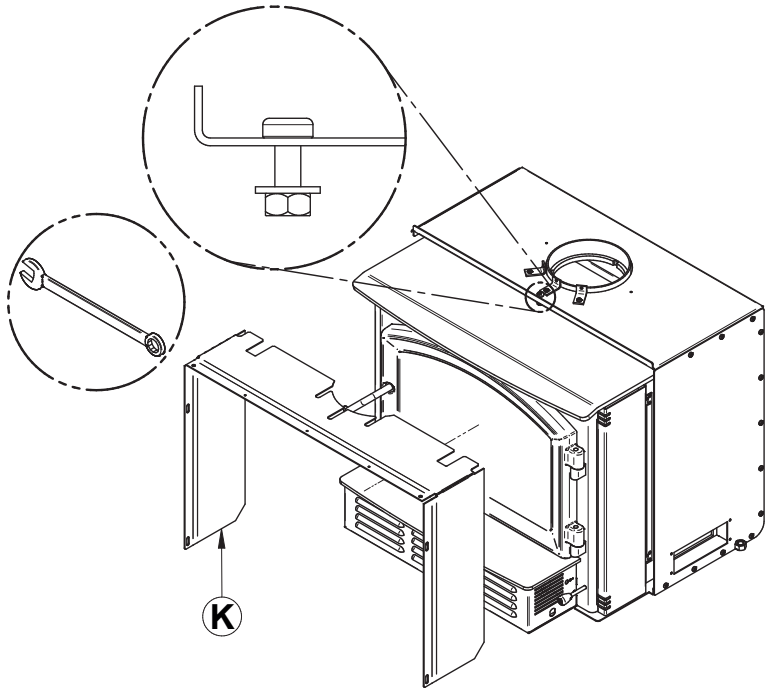
2. Center the blower on the ash lip and push it against the firebox. Then push it until it clips.



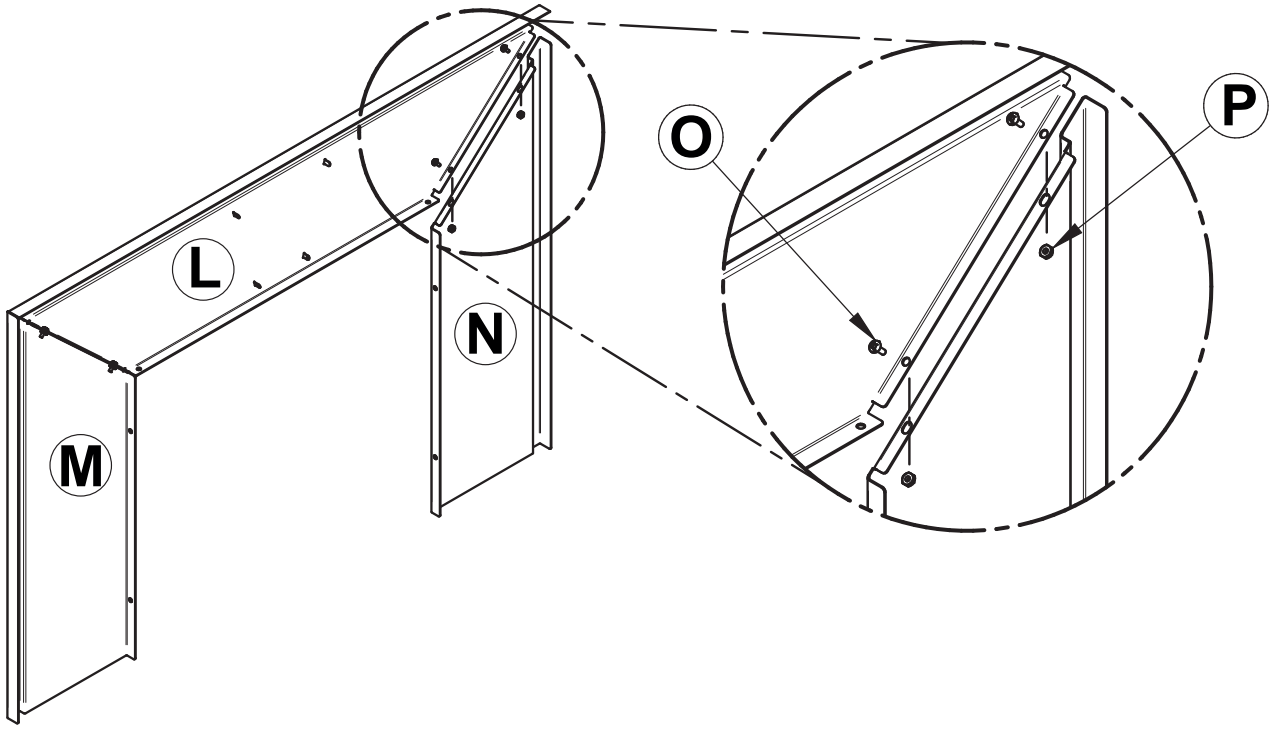
3.4 Faceplate and Trims Installation

Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

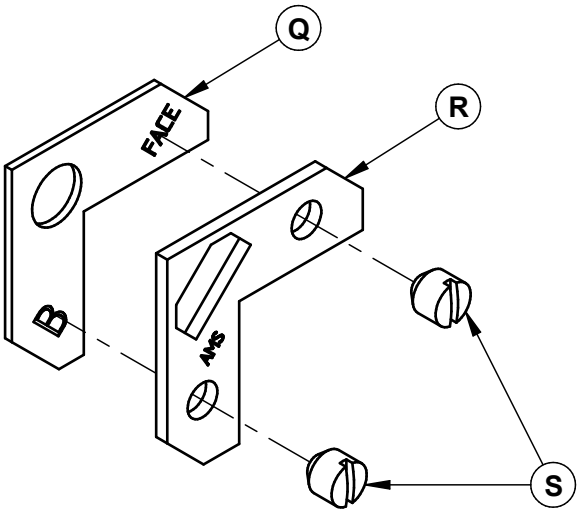
1. Remove the faceplate extension **(K)** secured between the firebox and the convection air jacket.



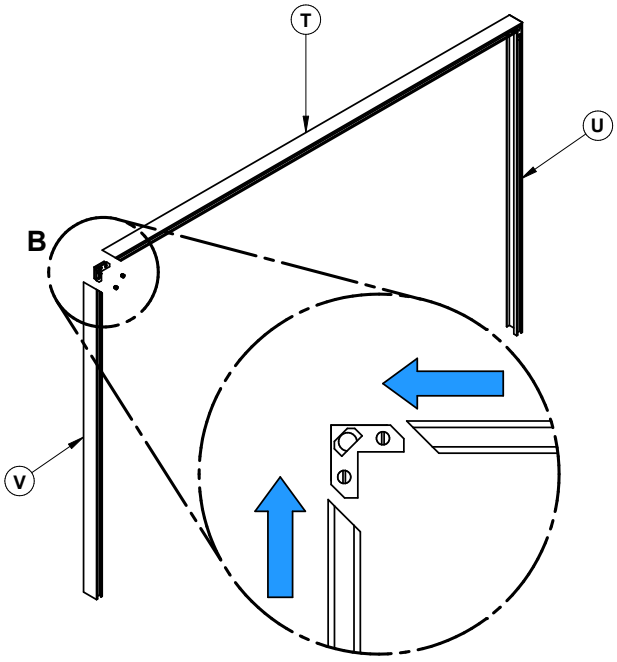
2. Lay the panels on a flat and non abrasive surface. Align the top panel holes **(L)** with the left **(N)** and right **(M)** panels. Secure together using the four bolts **(O)** and nuts **(P)** provided.



3. Partially thread the screws **(S)** on the trim's corner bracket **(R)** then superimpose the corner brackets **(R)** and **(Q)** as shown.

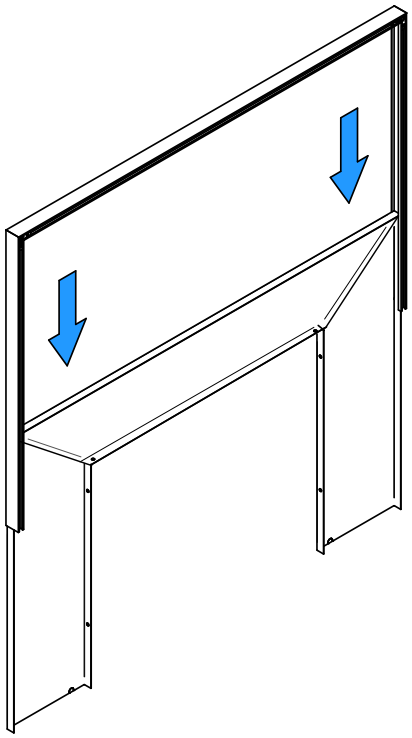


4. Insert the superimposed brackets **(Q)** and **(R)** in the groove of each decorative trim **(T)**, **(U)** and **(V)**. Align the corners of the angled side of each trim, and then tighten the screws **(S)** to secure the trims.

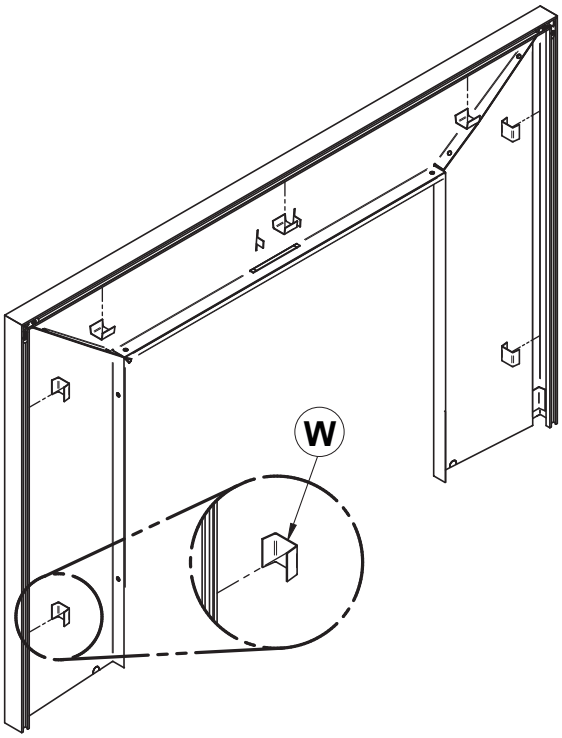


DETAIL B

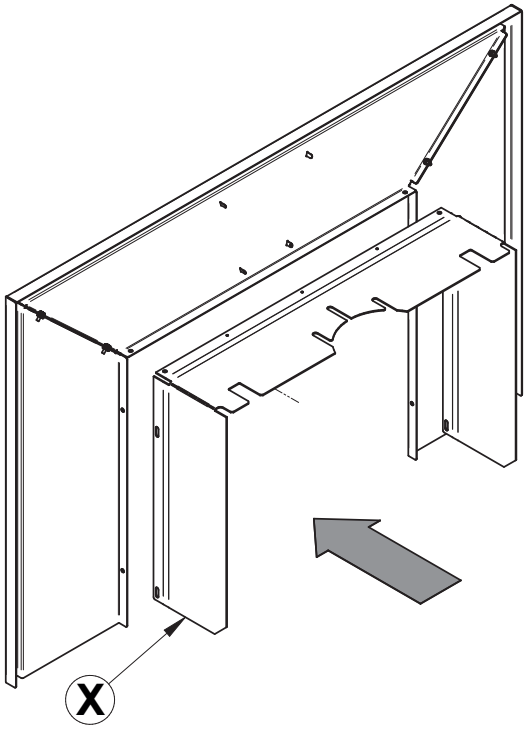
5. Align the trim assembly with the left and right edge of the faceplate and slowly slide it down over the faceplate.



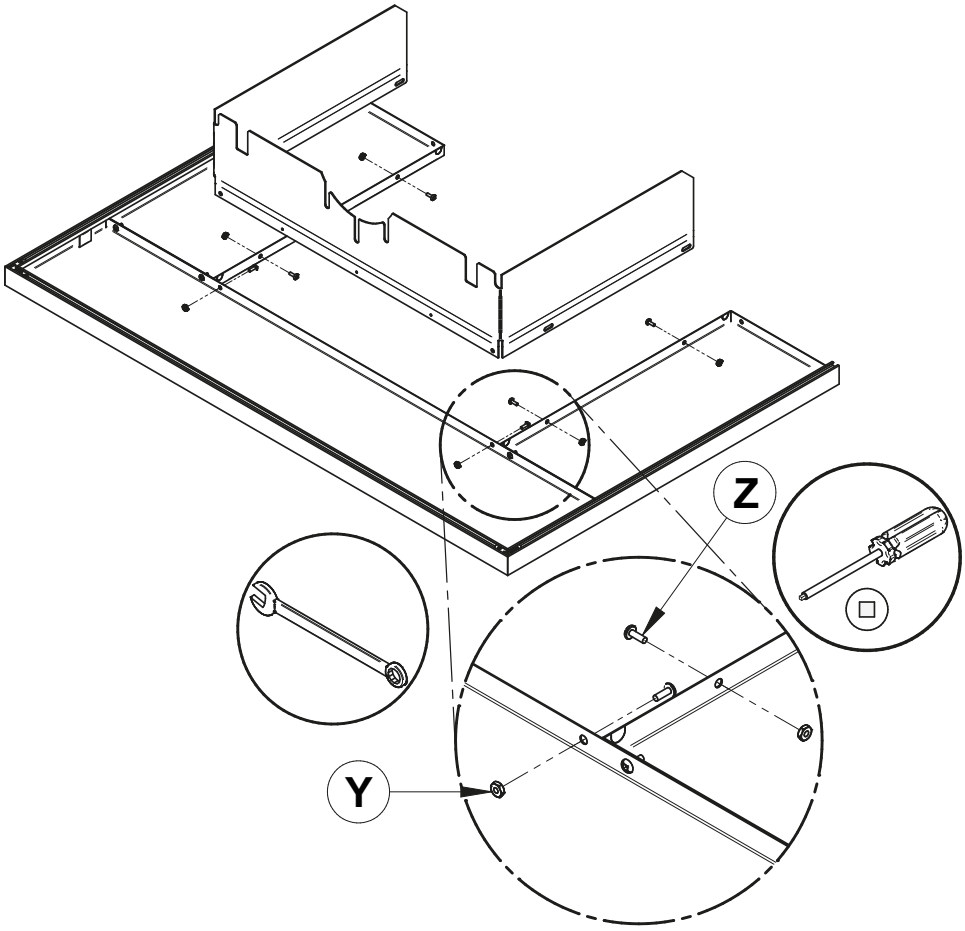
6. Secure the trim to the faceplate by squeezing the eight trim retainers **(W)** between the inner edge of the trim and the front of the faceplate.



7. Align the holes of the faceplate extension **(X)** with the holes in the faceplate panels.



8. Screw them using bolts **(Z)** and nuts **(Y)** provided.

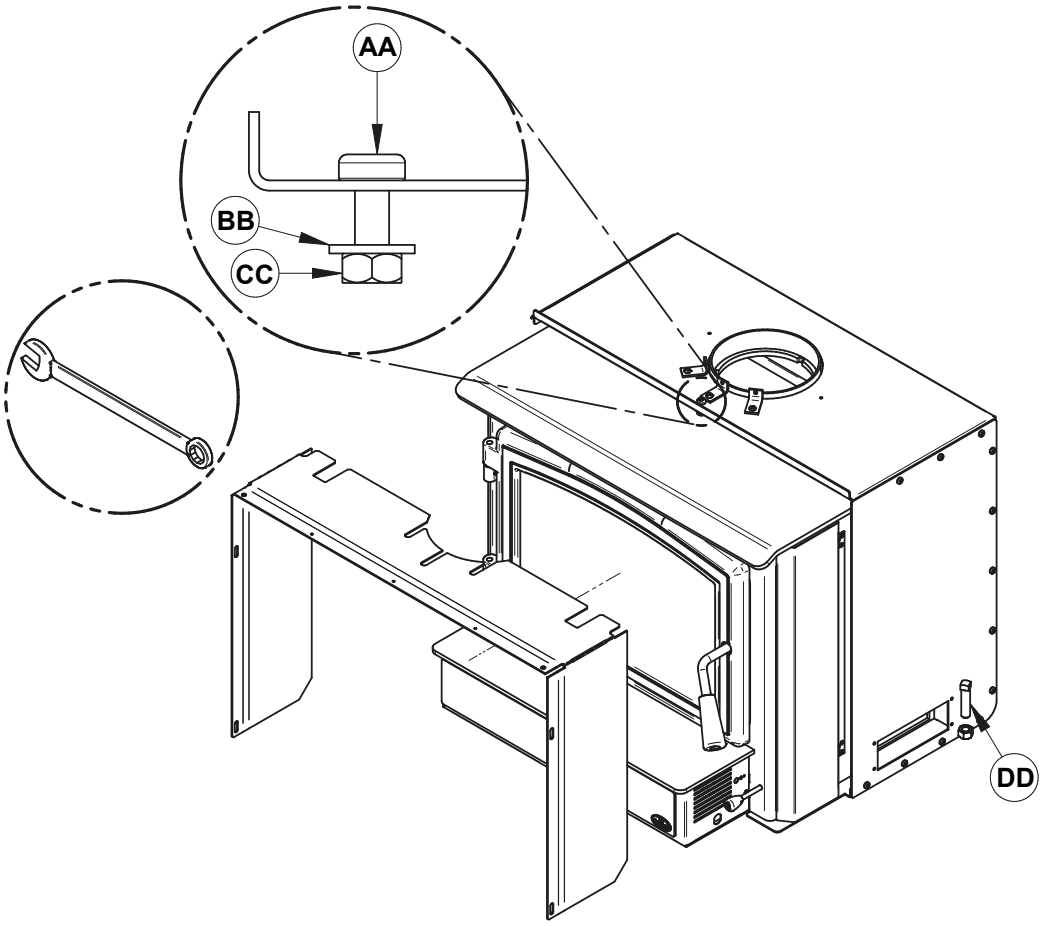


9. Center the insert into the fireplace opening.

10. Align the notch in the faceplate extension with the bolt **(CC)** welded to the air jacket located and slide the faceplate assembly just over the bolt's head and washer **(BB)**. Then push towards the fireplace.

    If necessary, adjust the height of the insert using the levelling bolts (DD) on each side of the insert until the faceplate is properly seated on the floor of the hearth extension.

11. Once the faceplate is in place, secure the assembly by tightening nuts **(AA)** using a 7/16" (11 mm) open end wrench.

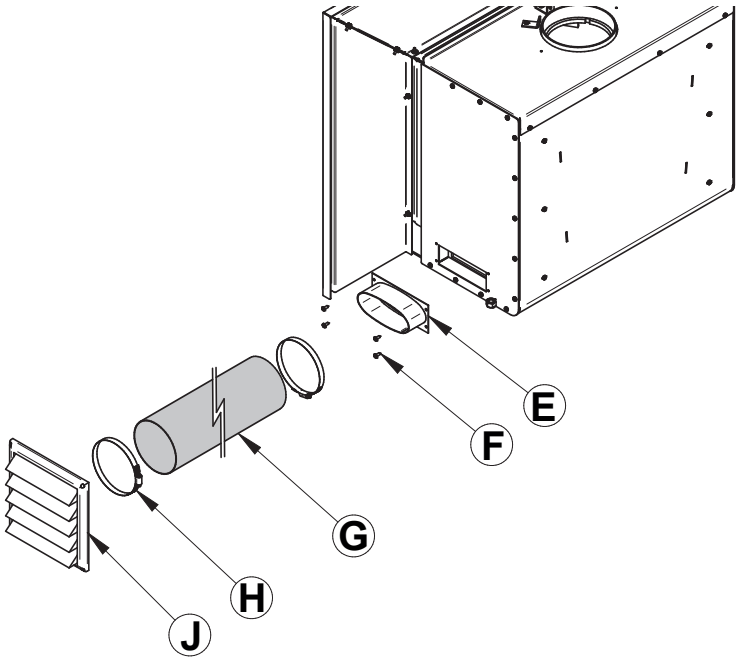


3.5 Optional Fresh Air Intake Kit Installation

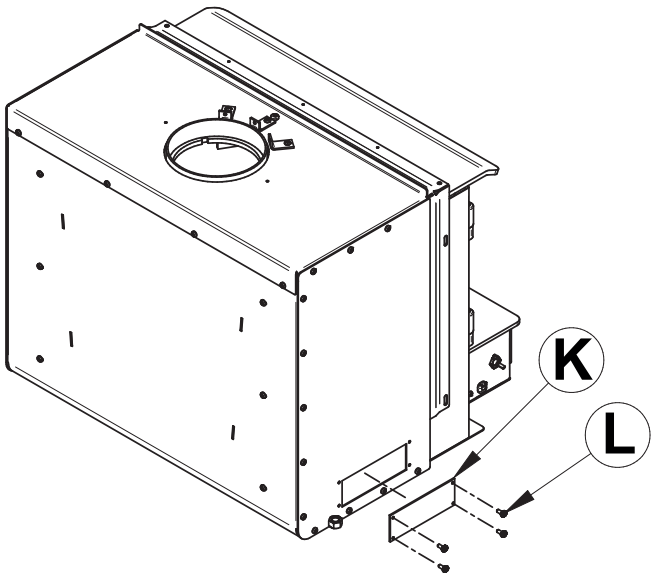
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

The fresh air intake kit may be installed on the right or left end side of the unit. The unused side must be covered by the plate provided in the user manual kit.

1. Install the fresh air intake adapter **(E)** with four screws **(F)** then secure the flexible pipe[15] **(H)** (not included) to the adapter using one of the pipe clamps **(G)**. Secure the other end of the pipe to the outside wall termination **(J)** using the other pipe clamp. The outside wall termination must be installed outside of the home.



2. Install the plate **(K)** with four screws **(L)** on the unused side of the insert.



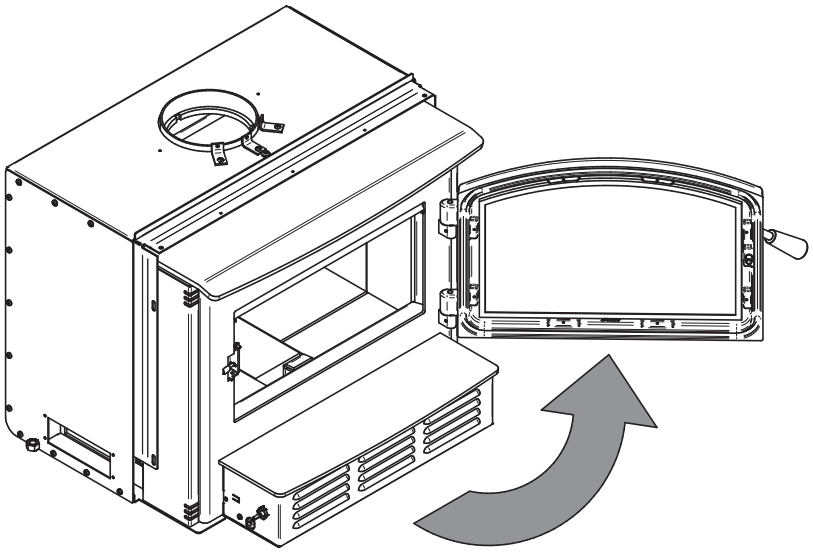
[15] The pipe must be HVAC type, insulated, and must comply with ULC S110 and/or UL 181, Class 0 or Class 1.

3.6 Optional Fire Screen Installation

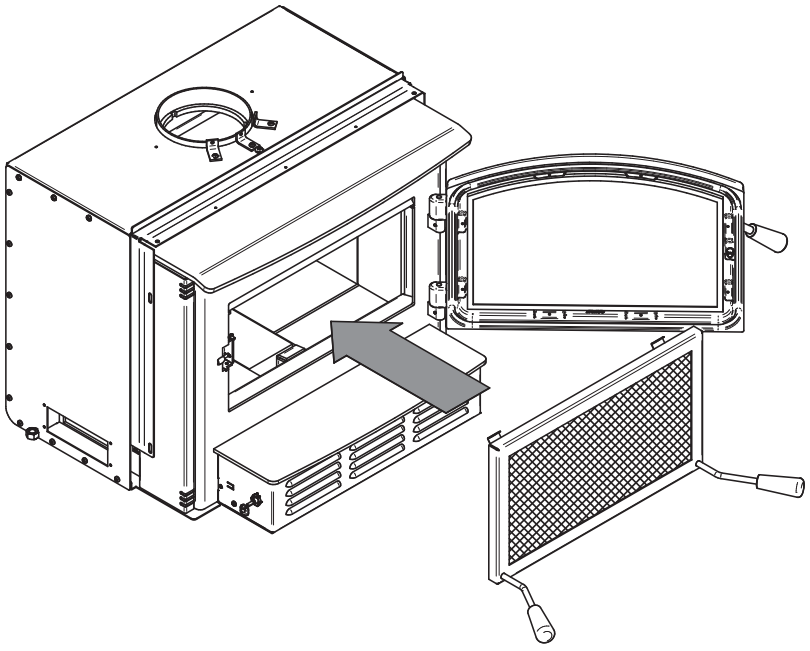
Note: The images shown are for guidance only and may be different from your product, but the assembly remains the same.

In the United States or in provinces with a particulate emissions limit (e.g.: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited.

1. Open the door.



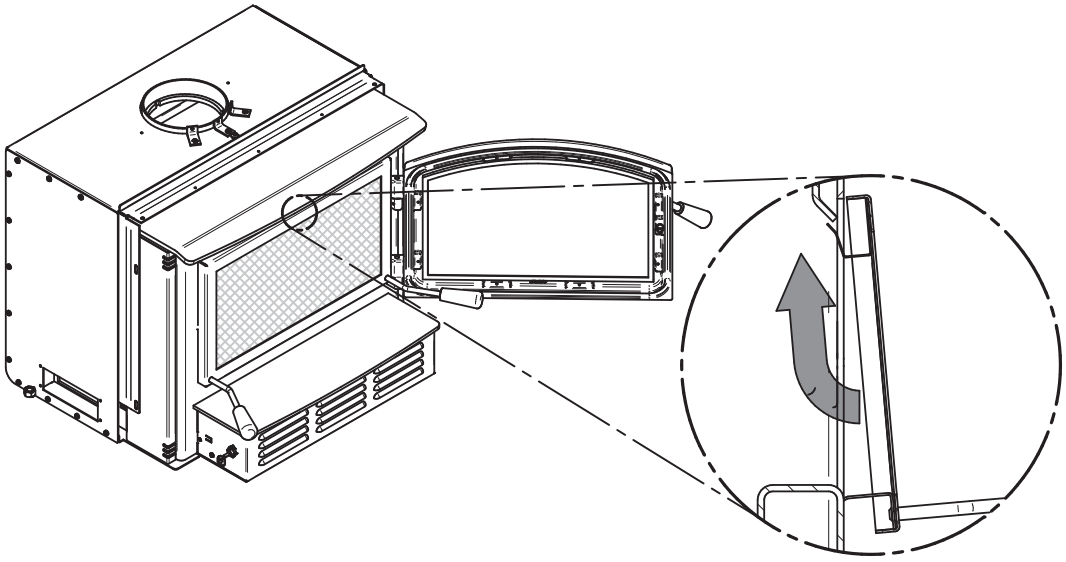
2. Hold the fire screen by the two handles and bring it close to the door opening.



3. Lean the upper part of the fire screen against the top door opening making sure to insert the top fire screen brackets behind the primary air deflector.

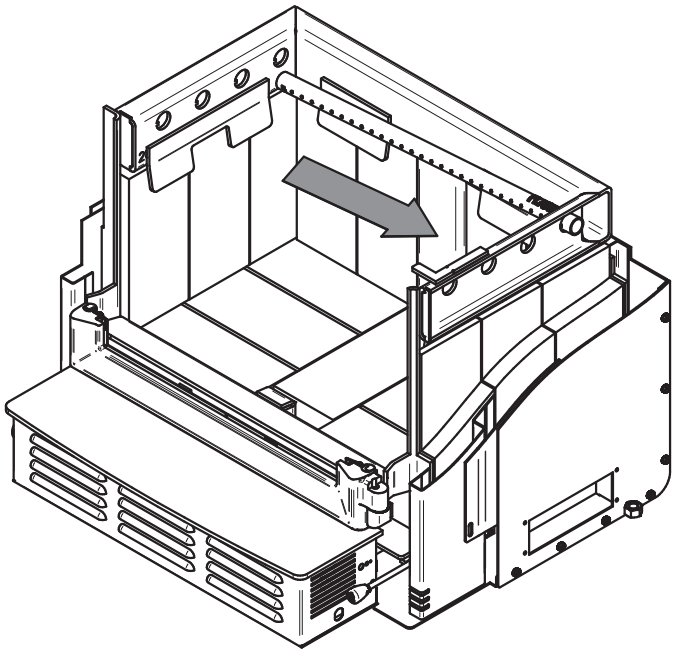
4. Lift the fire screen upwards and push the bottom part towards the insert then let the fire screen rest on the bottom of the door opening.

Warning: Never leave the insert unattended while in use with the fire screen.



3.7 Air Tubes and Baffle Installation

1. Starting with the rear tube, lean and insert the right end of the secondary air tube into the rear right channel hole. Then lift and insert the left end of the tube into the rear left channel.

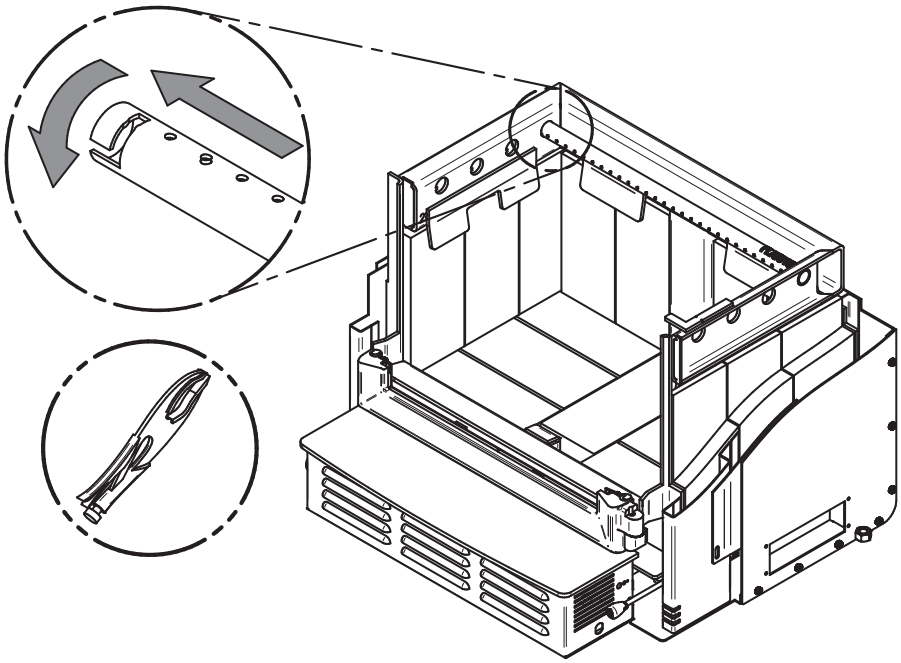


2. Align the notch in the left end of the tube with the key of the left air channel hole. Using a « Wise grip » hold the tube and lock it in place by turning the tube as shown. Make sure the notch reaches the end of the key way.

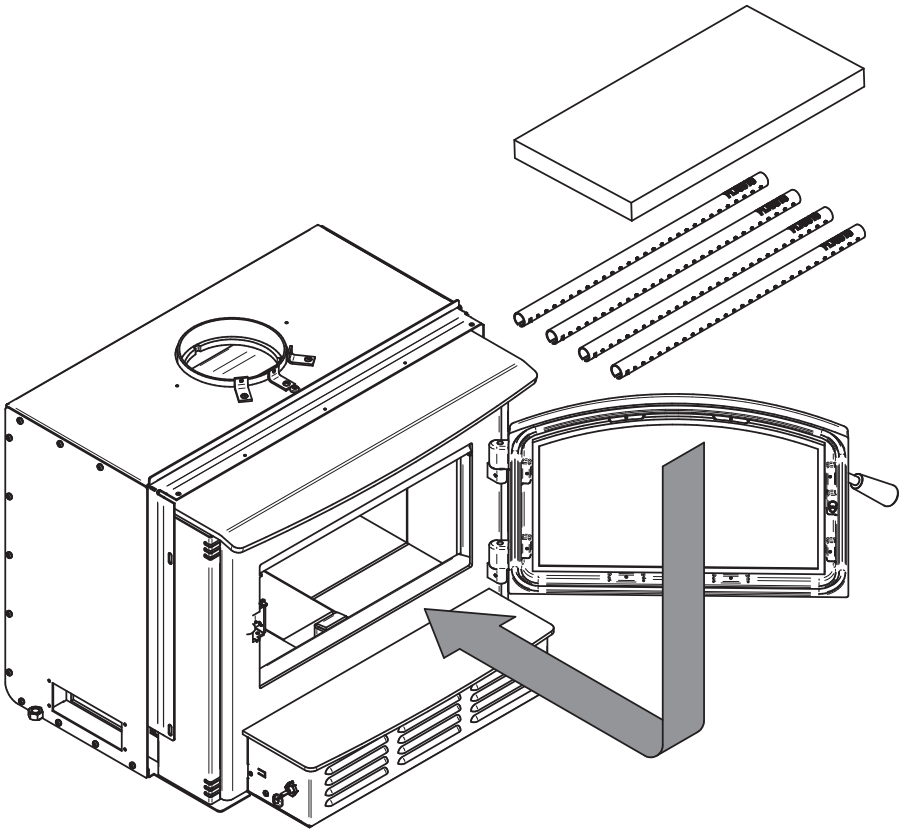
3. Install the baffle.

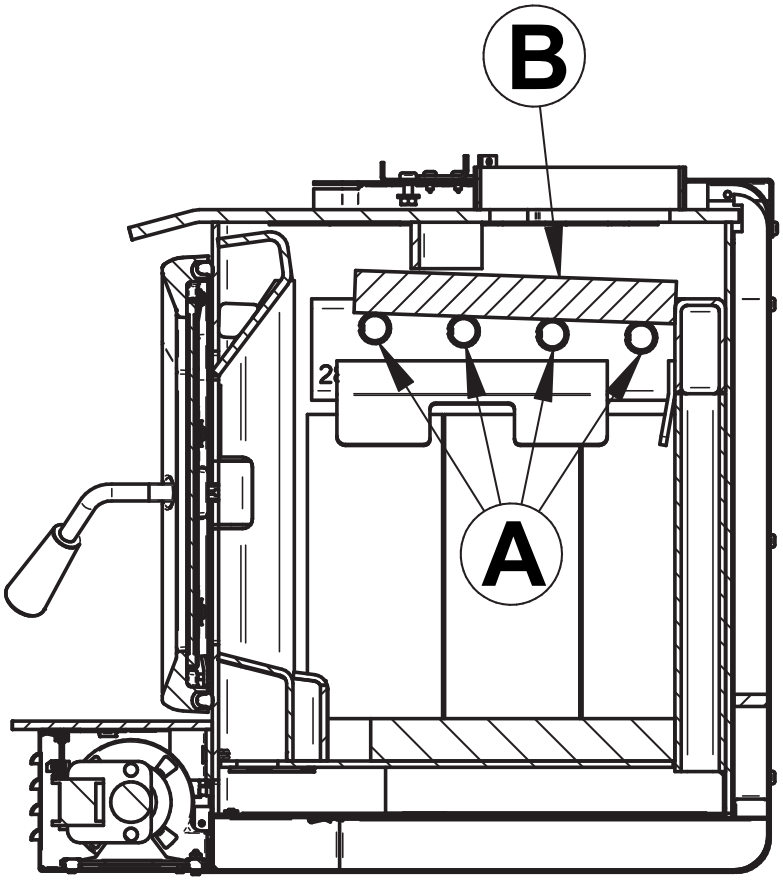
4. Repeat steps 1 and 2 for the three other tubes.

5. To remove the tubes use the above steps in reverse order.



Note that secondary air tubes **(A)** *can be replaced without removing the baffle board* **(B)** *and that all tubes are identical.*

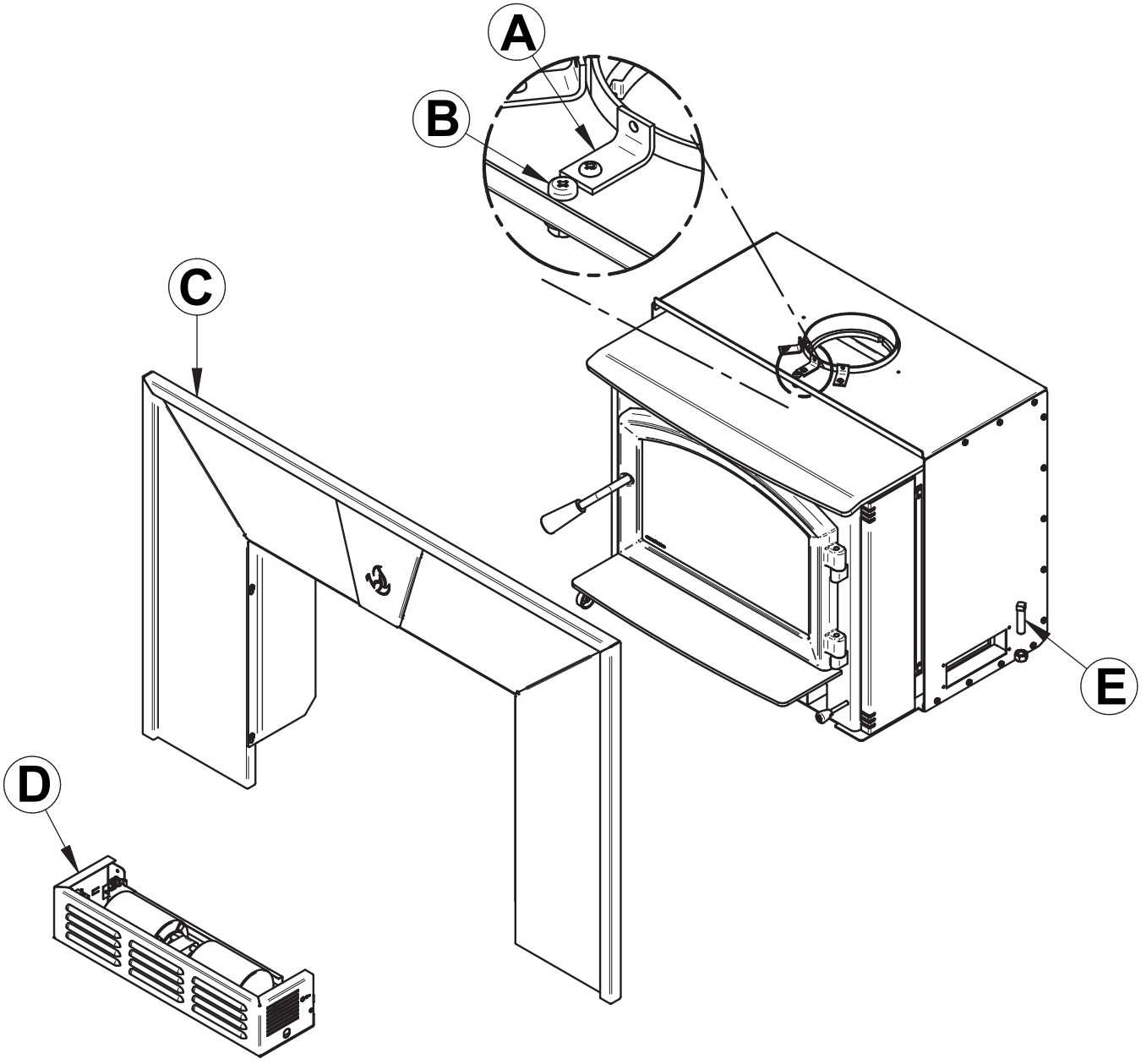



B
A

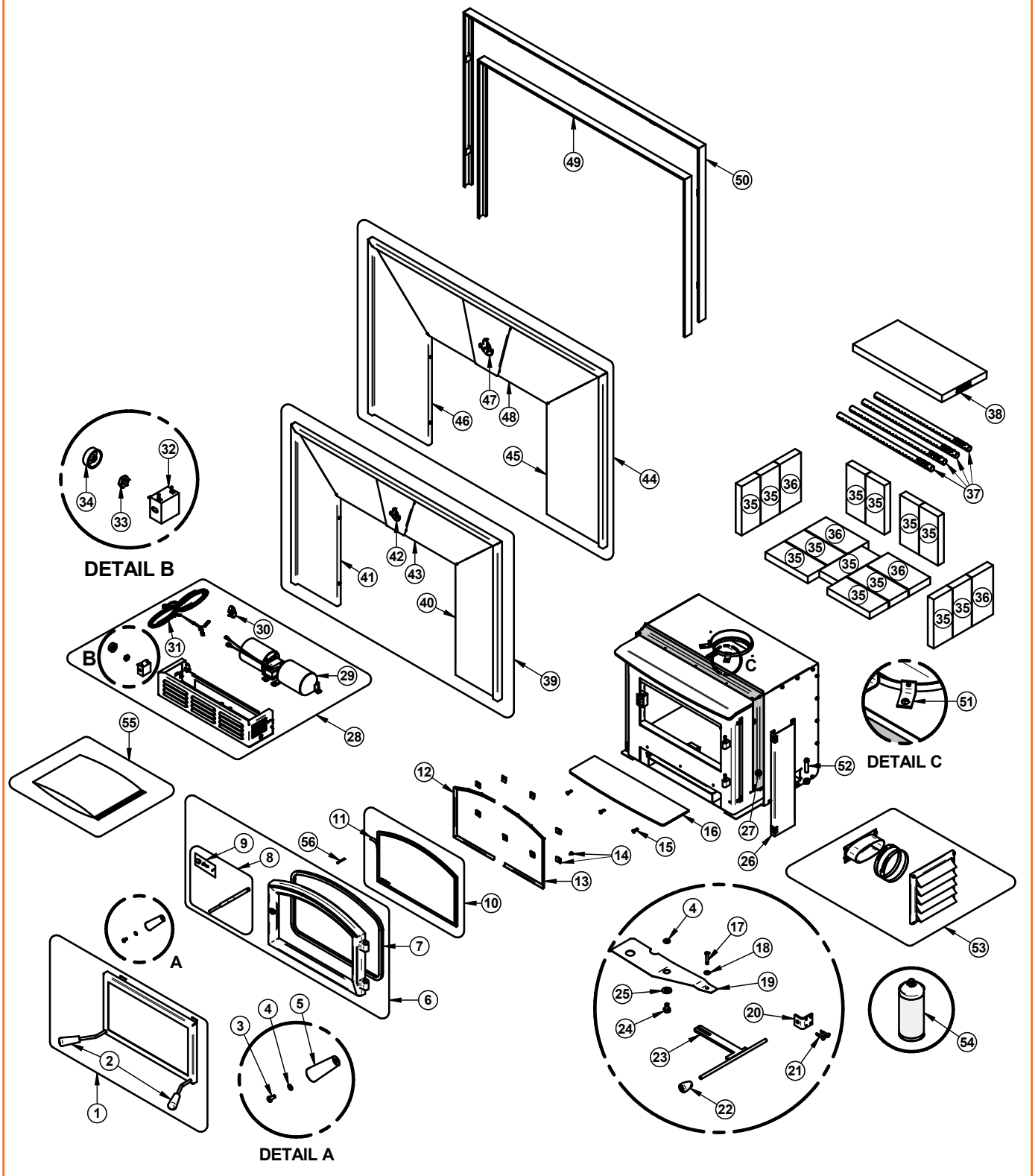
3.8 Removal Instructions

For inspecting purposes, the insert may need to be removed. To remove the insert, follow these instructions:

- Unscrew the faceplate fastener **(B)** holding the faceplate **(C)** on the insert.
- Remove faceplate **(C)** by pulling on it.
- Remove the blower assembly **(D)**.
- Remove the three screws securing the pipe connector **(A)**.
- Unscrew the bolts securing the insert to the floor on each side of the unit **(E)**.



3.9 Exploded Diagram and Parts List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for this unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

#	Item	Description	Qty
1	AC01299	FIRE SCREEN	1
2	30569	ROUND WOODEN HANDLE BLACK	2
3	30025	1/4-20 X 1/2" PAN-HEAD QUADREX BLACK SCREW	1
4	30187	STAINLESS WASHER ID 17/64" X OD 1/2"	2
5	30898	ROUND WOODEN BLACK HANDLE DULL BLACK FINISH	1
6	SE24299	SOLUTION 1.7 DOOR ASSEMBLY	1
7	AC06500	SILICONE AND 5/8" X 8' BLACK DOOR GASKET KIT	1
8	SE70698	REPLACEMENT HANDLE WITH LATCH KIT	1
9	AC09185	DOOR LATCH KIT	1
10	SE23086	ARCHED GLASS WITH GASKET	1
11	AC06400	3/4" (FLAT) X 6' BLACK SELF-ADHESIVE GLASS GASKET	1
12	PL70655	LEFT GLASS FRAME	1
13	PL70654	RIGHT GLASS FRAME	1
14	SE53585	GLASS RETAINER KIT WITH SCREWS (12 PER KIT)	1
15	30507	BLACK TORX SCREW WITH FLAT HEAD TYPE F 1/4-20 X 3/4"	3
16	SE70671	ASH LIP ASSEMBLY	1
17	30064	3/16" X 1" CLEVIS PIN	1
18	30059	5/32" ID PUSHNUT	1
19	PL70586	DAMPER	1
20	PL65562	AIR CONTRÔL DAMPER GUIDE	1
21	30160	METAL SCREW #8 X 3/4" QUADREX SELF TAPPING TEK BLACK	2
22	30102	1/4'' CAST STEEL AIR CONTROL HANDLE INCLUDES MOUNTING SCREW	1
23	SE65559	AIR CONTROL ROD ASSEMBLY	1
24	30060	THREAD-CUTTING SCREW 1/4-20 X 1/2" F HEX STEEL SLOT WASHER C102 ZINC	1
25	30206	ZINC WASHER 5/16"ID X 3/4"OD	1
26	PL70672	DECORATIVE PANEL	2
27	PL70587	FACEPLATE EXTENSION	1
28	SE70668	BLOWER ASSEMBLY	1
29	44089	DOUBLE CAGE BLOWER 144 CFM 115V - 60Hz - 1.1A	1
30	44028	CERAMIC THERMODISC F110-20F	1
31	60013	POWER CORD 96" X 18-3 type SJT (50 pcs per carton)	1
32	44080	RHEOSTAT WITHOUT NUT (MODEL KBMS-13BV)	1
33	44087	RHEOSTAT NUT	1

#	Item	Description	Qty
34	44085	RHEOSTAT KNOB	1
35	29011	4'' X 9" X 1 1/4" REFRACTORY BRICK HD	13
36	29020	4 1/2'' X 9'' X 1 1/4'' REFRACTORY BRICK HD	4
37	PL70516	SECONDARY AIR TUBE	4
38	21521	C-CAST BAFFLE 1.25'' X 18.875'' X 9.5''	1
39	AC01287	REGULAR FACEPLATE (29" X 44")	1
40	PL70681	REGULAR FACEPLATE RIGHT PANEL	1
41	PL70680	REGULAR FACEPLATE LEFT PANEL	1
42	PL70682	FACEPLATE DECORATION	1
43	PL70679	REGULAR FACEPLATE TOP PANEL	1
44	AC01285	LARGE FACEPLATE (32" X 50")	1
45	PL70701	LARGE FACEPLATE RIGHT PANEL	1
46	PL70700	LARGE FACEPLATE LEFT PANEL	1
47	PL70703	FACEPLATE DECORATION	1
48	PL70702	LARGE FACEPLATE TOP PANEL	1
49	OA10123	BRUSHED NICKEL FACEPLATE TRIMS (29" X 44")	1
49	OA10122	BLACK FACEPLATE TRIMS (29" X 44")	1
50	OA10129	BRUSHED NICKEL LARGE FACEPLATE TRIMS (32" X 50")	1
50	OA10128	BLACK LARGE FACEPLATE TRIMS (32" X 50")	1
51	PL34052	LINER FIXATION BRACKET	3
52	30337	SQUARE HEAD SET SCREW 1/2-13 X 1-3/4"	2
53	AC01298	5"Ø FRESH AIR INTAKE KIT OVAL	1
54	AC05959	METALLIC BLACK STOVE PAINT - 342 g (12oz) AEROSOL	1
55	SE45983	SOLUTION 1.7 INSERT INSTRUCTIONS MANUAL KIT	1
56	30101	SPRING TENSION PIN 5/32"Ø X 1 1/2"L	1

OSBURN LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original retail purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from the factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to the OSBURN dealer.

This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or underestimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized or other than the original parts voids this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer, at its discretion, may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall, in no event, be responsible for any uncommon, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. A one-time replacement limit applies to all parts benefiting from lifetime coverage. This warranty applies to products purchased after March 1st 2019.

DESCRIPTION	**WARRANTY APPLICATION***	
	PARTS	**LABOUR**
Combustion chamber (welds only) and cast iron door frame.	Lifetime	5 years
Ceramic glass**, plating (manufacturing defect**) and convector air mate.	Lifetime	N/A
Surrounds, heat shields, ash drawer, steel legs, pedestal, trims (aluminum extrusions), C-Cast baffle**, vermiculite baffle**, secondary air tubes**, removable stainless steel combustion chamber, deflectors and supports.	7 years	N/A
Handle assembly, glass retainers and air control mechanism.	5 years	3 years
Removable carbon steel combustion chamber components.	5 years	N/A
Standard and optional blower, heat sensors, switches, rheostat, wiring and electronics.	2 years	1 year
Paint (peeling**), gaskets, insulation, ceramic fiber blankets, firebricks and other options.	1 year	N/A
All parts replaced under the warranty.	90 days	N/A

*Subject to limitations above. **Picture required.

Labour cost and repair work to the account of the manufacturer are based on a predetermined rate schedule and must not exceed the wholesale price of the replacement parts.

Shall your unit or a component be defective, contact immediately your OSBURN dealer. To accelerate processing of your warranty claim, make sure to have on hand the following information when calling:

- Your name, address and telephone number;
- Bill of sale and dealer's name;
- Installation configuration;
- Serial number and model name as indicated on the nameplate fixed to the back of your unit;
- Nature of the defect and any relevant information.

Before shipping your unit or defective component to our plant, you must obtain an Authorization Number from your OSBURN dealer. Any merchandise shipped to our plant without authorization will be refused automatically and returned to the sender.

This document is available for free download on the manufacturer's website. It is a copyrighted document. Resale is strictly prohibited. The manufacturer may update this document from time to time and cannot be responsible for problems, injuries, or damages arising out of the use of information contained in any document obtained from unauthorized sources.

Stove Builder International inc.
250, rue de Copenhague,
St-Augustin-de-Desmaures (Québec) Canada
G3A 2H3
418-908-8002
https://www.osburn-mfg.com/en/
tech@sbi-international.com

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

C ETL US LISTED

Intertek

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CS A B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

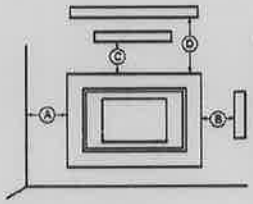
MODEL / MODÈLE :
ARCHWAY 1500

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number
No. de Série: 1

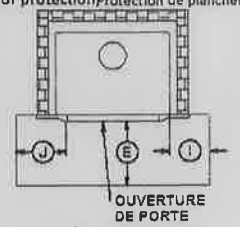
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E: 16 in./po. (406 mm) USA
18 in./po. (457 mm) CANADA
I: 8 in./po. (203 mm) CANADA
J: 8 in./po. (203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. (For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

EMPIRE
SINCE 1932

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27881

C ETL US LISTED

Intertek

Control number: 4002461
(March/Mars 2021)

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

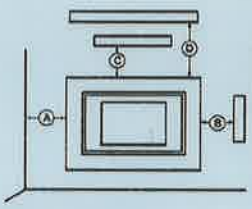
MODEL / MODÈLE :
CW2100

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number / No. de Série: 1

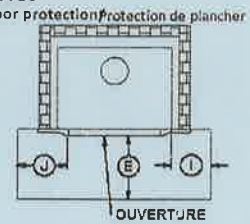
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E:	16 in./po.	(406 mm) USA
	18 in./po.	(457 mm) CANADA
I:	8 in./po.	(203 mm) CANADA
J:	8 in./po.	(203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27878

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

C ETL LISTED US

Intertek

Control number: 4002461
(March/Mars 2021)

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

LISTED SOLID FUEL BURNING INSERT APPLIANCE
APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

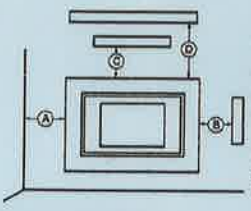
MODEL / MODÈLE :
DESTINATION 1.9

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number / No. de Série: 1

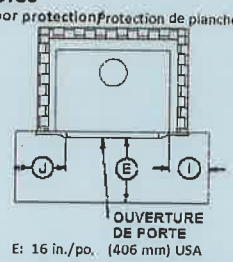
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



Combustible side wall / Mur côté adjacent	A: 19 in./po.	(483 mm)
Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
Combustible top surround / Parement supérieur combustible	C: 12 in./po.	(305 mm)
Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E:	16 in./po.	(406 mm) USA
	18 in./po.	(457 mm) CANADA
I:	8 in./po.	(203 mm) CANADA
J:	8 in./po.	(203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
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- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
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- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
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- Replace glass only with ceramic glass.
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PRÉVENEZ LES INCENDIES

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- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.
(For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27876

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

C ETL US LISTED

Intertek

Control number: 4002461
(March/Mars 2021)

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

LISTED SOLID FUEL BURNING INSERT APPLIANCE

APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

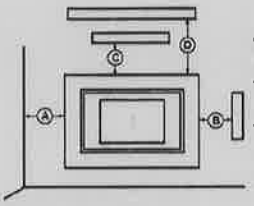
MODEL / MODÈLE :

GREEN MOUNTAIN INSERT 50

Serial Number / No. de Série: 1

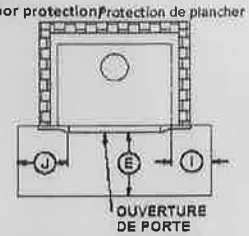
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
Mesuré à partir de l'ouverture de porte



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Combustible side surround / Parement latéral combustible	B: 9.5 in./po.	(241 mm)
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Combustible mantle shelf / Tablette combustible	D: 12 in./po.	(305 mm)

Floor protection/Protection de plancher



E: 16 in./po. (406 mm) USA
18 in./po. (457 mm) CANADA
I: 8 in./po. (203 mm) CANADA
J: 8 in./po. (203 mm) USA

Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
- Connect to a code-approved masonry chimney or listed factory-built fireplace chimney with a direct flue connector into the first chimney liner section.
- Do not overfire. If stove or chimney connector glows, your are overfiring.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Do not use grate or elevate fire. Build wood fire directly on hearth.
- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser avec le bois seulement. Ne pas utiliser d'autres combustibles.
- Risque de fuite de fumée et de flammes. Utiliser l'appareil la porte fermée ou ouverte avec le pare-étincelle en place uniquement. Ouvrir la porte ou retirer le pare-étincelle seulement lors du chargement.
- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
- Installer seulement dans un foyer de maçonnerie. Ne pas enlever les briques ou le mortier du foyer de maçonnerie.
- La protection de plancher incombustible au devant de l'encastrable devrait avoir un facteur d'isolation R égal ou supérieure à 1.00 et se prolonger 20 pouces (508 mm) au devant de l'appareil lorsque l'âtre possède moins de 2 pouces (51 mm) d'élévation et se prolonger 16 pouces (406 mm) (USA), 18 pouces (457 mm) (CANADA), sans facteur d'isolation R au devant de l'encastrable lorsque l'âtre possède plus de 2 pouces (51 mm) d'élévation.
- Raccorder à une cheminée de maçonnerie respectant les codes ou à une cheminée préfabriquée homologuée, directement à la première section de cheminée gainée.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Dans certaines conditions, la formation de créosote peut être rapide.
- Ne pas utiliser de chenets ou de grilles pour élever le feu. Préparer le feu directement sur l'âtre.
- Remplacer la vitre avec un verre de céramique.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. (For more information go to www.p65warnings.ca.gov)



CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures (Qc) Canada
26/03/2021 (# test)

hearthstone

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27879

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INSTRUCTIONS
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION

C ETL US LISTED

Intertek

STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon CSA B415.1-10
Certified to/Certifié selon ASTM E3053-17
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control number: 4002461
(March/Mars 2021)

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

LISTED SOLID FUEL BURNING INSERT APPLIANCE

APPAREIL ENCASTRABLE À COMBUSTIBLE SOLIDE HOMOLOGUÉ

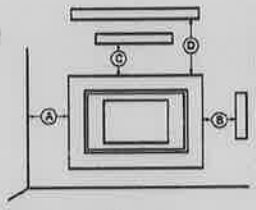
MODEL / MODÈLE :

HEI90

Serial Number / No. de Série: 1

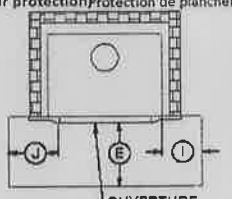
Clearances to combustibles / Dégagements aux combustibles

Measured from door opening
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Blower / Ventilateur:
115VOLTS, 0.8 AMPS, 60Hz

Floor - Ceiling / Plancher - Plafond: 84 in./po. (213 cm)

PREVENT HOUSE FIRES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use with solid wood fuel only. Do not use other fuels.
- Risk of smoke and flame spillage. Operate only with door closed or door open with screen door installed. Open door or remove screen door only to feed the stove.
- Do not connect this unit to a chimney serving another appliance.
- Install only in masonry fireplaces. Do not remove bricks or mortar from masonry fireplace.
- The non-combustible floor protection in front of the unit should have an R value equal or greater than 1.00 extending 20 inches (508 mm) in front of the insert if the hearth elevation is lower than 2 inches (51 mm) or extend 16 inches (406 mm) (USA), 18 inches (457 mm) (CANADA) without a R value if the hearth elevation is higher than 2 inches (51 mm).
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- Replace glass only with ceramic glass.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

PRÉVENEZ LES INCENDIES

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
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- Ne pas raccorder à un conduit de fumée servant déjà pour un autre appareil.
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AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.
Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. (For more information go to www.p65warnings.ca.gov)



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Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

VENTIS

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27880

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C ETL US LISTED

Intertek

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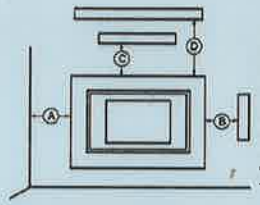
MODEL / MODÈLE :
MATRIX 1900

* See owner's manual for other installation instructions/
voir manuel d'installation pour d'autres instructions d'installation

Serial Number / No. de Série: 1

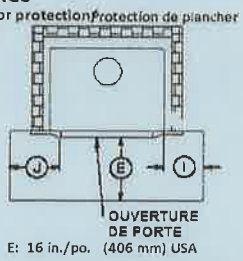
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115VOLTS, 0.8 AMPS, 60Hz

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Weighted average emission rate / Moyenne pondérée des émissions: 1.5 g/h
Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1(ii))

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(For more information go to www.p65warnings.ca.gov)



CAUTION

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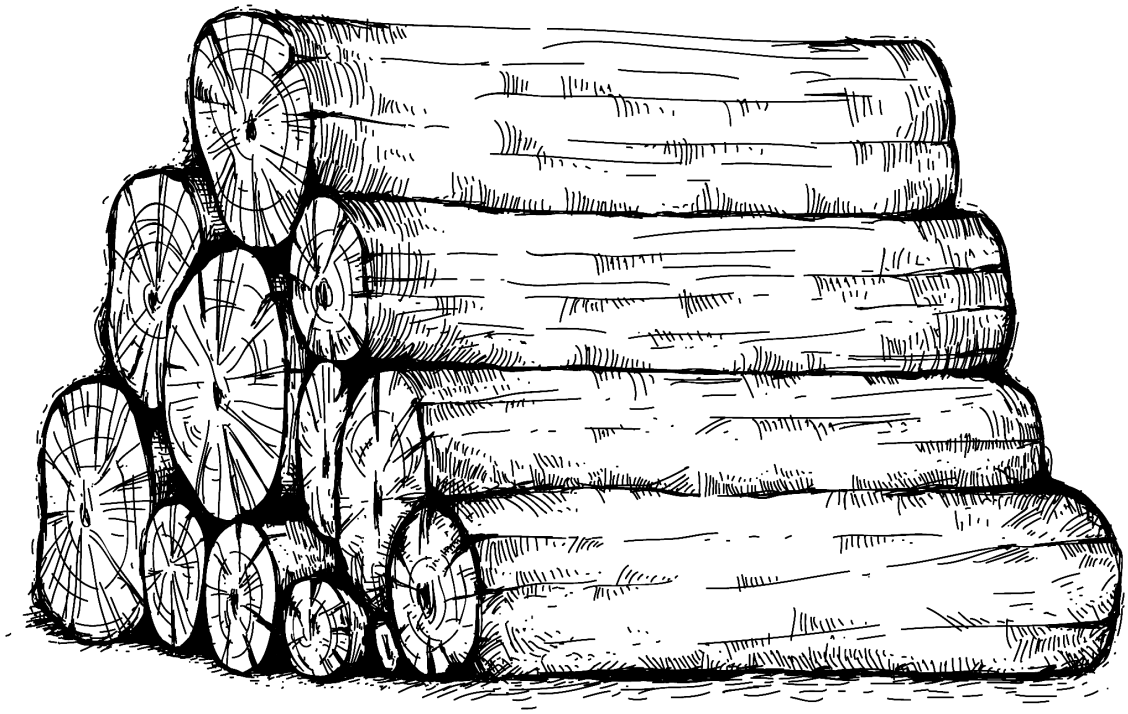
Made in St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

SBI
Fabricant de poêles international
Stove Builder International

Fabriqué à St-Augustin-de-Desmaures (Qc), Canada
26/03/2021 (# test)

27877

Wood Insert Guide



CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN THE AREA.

READ THIS ENTIRE GUIDE BEFORE INSTALLATION AND USE OF THIS WOOD INSERT. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

READ AND KEEP THIS GUIDE FOR REFERENCE

2021-03-29

Printed in Canada

46235

THANK YOU FOR CHOOSING THIS WOOD INSERT.

If this insert is not installed properly, combustible materials near it may overheat and catch fire.

To reduce the risk of fire, follow the installation instructions in this guide.

As one of North America's largest and most respected wood stove and fireplace manufacturers, Stove Builder International takes pride in the quality and performance of all its products.

The following pages provide general advice on wood heating, detailed instructions for safe and effective installation, and guidance on how to get the best performance from this insert.

It is highly recommended that this wood burning hearth product be installed and serviced by professionals who are certified by NFI (National Fireplace Institute®) or CSIA (Chimney Safety Institude of America) in the United States or in Canada by WETT (Wood Energy Technology Transfer) or in Quebec by APC (Association des Professionnels du Chauffage).

Contact local building or fire officials about restrictions and installation inspection requirements in the area.

A building permit might be required for the installation of this insert and the chimney that it is connected to. It is also recommended to inform your home insurance company.

Please read this entire guide before installing and using this insert.

A primary alternative heat source should be available in the home. This heating unit may serve as a supplementary heat source. The manufacturer cannot be responsible for additional heating costs associated with the use of analternative heat source.

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ENGLISH

1. Safety Information and Environment

- This insert has been tested for use with an open door in conjunction with a fire screen, sold separately. The door may be opened, or fire screen removed only during lighting procedures or reloading. Always close the door or put back on the fire screen after ignition. Do not leave the insert unattended when the door is opened with or without a fire screen.
- **WARNING: OPERATE ONLY WITH THE DOOR FULLY CLOSED OR FULLY OPEN WITH THE FIRE SCREEN IN PLACE. IF THE DOOR IS LEFT PARTLY OPEN, GAS AND FLAME MAY BE DRAWN OUT OF THE OPENING, CREATING RISKS FROM BOTH FIRE AND SMOKE.**
- **HOT WHILE IN OPERATION, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. GLOVES MAY BE NEEDED FOR INSERT OPERATION.**
- Using an insert with cracked or broken components, such as glass, firebricks or baffle may produce an unsafe condition and may damage the insert.
- Open the air control fully before opening the loading door.
- **NEVER USE GASOLINE, LANTERN FUEL (NAPHTHA), FUEL OIL, MOTOR OIL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS OR AEROSOLS TO START A FIRE IN THIS INSERT. KEEP ALL SUCH LIQUIDS OR AEROSOLS WELL AWAY FROM THE INSERT WHILE IT IS IN USE.**
- Do not store fuel within heater minimum installation clearances.
- Burn only seasoned natural firewood.
- 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 guide.
- This appliance should always be maintained and operated in accordance with these instructions.
- Do not elevate the fire by means of grates, andirons or other means.
- Do not use makeshift materials or make any compromises when installing this insert.
- A smoke detector, a carbon monoxide detector and a fire extinguisher should be installed in the house. The location of the fire extinguisher should be known by all family members.



This product can expose you to chemicals including carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65warnings.ca.gov/

- The information given on the certification label affixed to the appliance always overrides the information published, in any other media (owner's manual, catalogues, flyers, magazines and web sites).
- Mixing of appliance components from different sources or modifying components may result in hazardous conditions. Where any such changes are planned, SBI should be contacted in advance.
- Any modification of the appliance that has not been approved in writing by the testing authority violates CSA B365 (Canada), and ANSI NFPA 211 (USA).
- Connect this insert only to a listed stainless steel chimney liner for use with solid fuel.
- If required, a supply of combustion air shall be provided to the room.
- **DO NOT CONNECT TO OR USE IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATION.**
- **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**
- The insert and its stainless steel chimney liner are to be installed only within a lined masonry chimney and masonry fireplace conforming to building codes for use with solid fuel. Do not remove bricks or mortar from the existing fireplace when installing the insert.

1.1 Regulations Covering Insert Installation

When installed and operated as described in these instructions, this wood insert is suitable for use in residential installations but is not intended for installation in a bedroom.

In Canada, the CSA B365 Installation Code for Solid Fuel Burning Appliances and Equipment and the CSA C22.1 Canadian National Electrical Code are to be followed in the absence of local code requirements. In the USA, the ANSI NFPA 211 Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances and the ANSI NFPA 70 National Electrical Code are to be followed in the absence of local code requirements.

This insert must be installed with a continuous chimney liner of 6″ diameter extending from the insert to the top of the chimney. The chimney liner must conform to the Class 3 requirements of CAN/ULC-S635, Standard for Lining Systems for Existing Masonry or Factory-built Chimneys and Vents, or CAN/ULC-S640, Standard for Lining Systems for New Masonry Chimneys or UL 1777,Standard for Safety for Chimney Liners.

The insert is not approved for use with a so-called "positive flue connection" to the clay tile of a masonry chimney.

1.2 Certification Label

Since the information given on the certification label attached to the appliance always overrides the information published in any other media, it is important to refer to it to have a safe and compliant installation. The model and the serial number can also be found on the label.

The certification label is located underneath the insert, behind the blower. It is recommended to note the insert serial number on page 1 of the *Wood Insert Installation and Operation Manual*. It will be needed to identify the version of the appliance in the event replacement parts or technical assistance is required.

1.3 Emissions and Efficiency

The low smoke emissions produced by the special features inside this insert firebox means that the household will release up to 90% less smoke into the outside environment than if an older conventional insert was used. But there is more to the emission control technologies than protecting the environment.

The smoke released from wood when it is heated contains about half of the energy content of the fuel. By burning the wood completely, this insert releases all the heat energy from the wood instead of wasting it as smoke up the chimney. Also, the features inside the firebox allow control of the air supply meaning controlling the heat output, while maintaining clean and efficient flaming combustion, which boosts the efficient delivery of heat to the home.

The emission control and advanced combustion features of this insert can only work properly if the fuel used is in the correct moisture content range of 15% to 20%. Refer to the following section for suggestions on preparing fuelwood and judging its moisture.

1.4 Materials

The SBI team is committed to protecting the environment, so they do everything they can to use only materials in their products that will have no lasting negative impact on the environment.

The **body** of this insert, which is most of its weight, is carbon steel. Should it ever become necessary many years in the future, almost the entire insert can be recycled into new products, thus eliminating the need to mine new materials.

The **paint** coating on the insert is very thin. Its VOC content (Volatile Organic Compounds) is very low. VOCs can be responsible for smog, so all the paint used during the manufacturing process meets the latest air quality requirements regarding VOC reduction or elimination.

The **air tubes** are stainless steel, which can also be recycled.

The C-Cast **baffle** is made of aluminosilicate fibre material that is compressed with a binder to form a rigid board. C-Cast can withstand temperatures above 2,000 °F. It is not considered vhazardous waste. Disposal at a landfill is recommended.

The **firebrick** is mainly composed of silicon dioxide, also known as silica, a product processed from a mined mineral. It is most commonly found in nature in the form of sand and clay. Disposal at a ecocenter is recommended.

The door and glass **gaskets** are fibreglass which is spun from melted sand. Black gaskets have been dipped into a solvent-free solution. Disposal at a landfill is recommended.

The door **glass** is a 5/32" (4 mm) thick ceramic material that contains no toxic chemicals. It is made of natural raw materials such as sand and quartz that are combined in such a way to form a high temperature glass. Ceramic glass cannot be recycled in the same way as normal glass, so it should not be disposed of with the regular household products. Disposal at a landfill is recommended.

2. Fuel

Good firewood has been cut to the correct length for the insert, split to a range of sizes and stacked in an open area until its moisture content is down to 15% to 20%.

DO NOT BURN:

- **GARBAGE;**
- **LAWN CLIPPINGS OR YARD WASTE;**
- **MATERIALS CONTAINING RUBBER, INCLUDING TIRES;**
- **MATERIALS CONTAINING PLASTIC;**
- **WASTE PETROLEUM PRODUCTS, PAINTS OR PAINT THINNERS, OR ASPHALT PRODUCTS;**
- **MATERIALS CONTAINING ASBESTOS;**
- **CONSTRUCTION OR DEMOLITION DEBRIS;**
- **RAILROAD TIES OR PRESSURE-TREATED WOOD;**
- **MANURE OR ANIMAL REMAINS;**
- **SALT WATER DRIFTWOOD OR OTHER PREVIOUSLY SALT WATER SATURATED MATERIALS;**
- **UNSEASONED WOOD; OR**
- **PAPER PRODUCTS, CARDBOARD, PLYWOOD, OR 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.

2.1 Tree Species

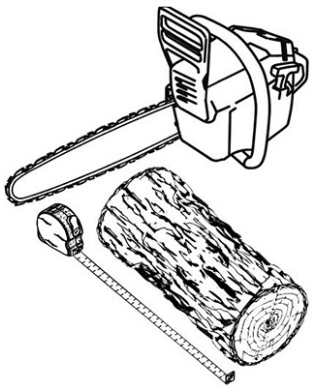
The tree species the firewood is produced from is less important than its moisture content. The main difference in firewood from various tree species is the density of the wood. Hardwoods are denser than softwoods.

Homeowners with access to both hardwood and softwood use both types for different purposes. Softer woods make good fuel for mild weather in spring and fall because they light quickly and produce less heat. Softwoods are not as dense as hardwoods so a given volume of wood contains less energy. Using softwoods avoids overheating the house, which can be a common problem with wood heating in moderate weather. Harder woods are best for colder winter weather when more heat and longer burn cycles are desirable.

Note that hardwood trees like oak, maple, ash and beech are slower growing and longer lived than softer woods like poplar and birch. That makes hardwood trees more valuable. The advice that only hardwoods are good to burn is outdated. Old, leaky cast iron inserts wouldn't hold a fire overnight unless they were fed large pieces of hardwood. That is no longer true.

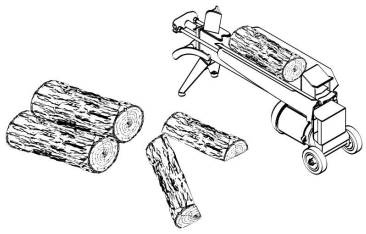
2.2 Log Length

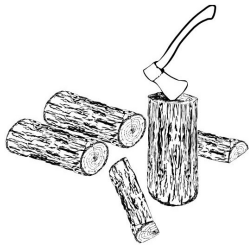
Logs should be cut at least 1″ (25 mm) shorter than the firebox so they fit in easily. Pieces that are even slightly too long makes loading the insert very difficult. The most common standard length of firewood is 16″ (400 mm).



2.3 Piece Size

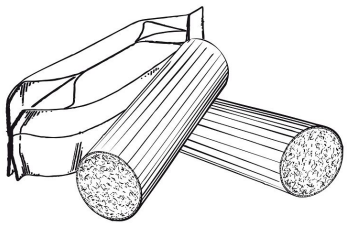
Firewood dries more quickly when it is split. Large unsplit rounds can take years to dry enough to burn. Even when dried, unsplit logs are difficult to ignite because they don't have the sharp edges where the flames first catch.





Wood should be split to a range of sizes, from about 3″ to 6″ (75 mm to 150 mm) in cross section. Having a range of sizes makes starting and rekindling fires much easier.

2.4 Compressed Wood Logs

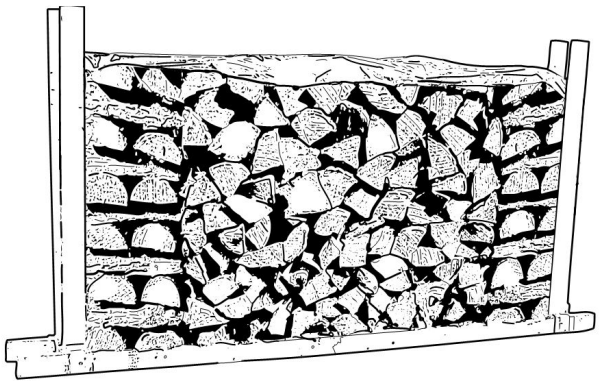


Compressed wood logs made of 100% compressed sawdust can be burned with caution in the number of these logs burned at once. Do not burn compressed logs made of wax impregnated sawdust or logs with any chemical additives. Follow the manufacturer's instructions and warnings.

2.5 Drying Time

Firewood that is not dry enough to burn is the cause of most complaints about wood inserts. Continually burning green or unseasoned wood produces more creosote and involves lack of heat and dirty glass door. Firewood with a moisture content between 15% and 20% will allow the insert to produce its highest possible efficiency.

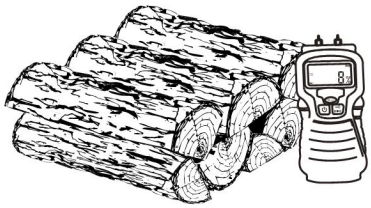
Here are some facts to consider in estimating drying time:



- Firewood bought from a dealer is rarely dry enough to burn, so it is advisable to buy the wood in spring and dry it yourself;
- Drying happens faster in dry weather than in a damp climate;
- Drying happens faster in warm summer weather than in winter weather;
- Small pieces dry more quickly than large pieces;
- Split pieces dry more quickly than unsplit rounds;
- Softwoods like pine, spruce, poplar, and aspen take less time to dry than hardwoods. they can be dry enough to burn after being stacked to air dry only for the summer months;
- Hardwoods like oak, maple and ash can take one, or even two years to dry fully, especially if the pieces are big;
- Firewood dries more quickly when stacked outside in a location exposed to sun and wind; it takes much longer to dry when stacked in a wood shed;

Use these guidelines to find out if the firewood is dry enough to burn:

- Cracks form at the ends of logs as they dry;
- The wood turns from white or cream colored to grey or yellow;
- Two pieces of wood struck together sounds hollow;
- The face of a fresh cut feels warm and dry;
- The moisture content read by a moisture meter is between 15% to 20%.



3. Burning Wood Efficiently

3.1 First Use

Two things happen when burning the first few fires; the paint cures and the internal components are conditioned. As the paint cures, some of the chemicals vaporize. The vapors are not poisonous, but they smell bad. Fresh paint fumes can also trigger false alarms in smoke detectors. When lighting the heater for the first few times, it may be wise to open doors and windows to ventilate the house.

Burn two or three small fires to begin the curing and conditioning process. Then build bigger and hotter fires until there is no longer paint smell from the insert. As hotter and hotter fires are burned, more of the painted surfaces reach the curing temperature of the paint. The smell of curing paint does not disappear until one or two very hot fires have been burned.

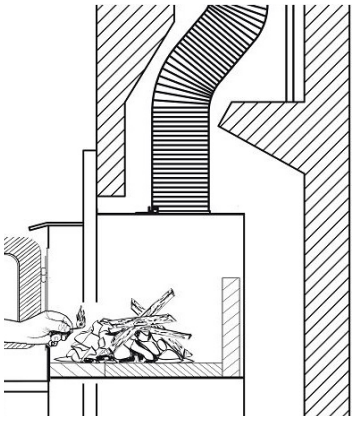
3.2 Lighting Fires

Each person heating with wood develops its own favorite way to light fires. Regardless of the method chosen, the goal should be to have a hot fire burning, quickly. A fire that ignites fast produces less smoke and deposits less creosote in the chimney.

Never use gasoline, gasoline-type lantern fuel (naphtha), fuel oil, motor oil, kerosene, charcoal lighter fluid, or similar liquids or aerosols to start or 'freshen up' a fire in this wood insert. Keep all such liquids well away from the insert while it is in use.

Here are three popular and effective ways to ignite wood fires.

3.2.1 Conventional Method



The conventional method to build a wood fire is to crumple 5 to 10 sheets of newspaper and place them in the firebox and hold them in place with ten pieces of kindling wood. The kindling should be placed on and behind the newspaper.

Then add two or three small pieces of firewood. Open the air intake control completely and ignite the newspaper. Leave the door slightly ajar.

Once the fire has ignited, the door can be closed with the air control still fully open. When the kindling is almost completely burned, standard firewood pieces can be added.

Do not leave the insert unattended when the door is slightly open. Always close and latch the door after the fire ignites.

3.2.2 The Top Down Method

This method is the opposite of the conventional method and only works properly if well-seasoned wood is used.

Place three or four small, split, dry logs in the firebox. Arrange the kindling wood on the logs in two layers at right angles and place a dozen finely split kindling on the second row.

It is possible to use ragged paper but it may not hold in place since it tends to roll while it is burning. The best is to wrap a sheet on itself, grab the ends of the roll and make a knot. Use four or five sheets of paper tied together and put them on top and around the kindling.

Open the air intake control completely, ignite the paper and close the door.

The down fire method has two advantages over the traditional method: first, the fire does not collapse on itself, and it is not necessary to add wood gradually since the combustion chamber is full before the fire is lit.

3.2.3 Two Parallel Logs Method

Two spit logs are placed in the firebox with a few sheets of twisted newspapers in between the logs. Fine kindling is added across the two logs and some larger kindling across those, log cabin style. Newspaper is lit.

3.2.4 Using Fire Starters

Commercial fire starters can be used instead of a newspaper. Some of these starters are made of sawdust and wax and others are made of specialized flammable solid chemicals. Always follow the package directions when using.

Gel starters can also be used, but only to light a fire, in a cold combustion chamber without hot embers inside.

3.3 Zone Heating

This insert is a space heater, which means it is intended to heat the area it is installed in, as well as spaces that connect to that area, although to a lower temperature. This is called zone heating and it is an increasingly popular way to heat homes or spaces within homes.

Zone heating can be used to supplement another heating system by heating a particular space within a home, such as a basement, a family room or an addition that lacks another heat source.

Houses of moderate size and relatively new construction can be heated with a properly sized and located wood insert. Whole house zone heating works best when the insert is in the part of the house where the family spends most of its time. This is normally the main living area where the kitchen, dining and living rooms are located.

Locating the insert in this area will give the maximum benefit of the heat it produces and will achieve the highest possible heating efficiency and comfort. The space where the most time is spent will be warmest, while bedrooms and basement (if there is one) will stay cooler. In this way, less wood is burned than with other forms of heating.

Although the insert may be able to heat the main living areas of the house to an adequate temperature, it is strongly recommended to also have a conventional oil, gas or electric heating system to provide backup heating. The success of zone heating will depend on several factors, including the correct sizing and location of the insert, the size, layout and age of the home and the climate zone. Three-season vacation homes can usually be heated with smaller inserts than houses that are heated all winter.

3.4 Combustion Cycles

Zone heating is very different than other forms of heating. There will be temperature variations in different parts of the house and there will be temperature variations throughout day and night. This is normal, and for experienced wood burners these are advantages of zone heating wood burning.

Wood heaters don't have a steady heat output. It is normal for the temperature to rise after a new load of wood is ignited and for its temperature to gradually decrease throughout the burning cycle. This increasing and decreasing temperature can be matched with the household routines. For example, the temperature in the area can be cooler when the household is active, and it can be warmer when it is inactive.

Wood burns best in cycles. A cycle starts when a new load of wood is ignited by hot coals and ends when that load has been consumed down to a bed of charcoal about the same size as it was when the wood was loaded.

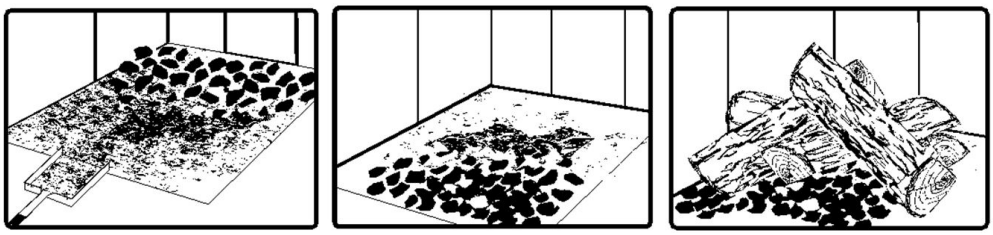
Trying to produce a steady heat output by placing a single log on the fire at regular intervals is not recommended. Always place at least three, and preferably more pieces on the fire at a time so that the heat radiated from one piece helps to ignite the pieces next to it. Each load of wood should provide several hours of heating. The size of each load may vary depending on the amount of heat required.

Burning in cycles means the loading door does not need to be opened while the wood is flaming. This is an advantage since it is preventing smoke leaking from the heater when the door is opened as a full fire is burning. This is especially true if the chimney is on the outside wall of the house.

If the door must be opened while the fire is flaming, fully open air control for a few minutes then open the door slowly.

3.5 Rekindling a Fire

When the temperature of the room is lower and all that remains is embers, it is time to reload. Remove excess ash from the front of the firebox and bring the ashes forward. Place a new load of wood on, and at the back of the embers. Open the air control completely and close the door.



Raking the coals is useful for two reasons. First, it brings them near where most of the combustion air enters the firebox. This will ignite the new load quickly. Secondly, the charcoal will not be smothered by the new load of wood. When the embers are simply spread inside the combustion chamber, the new load smoulder for a long time before igniting.

Close the air control only when the firebox is full of bright turbulent flames, the wood is charred, and its edges are glowing.

The heater should not be left unattended during ignition and the fire should not burn at full intensity for more than a few minutes.

When lighting a new load, the appliance produces a heat surge. This heat surge is pleasant when the room temperature is cool but can be unpleasant when the room is already warm. Therefore, it is best to let each load of wood burn completely so that the room cools down before putting a load of wood back on.

3.6 Removing Ashes

Ash should be removed from the firebox every two to three days of full time heating. Ash should not accumulate excessively in the firebox since it will affect the proper operation of the appliance.

The best time to remove ash is in the morning, after an overnight fire when the insert is relatively cold, but there is still a little chimney draft to draw the ash dust into the insert and prevent going out into the room.

Ashes almost always contain live embers that can stay hot for days and which release carbon monoxide gas.

Ashes should be placed in a tightly covered metal container. The container must be placed on a non-combustible floor or on the ground well away from all combustible materials.

If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be kept in a closed metal container until they are completely cooled. No other waste should be placed in this container.



NEVER STORE ASHES INDOORS OR IN A NON-METALLIC CONTAINER OR ON A WOODEN DECK.

3.7 Air Intake Control

Once the firewood, firebox and chimney are hot, air intake can be reduced to achieve a steady burn.

As the air intake is reduced, the burn rate decreases. This has the effect of distributing the thermal energy of the fuel over a longer period of time. In addition, the flow rate of exhaust through the appliance and flue pipe slows down, which increases the duration of the energy transfer of the exhaust gases. As the air intake is reduced, the flame slows down.

If the flames diminish to the point of disappearing, the air intake has been reduced too early in the combustion cycle or the wood used is too wet. If the wood is dry and the air control is used properly, the flames should decrease, but remain bright and stable.

On the other hand, too much air can make the fire uncontrollable, creating very high temperatures in the unit as well as in the chimney and seriously damaging them. A reddish glow on the unit and on the chimney components indicates overheating. Excessive temperatures can cause a chimney fire.

The images shown are for guidance only and may differ from your product, but the operation remains the same. See the EPA Loading Section of the *Insert Installation and Operation Manual* for a specific overview of the air control of your appliance.

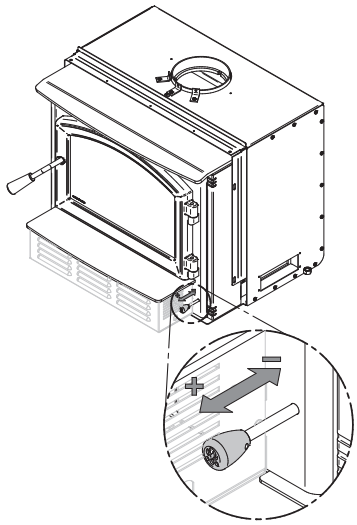


Figure 1 : Air Intake Control

3.8 Fire Types

Using the air intake control is not the only way to match the insert heat output to the desired temperature in the house. A house will need far less heating in October than in January to maintain a comfortable temperature. Filling the firebox full in fall weather will overheat the space. Otherwise, the combustion rate will have to be reduced to a minimum and the fire will be smoky and inefficient. Here are some suggestions for building fires suitable for different heating needs. The method used to certify your appliance according to EPA Standards is presented in the EPA Charging Section of the *Wood Insert Installation and Operation Manual* of your appliance.

3.8.1 Flash Fire

To build a small fire that will produce a low heat output, use small pieces of firewood and load them crisscross in the firebox.

The pieces should only be 3″ to 4″ in diameter. After raking the coals, lay two pieces parallel to each other diagonally in the firebox and lay two more across them in the other direction. Open the air control fully and only reduce the air after the wood is fully flaming.

This kind of fire is good for mild weather and should provide enough heat for up to four hours. Small fires like this are a good time to use softer wood species and avoid overheating the house.

3.8.2 Low and Long Output Fires

For a fire that will last up to eight hours but will not produce intense heat, use soft wood and place the logs compactly in the firebox. Before reducing the air intake, the load will have to burn at full heat for long enough for charring the surface of the logs. The flame must be bright before letting the fire burn by itself.

3.8.3 High Output Fires

When heating needs are high during cold weather, the fire should burn steadily and brightly. This is the time to use larger pieces of hardwood. Place the biggest pieces at the back of the firebox and place the rest of the pieces compactly. A densely built fire like this will produce the longest combustion this insert is capable of. Special attention must be paid when building fires like this since if the air intake is reduced too quickly, the fire could smoulder. The wood must be flaming brightly before leaving the fire to burn.

3.8.4 Maximum Burn Cycle Times

The burn cycle time is the period between loading wood on a coal bed and the consumption of that wood back to a coal bed of the same size. The flaming phase of the fire lasts for roughly the first half of the burn cycle and the second half is the coal bed phase during which there is little or no flame. The burn time expected from an insert, including both phases, will vary depending on a number of things, such as:

- firebox size,
- the amount of wood loaded,
- the species of wood,
- the wood moisture content,
- the size of the space to be heated,
- the climate zone where the house is, and
- the time of the year.

The table below gives an approximate maximum burn cycle times, based on firebox volume.

Table 1 : Approximate Maximum Burn Cycle Time

FIREBOX VOLUME	MAXIMUM BURN CYCLE TIME
<1.5 cubic feet	3 to 5 hours
1.5 c.f. to 2.0 c.f	5 to 6 hours
2.0 c.f. to 2.5 c.f.	6 to 8 hours
2.5 c.f. to 3.0 c.f.	8 to 9 hours
>3.0 c.f.	9 to 10 hours

A longer burning time is not necessarily an indication of efficient insert operation. It is preferable to build a smaller fire that will provide three or four hours of heating than to fully load the firebox for a much longer burn. Shorter burn cycles make it easier to match the heat output of the insert to the heat demand of the space.

3.8.5 Logs Orientation

In a relatively square firebox, the wood can be loaded north-south (ends of the logs visible) or east-west (sides of the logs visible).

North-south loads allow more wood to be loaded at the same time. On the other hand, they break into smaller pieces faster. North-south loading is good for high output, long lasting fires for cold weather.

East-west loads allow a limited amount of wood since too many logs could cause them to fall on the glass. East-west loads, placed in a compact way, take a long time before breaking down. They are excellent for low-intensity, long-lasting fires in relatively mild weather.

3.8.6 Carbon Monoxide

When there is no more flame in the firebox and there are still some unburned logs, check outside if there is smoke coming out of the chimney. If this is the case, it means that the fire is out of air to burn properly. In this situation, the level of CO increases and it is important to react. Open the door slightly and move the logs with a poker. Create a passage for the air below by making a trench with the ember bed. Add small pieces of wood to restart the combustion.

4. Maintenance

This heater will give many years of reliable service if used and maintained properly. Internal components of the firebox such as firebricks or refractory panels, baffle and air tubes will wear over time. Defective parts should always be replaced with original parts see « Exploded diagram and parts list » in the *Wood Insert Installation and Operation Manual*.

To avoid premature deterioration, follow the lighting and reloading procedures in section « 3. Burning Wood Efficiently » and also avoid letting the heater run with the air intake fully open for entire burn cycles.Insert

4.1 Wood Insert

4.1.1 Cleaning and Painting

Painted and plated surfaces can be wiped down with a soft, damp cloth. If the paint is scratched or damaged, it is possible to repaint the insert with a heat-resistant paint. **Do not clean or paint the insert when it is hot.** Before painting, the surface should be sanded lightly with sandpaper and then wiped off to remove dust. Apply two thin layers of paint.

4.1.2 Refractory Material and Baffle

Inspect the firebricks or the refractory panels and the baffle for damage periodically and replace anything that is cracked or broken.

Operation of the heater with a cracked or missing baffle may cause unsafe temperatures and hazardous conditions and will void the warranty.

4.2 Glass Door

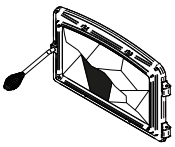
4.2.1 Cleaning

Under normal conditions, the door glass should stay relatively clear. If the firewood is dry enough and the operating instructions in this guide are followed, a whitish, dusty deposit will form on the inner surface of the glass after a week or so of use. This is normal and can be easily removed when the heater is cold by wiping with a damp cloth or paper towel and then drying.

When the insert runs at a low combustion rate, light brown stains may form, especially in the lower corners of the glass. This indicates that the fire has been smoky and some of the smoke has condensed on the glass. It also indicates incomplete combustion of the wood, which also means more smoke emissions and faster formation of creosote in the chimney.

The deposits that form on the glass are the best indication of the fuel quality and success in properly using the insert. These stains can be cleaned with a special wood insert glass cleaner. **Do not use abrasive products to clean the glass.**

The goal should be having a clear glass with no brown stains. If brown stains appear regularly on the glass, something about the fuel or the operating procedure needs to be changed. When brown streaks are coming from the edge of the glass, it is time to replace the gasket around the glass. Follow the instructions in section « 3.1.3 Gasket » in the *Wood Insert Installation and Operation Manual*. Always replace the gasket with a genuine one.



Do not clean the glass when the insert is hot.

Do not abuse the glass door by striking or slamming shut.

Do not use the insert if the glass is broken.

5. Operating the Insert

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 guide.

Before using the insert, the following steps should be completed, you will find the procedures installation in the *Wood Insert Installation and Operation Manual*:

- Handle installation.
- Installation of bricks in the product.
- Installation of ash shelf and blower.
- Facades installation.

The following step is optional:

- Air inlet installation.

5.1 Blower

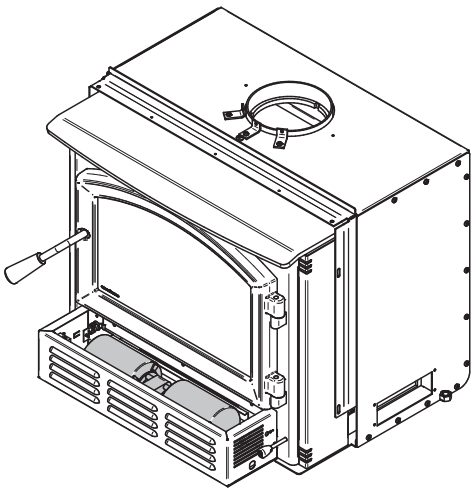


Figure 2 : Blower location

A blower is already installed on this insert. It is located underneath the ash lip, in front of the insert. Its function is to increase airflow through the heat exchanger and improve hot air circulation in the room. When used regularly, the blower can provide a small increase in efficiency, up to 2%. However, the use of a blower should not be used as a way to gain more output from an insert that is undersized for the space it is intended to heat.



Ensure the blower cord is not in contact with any surface of the insert to prevent electrical shock or fire damage. Do not run cord beneath the insert.

The blower has a rheostat that can be adjusted in three different positions; either from high (HI) to low (LO) or closed (OFF).

Allow the insert to reach operating temperature (approximately one hour) before turning on the blower, since increased airflow from the blower will remove heat and affect the start up combustion efficiency.

The blower is also equipped with a heat sensor. When the blower is ON, it will start automatically when the insert is hot enough and it will stop when the insert has cooled down. Therefore, the blower speed control can be left at the desired setting.

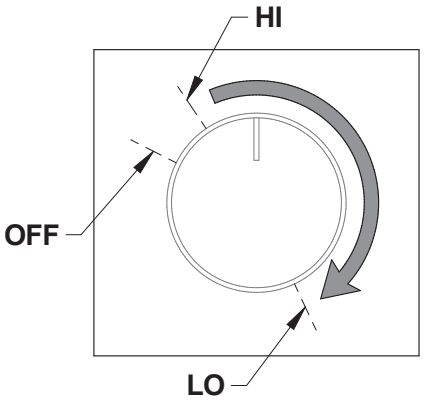


Figure 3 : Blower rheostat

5.2 Fire Screen

Some stoves have been tested for use with the door open with a rigid firescreen **(In the United States or in provinces with a particulate emissions limit (e.g .: US EPA), the use of open-door wood stoves with a rigid firescreen is prohibited)**, this option is sold separately (to confirm that your product has been tested with, please refer to the *Wood Insert Installation and Operation Manual*). The fire screen must be properly secured on the insert to avoid any risk of sparks damaging the flooring. When the fire screen is in use, do not leave the insert unattended to respond promptly in the event of smoke spillage into the room. Potential causes of smoke spillage are described in Section « 7. The Venting System » of this guide. See « Optional fire screen installation » in the user guide and the *Wood Insert Installation and Operation Manual* for installation instructions.

OPERATING THE INSERT WITH A FIRE SCREEN INCREASES POSSIBILITIES OF GENERATING CARBON MONOXIDE. CARBON MONOXIDE IS AN ODOURLESS GAS THAT IS HIGHLY TOXIC WHICH CAN CAUSE DEATH AT HIGH CONCENTRATION IN AIR.

5.3 Exhaust System

Wood smoke can condense inside the chimney, forming a inflammable deposit called creosote. If creosote builds up in the system, it can ignite when a hot fire is burned in the insert. A very hot fire can progress to the top of the chimney. Severe chimney fires can damage even the best chimneys. Smouldering, smoky fires can quickly cause a thick layer of creosote to form. When the insert is operated properly, the exhaust from the chimney is mostly clear and creosote builds up more slowly.

Creosote - Formation and Need to Removal

When wood is burned slowly, 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 (⅛" [3mm] or more it should be removed to reduce the risk of a chimney fire»

5.3.1 Cleaning frequency

It is not possible to predict how much or how quickly creosote will form in the chimney. It is important, therefore, to check the build-up in the chimney monthly until the rate of creosote formation is determined. Even if creosote forms slowly in the system, the chimney should be cleaned and inspected at least once each year.

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

5.3.2 Sweeping the Chimney

Chimney sweeping can be a difficult and dangerous job. People with no chimney sweeping experience will often prefer to hire a professional chimney sweep to inspect and clean the system for the first time. After seeing the cleaning process, some will choose to do it themselves.



The chimney should be checked regularly for creosote build-up. Inspection and cleaning of the chimney can be facilitated by removing the baffle. See « Air tubes and baffle installation » in the *Wood Insert Installation and Operation Manual* for more details.

5.3.3 Chimney Fire

Regular chimney maintenance and inspection can prevent chimney fires. If you have a chimney fire, follow these steps:

1. Close the insert door and the air intake control;
2. Alert the occupants of the house of the possible danger;
3. If you require assistance, alert the fire department;
4. If possible, use a dry chemical fire extinguisher, baking soda or sand to control the fire. *Do not use water*, as it may cause a dangerous steam explosion;

Do not use the appliance again until the insert and its chimney have been inspected by a qualified chimney sweep or a fire department inspector.

6. Masonry Fireplace Requirements

The masonry fireplace must meet the minimum requirements found in the building code enforced locally, or the equivalent, for a safe installation. Contact the local building inspector for requirements in the area. An inspection of the fireplace should include the following:

6.1 Fireplace and Chimney Condition

The masonry fireplace and chimney should be inspected prior to installation, to confirm that they are free from cracks, loose mortar, creosote deposits, blockage, or other signs of deterioration. If evidence of deterioration is noted, the fireplace or chimney should be upgraded and cleaned prior to installation.

Masonry or steel, including the damper plate, may be removed from the smoke shelf and adjacent damper frame if necessary to accommodate the insert's chimney liner, provided that their removal will not weaken the structure of the fireplace and chimney, and will not reduce protection for combustible materials to less than what is required by the building code.

Removal of any parts, which render the fireplace unfit for use with solid fuel, requires the fireplace to be permanently labelled by the installer as being no longer suitable for solid fuel, until the removed parts are replaced and the fireplace is restored to its original certified condition. Also, any air vents, grilles, or louvers that allow air circulation around the fireplace must not be removed or blocked.

6.2 Chimney Caps

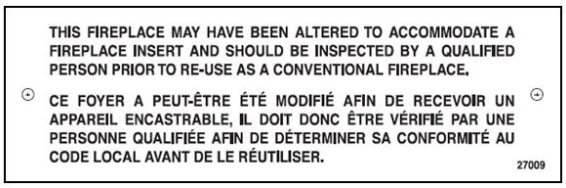
Mesh type chimney caps must have provision for regular cleaning, or the mesh should be removed to eliminate the potential of plugging.

6.3 Adjacent Combustibles

The fireplace should be inspected to make sure that there is adequate clearance to combustibles, both exposed combustibles to the top, side, and front as well as concealed combustibles, in the chimney and mantle area. The local inspector should have information on whether older fireplaces are of adequate construction.

6.4 Masonry Fireplace Throat Damper

If the fireplace draft control system is to remain in the masonry fireplace, it must be locked open for easy access to the chimney liner or removed entirely. If it is removed from the masonry hearth, the notice plate 27009 must be installed in a visible place, inside the masonry hearth. The plate can be found in the owner's manual kit.



ENGLISH

7. The Venting System

7.1 General

The venting system, made of the chimney and the liner inside the chimney, acts as the engine that drives the wood heating system. Even the best insert will not function safely and efficiently as intended if it is not connected to a suitable chimney and liner system.

The heat in the flue gases that pass from the insert into the chimney is not waste heat. This heat is what the chimney uses to make the draft that draws in combustion air, keeps smoke inside the insert and safely vents exhaust to outside. The heat in the flue gas can be seen as the fuel the chimney uses to create draft.

7.2 Block-off Plate

To reduce the possibility of a cold air back draft from the masonry chimney into the room, the installation of a sheet metal block-off plate **(A)** is recommended. When fabricating the block-off plate, cut the pipe hole slightly larger than the liner diameter and pass the liner through the hole. Install the block-off plate and secure it with masonry nails. Seal the joints between the plate and the chimney with high temperature silicone and use stove cement to seal between the pipe and the plate.

In Canada, the CSA B365 Standard permits «Roxul» type wool to be stuffed around the liner as it passes through the throat area as an alternative to a sheet metal block-off plate. However, this method is less efficient than using a plate.

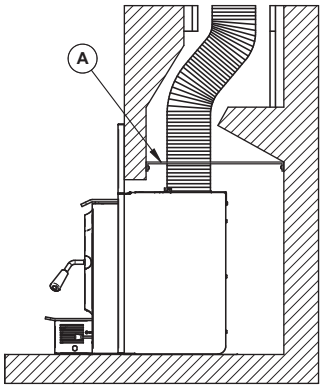


Figure 4 : Block-off Plate



Figure 5 : Block-off Plate

7.3 Suitable Chimneys

This wood insert will provide optimum efficiency and performance when connected to a 6″ diameter chimney liner. The connection to a chimney having a diameter of at least 5″ (Canada only) is permitted if it allows the proper venting of combustion gases and that such application is verified and authorized by a qualified installer. Otherwise, the diameter of the flue should be 6″. The reduction of the liner diameter to less than 6″ should only be done if the total height of the masonry chimney is greater than 20 feet.

7.4 Chimney Liner Installation

The use of a chimney liner (rigid or flexible) is recommended to ensure the best performance. To ensure an optimal draft, it is also strongly recommend adding a minimum of 12″ rigid liner between the top of the masonry chimney and the rain cap. In all cases, liners should be installed in accordance with the liner manufacturer's instructions, including instructions for extension above the masonry.

Use chimney liners listed UL 1777, ULC S635 or CAN/ ULC S640.

In order to connect the insert to the liner, refer to section « 7.5 Liner Connection ».

ATTENTION INSTALLER:

When positioning the unit in a fireplace opening, prior to the flue installation, install the insert into the opening until the top lip of air jacket is flush with fireplace facing.

If lag bolts or anchors are to be used to secure the insert, the holes location should be marked with the unit in place. Remove the insert and locate the anchors.

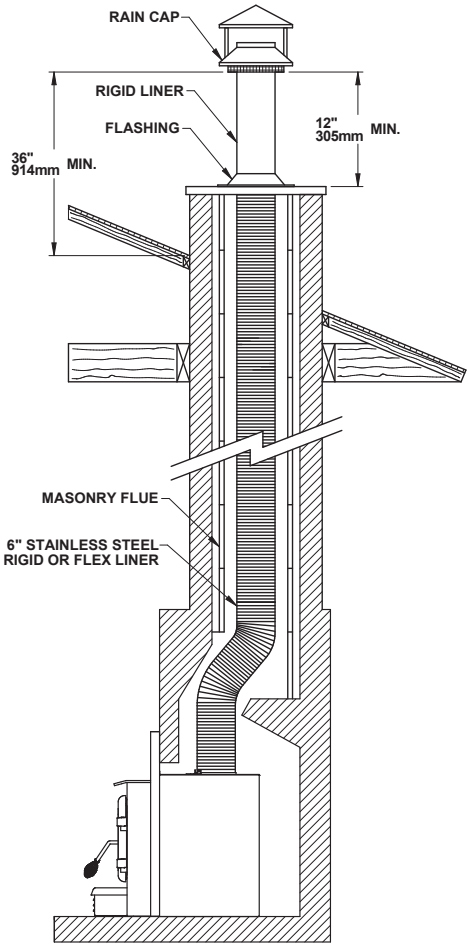


Figure 6 : Liner Installation

7.5 Liner Connection

Two options are possible to connect the liner to the insert:

7.5.1 Liner Starter Adaptor

Install the chimney liner starter adapter, provided with the chimney liner. Follow the chimney liner starter adapter manufacturer's instructions.

In order to connect the chimney liner starter adapter to the flue outlet, install three brackets with the three screws, all provided in the user manuals kit, on top of the insert. The long end of the brackets must be attached to the insert. Insert the chimney liner into the flue collar of the unit and secure the liner to the brackets with three self-tapping screws (not included).

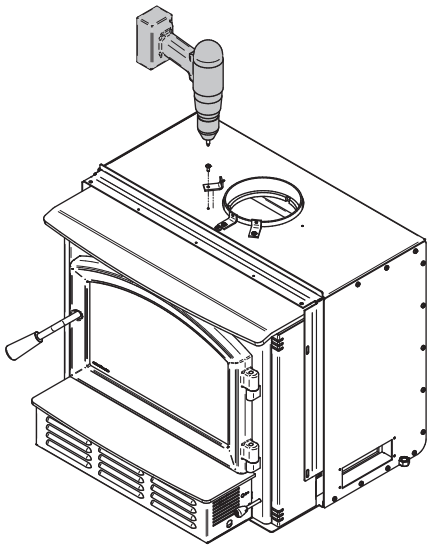


Figure 7 : Securing the brackets

The dealer may offer a liner fastening system, sold separately. Follow the installation instructions provided with the liner fastening system.

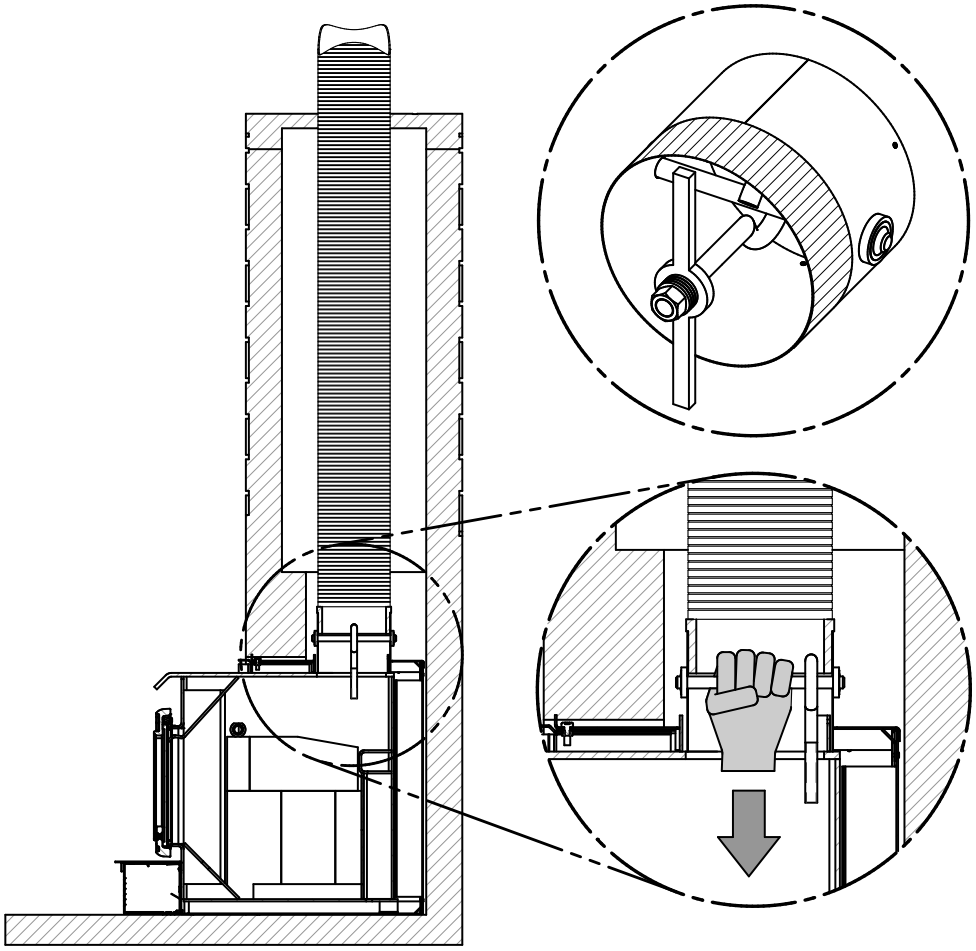
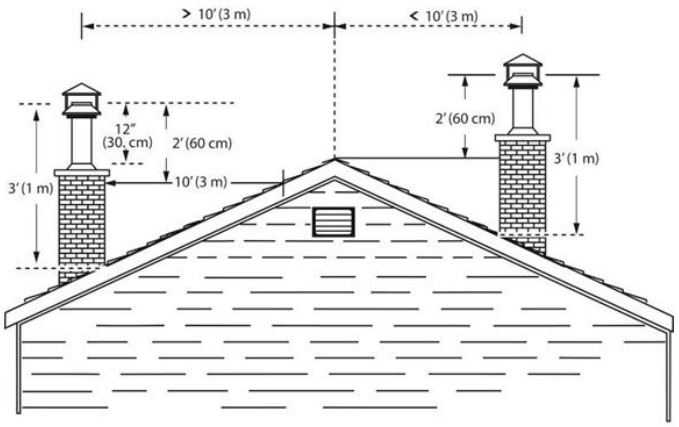


Figure 8 : Liner fastening system

7.6 Minimum Chimney Height

The top of the chimney should be tall enough to be above the air turbulence caused when wind blows against the house and its roof. The chimney must extend at least 3 ft. (1 m) above the highest point of contact with the roof, and at least 2 ft. (60 cm) higher than any roof line or obstacle within a horizontal distance of 10 ft. (3 m).



7.7 Chimney Location

Because the venting system is the engine that drives the wood heating system, it must have the right characteristics. The signs of bad system design are cold back drafting when there is no fire in the insert, slow kindling of new fires, and smoke roll-out when the door is open for loading.

When it is cold outside, the warm air in the house is buoyant so it tends to rise. This creates a slight pressure difference in the house. Called 'stack effect', it produces a slightly negative pressure in the lower part of the house (compared to the outside) and a slightly positive pressure zone in the high part of the house. If there is no fire burning in a heater connected to a chimney that is shorter than the warm space inside the house, the slight negative pressure in the lower part of the house will compete against the desired upward flow in the chimney. This occurs for the two following reasons:

First, the chimney runs up the outside of the house, so the air in it is colder and denser than the warm air in the house. And second, the chimney is shorter than the heated space of the house, meaning the negative pressure in the lower part of the house will draw cold air down the chimney, through the insert and into the room. Even the finest insert will not work well when connected to this chimney.

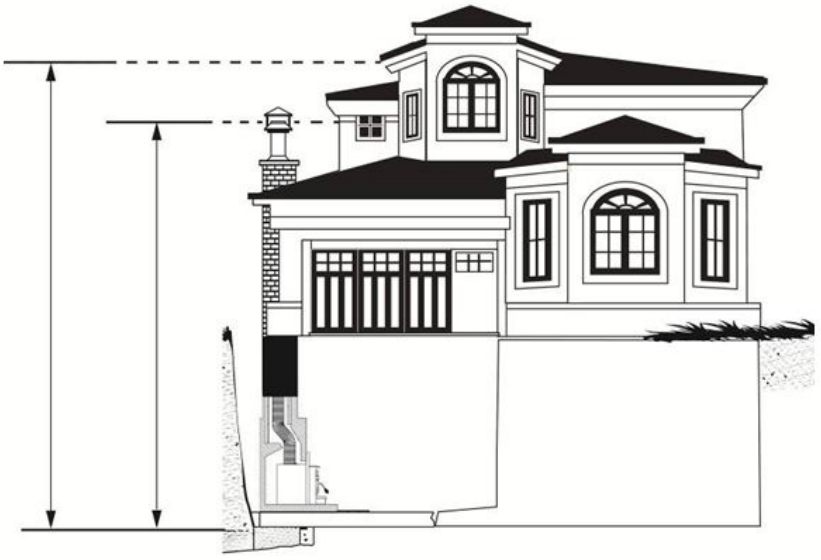


Figure 9 : Chimney location in the house

7.8 Supply of Combustion Air

In Canada, wood inserts are not required to have a combustion air supply from outside. Research has shown that outside air supply do not compensate for the depressurization of the house and may not be sufficient to provide a supply of combustion air in windy weather. However, to reduce the risks against smoke spillage due to house depressurization, a carbon monoxide (CO) detector is required in the room where the insert is installed. The CO detector will provide warning if for any reason the wood insert fails to function correctly.

7.8.1 Air Supply in Conventional Houses

The safest and most reliable supply of combustion air for a wood insert is from the room in which it is installed. Room air is already preheated so it will not chill the fire, and its availability is not affected by wind pressures on the house. Contrary to commonly expressed concerns, almost all tightly sealed new houses have enough natural leakage to provide a small amount of air needed by the insert. The only case in which the wood insert may not have adequate access to combustion air is if the operation of a powerful exhaust device (such as a kitchen range exhaust) causes the pressure in the house to become negative relative to outdoors.

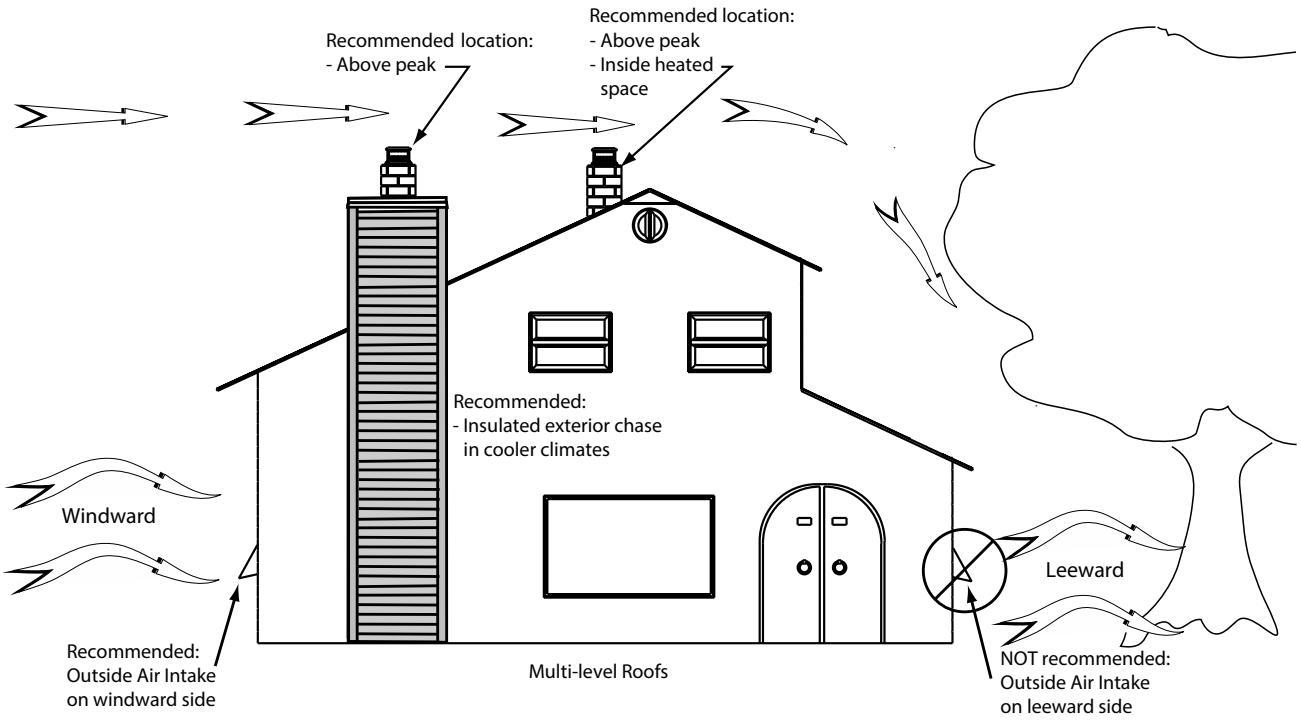


Figure 10 : Air supply in conventional houses

If an air intake is installed through the wall of the house, its pressure can vary during windy weather. If there are changes in wood insert performance in windy weather, and in particular if smoke puffs from the insert, the air duct should be disconnected from the insert to determine if it is the cause of the problem. In some windy conditions, negative pressure at the duct weather hood outside the house wall may draw hot exhaust gases from the insert backwards through the duct to outdoors. Check the outdoor air duct for soot deposits when the full system is cleaned and inspected at least once each year.

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G3A 2H3
418-908-8002
www.sbi-international.com
tech@sbi-international.com

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CLAS 2009-02

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 655

CERTIFICAT D'ÉTALONNAGE # 13027

Date d'étalonnage : 2020-10-13
Date d'émission du certificat : 2020-10-13

Stove Builder International
250, rue de Copenhague
Saint-Augustin-de-Desmaures, Québec, Canada
G3A 2H3

Étalonnage d'un
Débitmètre volumétrique American Meter Company DTM-200A S/N : 07J264834

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Tous les étalonnages sont effectués conformément au manuel d'assurance qualité de Polycontrols qui est conforme à la norme ISO/IEC 17025 – 2017, à la norme ISO 9001 – 2015 ainsi qu'à tout autre exigences de qualité définies dans la description d'achat des clients.

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SOMMAIRE DES CONDITIONS DE L'INSTRUMENT EN TEST

Conditions initiales	En bon état
Travail Effectué	Étalonnage de l'instrument
	Lectures Initiales = Lectures finales, aucun ajustement
Résultats	Lectures finales dans les tolérances
Remarques	Fréquence d'étalonnage aux 12 mois

Bernard Poirier
Métrologiste

Responsable du laboratoire

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Conseil canadien des normes
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Portée d'accréditation 655

Certificat d'étalonnage # 13027

Numéro de série:	07J264834	Station de mesure:	3
Date d'étalonnage:	2020-10-13	Procédure:	POS-CAL-005
Identification de l'instrument:	SBI-103	Règle de décision:	Méthode #2

Instrument de mesure de référence utilisé pour l'étalonnage final

Description	Modèle	# Série	Traçabilité	Date dû
DHI molbloc (30 slpm)	3E4-VCR-V-Q	2359	1500279712	2021-03-04
DHI molbox1	Molbox1	755	1500285062	2021-06-09
RTD Mist	Mist	L00295	2019008203	2020-12-13
Module 44.5 PSI avec Baro 163671	Module 30	160659	2020003156	2021-04-28

Spécifications finales de l'appareil

Gaz	Air
Température d'opération	
Pression à l'entrée	
Pression à la sortie	
Température de référence	
Pression de référence	
Étendue d'échelle	0-200 ACFH
Signaux Entrée/Sortie	-
Alimentation	
Tolérance	±2 %F.S.

Condition d'étalonnage

Gaz	Air
Température ambiante	22 °C
Pression ambiante	1017.71 mbar
Orientation	Horizontale
Élastomère	Viton
Valve	Viton

Lectures finales

Débit du test ACFH	Instrument en test ft³	Valeurs mesurées Pression PSIA	Température °C	Référence ft³	Référence calculée ft³	Erreur calculée ft³	Tolérance acceptable ft³	Incertitude k = 2 ft³	TUR
5.0012	0.8350	14.7006	22.19	0.8297	0.8325	0.0025	0.6658	0.0034	>4
10.0479	1.6910	14.6978	22.14	1.6681	1.6737	0.0173	0.6663	0.0056	>4
15.0460	2.5350	14.6960	22.09	2.4977	2.5060	0.0290	0.6662	0.0083	>4
25.0808	4.2250	14.6987	22.01	4.1601	4.1720	0.0530	0.6654	0.0139	>4
40.1053	6.7640	14.7066	21.93	6.6675	6.6813	0.0827	0.6664	0.0222	>4

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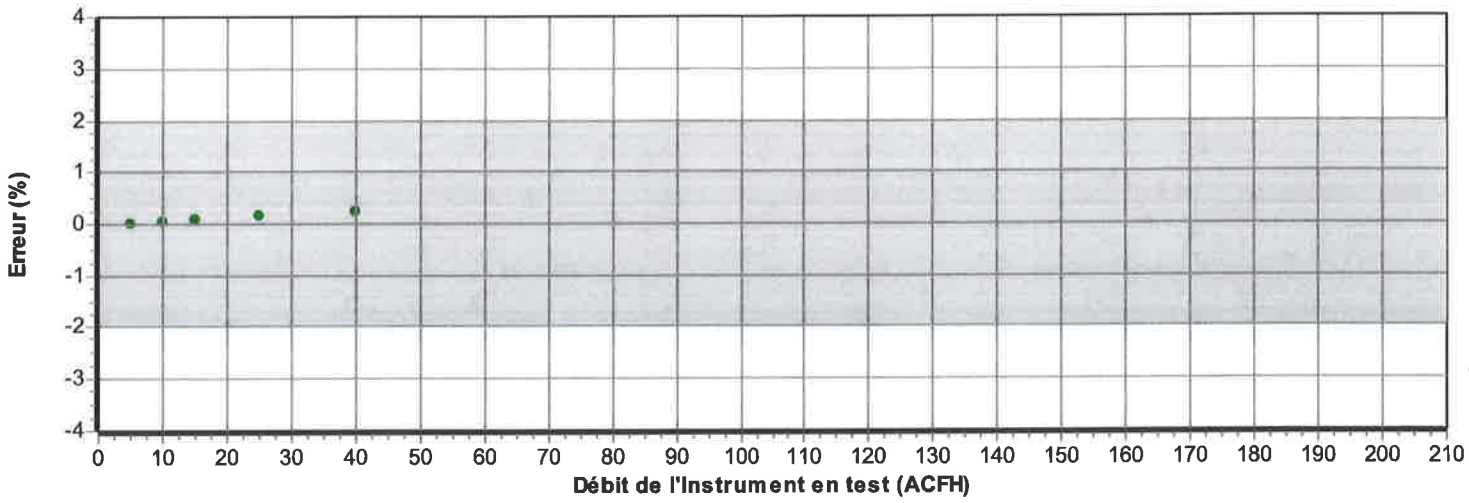
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Certificat d'étalonnage # 13027

Numéro de série:	07J264834	Station de mesure:	3
Date d'étalonnage:	2020-10-13	Procédure:	POS-CAL-005
Identification de l'instrument:	SBI-103	Règle de décision:	Méthode #2

Résultats finaux



Voir l'annexe pour la règle de décision

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-046 (90R054300)

Previous Calibration Comparision

Date	2020.04-16	Acceptable	
		Deviation (5%)	Deviation
y Factor	1.008	0.0504	0.003
Acceptance	Acceptable		

Average Gas Meter y Factor
1.011

Calibration Date:	2020-10-01
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	6-month
Next Calibration Due:	2021-04-01
Instrument Range:	1.000 cfm
Standard Temp.:	66 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.7 "Hg
Signature/Date:	Gabrielle Santerre 2020-10-01

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.003
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	25-oct-19	
	Calib. Value	0.996	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	399.9	408.4	416.804
Final Reference Meter	407.918	416.616	424.931
Initial DGM	704.269	712.693	720.985
Final DGM	712.196	720.784	728.971
Temp. Ref. Meter (°F), Tr	76.2	77.8	77.6
Temperature DGM (°F), Td	76.3	77.4	77.5
Time (Minutes)	92.0	65.0	49.0
Net Volume Ref. Meter, Vr	8.018	8.216	8.127
Net Volume DGM, Vd	7.927	8.091	7.986
Gas Meter y Factor =	**1.008**	**1.011**	**1.013**
Gas Meter y Factor Deviation (from avg.)	0.003	0.000	0.003
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.086163043

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-047 (98Z332226)

Previous Calibration Comparision

Date	2020-04-16	Acceptable	
		Deviation (5%)	Deviation
y Factor	1.008	0.0504	0.002
Acceptance	Acceptable		

	Average Gas Meter y Factor
	1.010
Calibration Date:	2020-10-06
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	6-month
Next Calibration Due:	2021-04-06
Instrument Range:	1.000 cfm
Standard Temp.:	65.7 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	30 "Hg
Signature/Date:	Gabrielle Santerre 2020-10-06

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.005
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	25-oct-19	
	Calib. Value	0.996	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	454.9	467	475.7
Final Reference Meter	466.768	474.965	480.93
Initial DGM	125.025	137	145.6
Final DGM	136.765	144.864	150.737
Temp. Ref. Meter (°F), Tr	75.4	76.0	76.6
Temperature DGM (°F), Td	74.6	76.2	76.7
Time (Minutes)	127.0	67.0	32.0
Net Volume Ref. Meter, Vr	11.868	7.965	5.230
Net Volume DGM, Vd	11.74	7.864	5.137
Gas Meter y Factor =	**1.005**	**1.009**	**1.014**
Gas Meter y Factor Deviation (from avg.)	0.004	0.000	0.005
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.092440945

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-290 (88N515612)

Previous Calibration Comparision

Date	2017-04-24	Acceptable	
		Deviation (5%)	Deviation
y Factor	1.000	0.05	0.007
Acceptance	Acceptable		

	Average Gas Meter y Factor
	0.993
Calibration Date:	2020-10-05
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	6-month
Next Calibration Due:	2021-04-05
Instrument Range:	1.000 cfm
Standard Temp.:	66 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	30.2 "Hg
Signature/Date:	Gabrielle Santerre 2020-10-05

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.001
Acceptance	Acceptable

Reference Standard *			
Standard	Model	Standard Test Meter	
Calibrator	S/N	07J264834	
	Calib. Date	25-oct-19	
	Calib. Value	0.996	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	428.6	438.1	445.3
Final Reference Meter	437.45	445.09	454.405
Initial DGM	3.63	13.16	20.364
Final DGM	12.501	20.171	29.506
Temp. Ref. Meter (°F), Tr	73.2	73.6	76.0
Temperature DGM (°F), Td	73.0	73.6	75.8
Time (Minutes)	52.0	45.0	79.0
Net Volume Ref. Meter, Vr	8.850	6.990	9.105
Net Volume DGM, Vd	8.871	7.011	9.142
Gas Meter y Factor =	**0.993**	**0.993**	**0.992**
Gas Meter y Factor Deviation (from avg.)	0.001	0.000	0.001
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.170596154

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-046 (90R054300)

Previous Calibration Comparision

Date	2020-10-01	Acceptable Deviation (5%)	Deviation
y Factor	1.011	0.05055	0.012
Acceptance	Acceptable		

Average Gas Meter y Factor
0.999

Calibration Date:	2021-03-02
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	Post test calibration
Next Calibration Due:	
Instrument Range:	1.000 cfm
Standard Temp.:	66 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.5 "Hg
Signature/Date:	Gabrielle Santerre 2021-03-02

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.004
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	13-oct-20	
	Calib. Value	0.990	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	611.3	619.7	628.9
Final Reference Meter	619.369	628.791	645.985
Initial DGM	278.984	287.235	296.354
Final DGM	286.942	296.248	313.299
Temp. Ref. Meter (°F), Tr	65.0	66.0	67.1
Temperature DGM (°F), Td	64.4	65.3	66.1
Time (Minutes)	62.0	73.0	138.0
Net Volume Ref. Meter, Vr	8.069	9.091	17.085
Net Volume DGM, Vd	7.958	9.013	16.945
Gas Meter y Factor =	**1.003**	**0.997**	**0.996**
Gas Meter y Factor Deviation (from avg.)	0.004	0.001	0.002
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.128354839

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-047 (98Z332226)

Previous Calibration Comparision

Date	2020-10-06	Acceptable Deviation (5%)	Deviation
y Factor	1.01	0.0505	0.012
Acceptance	Acceptable		

Average Gas Meter y Factor
0.998

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.000
Acceptance	Acceptable

Calibration Date:	2021-03-03
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	Post test calibration
Next Calibration Due:	
Instrument Range:	1.000 cfm
Standard Temp.:	68.1 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.45 "Hg
Signature/Date:	Gabrielle Santerre 2021-03-03

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	13-oct-20	
	Calib. Value	0.990	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	647.1	656.6	668.6
Final Reference Meter	656.343	668.245	677.079
Initial DGM	565.99	575.408	587.307
Final DGM	575.145	586.955	595.723
Temp. Ref. Meter (°F), Tr	67.3	66.3	65.9
Temperature DGM (°F), Td	66.5	65.9	65.8
Time (Minutes)	74.0	94.0	69.0
Net Volume Ref. Meter, Vr	9.243	11.645	8.479
Net Volume DGM, Vd	9.155	11.547	8.416
Gas Meter y Factor =	**0.998**	**0.998**	**0.997**
Gas Meter y Factor Deviation (from avg.)	0.000	0.000	0.000
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.123716216

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Thermal Metering System Calibration
Y factor for Method 5G sampling

Manufacturer:	American Meter Company
Model:	DTM-200A
Serial Number:	SBI-290 (88N515612)

Previous Calibration Comparision

Date	2020-10-05	Acceptable	
		Deviation (5%)	Deviation
y Factor	0.993	0.04965	0.011
Acceptance	Acceptable		

Average Gas Meter y Factor
0.982

Calibration Date:	2021-03-02
Calibrated by:	Gabrielle Santerre
Calibration Frequency:	Post test calibration
Next Calibration Due:	
Instrument Range:	1.000 cfm
Standard Temp.:	67.5 oF
Standard Press.:	29.92 "Hg
Barometric Press.:	29.5 "Hg
Signature/Date:	Gabrielle Santerre 2021-03-02

Current Calibration

Acceptable y Deviation	0.050
Maximum y Deviation	0.000
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	07J264834	
	Calib. Date	13-oct-20	
	Calib. Value	0.990	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Vacuum ("Hg)	0.00	0.00	0.00
dH ("H2O)	0.00	0.00	0.00
Initial Reference Meter	591.7	598.8	604.6
Final Reference Meter	598.422	604.264	610.588
Initial DGM	118.234	125.391	131.242
Final DGM	125	130.9	137.278
Temp. Ref. Meter (°F), Tr	65.7	65.2	65.4
Temperature DGM (°F), Td	64.6	65.1	65.4
Time (Minutes)	65.0	43.0	47.0
Net Volume Ref. Meter, Vr	6.722	5.464	5.988
Net Volume DGM, Vd	6.766	5.509	6.036
Gas Meter y Factor =	**0.982**	**0.982**	**0.982**
Gas Meter y Factor Deviation (from avg.)	0.000	0.000	0.000
Orifice dH@	**0.00**	**0.00**	**0.00**
Orifice dH@ Deviation (from avg.)	0.000	0.000	0.000

where: 0.104092308

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272

Unit break-in period

Total conditionning time (h)	57.17

Model tested: 2.1 Series

Identification number: QC202011302.1SERIES

Date	Burn cycle	Duration (min)	Load type (-)	Fuel added (lbs)	Moisture (% db)
2021-01-14	Preload	32	Kindling & SUF	6.00	15.1
	Condition	130	High fire	12.04	20.3
	Load	330	Medium fire	13.98	19.6
2021-01-19	Preload	34	Kindling & SUF	6.01	15.5
	Condition	137	High fire	12.04	20.1
	Load	340	Medium fire	14.41	19.5
2021-01-21	Preload	169	Kindling & SUF	5.59	16.4
	Condition	1	High fire	12.04	20.7
	Load	350	Medium fire	14.44	19.3
2021-01-28	Preload	34	Kindling & SUF	5.99	16
	Condition	155	High fire	12.06	23.8
	Load	280	Medium fire	14.49	21.0
2021-02-04	Preload	35	Kindling & SUF	5.90	15.8
	Condition	135	High fire	11.89	19.2
	Load	310	Medium fire	13.78	22.1
2021-02-10	Preload	42	Kindling & SUF	5.85	16
	Condition	128	High fire	11.75	20.1
	Load	355	Medium fire	14.3	20.4
2021-02-17	Preload	148	Kindling & SUF	5.34	14.9
	Condition	7	High fire	10.79	22.4
	Load	278	Medium fire	12.96	19.3

2.1 Series Pre-burn Data 2021-02-04 Total time (h) 8.00

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-02-04 11:04	Kindling & SUF	5.90	15.8	**Pre-Charge (min)**	35
2021-02-04 11:39	High fire	11.89	19.2	**Conditioning (min)**	135
2021-02-04 13:54	Medium fire	13.78	22.1	**Load (min)**	310

	Pre-Charge (min)	35	Conditioning (min)	135	Load (min)	310
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-02-04 11:04	108.9162869	2021-02-04 11:39	373.643371	2021-02-04 13:54	328.794677
2	2021-02-04 11:05	154.7692413	2021-02-04 11:40	377.559911	2021-02-04 13:55	318.219665
3	2021-02-04 11:06	243.5799901	2021-02-04 11:41	383.272164	2021-02-04 13:56	298.889041
4	2021-02-04 11:07	315.0037551	2021-02-04 11:42	401.078767	2021-02-04 13:57	294.833271
5	2021-02-04 11:08	358.0934936	2021-02-04 11:43	433.161948	2021-02-04 13:58	303.389568
6	2021-02-04 11:09	394.7844802	2021-02-04 11:44	459.59712	2021-02-04 13:59	313.596646
7	2021-02-04 11:10	420.7973455	2021-02-04 11:45	486.258789	2021-02-04 14:00	328.586142
8	2021-02-04 11:11	444.2624079	2021-02-04 11:46	509.861452	2021-02-04 14:01	346.212545
9	2021-02-04 11:12	459.6220839	2021-02-04 11:47	526.134489	2021-02-04 14:02	357.133959
10	2021-02-04 11:13	476.4686361	2021-02-04 11:48	536.702901	2021-02-04 14:03	370.237892
11	2021-02-04 11:14	486.6460831	2021-02-04 11:49	545.528435	2021-02-04 14:04	387.112578
12	2021-02-04 11:15	497.3524078	2021-02-04 11:50	552.762826	2021-02-04 14:05	408.481767
13	2021-02-04 11:16	513.2553016	2021-02-04 11:51	558.570985	2021-02-04 14:06	411.834155
14	2021-02-04 11:17	518.9131663	2021-02-04 11:52	561.797442	2021-02-04 14:07	407.576713
15	2021-02-04 11:18	520.794975	2021-02-04 11:53	563.732396	2021-02-04 14:08	418.129493
16	2021-02-04 11:19	525.1322691	2021-02-04 11:54	565.183979	2021-02-04 14:09	436.213185
17	2021-02-04 11:20	534.1989576	2021-02-04 11:55	565.974482	2021-02-04 14:10	442.358769
18	2021-02-04 11:21	541.6591948	2021-02-04 11:56	566.991352	2021-02-04 14:11	444.137552
19	2021-02-04 11:22	541.7947621	2021-02-04 11:57	567.438566	2021-02-04 14:12	449.876283
20	2021-02-04 11:23	539.9967308	2021-02-04 11:58	568.663812	2021-02-04 14:13	453.342872
21	2021-02-04 11:24	536.7852972	2021-02-04 11:59	569.970658	2021-02-04 14:14	454.981274
22	2021-02-04 11:25	535.5581326	2021-02-04 12:00	572.208615	2021-02-04 14:15	455.225871
23	2021-02-04 11:26	527.4294152	2021-02-04 12:01	575.21957	2021-02-04 14:16	455.73722
24	2021-02-04 11:27	517.3181149	2021-02-04 12:02	578.053268	2021-02-04 14:17	456.833662
25	2021-02-04 11:28	511.2007378	2021-02-04 12:03	580.108352	2021-02-04 14:18	458.574679
26	2021-02-04 11:29	506.635998	2021-02-04 12:04	581.990545	2021-02-04 14:19	460.611759
27	2021-02-04 11:30	504.4215213	2021-02-04 12:05	584.668891	2021-02-04 14:20	463.132794
28	2021-02-04 11:31	499.4018015	2021-02-04 12:06	585.04228	2021-02-04 14:21	464.54328
29	2021-02-04 11:32	491.7094343	2021-02-04 12:07	585.785286	2021-02-04 14:22	465.836495
30	2021-02-04 11:33	483.1048362	2021-02-04 12:08	586.688499	2021-02-04 14:23	467.523989
31	2021-02-04 11:34	475.9867559	2021-02-04 12:09	587.128652	2021-02-04 14:24	467.88759
32	2021-02-04 11:35	466.1791194	2021-02-04 12:10	587.294189	2021-02-04 14:25	468.52079
33	2021-02-04 11:36	456.70721	2021-02-04 12:11	586.755931	2021-02-04 14:26	469.795602
34	2021-02-04 11:37	436.433165	2021-02-04 12:12	585.749562	2021-02-04 14:27	471.254202
35	2021-02-04 11:38	383.0622005	2021-02-04 12:13	585.672693	2021-02-04 14:28	473.291406
36			2021-02-04 12:14	584.816142	2021-02-04 14:29	474.360749
37			2021-02-04 12:15	582.683176	2021-02-04 14:30	476.685006
38			2021-02-04 12:16	579.844182	2021-02-04 14:31	481.025852
39			2021-02-04 12:17	579.739803	2021-02-04 14:32	484.404185
40			2021-02-04 12:18	582.121461	2021-02-04 14:33	486.407448
41			2021-02-04 12:19	590.150068	2021-02-04 14:34	487.128052
42			2021-02-04 12:20	593.441393	2021-02-04 14:35	487.769608
43			2021-02-04 12:21	592.331823	2021-02-04 14:36	488.867144
44			2021-02-04 12:22	588.448553	2021-02-04 14:37	490.000395
45			2021-02-04 12:23	579.141	2021-02-04 14:38	490.222864
46			2021-02-04 12:24	568.650131	2021-02-04 14:39	490.710845
47			2021-02-04 12:25	558.442082	2021-02-04 14:40	490.718473

48			2021-02-04 12:26	546.977632	2021-02-04 14:41	490.018256
49			2021-02-04 12:27	535.724766	2021-02-04 14:42	489.795279
50			2021-02-04 12:28	526.760501	2021-02-04 14:43	488.96381
51			2021-02-04 12:29	519.148984	2021-02-04 14:44	489.082111
52			2021-02-04 12:30	512.561596	2021-02-04 14:45	488.149264
53			2021-02-04 12:31	506.683332	2021-02-04 14:46	485.900883
54			2021-02-04 12:32	500.352882	2021-02-04 14:47	484.453469
55			2021-02-04 12:33	492.676258	2021-02-04 14:48	483.034534
56			2021-02-04 12:34	485.153381	2021-02-04 14:49	481.707101
57			2021-02-04 12:35	478.14037	2021-02-04 14:50	481.15045
58			2021-02-04 12:36	472.312564	2021-02-04 14:51	480.829339
59			2021-02-04 12:37	466.226087	2021-02-04 14:52	479.333778
60			2021-02-04 12:38	460.788691	2021-02-04 14:53	477.769464
61			2021-02-04 12:39	456.101008	2021-02-04 14:54	476.40177
62			2021-02-04 12:40	451.533477	2021-02-04 14:55	474.163899
63			2021-02-04 12:41	447.118493	2021-02-04 14:56	471.790178
64			2021-02-04 12:42	442.999177	2021-02-04 14:57	469.880983
65			2021-02-04 12:43	439.128417	2021-02-04 14:58	467.802988
66			2021-02-04 12:44	436.025611	2021-02-04 14:59	465.705249
67			2021-02-04 12:45	432.396946	2021-02-04 15:00	464.712856
68			2021-02-04 12:46	429.20267	2021-02-04 15:01	458.945519
69			2021-02-04 12:47	426.081413	2021-02-04 15:02	452.015008
70			2021-02-04 12:48	423.145138	2021-02-04 15:03	445.222119
71			2021-02-04 12:49	420.278918	2021-02-04 15:04	439.293094
72			2021-02-04 12:50	417.309927	2021-02-04 15:05	433.159397
73			2021-02-04 12:51	414.583816	2021-02-04 15:06	426.932112
74			2021-02-04 12:52	412.505635	2021-02-04 15:07	420.294563
75			2021-02-04 12:53	410.052776	2021-02-04 15:08	414.309397
76			2021-02-04 12:54	408.066301	2021-02-04 15:09	408.79979
77			2021-02-04 12:55	406.06694	2021-02-04 15:10	404.264862
78			2021-02-04 12:56	403.895079	2021-02-04 15:11	400.044541
79			2021-02-04 12:57	401.423299	2021-02-04 15:12	396.347078
80			2021-02-04 12:58	398.850409	2021-02-04 15:13	393.556361
81			2021-02-04 12:59	397.464061	2021-02-04 15:14	391.306239
82			2021-02-04 13:00	395.462623	2021-02-04 15:15	389.179373
83			2021-02-04 13:01	393.660823	2021-02-04 15:16	387.222405
84			2021-02-04 13:02	391.998139	2021-02-04 15:17	385.242014
85			2021-02-04 13:03	390.292608	2021-02-04 15:18	384.270484
86			2021-02-04 13:04	388.82978	2021-02-04 15:19	382.223755
87			2021-02-04 13:05	387.105175	2021-02-04 15:20	379.124813
88			2021-02-04 13:06	385.295197	2021-02-04 15:21	375.684398
89			2021-02-04 13:07	383.385974	2021-02-04 15:22	372.713365
90			2021-02-04 13:08	380.981041	2021-02-04 15:23	370.157236
91			2021-02-04 13:09	379.614804	2021-02-04 15:24	367.632839
92			2021-02-04 13:10	377.645142	2021-02-04 15:25	365.411077
93			2021-02-04 13:11	375.755565	2021-02-04 15:26	364.076337
94			2021-02-04 13:12	373.476464	2021-02-04 15:27	362.133069
95			2021-02-04 13:13	370.881698	2021-02-04 15:28	361.091866
96			2021-02-04 13:14	368.153335	2021-02-04 15:29	359.881453
97			2021-02-04 13:15	365.996002	2021-02-04 15:30	358.517053
98			2021-02-04 13:16	363.98444	2021-02-04 15:31	357.06148
99			2021-02-04 13:17	362.05382	2021-02-04 15:32	355.899986
100			2021-02-04 13:18	360.112839	2021-02-04 15:33	353.942774
101			2021-02-04 13:19	358.889124	2021-02-04 15:34	352.377385
102			2021-02-04 13:20	357.353873	2021-02-04 15:35	350.629766
103			2021-02-04 13:21	355.401226	2021-02-04 15:36	348.90548
104			2021-02-04 13:22	354.28065	2021-02-04 15:37	347.158537
105			2021-02-04 13:23	352.731248	2021-02-04 15:38	345.149448

106			2021-02-04 13:24	352.101961	2021-02-04 15:39	343.684431
107			2021-02-04 13:25	351.585967	2021-02-04 15:40	341.91173
108			2021-02-04 13:26	351.698684	2021-02-04 15:41	339.841743
109			2021-02-04 13:27	351.394306	2021-02-04 15:42	337.686337
110			2021-02-04 13:28	350.903462	2021-02-04 15:43	335.607575
111			2021-02-04 13:29	351.293071	2021-02-04 15:44	333.317329
112			2021-02-04 13:30	351.810737	2021-02-04 15:45	331.025547
113			2021-02-04 13:31	352.17761	2021-02-04 15:46	328.368335
114			2021-02-04 13:32	352.573123	2021-02-04 15:47	325.943587
115			2021-02-04 13:33	363.504757	2021-02-04 15:48	323.627601
116			2021-02-04 13:34	369.575963	2021-02-04 15:49	321.482433
117			2021-02-04 13:35	373.783067	2021-02-04 15:50	320.130872
118			2021-02-04 13:36	376.250205	2021-02-04 15:51	318.828395
119			2021-02-04 13:37	377.227	2021-02-04 15:52	317.410379
120			2021-02-04 13:38	377.626477	2021-02-04 15:53	316.323803
121			2021-02-04 13:39	377.124872	2021-02-04 15:54	315.340222
122			2021-02-04 13:40	376.166264	2021-02-04 15:55	315.173756
123			2021-02-04 13:41	374.653461	2021-02-04 15:56	314.506441
124			2021-02-04 13:42	372.858422	2021-02-04 15:57	314.315727
125			2021-02-04 13:43	370.864259	2021-02-04 15:58	314.064845
126			2021-02-04 13:44	368.479433	2021-02-04 15:59	313.522067
127			2021-02-04 13:45	366.383194	2021-02-04 16:00	312.93727
128			2021-02-04 13:46	363.846081	2021-02-04 16:01	312.505393
129			2021-02-04 13:47	359.650146	2021-02-04 16:02	311.863645
130			2021-02-04 13:48	352.82459	2021-02-04 16:03	311.548953
131			2021-02-04 13:49	346.116527	2021-02-04 16:04	311.096733
132			2021-02-04 13:50	341.053804	2021-02-04 16:05	310.302635
133			2021-02-04 13:51	336.460391	2021-02-04 16:06	309.319651
134			2021-02-04 13:52	333.27983	2021-02-04 16:07	308.434288
135			2021-02-04 13:53	330.162079	2021-02-04 16:08	307.398579
136					2021-02-04 16:09	306.696352
137					2021-02-04 16:10	305.550587
138					2021-02-04 16:11	303.69698
139					2021-02-04 16:12	301.058993
140					2021-02-04 16:13	298.224662
141					2021-02-04 16:14	294.062995
142					2021-02-04 16:15	289.347349
143					2021-02-04 16:16	284.370885
144					2021-02-04 16:17	279.64413
145					2021-02-04 16:18	275.204691
146					2021-02-04 16:19	271.62965
147					2021-02-04 16:20	268.637099
148					2021-02-04 16:21	265.871693
149					2021-02-04 16:22	263.181947
150					2021-02-04 16:23	261.053461
151					2021-02-04 16:24	258.92289
152					2021-02-04 16:25	256.954234
153					2021-02-04 16:26	255.026079
154					2021-02-04 16:27	253.330574
155					2021-02-04 16:28	251.339311
156					2021-02-04 16:29	249.689944
157					2021-02-04 16:30	248.06642
158					2021-02-04 16:31	246.580345
159					2021-02-04 16:32	245.523193
160					2021-02-04 16:33	244.690912
161					2021-02-04 16:34	243.81247
162					2021-02-04 16:35	242.763702
163					2021-02-04 16:36	241.940188

164					2021-02-04 16:37	241.032634
165					2021-02-04 16:38	240.247882
166					2021-02-04 16:39	238.837913
167					2021-02-04 16:40	237.374119
168					2021-02-04 16:41	235.628837
169					2021-02-04 16:42	234.233723
170					2021-02-04 16:43	232.886797
171					2021-02-04 16:44	231.859842
172					2021-02-04 16:45	230.721247
173					2021-02-04 16:46	229.35877
174					2021-02-04 16:47	227.625576
175					2021-02-04 16:48	226.216341
176					2021-02-04 16:49	224.854641
177					2021-02-04 16:50	224.039408
178					2021-02-04 16:51	223.310883
179					2021-02-04 16:52	222.681444
180					2021-02-04 16:53	222.143831
181					2021-02-04 16:54	221.559768
182					2021-02-04 16:55	221.202279
183					2021-02-04 16:56	220.851503
184					2021-02-04 16:57	220.443198
185					2021-02-04 16:58	219.72288
186					2021-02-04 16:59	219.602676
187					2021-02-04 17:00	219.247261
188					2021-02-04 17:01	219.039512
189					2021-02-04 17:02	218.82519
190					2021-02-04 17:03	218.72739
191					2021-02-04 17:04	218.52101
192					2021-02-04 17:05	218.140849
193					2021-02-04 17:06	217.850724
194					2021-02-04 17:07	217.830943
195					2021-02-04 17:08	217.803969
196					2021-02-04 17:09	217.662524
197					2021-02-04 17:10	217.42353
198					2021-02-04 17:11	217.229185
199					2021-02-04 17:12	216.825166
200					2021-02-04 17:13	216.485807
201					2021-02-04 17:14	216.086439
202					2021-02-04 17:15	215.847037
203					2021-02-04 17:16	215.701122
204					2021-02-04 17:17	215.480021
205					2021-02-04 17:18	215.118516
206					2021-02-04 17:19	214.986039
207					2021-02-04 17:20	214.592255
208					2021-02-04 17:21	214.07388
209					2021-02-04 17:22	213.751754
210					2021-02-04 17:23	213.617826
211					2021-02-04 17:24	213.211802
212					2021-02-04 17:25	212.663259
213					2021-02-04 17:26	212.506397
214					2021-02-04 17:27	212.126829
215					2021-02-04 17:28	211.651557
216					2021-02-04 17:29	211.190573
217					2021-02-04 17:30	210.808316
218					2021-02-04 17:31	210.326379
219					2021-02-04 17:32	209.799978
220					2021-02-04 17:33	208.975598
221					2021-02-04 17:34	208.239009

222					2021-02-04 17:35	207.635593
223					2021-02-04 17:36	206.692603
224					2021-02-04 17:37	206.221606
225					2021-02-04 17:38	205.656003
226					2021-02-04 17:39	204.936864
227					2021-02-04 17:40	204.283015
228					2021-02-04 17:41	203.814741
229					2021-02-04 17:42	203.206518
230					2021-02-04 17:43	202.847571
231					2021-02-04 17:44	202.400325
232					2021-02-04 17:45	201.843286
233					2021-02-04 17:46	201.176196
234					2021-02-04 17:47	200.719424
235					2021-02-04 17:48	200.299677
236					2021-02-04 17:49	199.925356
237					2021-02-04 17:50	199.401417
238					2021-02-04 17:51	198.919337
239					2021-02-04 17:52	198.526921
240					2021-02-04 17:53	198.164165
241					2021-02-04 17:54	197.723693
242					2021-02-04 17:55	197.500142
243					2021-02-04 17:56	197.14334
244					2021-02-04 17:57	196.875841
245					2021-02-04 17:58	196.427283
246					2021-02-04 17:59	196.02189
247					2021-02-04 18:00	195.821655
248					2021-02-04 18:01	195.457059
249					2021-02-04 18:02	195.13172
250					2021-02-04 18:03	194.842506
251					2021-02-04 18:04	194.55294
252					2021-02-04 18:05	194.282947
253					2021-02-04 18:06	193.866094
254					2021-02-04 18:07	193.512278
255					2021-02-04 18:08	193.386521
256					2021-02-04 18:09	193.181135
257					2021-02-04 18:10	192.863688
258					2021-02-04 18:11	192.659122
259					2021-02-04 18:12	192.21508
260					2021-02-04 18:13	191.87873
261					2021-02-04 18:14	191.636779
262					2021-02-04 18:15	191.35576
263					2021-02-04 18:16	191.078626
264					2021-02-04 18:17	190.745857
265					2021-02-04 18:18	190.379152
266					2021-02-04 18:19	190.126058
267					2021-02-04 18:20	189.720467
268					2021-02-04 18:21	189.255346
269					2021-02-04 18:22	188.687314
270					2021-02-04 18:23	188.226233
271					2021-02-04 18:24	187.789714
272					2021-02-04 18:25	187.443429
273					2021-02-04 18:26	186.978409
274					2021-02-04 18:27	186.624324
275					2021-02-04 18:28	186.140782
276					2021-02-04 18:29	185.878426
277					2021-02-04 18:30	185.517167
278					2021-02-04 18:31	185.23894
279					2021-02-04 18:32	184.81053

280					2021-02-04 18:33	184.450074
281					2021-02-04 18:34	184.253795
282					2021-02-04 18:35	183.904381
283					2021-02-04 18:36	183.606381
284					2021-02-04 18:37	183.153746
285					2021-02-04 18:38	182.664999
286					2021-02-04 18:39	182.297936
287					2021-02-04 18:40	182.172785
288					2021-02-04 18:41	181.970091
289					2021-02-04 18:42	181.601977
290					2021-02-04 18:43	181.354098
291					2021-02-04 18:44	180.967947
292					2021-02-04 18:45	180.70655
293					2021-02-04 18:46	180.468364
294					2021-02-04 18:47	180.198119
295					2021-02-04 18:48	179.825235
296					2021-02-04 18:49	179.58803
297					2021-02-04 18:50	179.325265
298					2021-02-04 18:51	179.274461
299					2021-02-04 18:52	178.958348
300					2021-02-04 18:53	178.676172
301					2021-02-04 18:54	178.484336
302					2021-02-04 18:55	178.21818
303					2021-02-04 18:56	177.923502
304					2021-02-04 18:57	177.718576
305					2021-02-04 18:58	177.454864
306					2021-02-04 18:59	177.14018
307					2021-02-04 19:00	176.818766
308					2021-02-04 19:01	176.626072
309					2021-02-04 19:02	176.332159
310					2021-02-04 19:03	176.021251

2.1 Series Pre-burn Data 2021-01-14 Total time (h) 8.20

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-01-14 11:20	Kindling & SUF	6.00	15.1	**Pre-Charge (min)**	32
2021-01-14 11:52	High fire	12.04	20.3	**Conditioning (min)**	130
2021-01-14 14:01	Medium fire	13.98	19.6	**Load (min)**	330

	Pre-Charge (min)	32	Conditioning (min)	130	Load (min)	330
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-01-14 11:20	89.09456413	2021-01-14 11:52	465.327737	2021-01-14 14:01	314.565455
2	2021-01-14 11:21	144.633288	2021-01-14 11:53	467.562927	2021-01-14 14:02	293.39166
3	2021-01-14 11:22	226.1985628	2021-01-14 11:54	489.459031	2021-01-14 14:03	278.850544
4	2021-01-14 11:23	288.5828811	2021-01-14 11:55	511.52763	2021-01-14 14:04	278.757096
5	2021-01-14 11:24	335.436206	2021-01-14 11:56	524.715517	2021-01-14 14:05	293.08214
6	2021-01-14 11:25	371.9990867	2021-01-14 11:57	536.299403	2021-01-14 14:06	323.621523
7	2021-01-14 11:26	382.3552294	2021-01-14 11:58	545.468432	2021-01-14 14:07	339.230037
8	2021-01-14 11:27	389.9594159	2021-01-14 11:59	549.573609	2021-01-14 14:08	355.184401
9	2021-01-14 11:28	398.6737214	2021-01-14 12:00	549.675241	2021-01-14 14:09	376.292204
10	2021-01-14 11:29	413.5056301	2021-01-14 12:01	551.804181	2021-01-14 14:10	392.001013
11	2021-01-14 11:30	438.6616451	2021-01-14 12:02	552.466798	2021-01-14 14:11	401.440002
12	2021-01-14 11:31	452.2197264	2021-01-14 12:03	552.622769	2021-01-14 14:12	408.485987
13	2021-01-14 11:32	462.1537499	2021-01-14 12:04	552.474796	2021-01-14 14:13	415.807784
14	2021-01-14 11:33	473.1382115	2021-01-14 12:05	555.436798	2021-01-14 14:14	422.336225
15	2021-01-14 11:34	483.2370544	2021-01-14 12:06	556.499196	2021-01-14 14:15	428.760555
16	2021-01-14 11:35	489.5888408	2021-01-14 12:07	556.294178	2021-01-14 14:16	434.966482
17	2021-01-14 11:36	496.1121565	2021-01-14 12:08	554.227743	2021-01-14 14:17	441.785051
18	2021-01-14 11:37	502.7437491	2021-01-14 12:09	552.184802	2021-01-14 14:18	445.559576
19	2021-01-14 11:38	508.7358148	2021-01-14 12:10	550.253008	2021-01-14 14:19	449.420265
20	2021-01-14 11:39	517.1542928	2021-01-14 12:11	548.75778	2021-01-14 14:20	453.091333
21	2021-01-14 11:40	523.206243	2021-01-14 12:12	546.67307	2021-01-14 14:21	456.679174
22	2021-01-14 11:41	524.7468546	2021-01-14 12:13	545.068876	2021-01-14 14:22	459.611291
23	2021-01-14 11:42	522.9798692	2021-01-14 12:14	543.681081	2021-01-14 14:23	462.54535
24	2021-01-14 11:43	522.0586954	2021-01-14 12:15	543.017871	2021-01-14 14:24	465.706774
25	2021-01-14 11:44	518.3255111	2021-01-14 12:16	542.417455	2021-01-14 14:25	468.678989
26	2021-01-14 11:45	515.4945211	2021-01-14 12:17	542.506108	2021-01-14 14:26	471.397462
27	2021-01-14 11:46	514.5683041	2021-01-14 12:18	542.413911	2021-01-14 14:27	473.965608
28	2021-01-14 11:47	511.7824436	2021-01-14 12:19	542.768411	2021-01-14 14:28	476.724276
29	2021-01-14 11:48	505.6151682	2021-01-14 12:20	544.59622	2021-01-14 14:29	478.312131
30	2021-01-14 11:49	498.2650619	2021-01-14 12:21	544.013694	2021-01-14 14:30	478.959568
31	2021-01-14 11:50	493.6657109	2021-01-14 12:22	543.098113	2021-01-14 14:31	479.880571
32	2021-01-14 11:51	492.0500315	2021-01-14 12:23	542.557152	2021-01-14 14:32	480.414571
33			2021-01-14 12:24	540.86798	2021-01-14 14:33	480.169342
34			2021-01-14 12:25	540.351615	2021-01-14 14:34	480.086938
35			2021-01-14 12:26	538.457522	2021-01-14 14:35	480.06692
36			2021-01-14 12:27	537.244335	2021-01-14 14:36	480.932414
37			2021-01-14 12:28	536.057378	2021-01-14 14:37	480.453197
38			2021-01-14 12:29	534.529901	2021-01-14 14:38	481.30384
39			2021-01-14 12:30	532.039277	2021-01-14 14:39	481.106967
40			2021-01-14 12:31	528.480389	2021-01-14 14:40	480.754105
41			2021-01-14 12:32	526.239532	2021-01-14 14:41	481.04834
42			2021-01-14 12:33	522.702379	2021-01-14 14:42	481.393725
43			2021-01-14 12:34	519.496695	2021-01-14 14:43	481.499519
44			2021-01-14 12:35	516.076641	2021-01-14 14:44	481.179029
45			2021-01-14 12:36	512.561	2021-01-14 14:45	481.609398
46			2021-01-14 12:37	510.425752	2021-01-14 14:46	482.625573
47			2021-01-14 12:38	509.001417	2021-01-14 14:47	482.943438

48			2021-01-14 12:39	505.652753	2021-01-14 14:48	482.242119
49			2021-01-14 12:40	501.880805	2021-01-14 14:49	481.242482
50			2021-01-14 12:41	498.485951	2021-01-14 14:50	480.198489
51			2021-01-14 12:42	498.267455	2021-01-14 14:51	479.021043
52			2021-01-14 12:43	498.956552	2021-01-14 14:52	478.40432
53			2021-01-14 12:44	496.942515	2021-01-14 14:53	477.263889
54			2021-01-14 12:45	493.535268	2021-01-14 14:54	476.421801
55			2021-01-14 12:46	488.044995	2021-01-14 14:55	475.414584
56			2021-01-14 12:47	483.104955	2021-01-14 14:56	473.29676
57			2021-01-14 12:48	477.905757	2021-01-14 14:57	469.218785
58			2021-01-14 12:49	472.616113	2021-01-14 14:58	466.659763
59			2021-01-14 12:50	467.917671	2021-01-14 14:59	462.893023
60			2021-01-14 12:51	464.071128	2021-01-14 15:00	457.764969
61			2021-01-14 12:52	459.813895	2021-01-14 15:01	452.173325
62			2021-01-14 12:53	455.968722	2021-01-14 15:02	446.123076
63			2021-01-14 12:54	453.030896	2021-01-14 15:03	441.456325
64			2021-01-14 12:55	449.447402	2021-01-14 15:04	436.118923
65			2021-01-14 12:56	446.79112	2021-01-14 15:05	431.259719
66			2021-01-14 12:57	443.434187	2021-01-14 15:06	424.503919
67			2021-01-14 12:58	441.170462	2021-01-14 15:07	418.21292
68			2021-01-14 12:59	438.781666	2021-01-14 15:08	413.026562
69			2021-01-14 13:00	435.453352	2021-01-14 15:09	408.36746
70			2021-01-14 13:01	432.549844	2021-01-14 15:10	403.907308
71			2021-01-14 13:02	430.696842	2021-01-14 15:11	400.216221
72			2021-01-14 13:03	429.655864	2021-01-14 15:12	397.942799
73			2021-01-14 13:04	427.27257	2021-01-14 15:13	395.570721
74			2021-01-14 13:05	426.309129	2021-01-14 15:14	393.173927
75			2021-01-14 13:06	424.110103	2021-01-14 15:15	391.183418
76			2021-01-14 13:07	422.459339	2021-01-14 15:16	388.944267
77			2021-01-14 13:08	421.110435	2021-01-14 15:17	386.400153
78			2021-01-14 13:09	419.255093	2021-01-14 15:18	383.975091
79			2021-01-14 13:10	417.134932	2021-01-14 15:19	381.825566
80			2021-01-14 13:11	414.475724	2021-01-14 15:20	378.942533
81			2021-01-14 13:12	411.113348	2021-01-14 15:21	375.221259
82			2021-01-14 13:13	407.207167	2021-01-14 15:22	371.483345
83			2021-01-14 13:14	403.250309	2021-01-14 15:23	366.687358
84			2021-01-14 13:15	400.102019	2021-01-14 15:24	362.605153
85			2021-01-14 13:16	395.521173	2021-01-14 15:25	359.139738
86			2021-01-14 13:17	390.63445	2021-01-14 15:26	356.763076
87			2021-01-14 13:18	385.148363	2021-01-14 15:27	353.8661
88			2021-01-14 13:19	380.737322	2021-01-14 15:28	351.440012
89			2021-01-14 13:20	376.779798	2021-01-14 15:29	349.556496
90			2021-01-14 13:21	373.064728	2021-01-14 15:30	348.178324
91			2021-01-14 13:22	369.93886	2021-01-14 15:31	347.062848
92			2021-01-14 13:23	366.213046	2021-01-14 15:32	345.786936
93			2021-01-14 13:24	362.832294	2021-01-14 15:33	345.259688
94			2021-01-14 13:25	359.875131	2021-01-14 15:34	345.468401
95			2021-01-14 13:26	357.643038	2021-01-14 15:35	344.875028
96			2021-01-14 13:27	355.439254	2021-01-14 15:36	344.095278
97			2021-01-14 13:28	353.743131	2021-01-14 15:37	343.133432
98			2021-01-14 13:29	352.847332	2021-01-14 15:38	342.332882
99			2021-01-14 13:30	352.150851	2021-01-14 15:39	340.881048
100			2021-01-14 13:31	351.228097	2021-01-14 15:40	339.543367
101			2021-01-14 13:32	350.374403	2021-01-14 15:41	338.656373
102			2021-01-14 13:33	350.527281	2021-01-14 15:42	336.90575
103			2021-01-14 13:34	349.178566	2021-01-14 15:43	335.500935
104			2021-01-14 13:35	348.172171	2021-01-14 15:44	333.937032
105			2021-01-14 13:36	347.243458	2021-01-14 15:45	332.638736

106			2021-01-14 13:37	346.47632	2021-01-14 15:46	331.615012
107			2021-01-14 13:38	347.413028	2021-01-14 15:47	330.152074
108			2021-01-14 13:39	347.175885	2021-01-14 15:48	325.955608
109			2021-01-14 13:40	347.263457	2021-01-14 15:49	320.235998
110			2021-01-14 13:41	347.41766	2021-01-14 15:50	314.394433
111			2021-01-14 13:42	348.841623	2021-01-14 15:51	309.334368
112			2021-01-14 13:43	349.04169	2021-01-14 15:52	305.068335
113			2021-01-14 13:44	348.862391	2021-01-14 15:53	300.686866
114			2021-01-14 13:45	347.338425	2021-01-14 15:54	296.285689
115			2021-01-14 13:46	345.00515	2021-01-14 15:55	292.617083
116			2021-01-14 13:47	342.245219	2021-01-14 15:56	289.389584
117			2021-01-14 13:48	339.680676	2021-01-14 15:57	286.253498
118			2021-01-14 13:49	336.702725	2021-01-14 15:58	283.43058
119			2021-01-14 13:50	334.009667	2021-01-14 15:59	280.534248
120			2021-01-14 13:51	330.998377	2021-01-14 16:00	277.853517
121			2021-01-14 13:52	328.356537	2021-01-14 16:01	275.529836
122			2021-01-14 13:53	325.992008	2021-01-14 16:02	273.414832
123			2021-01-14 13:54	323.979364	2021-01-14 16:03	271.834507
124			2021-01-14 13:55	321.803526	2021-01-14 16:04	269.52646
125			2021-01-14 13:56	319.336168	2021-01-14 16:05	267.733943
126			2021-01-14 13:57	318.041838	2021-01-14 16:06	266.065859
127			2021-01-14 13:58	316.15266	2021-01-14 16:07	264.453466
128			2021-01-14 13:59	314.283548	2021-01-14 16:08	263.239817
129			2021-01-14 14:00	314.027233	2021-01-14 16:09	261.827171
130			2021-01-14 14:01	315.724118	2021-01-14 16:10	260.411244
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132					2021-01-14 16:12	257.848896
133					2021-01-14 16:13	256.499884
134					2021-01-14 16:14	255.270879
135					2021-01-14 16:15	254.206998
136					2021-01-14 16:16	253.161085
137					2021-01-14 16:17	252.151503
138					2021-01-14 16:18	251.204342
139					2021-01-14 16:19	250.339348
140					2021-01-14 16:20	249.179794
141					2021-01-14 16:21	248.19486
142					2021-01-14 16:22	247.211601
143					2021-01-14 16:23	246.354375
144					2021-01-14 16:24	244.92976
145					2021-01-14 16:25	243.931269
146					2021-01-14 16:26	243.372867
147					2021-01-14 16:27	242.893075
148					2021-01-14 16:28	242.348042
149					2021-01-14 16:29	242.155577
150					2021-01-14 16:30	242.245294
151					2021-01-14 16:31	242.396032
152					2021-01-14 16:32	242.167137
153					2021-01-14 16:33	241.829104
154					2021-01-14 16:34	241.593856
155					2021-01-14 16:35	241.419936
156					2021-01-14 16:36	241.471969
157					2021-01-14 16:37	240.909738
158					2021-01-14 16:38	240.336397
159					2021-01-14 16:39	239.881252
160					2021-01-14 16:40	239.598908
161					2021-01-14 16:41	239.675601
162					2021-01-14 16:42	239.423534
163					2021-01-14 16:43	239.009922

164					2021-01-14 16:44	238.911294
165					2021-01-14 16:45	238.579069
166					2021-01-14 16:46	238.639711
167					2021-01-14 16:47	238.287602
168					2021-01-14 16:48	237.708666
169					2021-01-14 16:49	237.741559
170					2021-01-14 16:50	237.860229
171					2021-01-14 16:51	237.568753
172					2021-01-14 16:52	237.170551
173					2021-01-14 16:53	237.074905
174					2021-01-14 16:54	236.92814
175					2021-01-14 16:55	236.728628
176					2021-01-14 16:56	236.484703
177					2021-01-14 16:57	236.205089
178					2021-01-14 16:58	236.066801
179					2021-01-14 16:59	235.923754
180					2021-01-14 17:00	235.515361
181					2021-01-14 17:01	235.17723
182					2021-01-14 17:02	234.965697
183					2021-01-14 17:03	234.876984
184					2021-01-14 17:04	234.807455
185					2021-01-14 17:05	234.490157
186					2021-01-14 17:06	234.399569
187					2021-01-14 17:07	233.998067
188					2021-01-14 17:08	233.68017
189					2021-01-14 17:09	233.625611
190					2021-01-14 17:10	233.480401
191					2021-01-14 17:11	233.133344
192					2021-01-14 17:12	232.881391
193					2021-01-14 17:13	232.757842
194					2021-01-14 17:14	232.679596
195					2021-01-14 17:15	232.384899
196					2021-01-14 17:16	232.336243
197					2021-01-14 17:17	232.144956
198					2021-01-14 17:18	232.037424
199					2021-01-14 17:19	231.853902
200					2021-01-14 17:20	231.597091
201					2021-01-14 17:21	231.348765
202					2021-01-14 17:22	231.081586
203					2021-01-14 17:23	230.966425
204					2021-01-14 17:24	230.521454
205					2021-01-14 17:25	230.369268
206					2021-01-14 17:26	230.208756
207					2021-01-14 17:27	230.024374
208					2021-01-14 17:28	229.603471
209					2021-01-14 17:29	229.235773
210					2021-01-14 17:30	228.984778
211					2021-01-14 17:31	228.683765
212					2021-01-14 17:32	228.244148
213					2021-01-14 17:33	227.479661
214					2021-01-14 17:34	226.43024
215					2021-01-14 17:35	225.65216
216					2021-01-14 17:36	224.72224
217					2021-01-14 17:37	223.90626
218					2021-01-14 17:38	223.527084
219					2021-01-14 17:39	222.925769
220					2021-01-14 17:40	222.227492
221					2021-01-14 17:41	221.647052

222					2021-01-14 17:42	221.104823
223					2021-01-14 17:43	220.475033
224					2021-01-14 17:44	219.829251
225					2021-01-14 17:45	219.306922
226					2021-01-14 17:46	218.669769
227					2021-01-14 17:47	218.29939
228					2021-01-14 17:48	217.873995
229					2021-01-14 17:49	217.728447
230					2021-01-14 17:50	216.903283
231					2021-01-14 17:51	216.272955
232					2021-01-14 17:52	215.800853
233					2021-01-14 17:53	215.351924
234					2021-01-14 17:54	214.675183
235					2021-01-14 17:55	214.278957
236					2021-01-14 17:56	213.942845
237					2021-01-14 17:57	213.467902
238					2021-01-14 17:58	212.843167
239					2021-01-14 17:59	212.50164
240					2021-01-14 18:00	212.121466
241					2021-01-14 18:01	211.630694
242					2021-01-14 18:02	211.341975
243					2021-01-14 18:03	210.927515
244					2021-01-14 18:04	210.627225
245					2021-01-14 18:05	210.275409
246					2021-01-14 18:06	209.700794
247					2021-01-14 18:07	209.206498
248					2021-01-14 18:08	208.905847
249					2021-01-14 18:09	208.650091
250					2021-01-14 18:10	208.116018
251					2021-01-14 18:11	207.78676
252					2021-01-14 18:12	207.533904
253					2021-01-14 18:13	207.228453
254					2021-01-14 18:14	206.883119
255					2021-01-14 18:15	206.813721
256					2021-01-14 18:16	206.195654
257					2021-01-14 18:17	205.781156
258					2021-01-14 18:18	205.468163
259					2021-01-14 18:19	204.939451
260					2021-01-14 18:20	204.753534
261					2021-01-14 18:21	204.39724
262					2021-01-14 18:22	204.102877
263					2021-01-14 18:23	203.835564
264					2021-01-14 18:24	203.344904
265					2021-01-14 18:25	203.355874
266					2021-01-14 18:26	202.852504
267					2021-01-14 18:27	202.644004
268					2021-01-14 18:28	202.197969
269					2021-01-14 18:29	201.872579
270					2021-01-14 18:30	201.37773
271					2021-01-14 18:31	201.402969
272					2021-01-14 18:32	200.982757
273					2021-01-14 18:33	200.810851
274					2021-01-14 18:34	200.559645
275					2021-01-14 18:35	200.081599
276					2021-01-14 18:36	199.944129
277					2021-01-14 18:37	199.421137
278					2021-01-14 18:38	199.032345
279					2021-01-14 18:39	198.314171

280					2021-01-14 18:40	197.638295
281					2021-01-14 18:41	197.243756
282					2021-01-14 18:42	196.416857
283					2021-01-14 18:43	195.826126
284					2021-01-14 18:44	195.152389
285					2021-01-14 18:45	194.358224
286					2021-01-14 18:46	193.703784
287					2021-01-14 18:47	193.034743
288					2021-01-14 18:48	192.423811
289					2021-01-14 18:49	191.709477
290					2021-01-14 18:50	191.107629
291					2021-01-14 18:51	190.559649
292					2021-01-14 18:52	190.253973
293					2021-01-14 18:53	189.61709
294					2021-01-14 18:54	189.09491
295					2021-01-14 18:55	188.168043
296					2021-01-14 18:56	187.74029
297					2021-01-14 18:57	187.408067
298					2021-01-14 18:58	186.734536
299					2021-01-14 18:59	186.383033
300					2021-01-14 19:00	185.804808
301					2021-01-14 19:01	185.302986
302					2021-01-14 19:02	185.039765
303					2021-01-14 19:03	184.500052
304					2021-01-14 19:04	183.812235
305					2021-01-14 19:05	183.37085
306					2021-01-14 19:06	182.855136
307					2021-01-14 19:07	182.428086
308					2021-01-14 19:08	181.831803
309					2021-01-14 19:09	181.315937
310					2021-01-14 19:10	180.873077
311					2021-01-14 19:11	180.40388
312					2021-01-14 19:12	179.988741
313					2021-01-14 19:13	179.458208
314					2021-01-14 19:14	179.041484
315					2021-01-14 19:15	178.537211
316					2021-01-14 19:16	178.16735
317					2021-01-14 19:17	177.900194
318					2021-01-14 19:18	177.577563
319					2021-01-14 19:19	177.120161
320					2021-01-14 19:20	176.752646
321					2021-01-14 19:21	176.228987
322					2021-01-14 19:22	175.928556
323					2021-01-14 19:23	175.593481
324					2021-01-14 19:24	175.034302
325					2021-01-14 19:25	174.586039
326					2021-01-14 19:26	174.294343
327					2021-01-14 19:27	173.813482
328					2021-01-14 19:28	173.552576
329					2021-01-14 19:29	173.119511
330					2021-01-14 19:30	172.711797

2.1 Series Pre-burn Data 2021-01-19 Total time (h) 8.52

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-01-19 11:10	Kindling & SUF	6.01	15.5	**Pre-Charge (min)**	34
2021-01-19 11:44	High fire	12.04	20.1	**Conditioning (min)**	137
2021-01-19 14:00	Medium fire	14.41	19.5	**Load (min)**	340

	Pre-Charge (min)	34	Conditioning (min)	137	Load (min)	340
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-01-19 11:10	92.10108195	2021-01-19 11:44	392.611636	2021-01-19 14:00	323.447614
2	2021-01-19 11:11	141.4512581	2021-01-19 11:45	359.866643	2021-01-19 14:01	303.031482
3	2021-01-19 11:12	181.4276951	2021-01-19 11:46	337.56932	2021-01-19 14:02	286.176296
4	2021-01-19 11:13	237.6548085	2021-01-19 11:47	358.125826	2021-01-19 14:03	287.143807
5	2021-01-19 11:14	296.466805	2021-01-19 11:48	375.76258	2021-01-19 14:04	317.740941
6	2021-01-19 11:15	333.4244341	2021-01-19 11:49	396.667659	2021-01-19 14:05	356.758226
7	2021-01-19 11:16	374.1420255	2021-01-19 11:50	423.312524	2021-01-19 14:06	355.153934
8	2021-01-19 11:17	418.524917	2021-01-19 11:51	447.66139	2021-01-19 14:07	396.540508
9	2021-01-19 11:18	438.4121971	2021-01-19 11:52	466.300628	2021-01-19 14:08	446.188617
10	2021-01-19 11:19	461.8627379	2021-01-19 11:53	479.970991	2021-01-19 14:09	498.042894
11	2021-01-19 11:20	482.0316537	2021-01-19 11:54	489.3553	2021-01-19 14:10	508.00598
12	2021-01-19 11:21	496.5213841	2021-01-19 11:55	496.049708	2021-01-19 14:11	506.722167
13	2021-01-19 11:22	512.8768227	2021-01-19 11:56	501.663262	2021-01-19 14:12	511.840498
14	2021-01-19 11:23	538.1422785	2021-01-19 11:57	505.540928	2021-01-19 14:13	514.650198
15	2021-01-19 11:24	558.9379379	2021-01-19 11:58	507.203168	2021-01-19 14:14	512.109501
16	2021-01-19 11:25	563.5700849	2021-01-19 11:59	509.683399	2021-01-19 14:15	509.890229
17	2021-01-19 11:26	563.3325068	2021-01-19 12:00	511.704827	2021-01-19 14:16	510.890438
18	2021-01-19 11:27	564.7557301	2021-01-19 12:01	513.175438	2021-01-19 14:17	511.875841
19	2021-01-19 11:28	564.8373019	2021-01-19 12:02	514.941265	2021-01-19 14:18	515.534716
20	2021-01-19 11:29	563.7556692	2021-01-19 12:03	516.188522	2021-01-19 14:19	517.90776
21	2021-01-19 11:30	561.4435465	2021-01-19 12:04	518.733747	2021-01-19 14:20	517.936177
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338					2021-01-19 19:38	186.498466
339					2021-01-19 19:39	186.041349
340					2021-01-19 19:40	185.628795

2.1 Series Pre-burn Data 2021-01-21 Total time (h) 8.67

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-01-21 11:09	Kindling & SUF	5.59	16.4	**Pre-Charge (min)**	169
2021-01-21 11:36	High fire	12.04	20.7	**Conditioning (min)**	1
2021-01-21 13:59	Medium fire	14.44	19.3	**Load (min)**	350

	Pre-Charge (min)	169	Conditioning (min)	1	Load (min)	350
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-01-21 11:09	129.8430609	2021-01-21 13:58	306.032455	2021-01-21 13:59	305.562154
2	2021-01-21 11:10	188.8214097			2021-01-21 14:00	298.407759
3	2021-01-21 11:11	271.9269523			2021-01-21 14:01	279.418155
4	2021-01-21 11:12	338.230932			2021-01-21 14:02	279.137167
5	2021-01-21 11:13	384.7765793			2021-01-21 14:03	287.710793
6	2021-01-21 11:14	416.4914304			2021-01-21 14:04	315.557159
7	2021-01-21 11:15	440.1193196			2021-01-21 14:05	333.61945
8	2021-01-21 11:16	465.3337109			2021-01-21 14:06	344.523015
9	2021-01-21 11:17	496.3521171			2021-01-21 14:07	350.801454
10	2021-01-21 11:18	516.2781744			2021-01-21 14:08	355.199229
11	2021-01-21 11:19	525.4556646			2021-01-21 14:09	360.437669
12	2021-01-21 11:20	529.3363942			2021-01-21 14:10	368.709469
13	2021-01-21 11:21	538.3515312			2021-01-21 14:11	380.902445
14	2021-01-21 11:22	543.1895759			2021-01-21 14:12	396.947592
15	2021-01-21 11:23	543.1449038			2021-01-21 14:13	413.632375
16	2021-01-21 11:24	542.7492886			2021-01-21 14:14	422.161315
17	2021-01-21 11:25	543.0059535			2021-01-21 14:15	426.328592
18	2021-01-21 11:26	544.8587295			2021-01-21 14:16	420.240646
19	2021-01-21 11:27	546.7310584			2021-01-21 14:17	414.741144
20	2021-01-21 11:28	546.059949			2021-01-21 14:18	414.070647
21	2021-01-21 11:29	544.1187645			2021-01-21 14:19	413.983602
22	2021-01-21 11:30	544.5340463			2021-01-21 14:20	412.617837
23	2021-01-21 11:31	539.5651277			2021-01-21 14:21	411.180033
24	2021-01-21 11:32	530.9215603			2021-01-21 14:22	411.243545
25	2021-01-21 11:33	519.5263071			2021-01-21 14:23	413.297298
26	2021-01-21 11:34	507.7178196			2021-01-21 14:24	414.19595
27	2021-01-21 11:35	499.3677607			2021-01-21 14:25	415.780312
28	2021-01-21 11:36	481.9912307			2021-01-21 14:26	417.979289
29	2021-01-21 11:37	447.9471881			2021-01-21 14:27	422.233722
30	2021-01-21 11:38	446.7485058			2021-01-21 14:28	430.293491
31	2021-01-21 11:39	472.7458514			2021-01-21 14:29	440.332183
32	2021-01-21 11:40	501.0092943			2021-01-21 14:30	451.344592
33	2021-01-21 11:41	522.7004197			2021-01-21 14:31	459.456158
34	2021-01-21 11:42	539.322026			2021-01-21 14:32	464.45535
35	2021-01-21 11:43	552.1898874			2021-01-21 14:33	467.44296
36	2021-01-21 11:44	559.6362142			2021-01-21 14:34	469.533717
37	2021-01-21 11:45	564.4573981			2021-01-21 14:35	472.131566
38	2021-01-21 11:46	567.8493687			2021-01-21 14:36	475.157477
39	2021-01-21 11:47	570.3913662			2021-01-21 14:37	477.631425
40	2021-01-21 11:48	571.3919903			2021-01-21 14:38	478.411941
41	2021-01-21 11:49	572.4685822			2021-01-21 14:39	479.320223
42	2021-01-21 11:50	572.245388			2021-01-21 14:40	480.77148
43	2021-01-21 11:51	571.645473			2021-01-21 14:41	481.611565
44	2021-01-21 11:52	569.7614064			2021-01-21 14:42	483.992251
45	2021-01-21 11:53	570.2083554			2021-01-21 14:43	484.794876
46	2021-01-21 11:54	569.8920263			2021-01-21 14:44	486.166439
47	2021-01-21 11:55	566.8884153			2021-01-21 14:45	486.334086

48	2021-01-21 11:56	565.1734525			2021-01-21 14:46	486.348953
49	2021-01-21 11:57	564.6382697			2021-01-21 14:47	486.856011
50	2021-01-21 11:58	562.4408868			2021-01-21 14:48	486.907306
51	44217.49998	559.8836357			2021-01-21 14:49	486.001401
52	44217.50067	557.8822022			2021-01-21 14:50	484.506181
53	44217.50137	556.3420972			2021-01-21 14:51	482.563489
54	44217.50206	555.6462117			2021-01-21 14:52	480.842465
55	44217.50275	555.0170904			2021-01-21 14:53	479.503408
56	44217.50345	553.857624			2021-01-21 14:54	477.610192
57	44217.50414	552.4582713			2021-01-21 14:55	476.026405
58	44217.50484	551.7439916			2021-01-21 14:56	474.632478
59	44217.50553	551.0156448			2021-01-21 14:57	472.243663
60	44217.50623	549.4270103			2021-01-21 14:58	469.901586
61	44217.50692	549.1851912			2021-01-21 14:59	467.867996
62	44217.50762	547.9836713			2021-01-21 15:00	466.160467
63	44217.50831	547.3690159			2021-01-21 15:01	464.798595
64	44217.509	547.2663346			2021-01-21 15:02	463.758464
65	44217.5097	546.178793			2021-01-21 15:03	462.66118
66	44217.51039	545.7913639			2021-01-21 15:04	461.266623
67	44217.51109	545.8676576			2021-01-21 15:05	459.765417
68	44217.51178	545.9236359			2021-01-21 15:06	458.818946
69	44217.51248	546.4472654			2021-01-21 15:07	457.759095
70	44217.51317	546.0146124			2021-01-21 15:08	456.637837
71	44217.51387	545.1105413			2021-01-21 15:09	455.518522
72	44217.51456	543.705623			2021-01-21 15:10	454.88346
73	44217.51525	542.1694568			2021-01-21 15:11	454.753595
74	44217.51595	539.485893			2021-01-21 15:12	455.58873
75	44217.51664	537.1272296			2021-01-21 15:13	456.254888
76	44217.51734	535.5267667			2021-01-21 15:14	455.632985
77	44217.51803	531.9314079			2021-01-21 15:15	454.515186
78	44217.51873	527.7617481			2021-01-21 15:16	453.681855
79	44217.51942	524.3454665			2021-01-21 15:17	451.886817
80	44217.52012	520.0602686			2021-01-21 15:18	449.104344
81	44217.52081	517.3613306			2021-01-21 15:19	444.518225
82	44217.5215	514.2205871			2021-01-21 15:20	438.980769
83	44217.5222	512.1106122			2021-01-21 15:21	433.534067
84	44217.52289	509.6737205			2021-01-21 15:22	427.919071
85	44217.52359	507.1321503			2021-01-21 15:23	423.001816
86	44217.52428	504.0224627			2021-01-21 15:24	418.640222
87	44217.52498	498.1980515			2021-01-21 15:25	414.94972
88	44217.52567	492.4369131			2021-01-21 15:26	411.185716
89	44217.52637	486.9111146			2021-01-21 15:27	407.563221
90	44217.52706	482.4934151			2021-01-21 15:28	404.506122
91	44217.52775	478.6599598			2021-01-21 15:29	401.291514
92	44217.52845	474.6671896			2021-01-21 15:30	397.138023
93	44217.52914	471.4168806			2021-01-21 15:31	393.515729
94	44217.52984	467.6895094			2021-01-21 15:32	390.428929
95	44217.53053	464.5813116			2021-01-21 15:33	387.306325
96	44217.53123	461.340274			2021-01-21 15:34	383.794567
97	44217.53192	457.8540385			2021-01-21 15:35	380.779361
98	44217.53262	454.5221425			2021-01-21 15:36	377.939853
99	44217.53331	451.2799238			2021-01-21 15:37	374.568086
100	44217.534	447.7338548			2021-01-21 15:38	371.336518
101	44217.5347	444.1702272			2021-01-21 15:39	367.623233
102	44217.53539	441.1755451			2021-01-21 15:40	362.815511
103	44217.53609	438.7943987			2021-01-21 15:41	358.588684
104	44217.53678	435.4556416			2021-01-21 15:42	354.260304
105	44217.53748	432.9643625			2021-01-21 15:43	349.917426

106	44217.53817	429.4033791			2021-01-21 15:44	345.633117
107	44217.53887	425.8235172			2021-01-21 15:45	341.935097
108	44217.53956	422.9869605			2021-01-21 15:46	338.946221
109	44217.54025	420.1669901			2021-01-21 15:47	335.915279
110	44217.54095	417.6196663			2021-01-21 15:48	333.057183
111	44217.54164	415.4297277			2021-01-21 15:49	329.800372
112	44217.54234	413.1494435			2021-01-21 15:50	326.415357
113	44217.54303	410.4981627			2021-01-21 15:51	322.44045
114	44217.54373	407.4053688			2021-01-21 15:52	318.314236
115	44217.54442	404.6586405			2021-01-21 15:53	313.454351
116	44217.54512	402.4743502			2021-01-21 15:54	309.02867
117	44217.54581	400.436326			2021-01-21 15:55	305.326243
118	44217.5465	397.6333765			2021-01-21 15:56	302.155049
119	44217.5472	395.1568015			2021-01-21 15:57	298.965556
120	44217.54789	392.5118794			2021-01-21 15:58	296.239935
121	44217.54859	389.8783236			2021-01-21 15:59	293.688915
122	44217.54928	387.9618235			2021-01-21 16:00	291.078667
123	44217.54998	385.9683309			2021-01-21 16:01	288.485615
124	44217.55067	383.8788865			2021-01-21 16:02	286.078084
125	44217.55137	381.8548304			2021-01-21 16:03	283.536294
126	44217.55206	380.3169097			2021-01-21 16:04	281.361099
127	44217.55275	378.074846			2021-01-21 16:05	279.418162
128	44217.55345	376.8468767			2021-01-21 16:06	277.473699
129	44217.55414	375.1530878			2021-01-21 16:07	275.848921
130	44217.55484	374.0787502			2021-01-21 16:08	274.568884
131	44217.55553	372.2333412			2021-01-21 16:09	273.060182
132	44217.55623	370.7442391			2021-01-21 16:10	271.571955
133	44217.55692	369.1238821			2021-01-21 16:11	270.395234
134	44217.55762	366.9309617			2021-01-21 16:12	269.435937
135	44217.55831	365.5022031			2021-01-21 16:13	268.543291
136	44217.559	363.6818826			2021-01-21 16:14	267.371558
137	44217.5597	362.1052651			2021-01-21 16:15	266.492393
138	44217.56039	360.8717268			2021-01-21 16:16	265.50159
139	44217.56109	359.6630831			2021-01-21 16:17	264.802258
140	44217.56178	358.0385651			2021-01-21 16:18	263.773028
141	44217.56248	356.2338832			2021-01-21 16:19	263.181981
142	44217.56317	354.3620605			2021-01-21 16:20	262.479018
143	44217.56387	351.0480833			2021-01-21 16:21	261.72455
144	44217.56456	348.4045499			2021-01-21 16:22	261.072436
145	44217.56525	346.0605618			2021-01-21 16:23	260.227707
146	44217.56595	344.0286446			2021-01-21 16:24	259.249229
147	44217.56664	341.9892871			2021-01-21 16:25	258.929758
148	44217.56734	340.1576938			2021-01-21 16:26	258.362189
149	44217.56803	337.9926824			2021-01-21 16:27	257.500021
150	44217.56873	336.0914342			2021-01-21 16:28	256.782974
151	44217.56942	334.2397875			2021-01-21 16:29	256.081606
152	44217.57012	332.4668601			2021-01-21 16:30	255.684452
153	44217.57081	330.8383787			2021-01-21 16:31	255.08852
154	44217.5715	329.0407051			2021-01-21 16:32	254.342234
155	44217.5722	327.094043			2021-01-21 16:33	253.795169
156	44217.57289	325.4888342			2021-01-21 16:34	253.02505
157	44217.57359	323.9943662			2021-01-21 16:35	252.26423
158	44217.57428	321.9656203			2021-01-21 16:36	251.594612
159	44217.57498	320.6430311			2021-01-21 16:37	250.745202
160	44217.57567	318.8858123			2021-01-21 16:38	250.130736
161	44217.57637	317.9084147			2021-01-21 16:39	249.615394
162	44217.57706	317.1182535			2021-01-21 16:40	249.055936
163	44217.57775	316.3510833			2021-01-21 16:41	248.463405

164	44217.57845	315.0641866			2021-01-21 16:42	247.848992
165	44217.57914	313.8686038			2021-01-21 16:43	247.303695
166	44217.57984	312.6098615			2021-01-21 16:44	246.608788
167	44217.58053	311.5440523			2021-01-21 16:45	246.386441
168	44217.58123	310.6697947			2021-01-21 16:46	245.758199
169	44217.58192	310.135414			2021-01-21 16:47	245.326639
170					2021-01-21 16:48	244.887408
171					2021-01-21 16:49	244.428027
172					2021-01-21 16:50	244.00599
173					2021-01-21 16:51	243.689062
174					2021-01-21 16:52	243.504379
175					2021-01-21 16:53	243.246764
176					2021-01-21 16:54	242.968174
177					2021-01-21 16:55	242.932574
178					2021-01-21 16:56	242.664925
179					2021-01-21 16:57	242.594216
180					2021-01-21 16:58	242.465826
181					2021-01-21 16:59	242.340965
182					2021-01-21 17:00	242.16484
183					2021-01-21 17:01	242.010453
184					2021-01-21 17:02	241.978519
185					2021-01-21 17:03	241.740202
186					2021-01-21 17:04	241.778118
187					2021-01-21 17:05	241.388641
188					2021-01-21 17:06	241.22812
189					2021-01-21 17:07	240.747888
190					2021-01-21 17:08	240.524142
191					2021-01-21 17:09	239.76065
192					2021-01-21 17:10	239.152636
193					2021-01-21 17:11	238.437687
194					2021-01-21 17:12	238.026886
195					2021-01-21 17:13	237.451323
196					2021-01-21 17:14	236.710248
197					2021-01-21 17:15	236.762495
198					2021-01-21 17:16	236.142431
199					2021-01-21 17:17	235.689244
200					2021-01-21 17:18	235.463273
201					2021-01-21 17:19	234.792195
202					2021-01-21 17:20	234.477363
203					2021-01-21 17:21	234.099859
204					2021-01-21 17:22	233.79808
205					2021-01-21 17:23	233.525288
206					2021-01-21 17:24	232.969847
207					2021-01-21 17:25	232.482832
208					2021-01-21 17:26	232.24211
209					2021-01-21 17:27	231.942277
210					2021-01-21 17:28	231.887616
211					2021-01-21 17:29	231.404004
212					2021-01-21 17:30	231.24425
213					2021-01-21 17:31	230.919539
214					2021-01-21 17:32	230.641451
215					2021-01-21 17:33	230.218311
216					2021-01-21 17:34	229.917147
217					2021-01-21 17:35	229.698934
218					2021-01-21 17:36	229.018739
219					2021-01-21 17:37	228.61637
220					2021-01-21 17:38	228.307164
221					2021-01-21 17:39	228.295596

222					2021-01-21 17:40	227.583296
223					2021-01-21 17:41	227.018295
224					2021-01-21 17:42	226.4727
225					2021-01-21 17:43	225.841037
226					2021-01-21 17:44	225.318772
227					2021-01-21 17:45	224.601408
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229					2021-01-21 17:47	223.862483
230					2021-01-21 17:48	223.447021
231					2021-01-21 17:49	223.008922
232					2021-01-21 17:50	222.544584
233					2021-01-21 17:51	222.041615
234					2021-01-21 17:52	221.813096
235					2021-01-21 17:53	221.443047
236					2021-01-21 17:54	221.123382
237					2021-01-21 17:55	220.793053
238					2021-01-21 17:56	220.446729
239					2021-01-21 17:57	220.051431
240					2021-01-21 17:58	219.662162
241					2021-01-21 17:59	219.379486
242					2021-01-21 18:00	219.136563
243					2021-01-21 18:01	218.715789
244					2021-01-21 18:02	218.370065
245					2021-01-21 18:03	217.872136
246					2021-01-21 18:04	217.612719
247					2021-01-21 18:05	217.158158
248					2021-01-21 18:06	217.12382
249					2021-01-21 18:07	216.892928
250					2021-01-21 18:08	216.549337
251					2021-01-21 18:09	216.284014
252					2021-01-21 18:10	216.086608
253					2021-01-21 18:11	216.218794
254					2021-01-21 18:12	215.92944
255					2021-01-21 18:13	215.719492
256					2021-01-21 18:14	215.467224
257					2021-01-21 18:15	215.245784
258					2021-01-21 18:16	214.694223
259					2021-01-21 18:17	214.420707
260					2021-01-21 18:18	213.933918
261					2021-01-21 18:19	213.548578
262					2021-01-21 18:20	213.165511
263					2021-01-21 18:21	212.73722
264					2021-01-21 18:22	212.455562
265					2021-01-21 18:23	212.048939
266					2021-01-21 18:24	211.517874
267					2021-01-21 18:25	211.222283
268					2021-01-21 18:26	210.855697
269					2021-01-21 18:27	210.479648
270					2021-01-21 18:28	210.08214
271					2021-01-21 18:29	209.661354
272					2021-01-21 18:30	209.355005
273					2021-01-21 18:31	208.86433
274					2021-01-21 18:32	208.675172
275					2021-01-21 18:33	208.687227
276					2021-01-21 18:34	208.378776
277					2021-01-21 18:35	207.851259
278					2021-01-21 18:36	207.401148
279					2021-01-21 18:37	207.115087

280					2021-01-21 18:38	206.939091
281					2021-01-21 18:39	206.064032
282					2021-01-21 18:40	205.1216
283					2021-01-21 18:41	204.508531
284					2021-01-21 18:42	203.609103
285					2021-01-21 18:43	202.917891
286					2021-01-21 18:44	202.190664
287					2021-01-21 18:45	201.358673
288					2021-01-21 18:46	200.737997
289					2021-01-21 18:47	200.151885
290					2021-01-21 18:48	199.410485
291					2021-01-21 18:49	198.537743
292					2021-01-21 18:50	197.972925
293					2021-01-21 18:51	197.323704
294					2021-01-21 18:52	196.61889
295					2021-01-21 18:53	195.998619
296					2021-01-21 18:54	195.412469
297					2021-01-21 18:55	194.860477
298					2021-01-21 18:56	194.282324
299					2021-01-21 18:57	193.707199
300					2021-01-21 18:58	193.070555
301					2021-01-21 18:59	192.65354
302					2021-01-21 19:00	192.198084
303					2021-01-21 19:01	191.670367
304					2021-01-21 19:02	191.265187
305					2021-01-21 19:03	190.642999
306					2021-01-21 19:04	190.269169
307					2021-01-21 19:05	189.636327
308					2021-01-21 19:06	189.19406
309					2021-01-21 19:07	188.805096
310					2021-01-21 19:08	188.482785
311					2021-01-21 19:09	188.033166
312					2021-01-21 19:10	187.616926
313					2021-01-21 19:11	187.332672
314					2021-01-21 19:12	186.981395
315					2021-01-21 19:13	186.325336
316					2021-01-21 19:14	185.803522
317					2021-01-21 19:15	185.601135
318					2021-01-21 19:16	185.023788
319					2021-01-21 19:17	184.580853
320					2021-01-21 19:18	184.240832
321					2021-01-21 19:19	183.8565
322					2021-01-21 19:20	183.525798
323					2021-01-21 19:21	182.883067
324					2021-01-21 19:22	182.367655
325					2021-01-21 19:23	181.994934
326					2021-01-21 19:24	181.625955
327					2021-01-21 19:25	181.077951
328					2021-01-21 19:26	180.664432
329					2021-01-21 19:27	180.222304
330					2021-01-21 19:28	179.914588
331					2021-01-21 19:29	179.460862
332					2021-01-21 19:30	179.019056
333					2021-01-21 19:31	178.636818
334					2021-01-21 19:32	178.068619
335					2021-01-21 19:33	177.626726
336					2021-01-21 19:34	177.079234
337					2021-01-21 19:35	176.559774

338					2021-01-21 19:36	176.199618
339					2021-01-21 19:37	175.689782
340					2021-01-21 19:38	175.223071
341					2021-01-21 19:39	174.922174
342					2021-01-21 19:40	174.423682
343					2021-01-21 19:41	174.064855
344					2021-01-21 19:42	173.546911
345					2021-01-21 19:43	173.061585
346					2021-01-21 19:44	172.595828
347					2021-01-21 19:45	172.307116
348					2021-01-21 19:46	171.831792
349					2021-01-21 19:47	171.356839
350					2021-01-21 19:48	171.012205

2.1 Series Pre-burn Data 2021-01-28 Total time (h) 7.82

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-01-28 11:10	Kindling & SUF	5.99	16	**Pre-Charge (min)**	34
2021-01-21 11:36	High fire	12.06	23.8	**Conditioning (min)**	155
2021-01-28 14:19	Medium fire	14.49	21.0	**Load (min)**	280

	Pre-Charge (min)	34	Conditioning (min)	155	Load (min)	280
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-01-28 11:10	73.81131946	2021-01-28 11:44	432.963235	2021-01-28 14:19	302.835643
2	2021-01-28 11:11	105.1368809	2021-01-28 11:45	430.215829	2021-01-28 14:20	284.111023
3	2021-01-28 11:12	143.7467458	2021-01-28 11:46	428.883015	2021-01-28 14:21	281.756572
4	2021-01-28 11:13	223.7084985	2021-01-28 11:47	426.362975	2021-01-28 14:22	271.033895
5	2021-01-28 11:14	297.6157139	2021-01-28 11:48	433.280677	2021-01-28 14:23	260.844604
6	2021-01-28 11:15	362.8456243	2021-01-28 11:49	455.71705	2021-01-28 14:24	261.851842
7	2021-01-28 11:16	421.8644326	2021-01-28 11:50	472.296923	2021-01-28 14:25	259.146761
8	2021-01-28 11:17	447.5750093	2021-01-28 11:51	481.769366	2021-01-28 14:26	256.560372
9	2021-01-28 11:18	453.5630505	2021-01-28 11:52	486.761396	2021-01-28 14:27	255.269134
10	2021-01-28 11:19	457.4969509	2021-01-28 11:53	489.035081	2021-01-28 14:28	253.818871
11	2021-01-28 11:20	465.7756911	2021-01-28 11:54	490.22157	2021-01-28 14:29	266.774918
12	2021-01-28 11:21	473.5510251	2021-01-28 11:55	491.027208	2021-01-28 14:30	286.784531
13	2021-01-28 11:22	492.4747725	2021-01-28 11:56	491.734789	2021-01-28 14:31	292.273577
14	2021-01-28 11:23	500.7485509	2021-01-28 11:57	492.268611	2021-01-28 14:32	292.909254
15	2021-01-28 11:24	506.0147845	2021-01-28 11:58	492.480005	2021-01-28 14:33	292.170518
16	2021-01-28 11:25	513.2045074	2021-01-28 11:59	493.436111	2021-01-28 14:34	293.735372
17	2021-01-28 11:26	522.6600473	2021-01-28 12:00	494.351959	2021-01-28 14:35	315.345385
18	2021-01-28 11:27	528.9358473	2021-01-28 12:01	495.36936	2021-01-28 14:36	338.976356
19	2021-01-28 11:28	530.3473781	2021-01-28 12:02	497.047784	2021-01-28 14:37	368.718108
20	2021-01-28 11:29	522.9832031	2021-01-28 12:03	498.78634	2021-01-28 14:38	396.975025
21	2021-01-28 11:30	516.4091134	2021-01-28 12:04	500.152908	2021-01-28 14:39	432.472684
22	2021-01-28 11:31	510.7601727	2021-01-28 12:05	503.353598	2021-01-28 14:40	456.387444
23	2021-01-28 11:32	505.033143	2021-01-28 12:06	506.785125	2021-01-28 14:41	467.372263
24	2021-01-28 11:33	500.3065629	2021-01-28 12:07	508.209111	2021-01-28 14:42	474.40933
25	2021-01-28 11:34	493.9696163	2021-01-28 12:08	509.926285	2021-01-28 14:43	482.130133
26	2021-01-28 11:35	487.2790617	2021-01-28 12:09	510.926184	2021-01-28 14:44	489.949717
27	2021-01-28 11:36	480.0059893	2021-01-28 12:10	512.274764	2021-01-28 14:45	499.349586
28	2021-01-28 11:37	473.4699754	2021-01-28 12:11	513.674344	2021-01-28 14:46	511.682754
29	2021-01-28 11:38	467.6274176	2021-01-28 12:12	516.093298	2021-01-28 14:47	531.244854
30	2021-01-28 11:39	462.6755803	2021-01-28 12:13	519.696397	2021-01-28 14:48	549.414196
31	2021-01-28 11:40	458.3215696	2021-01-28 12:14	521.724364	2021-01-28 14:49	560.370868
32	2021-01-28 11:41	454.5554826	2021-01-28 12:15	525.022628	2021-01-28 14:50	567.075933
33	2021-01-28 11:42	473.4098626	2021-01-28 12:16	527.334951	2021-01-28 14:51	571.180414
34	2021-01-28 11:43	440.2829032	2021-01-28 12:17	529.775598	2021-01-28 14:52	575.540246
35			2021-01-28 12:18	531.692031	2021-01-28 14:53	580.108631
36			2021-01-28 12:19	532.529062	2021-01-28 14:54	585.223944
37			2021-01-28 12:20	533.302616	2021-01-28 14:55	587.833933
38			2021-01-28 12:21	533.809181	2021-01-28 14:56	588.063593
39			2021-01-28 12:22	534.840909	2021-01-28 14:57	590.186743
40			2021-01-28 12:23	534.513145	2021-01-28 14:58	592.32279
41			2021-01-28 12:24	532.227968	2021-01-28 14:59	594.097399
42			2021-01-28 12:25	531.361166	2021-01-28 15:00	596.083
43			2021-01-28 12:26	529.081347	2021-01-28 15:01	596.539195
44			2021-01-28 12:27	527.692128	2021-01-28 15:02	595.923055
45			2021-01-28 12:28	525.227	2021-01-28 15:03	593.956982
46			2021-01-28 12:29	523.940403	2021-01-28 15:04	593.889229
47			2021-01-28 12:30	522.893912	2021-01-28 15:05	594.801642
48			2021-01-28 12:31	521.410879	2021-01-28 15:06	591.242937

49			2021-01-28 12:32	518.622492	2021-01-28 15:07	585.520858
50			2021-01-28 12:33	515.394466	2021-01-28 15:08	583.404888
51			2021-01-28 12:34	512.567963	2021-01-28 15:09	578.694735
52			2021-01-28 12:35	510.485717	2021-01-28 15:10	573.991985
53			2021-01-28 12:36	509.088838	2021-01-28 15:11	570.679467
54			2021-01-28 12:37	506.094663	2021-01-28 15:12	568.052974
55			2021-01-28 12:38	501.776319	2021-01-28 15:13	566.588798
56			2021-01-28 12:39	496.458764	2021-01-28 15:14	564.490835
57			2021-01-28 12:40	491.533501	2021-01-28 15:15	562.324155
58			2021-01-28 12:41	486.240723	2021-01-28 15:16	559.019999
59			2021-01-28 12:42	479.846467	2021-01-28 15:17	555.092389
60			2021-01-28 12:43	474.521821	2021-01-28 15:18	550.703188
61			2021-01-28 12:44	470.051995	2021-01-28 15:19	546.844621
62			2021-01-28 12:45	468.328335	2021-01-28 15:20	543.127465
63			2021-01-28 12:46	468.763574	2021-01-28 15:21	539.601512
64			2021-01-28 12:47	463.567261	2021-01-28 15:22	536.654963
65			2021-01-28 12:48	455.8026	2021-01-28 15:23	533.744365
66			2021-01-28 12:49	447.558643	2021-01-28 15:24	529.399392
67			2021-01-28 12:50	440.832653	2021-01-28 15:25	524.11056
68			2021-01-28 12:51	433.873875	2021-01-28 15:26	519.140181
69			2021-01-28 12:52	428.169392	2021-01-28 15:27	514.467229
70			2021-01-28 12:53	422.603801	2021-01-28 15:28	509.322799
71			2021-01-28 12:54	417.103246	2021-01-28 15:29	505.361259
72			2021-01-28 12:55	411.766561	2021-01-28 15:30	502.002581
73			2021-01-28 12:56	406.816752	2021-01-28 15:31	497.738331
74			2021-01-28 12:57	401.65054	2021-01-28 15:32	493.738869
75			2021-01-28 12:58	396.18767	2021-01-28 15:33	490.525584
76			2021-01-28 12:59	390.348808	2021-01-28 15:34	487.582949
77			2021-01-28 13:00	384.51797	2021-01-28 15:35	485.054039
78			2021-01-28 13:01	377.865499	2021-01-28 15:36	481.963143
79			2021-01-28 13:02	371.285407	2021-01-28 15:37	478.259336
80			2021-01-28 13:03	365.710423	2021-01-28 15:38	475.219695
81			2021-01-28 13:04	360.679588	2021-01-28 15:39	471.815778
82			2021-01-28 13:05	355.833421	2021-01-28 15:40	468.939929
83			2021-01-28 13:06	351.472978	2021-01-28 15:41	465.497066
84			2021-01-28 13:07	346.733741	2021-01-28 15:42	460.734973
85			2021-01-28 13:08	342.617704	2021-01-28 15:43	455.24636
86			2021-01-28 13:09	338.845964	2021-01-28 15:44	449.540548
87			2021-01-28 13:10	335.912554	2021-01-28 15:45	444.841993
88			2021-01-28 13:11	333.356726	2021-01-28 15:46	440.346448
89			2021-01-28 13:12	331.500189	2021-01-28 15:47	436.203776
90			2021-01-28 13:13	329.631496	2021-01-28 15:48	433.295107
91			2021-01-28 13:14	327.024756	2021-01-28 15:49	429.48933
92			2021-01-28 13:15	325.169234	2021-01-28 15:50	425.168808
93			2021-01-28 13:16	322.989891	2021-01-28 15:51	420.811001
94			2021-01-28 13:17	321.262391	2021-01-28 15:52	416.937929
95			2021-01-28 13:18	319.569452	2021-01-28 15:53	412.945416
96			2021-01-28 13:19	318.129315	2021-01-28 15:54	409.212932
97			2021-01-28 13:20	318.215011	2021-01-28 15:55	405.424959
98			2021-01-28 13:21	331.310573	2021-01-28 15:56	401.824972
99			2021-01-28 13:22	339.484514	2021-01-28 15:57	398.586412
100			2021-01-28 13:23	347.285403	2021-01-28 15:58	395.512283
101			2021-01-28 13:24	353.275847	2021-01-28 15:59	393.044585
102			2021-01-28 13:25	358.487494	2021-01-28 16:00	390.019637
103			2021-01-28 13:26	362.872069	2021-01-28 16:01	387.374713
104			2021-01-28 13:27	366.240424	2021-01-28 16:02	384.756321
105			2021-01-28 13:28	368.305823	2021-01-28 16:03	382.09193
106			2021-01-28 13:29	369.131642	2021-01-28 16:04	379.509007

107			2021-01-28 13:30	369.344466	2021-01-28 16:05	377.129758
108			2021-01-28 13:31	369.561384	2021-01-28 16:06	374.962247
109			2021-01-28 13:32	369.168477	2021-01-28 16:07	373.094887
110			2021-01-28 13:33	367.894239	2021-01-28 16:08	370.967632
111			2021-01-28 13:34	366.962087	2021-01-28 16:09	368.288995
112			2021-01-28 13:35	365.401447	2021-01-28 16:10	366.261422
113			2021-01-28 13:36	363.919185	2021-01-28 16:11	364.156273
114			2021-01-28 13:37	362.119216	2021-01-28 16:12	360.514015
115			2021-01-28 13:38	360.479417	2021-01-28 16:13	355.668901
116			2021-01-28 13:39	358.522711	2021-01-28 16:14	350.710125
117			2021-01-28 13:40	356.716822	2021-01-28 16:15	346.127303
118			2021-01-28 13:41	355.335627	2021-01-28 16:16	342.65929
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122			2021-01-28 13:45	349.837894	2021-01-28 16:20	331.024024
123			2021-01-28 13:46	348.802631	2021-01-28 16:21	328.542586
124			2021-01-28 13:47	347.281851	2021-01-28 16:22	326.155079
125			2021-01-28 13:48	346.239712	2021-01-28 16:23	323.611919
126			2021-01-28 13:49	345.479528	2021-01-28 16:24	320.693801
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129			2021-01-28 13:52	345.40737	2021-01-28 16:27	313.761493
130			2021-01-28 13:53	345.583907	2021-01-28 16:28	311.823991
131			2021-01-28 13:54	345.915516	2021-01-28 16:29	310.04596
132			2021-01-28 13:55	346.026336	2021-01-28 16:30	308.126537
133			2021-01-28 13:56	346.215516	2021-01-28 16:31	306.859783
134			2021-01-28 13:57	345.894302	2021-01-28 16:32	305.367913
135			2021-01-28 13:58	344.825793	2021-01-28 16:33	303.749544
136			2021-01-28 13:59	341.293317	2021-01-28 16:34	302.2889
137			2021-01-28 14:00	336.422668	2021-01-28 16:35	300.754065
138			2021-01-28 14:01	332.243707	2021-01-28 16:36	299.166837
139			2021-01-28 14:02	328.519247	2021-01-28 16:37	297.929067
140			2021-01-28 14:03	325.675953	2021-01-28 16:38	296.564772
141			2021-01-28 14:04	323.324311	2021-01-28 16:39	295.386889
142			2021-01-28 14:05	321.209765	2021-01-28 16:40	294.311046
143			2021-01-28 14:06	319.193015	2021-01-28 16:41	293.474744
144			2021-01-28 14:07	317.210449	2021-01-28 16:42	292.594935
145			2021-01-28 14:08	315.161247	2021-01-28 16:43	291.720598
146			2021-01-28 14:09	313.150693	2021-01-28 16:44	290.855405
147			2021-01-28 14:10	311.564057	2021-01-28 16:45	289.935226
148			2021-01-28 14:11	310.085206	2021-01-28 16:46	287.970864
149			2021-01-28 14:12	308.347057	2021-01-28 16:47	285.997244
150			2021-01-28 14:13	306.78445	2021-01-28 16:48	284.082788
151			2021-01-28 14:14	305.21005	2021-01-28 16:49	282.460942
152			2021-01-28 14:15	303.786939	2021-01-28 16:50	281.216185
153			2021-01-28 14:16	302.79464	2021-01-28 16:51	279.626234
154			2021-01-28 14:17	303.134737	2021-01-28 16:52	278.269302
155			2021-01-28 14:18	305.657475	2021-01-28 16:53	276.997115
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157					2021-01-28 16:55	274.51483
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163					2021-01-28 17:01	268.269479
164					2021-01-28 17:02	267.283445

165					2021-01-28 17:03	266.297695
166					2021-01-28 17:04	265.572699
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169					2021-01-28 17:07	262.77265
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175					2021-01-28 17:13	258.663028
176					2021-01-28 17:14	258.211955
177					2021-01-28 17:15	257.805345
178					2021-01-28 17:16	257.037385
179					2021-01-28 17:17	256.27786
180					2021-01-28 17:18	255.701479
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182					2021-01-28 17:20	254.695178
183					2021-01-28 17:21	254.212662
184					2021-01-28 17:22	253.878352
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186					2021-01-28 17:24	252.643117
187					2021-01-28 17:25	251.927562
188					2021-01-28 17:26	251.560368
189					2021-01-28 17:27	251.017443
190					2021-01-28 17:28	250.34573
191					2021-01-28 17:29	249.501905
192					2021-01-28 17:30	248.971883
193					2021-01-28 17:31	248.345431
194					2021-01-28 17:32	247.88265
195					2021-01-28 17:33	247.210119
196					2021-01-28 17:34	246.537149
197					2021-01-28 17:35	246.129526
198					2021-01-28 17:36	245.238398
199					2021-01-28 17:37	244.911428
200					2021-01-28 17:38	244.45147
201					2021-01-28 17:39	243.96169
202					2021-01-28 17:40	243.188119
203					2021-01-28 17:41	242.806252
204					2021-01-28 17:42	242.530288
205					2021-01-28 17:43	241.910093
206					2021-01-28 17:44	241.389298
207					2021-01-28 17:45	240.695868
208					2021-01-28 17:46	240.233077
209					2021-01-28 17:47	239.52976
210					2021-01-28 17:48	238.764541
211					2021-01-28 17:49	238.20534
212					2021-01-28 17:50	237.798554
213					2021-01-28 17:51	237.224589
214					2021-01-28 17:52	236.695975
215					2021-01-28 17:53	236.261761
216					2021-01-28 17:54	235.637528
217					2021-01-28 17:55	235.102906
218					2021-01-28 17:56	234.818031
219					2021-01-28 17:57	234.430146
220					2021-01-28 17:58	233.894781
221					2021-01-28 17:59	233.583542
222					2021-01-28 18:00	233.742668

223					2021-01-28 18:01	233.569383
224					2021-01-28 18:02	233.379558
225					2021-01-28 18:03	233.030259
226					2021-01-28 18:04	232.681708
227					2021-01-28 18:05	232.128084
228					2021-01-28 18:06	231.43207
229					2021-01-28 18:07	230.592911
230					2021-01-28 18:08	229.884214
231					2021-01-28 18:09	229.076883
232					2021-01-28 18:10	228.338127
233					2021-01-28 18:11	227.400423
234					2021-01-28 18:12	226.889205
235					2021-01-28 18:13	226.103647
236					2021-01-28 18:14	225.531682
237					2021-01-28 18:15	224.704568
238					2021-01-28 18:16	223.940167
239					2021-01-28 18:17	223.048429
240					2021-01-28 18:18	221.934514
241					2021-01-28 18:19	220.99467
242					2021-01-28 18:20	219.940741
243					2021-01-28 18:21	218.877535
244					2021-01-28 18:22	218.022975
245					2021-01-28 18:23	217.107397
246					2021-01-28 18:24	216.212543
247					2021-01-28 18:25	215.319282
248					2021-01-28 18:26	214.340928
249					2021-01-28 18:27	213.369098
250					2021-01-28 18:28	212.658123
251					2021-01-28 18:29	211.512125
252					2021-01-28 18:30	210.693724
253					2021-01-28 18:31	209.818392
254					2021-01-28 18:32	208.858649
255					2021-01-28 18:33	207.979575
256					2021-01-28 18:34	207.2999
257					2021-01-28 18:35	206.408384
258					2021-01-28 18:36	205.48114
259					2021-01-28 18:37	204.685437
260					2021-01-28 18:38	203.913954
261					2021-01-28 18:39	202.800278
262					2021-01-28 18:40	201.980089
263					2021-01-28 18:41	201.106298
264					2021-01-28 18:42	200.384118
265					2021-01-28 18:43	199.58525
266					2021-01-28 18:44	198.914323
267					2021-01-28 18:45	198.162041
268					2021-01-28 18:46	197.403182
269					2021-01-28 18:47	196.74399
270					2021-01-28 18:48	196.242589
271					2021-01-28 18:49	195.495525
272					2021-01-28 18:50	194.768001
273					2021-01-28 18:51	194.160873
274					2021-01-28 18:52	193.62247
275					2021-01-28 18:53	192.826038
276					2021-01-28 18:54	192.373789
277					2021-01-28 18:55	191.628987
278					2021-01-28 18:56	191.14341
279					2021-01-28 18:57	190.497899
280					2021-01-28 18:58	189.889625

2.1 Series Pre-burn Data 2021-02-10 Total time (h) 8.75

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-02-10 10:58	Kindling & SUF	5.85	16	**Pre-Charge (min)**	42
2021-02-10 11:40	High fire	11.75	20.1	**Conditioning (min)**	128
2021-02-10 13:48	Medium fire	14.30	20.4	**Load (min)**	355

	Pre-Charge (min)	42	Conditioning (min)	128	Load (min)	355
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-02-10 10:58	101.7287734	2021-02-10 11:40	386.868072	2021-02-10 13:48	315.537797
2	2021-02-10 10:59	135.6598931	2021-02-10 11:41	377.473963	2021-02-10 13:49	295.238611
3	2021-02-10 11:00	162.1910605	2021-02-10 11:42	373.015909	2021-02-10 13:50	270.371274
4	2021-02-10 11:01	191.328721	2021-02-10 11:43	374.678235	2021-02-10 13:51	256.079194
5	2021-02-10 11:02	252.3599299	2021-02-10 11:44	391.808903	2021-02-10 13:52	254.838297
6	2021-02-10 11:03	311.4179356	2021-02-10 11:45	416.393678	2021-02-10 13:53	257.249461
7	2021-02-10 11:04	375.1923227	2021-02-10 11:46	456.516459	2021-02-10 13:54	265.203334
8	2021-02-10 11:05	436.6045185	2021-02-10 11:47	489.027373	2021-02-10 13:55	266.689215
9	2021-02-10 11:06	465.8752802	2021-02-10 11:48	512.628816	2021-02-10 13:56	267.39876
10	2021-02-10 11:07	483.9520433	2021-02-10 11:49	538.105057	2021-02-10 13:57	268.08989
11	2021-02-10 11:08	492.4099699	2021-02-10 11:50	552.212481	2021-02-10 13:58	270.037167
12	2021-02-10 11:09	498.987675	2021-02-10 11:51	562.292816	2021-02-10 13:59	282.503066
13	2021-02-10 11:10	500.006422	2021-02-10 11:52	574.520504	2021-02-10 14:00	299.581322
14	2021-02-10 11:11	501.252963	2021-02-10 11:53	585.293875	2021-02-10 14:01	314.604415
15	2021-02-10 11:12	512.0841553	2021-02-10 11:54	593.990264	2021-02-10 14:02	332.181603
16	2021-02-10 11:13	513.7117376	2021-02-10 11:55	600.052794	2021-02-10 14:03	353.211359
17	2021-02-10 11:14	516.3345307	2021-02-10 11:56	608.322787	2021-02-10 14:04	357.09449
18	2021-02-10 11:15	519.9224705	2021-02-10 11:57	612.314582	2021-02-10 14:05	367.803549
19	2021-02-10 11:16	523.4779913	2021-02-10 11:58	613.750169	2021-02-10 14:06	387.28179
20	2021-02-10 11:17	522.1169774	2021-02-10 11:59	611.538291	2021-02-10 14:07	407.116386
21	2021-02-10 11:18	520.4293681	2021-02-10 12:00	608.592248	2021-02-10 14:08	432.481106
22	2021-02-10 11:19	516.956675	2021-02-10 12:01	606.081461	2021-02-10 14:09	453.966983
23	2021-02-10 11:20	511.8663097	2021-02-10 12:02	604.405601	2021-02-10 14:10	467.942583
24	2021-02-10 11:21	505.3652028	2021-02-10 12:03	604.257433	2021-02-10 14:11	481.406033
25	2021-02-10 11:22	501.1261265	2021-02-10 12:04	604.851304	2021-02-10 14:12	489.771244
26	2021-02-10 11:23	497.8936505	2021-02-10 12:05	605.036353	2021-02-10 14:13	495.494531
27	2021-02-10 11:24	495.9338268	2021-02-10 12:06	606.791136	2021-02-10 14:14	499.926608
28	2021-02-10 11:25	495.8959612	2021-02-10 12:07	609.5787	2021-02-10 14:15	501.637494
29	2021-02-10 11:26	494.2917539	2021-02-10 12:08	611.756149	2021-02-10 14:16	501.751272
30	2021-02-10 11:27	492.58453	2021-02-10 12:09	612.679963	2021-02-10 14:17	501.471604
31	2021-02-10 11:28	491.5031002	2021-02-10 12:10	613.439078	2021-02-10 14:18	501.112022
32	2021-02-10 11:29	488.7942884	2021-02-10 12:11	612.02363	2021-02-10 14:19	502.32528
33	2021-02-10 11:30	479.4942317	2021-02-10 12:12	608.774734	2021-02-10 14:20	505.002989
34	2021-02-10 11:31	467.1638834	2021-02-10 12:13	605.276862	2021-02-10 14:21	507.404332
35	2021-02-10 11:32	456.1880898	2021-02-10 12:14	601.569029	2021-02-10 14:22	508.722457
36	2021-02-10 11:33	446.2674274	2021-02-10 12:15	597.488728	2021-02-10 14:23	509.010288
37	2021-02-10 11:34	439.2996351	2021-02-10 12:16	593.416143	2021-02-10 14:24	509.417514
38	2021-02-10 11:35	432.5746465	2021-02-10 12:17	588.611755	2021-02-10 14:25	508.868824
39	2021-02-10 11:36	424.4342685	2021-02-10 12:18	584.43221	2021-02-10 14:26	508.835549
40	2021-02-10 11:37	417.2890041	2021-02-10 12:19	580.465717	2021-02-10 14:27	508.130471
41	2021-02-10 11:38	411.4777466	2021-02-10 12:20	576.076374	2021-02-10 14:28	507.934493
42	2021-02-10 11:39	400.3724683	2021-02-10 12:21	572.572769	2021-02-10 14:29	508.940408
43			2021-02-10 12:22	569.243802	2021-02-10 14:30	509.501418
44			2021-02-10 12:23	569.68431	2021-02-10 14:31	509.851706
45			2021-02-10 12:24	570.018	2021-02-10 14:32	509.930476
46			2021-02-10 12:25	569.660948	2021-02-10 14:33	511.666734
47			2021-02-10 12:26	565.966342	2021-02-10 14:34	513.778446

48			2021-02-10 12:27	562.546625	2021-02-10 14:35	514.500859
49			2021-02-10 12:28	559.197245	2021-02-10 14:36	514.830075
50			2021-02-10 12:29	556.316981	2021-02-10 14:37	514.224929
51			2021-02-10 12:30	552.565511	2021-02-10 14:38	513.058916
52			2021-02-10 12:31	546.530811	2021-02-10 14:39	511.645582
53			2021-02-10 12:32	541.495786	2021-02-10 14:40	509.776509
54			2021-02-10 12:33	537.923717	2021-02-10 14:41	507.243289
55			2021-02-10 12:34	533.050281	2021-02-10 14:42	504.526961
56			2021-02-10 12:35	524.256425	2021-02-10 14:43	501.373217
57			2021-02-10 12:36	514.350599	2021-02-10 14:44	497.628961
58			2021-02-10 12:37	505.521783	2021-02-10 14:45	494.354461
59			2021-02-10 12:38	498.446715	2021-02-10 14:46	490.714389
60			2021-02-10 12:39	491.58679	2021-02-10 14:47	486.821118
61			2021-02-10 12:40	485.085694	2021-02-10 14:48	483.056967
62			2021-02-10 12:41	479.473832	2021-02-10 14:49	479.190276
63			2021-02-10 12:42	473.485056	2021-02-10 14:50	474.111874
64			2021-02-10 12:43	469.430249	2021-02-10 14:51	468.040141
65			2021-02-10 12:44	465.396897	2021-02-10 14:52	461.492971
66			2021-02-10 12:45	461.519098	2021-02-10 14:53	455.235694
67			2021-02-10 12:46	457.043521	2021-02-10 14:54	448.151305
68			2021-02-10 12:47	453.136766	2021-02-10 14:55	441.463797
69			2021-02-10 12:48	450.267712	2021-02-10 14:56	434.949633
70			2021-02-10 12:49	446.104896	2021-02-10 14:57	428.753954
71			2021-02-10 12:50	442.029983	2021-02-10 14:58	423.938636
72			2021-02-10 12:51	438.448564	2021-02-10 14:59	419.605237
73			2021-02-10 12:52	435.035822	2021-02-10 15:00	415.427649
74			2021-02-10 12:53	432.208426	2021-02-10 15:01	410.937182
75			2021-02-10 12:54	428.869274	2021-02-10 15:02	405.878343
76			2021-02-10 12:55	425.926323	2021-02-10 15:03	400.791455
77			2021-02-10 12:56	423.048415	2021-02-10 15:04	395.93713
78			2021-02-10 12:57	421.0403	2021-02-10 15:05	391.390922
79			2021-02-10 12:58	418.443374	2021-02-10 15:06	386.954626
80			2021-02-10 12:59	416.917219	2021-02-10 15:07	382.588335
81			2021-02-10 13:00	414.593369	2021-02-10 15:08	377.825265
82			2021-02-10 13:01	413.169669	2021-02-10 15:09	373.66241
83			2021-02-10 13:02	412.10576	2021-02-10 15:10	370.249292
84			2021-02-10 13:03	411.174375	2021-02-10 15:11	367.643661
85			2021-02-10 13:04	409.509816	2021-02-10 15:12	365.439936
86			2021-02-10 13:05	408.138189	2021-02-10 15:13	363.13964
87			2021-02-10 13:06	407.487813	2021-02-10 15:14	360.54259
88			2021-02-10 13:07	406.315864	2021-02-10 15:15	358.932844
89			2021-02-10 13:08	405.220263	2021-02-10 15:16	356.888549
90			2021-02-10 13:09	404.228889	2021-02-10 15:17	354.1168
91			2021-02-10 13:10	403.420283	2021-02-10 15:18	351.269664
92			2021-02-10 13:11	402.001143	2021-02-10 15:19	349.199801
93			2021-02-10 13:12	400.827756	2021-02-10 15:20	347.415088
94			2021-02-10 13:13	400.095921	2021-02-10 15:21	345.233296
95			2021-02-10 13:14	398.871704	2021-02-10 15:22	343.210538
96			2021-02-10 13:15	397.566153	2021-02-10 15:23	341.662329
97			2021-02-10 13:16	396.239106	2021-02-10 15:24	339.623694
98			2021-02-10 13:17	394.931147	2021-02-10 15:25	337.310695
99			2021-02-10 13:18	394.17213	2021-02-10 15:26	334.399358
100			2021-02-10 13:19	393.178956	2021-02-10 15:27	330.606544
101			2021-02-10 13:20	392.665444	2021-02-10 15:28	326.449437
102			2021-02-10 13:21	391.362042	2021-02-10 15:29	322.808962
103			2021-02-10 13:22	389.375034	2021-02-10 15:30	319.181041
104			2021-02-10 13:23	387.587378	2021-02-10 15:31	316.178547
105			2021-02-10 13:24	385.06083	2021-02-10 15:32	313.117408

106			2021-02-10 13:25	382.724323	2021-02-10 15:33	310.808755
107			2021-02-10 13:26	379.626932	2021-02-10 15:34	308.573374
108			2021-02-10 13:27	376.919752	2021-02-10 15:35	304.886517
109			2021-02-10 13:28	374.099684	2021-02-10 15:36	301.852701
110			2021-02-10 13:29	371.380203	2021-02-10 15:37	300.329738
111			2021-02-10 13:30	368.634155	2021-02-10 15:38	298.176625
112			2021-02-10 13:31	367.05842	2021-02-10 15:39	296.070151
113			2021-02-10 13:32	364.870241	2021-02-10 15:40	294.003053
114			2021-02-10 13:33	360.954857	2021-02-10 15:41	292.388324
115			2021-02-10 13:34	357.28918	2021-02-10 15:42	290.928339
116			2021-02-10 13:35	353.780716	2021-02-10 15:43	289.807284
117			2021-02-10 13:36	348.773728	2021-02-10 15:44	289.119979
118			2021-02-10 13:37	344.631284	2021-02-10 15:45	288.933732
119			2021-02-10 13:38	340.967996	2021-02-10 15:46	288.58285
120			2021-02-10 13:39	337.896169	2021-02-10 15:47	287.985328
121			2021-02-10 13:40	335.336829	2021-02-10 15:48	287.235102
122			2021-02-10 13:41	332.510797	2021-02-10 15:49	285.874811
123			2021-02-10 13:42	330.219093	2021-02-10 15:50	284.503893
124			2021-02-10 13:43	327.66417	2021-02-10 15:51	282.432929
125			2021-02-10 13:44	325.451146	2021-02-10 15:52	280.252652
126			2021-02-10 13:45	323.736367	2021-02-10 15:53	277.259165
127			2021-02-10 13:46	321.721466	2021-02-10 15:54	274.346695
128			2021-02-10 13:47	315.181865	2021-02-10 15:55	272.193417
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130					2021-02-10 15:57	265.950561
131					2021-02-10 15:58	262.942538
132					2021-02-10 15:59	260.115195
133					2021-02-10 16:00	257.757966
134					2021-02-10 16:01	255.41408
135					2021-02-10 16:02	253.110472
136					2021-02-10 16:03	251.218316
137					2021-02-10 16:04	249.084059
138					2021-02-10 16:05	247.463838
139					2021-02-10 16:06	245.81903
140					2021-02-10 16:07	244.479899
141					2021-02-10 16:08	242.770467
142					2021-02-10 16:09	241.167839
143					2021-02-10 16:10	239.631377
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145					2021-02-10 16:12	237.058635
146					2021-02-10 16:13	235.990538
147					2021-02-10 16:14	234.724278
148					2021-02-10 16:15	233.580041
149					2021-02-10 16:16	232.83401
150					2021-02-10 16:17	231.598793
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153					2021-02-10 16:20	229.340257
154					2021-02-10 16:21	228.661381
155					2021-02-10 16:22	227.955336
156					2021-02-10 16:23	227.691922
157					2021-02-10 16:24	226.948962
158					2021-02-10 16:25	226.239038
159					2021-02-10 16:26	225.891514
160					2021-02-10 16:27	225.393136
161					2021-02-10 16:28	224.990769
162					2021-02-10 16:29	224.936944
163					2021-02-10 16:30	224.445849

164					2021-02-10 16:31	224.174072
165					2021-02-10 16:32	223.816101
166					2021-02-10 16:33	223.635161
167					2021-02-10 16:34	223.671717
168					2021-02-10 16:35	223.58804
169					2021-02-10 16:36	223.8742
170					2021-02-10 16:37	223.891944
171					2021-02-10 16:38	224.012853
172					2021-02-10 16:39	224.063272
173					2021-02-10 16:40	224.227078
174					2021-02-10 16:41	229.961622
175					2021-02-10 16:42	235.55031
176					2021-02-10 16:43	240.472496
177					2021-02-10 16:44	244.78502
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180					2021-02-10 16:47	254.163254
181					2021-02-10 16:48	255.196464
182					2021-02-10 16:49	254.678162
183					2021-02-10 16:50	251.090812
184					2021-02-10 16:51	247.486543
185					2021-02-10 16:52	244.705317
186					2021-02-10 16:53	242.21451
187					2021-02-10 16:54	239.900096
188					2021-02-10 16:55	238.064836
189					2021-02-10 16:56	236.241986
190					2021-02-10 16:57	234.869886
191					2021-02-10 16:58	233.499386
192					2021-02-10 16:59	231.872014
193					2021-02-10 17:00	230.821641
194					2021-02-10 17:01	229.698961
195					2021-02-10 17:02	228.863415
196					2021-02-10 17:03	227.927091
197					2021-02-10 17:04	227.202464
198					2021-02-10 17:05	226.369033
199					2021-02-10 17:06	225.515738
200					2021-02-10 17:07	224.596799
201					2021-02-10 17:08	224.112415
202					2021-02-10 17:09	223.533661
203					2021-02-10 17:10	222.500955
204					2021-02-10 17:11	221.94511
205					2021-02-10 17:12	221.306924
206					2021-02-10 17:13	220.945601
207					2021-02-10 17:14	220.391483
208					2021-02-10 17:15	219.809575
209					2021-02-10 17:16	219.457704
210					2021-02-10 17:17	218.793428
211					2021-02-10 17:18	218.470819
212					2021-02-10 17:19	218.382875
213					2021-02-10 17:20	217.808858
214					2021-02-10 17:21	217.255009
215					2021-02-10 17:22	217.026235
216					2021-02-10 17:23	216.874323
217					2021-02-10 17:24	216.652148
218					2021-02-10 17:25	215.916979
219					2021-02-10 17:26	215.397584
220					2021-02-10 17:27	215.044078
221					2021-02-10 17:28	214.60412

222					2021-02-10 17:29	214.428764
223					2021-02-10 17:30	213.963883
224					2021-02-10 17:31	213.706251
225					2021-02-10 17:32	213.207374
226					2021-02-10 17:33	212.554007
227					2021-02-10 17:34	212.021937
228					2021-02-10 17:35	211.496425
229					2021-02-10 17:36	211.24732
230					2021-02-10 17:37	210.740429
231					2021-02-10 17:38	210.186372
232					2021-02-10 17:39	209.917443
233					2021-02-10 17:40	209.621212
234					2021-02-10 17:41	209.413139
235					2021-02-10 17:42	209.023903
236					2021-02-10 17:43	208.851963
237					2021-02-10 17:44	208.338289
238					2021-02-10 17:45	207.836829
239					2021-02-10 17:46	207.533666
240					2021-02-10 17:47	207.213772
241					2021-02-10 17:48	206.982067
242					2021-02-10 17:49	206.681197
243					2021-02-10 17:50	206.218629
244					2021-02-10 17:51	205.874935
245					2021-02-10 17:52	205.506227
246					2021-02-10 17:53	204.915151
247					2021-02-10 17:54	204.656491
248					2021-02-10 17:55	204.107967
249					2021-02-10 17:56	203.940944
250					2021-02-10 17:57	203.419843
251					2021-02-10 17:58	202.900168
252					2021-02-10 17:59	202.521783
253					2021-02-10 18:00	202.119265
254					2021-02-10 18:01	201.76761
255					2021-02-10 18:02	201.27259
256					2021-02-10 18:03	200.924538
257					2021-02-10 18:04	200.701083
258					2021-02-10 18:05	200.367957
259					2021-02-10 18:06	199.994582
260					2021-02-10 18:07	199.33502
261					2021-02-10 18:08	198.932122
262					2021-02-10 18:09	198.605383
263					2021-02-10 18:10	198.016822
264					2021-02-10 18:11	197.72921
265					2021-02-10 18:12	197.545222
266					2021-02-10 18:13	197.180018
267					2021-02-10 18:14	196.513157
268					2021-02-10 18:15	196.145856
269					2021-02-10 18:16	195.879353
270					2021-02-10 18:17	195.303603
271					2021-02-10 18:18	195.185681
272					2021-02-10 18:19	194.341128
273					2021-02-10 18:20	194.037595
274					2021-02-10 18:21	193.693831
275					2021-02-10 18:22	193.390813
276					2021-02-10 18:23	193.067679
277					2021-02-10 18:24	192.691026
278					2021-02-10 18:25	191.981326
279					2021-02-10 18:26	191.338451

280					2021-02-10 18:27	190.979108
281					2021-02-10 18:28	190.513102
282					2021-02-10 18:29	189.932642
283					2021-02-10 18:30	189.643028
284					2021-02-10 18:31	189.215624
285					2021-02-10 18:32	188.675169
286					2021-02-10 18:33	188.175044
287					2021-02-10 18:34	187.84164
288					2021-02-10 18:35	187.173338
289					2021-02-10 18:36	186.835825
290					2021-02-10 18:37	186.363582
291					2021-02-10 18:38	185.842576
292					2021-02-10 18:39	185.385567
293					2021-02-10 18:40	185.230712
294					2021-02-10 18:41	184.690605
295					2021-02-10 18:42	184.270774
296					2021-02-10 18:43	183.719492
297					2021-02-10 18:44	183.172452
298					2021-02-10 18:45	182.576348
299					2021-02-10 18:46	182.118437
300					2021-02-10 18:47	181.812069
301					2021-02-10 18:48	181.417066
302					2021-02-10 18:49	181.087243
303					2021-02-10 18:50	180.553105
304					2021-02-10 18:51	180.117776
305					2021-02-10 18:52	179.62764
306					2021-02-10 18:53	179.372902
307					2021-02-10 18:54	178.925686
308					2021-02-10 18:55	178.54505
309					2021-02-10 18:56	178.311591
310					2021-02-10 18:57	177.877386
311					2021-02-10 18:58	177.553535
312					2021-02-10 18:59	177.152913
313					2021-02-10 19:00	176.712691
314					2021-02-10 19:01	176.220692
315					2021-02-10 19:02	175.825671
316					2021-02-10 19:03	175.508993
317					2021-02-10 19:04	174.980783
318					2021-02-10 19:05	174.623058
319					2021-02-10 19:06	174.256759
320					2021-02-10 19:07	173.725816
321					2021-02-10 19:08	173.107425
322					2021-02-10 19:09	172.625293
323					2021-02-10 19:10	172.101736
324					2021-02-10 19:11	171.625587
325					2021-02-10 19:12	171.109778
326					2021-02-10 19:13	170.451903
327					2021-02-10 19:14	169.944269
328					2021-02-10 19:15	169.339979
329					2021-02-10 19:16	168.878568
330					2021-02-10 19:17	168.569273
331					2021-02-10 19:18	167.90712
332					2021-02-10 19:19	167.53525
333					2021-02-10 19:20	167.117691
334					2021-02-10 19:21	166.612981
335					2021-02-10 19:22	166.062263
336					2021-02-10 19:23	165.510509
337					2021-02-10 19:24	165.171689

338					2021-02-10 19:25	164.693489
339					2021-02-10 19:26	164.269729
340					2021-02-10 19:27	163.66555
341					2021-02-10 19:28	163.118827
342					2021-02-10 19:29	162.747575
343					2021-02-10 19:30	162.30014
344					2021-02-10 19:31	161.484136
345					2021-02-10 19:32	160.903149
346					2021-02-10 19:33	160.462278
347					2021-02-10 19:34	159.976636
348					2021-02-10 19:35	159.449364
349					2021-02-10 19:36	158.936626
350					2021-02-10 19:37	158.400075
351					2021-02-10 19:38	158.040411
352					2021-02-10 19:39	157.459242
353					2021-02-10 19:40	156.825967
354					2021-02-10 19:41	156.294501
355					2021-02-10 19:42	155.811397

2.1 Series Pre-burn Data 2021-02-17 Total time (h) 7.22

Load time	Load type	Fuel added	Moisture		Time
(-)	(-)	(lbs)	(%)		(min)
2021-02-17 11:17	Kindling & SUF	5.34	14.9	**Pre-Charge (min)**	148
2021-02-17 11:46	High fire	10.79	22.4	**Conditioning (min)**	7
2021-02-17 13:51	Medium fire	12.96	19.3	**Load (min)**	278

	Pre-Charge (min)	148	Conditioning (min)	7	Load (min)	278
Minutes	Date & Time	Flue (F)	Date & Time	Flue (F)	Date & Time	Flue (F)
1	2021-02-17 11:17	132.8969234	2021-02-17 13:45	306.85765	2021-02-17 13:51	294.53264
2	2021-02-17 11:18	252.1743976	2021-02-17 13:46	305.483143	2021-02-17 13:52	264.599132
3	2021-02-17 11:19	301.7701936	2021-02-17 13:47	302.157154	2021-02-17 13:53	263.385178
4	2021-02-17 11:20	342.1329512	2021-02-17 13:48	298.657401	2021-02-17 13:54	257.897284
5	2021-02-17 11:21	396.5555505	2021-02-17 13:49	295.347554	2021-02-17 13:55	273.545515
6	2021-02-17 11:22	435.9250978	2021-02-17 13:50	305.156552	2021-02-17 13:56	298.107982
7	2021-02-17 11:23	455.1351091	2021-02-17 13:51	297.703531	2021-02-17 13:57	314.674087
8	2021-02-17 11:24	462.456557			2021-02-17 13:58	342.832124
9	2021-02-17 11:25	482.7707622			2021-02-17 13:59	381.07559
10	2021-02-17 11:26	488.9018896			2021-02-17 14:00	416.071376
11	2021-02-17 11:27	496.4341745			2021-02-17 14:01	447.115839
12	2021-02-17 11:28	499.3144951			2021-02-17 14:02	468.864632
13	2021-02-17 11:29	502.5145455			2021-02-17 14:03	477.601938
14	2021-02-17 11:30	505.7940838			2021-02-17 14:04	463.929931
15	2021-02-17 11:31	506.2668453			2021-02-17 14:05	458.725821
16	2021-02-17 11:32	491.4083559			2021-02-17 14:06	458.266841
17	2021-02-17 11:33	479.3386117			2021-02-17 14:07	459.640113
18	2021-02-17 11:34	476.9423166			2021-02-17 14:08	458.233589
19	2021-02-17 11:35	475.6717057			2021-02-17 14:09	416.395488
20	2021-02-17 11:36	472.8391784			2021-02-17 14:10	395.565804
21	2021-02-17 11:37	468.5549931			2021-02-17 14:11	381.495722
22	2021-02-17 11:38	462.8029931			2021-02-17 14:12	368.674341
23	2021-02-17 11:39	457.209912			2021-02-17 14:13	359.549001
24	2021-02-17 11:40	454.4029205			2021-02-17 14:14	351.170455
25	2021-02-17 11:41	451.8631101			2021-02-17 14:15	344.729493
26	2021-02-17 11:42	451.9727651			2021-02-17 14:16	339.482146
27	2021-02-17 11:43	449.5115099			2021-02-17 14:17	334.722609
28	2021-02-17 11:44	443.0439488			2021-02-17 14:18	331.099248
29	2021-02-17 11:45	438.4984913			2021-02-17 14:19	328.646305
30	2021-02-17 11:46	463.7612602			2021-02-17 14:20	327.208786
31	2021-02-17 11:47	405.6112951			2021-02-17 14:21	327.21374
32	2021-02-17 11:48	395.1641154			2021-02-17 14:22	330.908434
33	2021-02-17 11:49	399.4148995			2021-02-17 14:23	332.845371
34	2021-02-17 11:50	407.248805			2021-02-17 14:24	335.835788
35	2021-02-17 11:51	428.4921244			2021-02-17 14:25	339.122891
36	2021-02-17 11:52	467.1198435			2021-02-17 14:26	340.746138
37	2021-02-17 11:53	493.8376624			2021-02-17 14:27	341.82102
38	2021-02-17 11:54	508.6974447			2021-02-17 14:28	343.37022
39	2021-02-17 11:55	519.2297206			2021-02-17 14:29	344.291917
40	2021-02-17 11:56	527.9083602			2021-02-17 14:30	345.753346
41	2021-02-17 11:57	535.1538036			2021-02-17 14:31	346.703049
42	2021-02-17 11:58	540.1640883			2021-02-17 14:32	348.493481
43	2021-02-17 11:59	540.5075343			2021-02-17 14:33	348.877557
44	2021-02-17 12:00	540.518906			2021-02-17 14:34	351.361296
45	2021-02-17 12:01	540.0154704			2021-02-17 14:35	351.818287
46	2021-02-17 12:02	539.3012669			2021-02-17 14:36	353.372571
47	2021-02-17 12:03	539.7806344			2021-02-17 14:37	354.00123

48	2021-02-17 12:04	541.6254107			2021-02-17 14:38	353.314405
49	2021-02-17 12:05	540.4333435			2021-02-17 14:39	352.033564
50	2021-02-17 12:06	538.4309258			2021-02-17 14:40	351.303785
51	44244.50538	536.8552294			2021-02-17 14:41	350.420974
52	44244.50608	535.5203024			2021-02-17 14:42	349.741796
53	44244.50677	535.1391836			2021-02-17 14:43	348.980635
54	44244.50747	532.3125365			2021-02-17 14:44	348.99658
55	44244.50816	529.7674812			2021-02-17 14:45	348.965758
56	44244.50885	527.6684521			2021-02-17 14:46	350.564221
57	44244.50955	525.6424864			2021-02-17 14:47	351.345694
58	44244.51024	524.3684599			2021-02-17 14:48	351.785554
59	44244.51094	523.1855445			2021-02-17 14:49	350.906063
60	44244.51163	522.8768743			2021-02-17 14:50	349.476133
61	44244.51233	521.6852886			2021-02-17 14:51	349.722319
62	44244.51302	520.7856497			2021-02-17 14:52	350.047618
63	44244.51372	520.8213606			2021-02-17 14:53	350.603585
64	44244.51441	522.0662893			2021-02-17 14:54	350.321433
65	44244.5151	520.1230342			2021-02-17 14:55	349.574648
66	44244.5158	519.8394909			2021-02-17 14:56	347.953974
67	44244.51649	517.2322408			2021-02-17 14:57	346.761238
68	44244.51719	517.5100002			2021-02-17 14:58	344.959956
69	44244.51788	515.7767191			2021-02-17 14:59	343.699046
70	44244.51858	515.0299724			2021-02-17 15:00	342.371312
71	44244.51927	512.7789033			2021-02-17 15:01	340.605933
72	44244.51997	513.3828469			2021-02-17 15:02	337.996084
73	44244.52066	516.4870179			2021-02-17 15:03	336.077721
74	44244.52135	513.1563207			2021-02-17 15:04	334.229057
75	44244.52205	507.9484538			2021-02-17 15:05	332.202196
76	44244.52274	501.5611374			2021-02-17 15:06	331.08932
77	44244.52344	497.2908558			2021-02-17 15:07	330.204202
78	44244.52413	491.3813584			2021-02-17 15:08	329.753534
79	44244.52483	483.6139451			2021-02-17 15:09	328.405157
80	44244.52552	478.6407087			2021-02-17 15:10	326.000238
81	44244.52622	475.063307			2021-02-17 15:11	325.017596
82	44244.52691	469.3966306			2021-02-17 15:12	323.381086
83	44244.5276	464.1447651			2021-02-17 15:13	320.781891
84	44244.5283	460.1733775			2021-02-17 15:14	317.707286
85	44244.52899	455.2368337			2021-02-17 15:15	314.44686
86	44244.52969	451.3581524			2021-02-17 15:16	309.377744
87	44244.53038	446.9194128			2021-02-17 15:17	304.10867
88	44244.53108	442.7543457			2021-02-17 15:18	300.053729
89	44244.53177	436.7562716			2021-02-17 15:19	296.495064
90	44244.53247	432.1447345			2021-02-17 15:20	292.91832
91	44244.53316	427.871441			2021-02-17 15:21	290.211402
92	44244.53385	423.9295278			2021-02-17 15:22	286.358848
93	44244.53455	420.1375167			2021-02-17 15:23	283.745185
94	44244.53524	416.6144213			2021-02-17 15:24	280.153721
95	44244.53594	412.5415926			2021-02-17 15:25	277.923656
96	44244.53663	409.5494015			2021-02-17 15:26	275.185528
97	44244.53733	406.6603322			2021-02-17 15:27	273.001152
98	44244.53802	404.2935649			2021-02-17 15:28	271.968922
99	44244.53872	401.6722125			2021-02-17 15:29	269.900552
100	44244.53941	399.4657965			2021-02-17 15:30	268.55907
101	44244.5401	396.9144848			2021-02-17 15:31	266.466982
102	44244.5408	395.6061659			2021-02-17 15:32	264.716863
103	44244.54149	393.0523997			2021-02-17 15:33	262.655042
104	44244.54219	390.9730085			2021-02-17 15:34	261.148769
105	44244.54288	388.2224727			2021-02-17 15:35	259.996669

106	44244.54358	386.351385			2021-02-17 15:36	258.87347
107	44244.54427	384.1202324			2021-02-17 15:37	257.113152
108	44244.54497	382.996793			2021-02-17 15:38	255.945385
109	44244.54566	381.5520358			2021-02-17 15:39	254.932366
110	44244.54635	379.2487738			2021-02-17 15:40	253.344247
111	44244.54705	376.7988517			2021-02-17 15:41	251.65131
112	44244.54774	375.9556415			2021-02-17 15:42	249.955895
113	44244.54844	375.4949439			2021-02-17 15:43	248.774125
114	44244.54913	372.4019808			2021-02-17 15:44	246.800986
115	44244.54983	370.0489855			2021-02-17 15:45	245.268623
116	44244.55052	366.2925431			2021-02-17 15:46	243.556339
117	44244.55122	362.2973737			2021-02-17 15:47	241.665299
118	44244.55191	359.7296709			2021-02-17 15:48	240.692788
119	44244.5526	356.5236571			2021-02-17 15:49	238.521319
120	44244.5533	354.7677956			2021-02-17 15:50	237.285246
121	44244.55399	352.5950024			2021-02-17 15:51	236.377922
122	44244.55469	351.2792898			2021-02-17 15:52	234.955397
123	44244.55538	350.0822169			2021-02-17 15:53	233.892987
124	44244.55608	349.4350875			2021-02-17 15:54	232.864738
125	44244.55677	347.439765			2021-02-17 15:55	232.049503
126	44244.55747	346.851782			2021-02-17 15:56	231.241741
127	44244.55816	344.9816625			2021-02-17 15:57	230.695664
128	44244.55885	343.3845638			2021-02-17 15:58	230.304389
129	44244.55955	341.8514022			2021-02-17 15:59	230.673797
130	44244.56024	339.0569339			2021-02-17 16:00	231.299744
131	44244.56094	337.8944771			2021-02-17 16:01	231.352216
132	44244.56163	336.0783041			2021-02-17 16:02	231.413434
133	44244.56233	334.3686407			2021-02-17 16:03	229.669543
134	44244.56302	333.5970397			2021-02-17 16:04	227.532418
135	44244.56372	332.789554			2021-02-17 16:05	225.115865
136	44244.56441	331.5139229			2021-02-17 16:06	221.288451
137	44244.5651	331.574663			2021-02-17 16:07	217.132578
138	44244.5658	330.8737837			2021-02-17 16:08	213.897804
139	44244.56649	330.9961595			2021-02-17 16:09	211.139281
140	44244.56719	329.9103846			2021-02-17 16:10	208.370769
141	44244.56788	328.8906894			2021-02-17 16:11	206.191952
142	44244.56858	327.4802133			2021-02-17 16:12	204.060118
143	44244.56927	324.8006854			2021-02-17 16:13	202.158938
144	44244.56997	321.5332998			2021-02-17 16:14	200.767845
145	44244.57066	317.052474			2021-02-17 16:15	199.542078
146	44244.57135	313.5009139			2021-02-17 16:16	197.975004
147	44244.57205	310.1405152			2021-02-17 16:17	196.760073
148	44244.57274	307.7612797			2021-02-17 16:18	195.736766
149					2021-02-17 16:19	194.383572
150					2021-02-17 16:20	193.33549
151					2021-02-17 16:21	192.809014
152					2021-02-17 16:22	191.771295
153					2021-02-17 16:23	190.832231
154					2021-02-17 16:24	190.100894
155					2021-02-17 16:25	189.342636
156					2021-02-17 16:26	188.790332
157					2021-02-17 16:27	187.864873
158					2021-02-17 16:28	187.448794
159					2021-02-17 16:29	186.615632
160					2021-02-17 16:30	185.949477
161					2021-02-17 16:31	185.465147
162					2021-02-17 16:32	185.020798
163					2021-02-17 16:33	184.504196

164					2021-02-17 16:34	184.159782
165					2021-02-17 16:35	183.435366
166					2021-02-17 16:36	182.96773
167					2021-02-17 16:37	182.438346
168					2021-02-17 16:38	182.253173
169					2021-02-17 16:39	181.828873
170					2021-02-17 16:40	181.402987
171					2021-02-17 16:41	181.119869
172					2021-02-17 16:42	180.654477
173					2021-02-17 16:43	180.231473
174					2021-02-17 16:44	180.074142
175					2021-02-17 16:45	179.739083
176					2021-02-17 16:46	179.594025
177					2021-02-17 16:47	179.264588
178					2021-02-17 16:48	179.033292
179					2021-02-17 16:49	178.549347
180					2021-02-17 16:50	178.16124
181					2021-02-17 16:51	178.06321
182					2021-02-17 16:52	177.82951
183					2021-02-17 16:53	177.237154
184					2021-02-17 16:54	176.999824
185					2021-02-17 16:55	176.790631
186					2021-02-17 16:56	176.680981
187					2021-02-17 16:57	176.49828
188					2021-02-17 16:58	176.223475
189					2021-02-17 16:59	176.243618
190					2021-02-17 17:00	176.027312
191					2021-02-17 17:01	175.748269
192					2021-02-17 17:02	175.631629
193					2021-02-17 17:03	175.553211
194					2021-02-17 17:04	175.599585
195					2021-02-17 17:05	175.352031
196					2021-02-17 17:06	174.967222
197					2021-02-17 17:07	175.099427
198					2021-02-17 17:08	175.139038
199					2021-02-17 17:09	174.909705
200					2021-02-17 17:10	175.299431
201					2021-02-17 17:11	175.018895
202					2021-02-17 17:12	175.270933
203					2021-02-17 17:13	174.977363
204					2021-02-17 17:14	174.928233
205					2021-02-17 17:15	175.016569
206					2021-02-17 17:16	174.837265
207					2021-02-17 17:17	174.746262
208					2021-02-17 17:18	174.788529
209					2021-02-17 17:19	175.120166
210					2021-02-17 17:20	175.000008
211					2021-02-17 17:21	175.329824
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214					2021-02-17 17:24	174.990595
215					2021-02-17 17:25	174.97725
216					2021-02-17 17:26	174.812404
217					2021-02-17 17:27	174.925424
218					2021-02-17 17:28	174.741298
219					2021-02-17 17:29	175.183641
220					2021-02-17 17:30	174.575803
221					2021-02-17 17:31	174.675159

222					2021-02-17 17:32	174.644302
223					2021-02-17 17:33	174.770303
224					2021-02-17 17:34	174.440584
225					2021-02-17 17:35	174.323638
226					2021-02-17 17:36	174.175785
227					2021-02-17 17:37	174.089441
228					2021-02-17 17:38	174.236175
229					2021-02-17 17:39	173.798575
230					2021-02-17 17:40	173.948997
231					2021-02-17 17:41	173.795878
232					2021-02-17 17:42	174.037262
233					2021-02-17 17:43	173.624703
234					2021-02-17 17:44	173.135036
235					2021-02-17 17:45	172.989069
236					2021-02-17 17:46	173.032872
237					2021-02-17 17:47	172.915986
238					2021-02-17 17:48	172.951965
239					2021-02-17 17:49	172.749371
240					2021-02-17 17:50	172.43546
241					2021-02-17 17:51	172.430564
242					2021-02-17 17:52	172.115249
243					2021-02-17 17:53	172.224745
244					2021-02-17 17:54	172.227606
245					2021-02-17 17:55	172.105811
246					2021-02-17 17:56	172.053939
247					2021-02-17 17:57	171.766896
248					2021-02-17 17:58	171.838898
249					2021-02-17 17:59	171.79258
250					2021-02-17 18:00	171.389733
251					2021-02-17 18:01	171.325088
252					2021-02-17 18:02	171.119196
253					2021-02-17 18:03	170.865686
254					2021-02-17 18:04	170.76382
255					2021-02-17 18:05	170.643605
256					2021-02-17 18:06	170.427336
257					2021-02-17 18:07	170.34793
258					2021-02-17 18:08	170.516875
259					2021-02-17 18:09	170.593033
260					2021-02-17 18:10	170.771649
261					2021-02-17 18:11	170.534354
262					2021-02-17 18:12	170.136002
263					2021-02-17 18:13	170.387375
264					2021-02-17 18:14	170.03571
265					2021-02-17 18:15	169.823219
266					2021-02-17 18:16	169.661995
267					2021-02-17 18:17	169.592592
268					2021-02-17 18:18	169.451906
269					2021-02-17 18:19	169.377865
270					2021-02-17 18:20	169.085814
271					2021-02-17 18:21	169.050749
272					2021-02-17 18:22	168.78728
273					2021-02-17 18:23	168.445379
274					2021-02-17 18:24	168.390714
275					2021-02-17 18:25	167.940452
276					2021-02-17 18:26	167.589862
277					2021-02-17 18:27	167.438253
278					2021-02-17 18:28	167.430752

VERSION: 2.4 2010-04-15

Manufacturer: SBI
Model: 2.1 series
Date: 2021-02-22
Run: 1
Control #: G104576994
Test Duration: 330
Output Category: Med

Appliance Type: Non-Cat (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Fuel Data

	Beech	
HHV	18,800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Default Fuel Values

	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Wood Moisture (% wet): 16.70
Load Weight (lb wet): 12.61
Burn Rate (dry kg/h): 0.87
Total Particulate Emissions: 7.217 g

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

	Averages	0.27	5.07	16.18	245.25	78.52
					Temp. (°F)	
Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Flue Gas	Room Temp
0	12.61	0.12	1.46	19.42	281.4	74.3
1	12.57	0.13	1.51	19.41	260.3	76.1
2	12.53	0.18	3.23	19.00	260.6	77.2
3	12.46	0.46	5.78	18.71	259.9	77.7
4	12.35	0.39	6.48	17.53	265.2	76.0
5	12.28	0.26	7.80	16.41	271.4	76.5
6	12.18	0.28	7.31	15.91	268.6	77.2
7	12.06	0.31	7.19	15.52	272.8	77.6
8	11.93	0.24	10.00	13.73	292.3	76.7
9	11.80	0.21	12.78	11.16	318.4	76.1
10	11.69	0.21	12.36	10.26	337.6	75.9
11	11.58	0.18	11.90	9.95	347.0	77.1
12	11.45	0.19	11.84	9.70	359.8	77.9
13	11.25	0.18	11.65	9.68	408.4	78.2
14	11.08	0.15	11.43	9.73	430.3	78.6
15	10.93	0.13	11.46	9.67	424.7	78.8
16	10.77	0.12	11.52	9.59	420.0	79.0
17	10.62	0.11	11.59	9.50	413.8	78.2
18	10.46	0.10	11.79	9.37	411.6	75.8
19	10.34	0.11	11.69	9.34	410.8	73.2
20	10.23	0.11	11.75	9.29	411.3	72.9
21	10.10	0.12	11.78	9.17	411.1	73.8
22	9.97	0.11	11.84	9.06	412.3	73.1
23	9.83	0.10	11.98	8.91	413.5	73.4
24	9.66	0.10	12.28	8.72	415.5	72.8
25	9.54	0.09	12.43	8.58	418.3	70.7
26	9.37	0.10	12.47	8.47	419.3	70.0
27	9.22	0.10	12.47	8.44	419.7	68.7
28	9.06	0.10	12.57	8.34	421.7	68.1
29	8.92	0.10	12.66	8.29	422.9	67.9
30	8.76	0.11	12.82	8.18	424.3	67.7
31	8.60	0.11	12.93	8.04	425.2	67.4
32	8.47	0.11	12.93	7.97	426.9	67.4
33	8.29	0.11	13.02	7.89	427.8	67.2
34	8.16	0.12	13.11	7.83	429.5	67.4
35	8.00	0.12	13.08	7.78	430.4	66.9
36	7.85	0.12	13.15	7.76	432.4	67.6
37	7.70	0.12	13.19	7.71	432.9	67.7
38	7.55	0.12	13.23	7.64	433.6	67.9
39	7.39	0.13	13.32	7.55	435.6	67.9
40	7.25	0.13	13.58	7.42	435.4	68.2
41	7.08	0.14	13.50	7.42	435.3	68.3
42	6.96	0.14	13.79	7.24	436.0	67.9
43	6.80	0.15	13.97	7.05	437.0	68.3
44	6.64	0.15	14.01	7.00	437.4	67.6
45	6.51	0.14	14.07	6.99	437.8	67.9
46	6.37	0.13	14.05	6.93	438.9	68.4
47	6.23	0.13	14.02	6.96	439.8	67.9
48	6.08	0.12	14.09	6.94	441.8	67.6
49	5.95	0.1345	14.3	6.79	442.519	68.5357
50	5.77	0.146	13.85	6.94	442.181	68.7395
51	5.65	0.1013	13.32	7.43	442.129	68.6837
52	5.50	0.0843	13.05	7.68	441.172	68.3909
53	5.35	0.0807	13.01	7.81	441.494	67.8395
54	5.21	0.0778	12.74	7.96	443.14	67.263

55	5.09	0.0686	12.2	8.38	439.357	67.9561
56	4.95	0.0601	11.75	8.81	435.777	67.6884
57	4.84	0.0606	11.51	9.13	432.796	67.8055
58	4.74	0.0448	10.93	9.58	431.244	68.0432
59	4.61	0.0279	10.38	10.08	427.133	68.475
60	4.50	0.0219	10.06	10.43	423.004	67.7802
61	4.40	0.0222	9.99	10.59	418.438	69.0451
62	4.29	0.023	9.85	10.8	412.963	68.5932
63	4.22	0.0263	9.59	11.07	407.945	67.6864
64	4.12	0.03	9.45	11.25	401.765	68.246
65	4.04	0.0338	9.48	11.31	397.986	68.0029
66	3.93	0.0375	9.49	11.36	394.351	67.4871
67	3.85	0.0389	9.39	11.44	389.545	67.4029
68	3.76	0.0378	9.35	11.54	385.72	68.758
69	3.70	0.0403	9.32	11.53	381.706	69.5912
70	3.60	0.0346	9.33	11.52	377.113	70.7514
71	3.54	0.0334	9.3	11.56	373.855	72.571
72	3.47	0.0334	9.21	11.6	370.382	74.15
73	3.38	0.0348	8.95	11.78	367.827	75.3481
74	3.32	0.0431	8.72	12.01	365.839	76.1949
75	3.24	0.0511	8.34	12.3	364.611	76.803
76	3.16	0.0574	8.03	12.63	363.214	77.5037
77	3.09	0.0657	7.78	12.89	361.572	78.1588
78	3.02	0.0716	7.54	13.11	358.84	78.5912
79	2.95	0.078	7.34	13.28	356.204	79.242
80	2.88	0.0796	7.2	13.49	352.446	79.7552
81	2.82	0.0804	7.05	13.57	349.479	80.0555
82	2.77	0.0865	6.85	13.71	346.147	80.4031
83	2.71	0.0889	6.7	13.83	342.183	80.8059
84	2.67	0.0987	6.63	13.91	338.342	81.1296
85	2.62	0.1019	6.57	13.93	335.261	81.585
86	2.56	0.1051	6.59	13.93	332.149	81.8556
87	2.52	0.1055	6.43	13.99	327.977	82.2495
88	2.47	0.1055	6.38	14.02	324.304	82.6216
89	2.43	0.1071	6.32	14.05	321.229	82.7695
90	2.38	0.109	6.23	14.09	318.83	82.6913
91	2.35	0.1039	6.19	14.11	315.609	82.866
92	2.31	0.1031	6.14	14.15	312.651	83.126
93	2.27	0.105	6.04	14.19	310.016	83.2873
94	2.22	0.1079	5.89	14.26	307.534	83.4885
95	2.20	0.1085	5.83	14.27	304.839	83.5757
96	2.15	0.107	5.78	14.27	303.056	83.5804
97	2.11	0.1078	5.71	14.3	301.582	83.5187
98	2.08	0.1262	5.5	14.38	299.507	83.6027
99	2.05	0.1754	5.34	14.44	297.18	83.8259
100	2.02	0.2145	5.17	14.54	294.889	83.808
101	1.98	0.2212	5.08	14.59	293.3	84.0491
102	1.96	0.2455	4.6	14.89	290.676	83.8851
103	1.94	0.3086	4.23	15.15	288.006	84.3059
104	1.90	0.4117	3.98	15.35	285.768	83.9933
105	1.88	0.4615	3.87	15.4	282.974	84.0708
106	1.87	0.4264	3.79	15.5	280.938	84.1893
107	1.86	0.4772	3.59	15.63	277.465	84.0168
108	1.83	0.4845	3.56	15.68	273.117	82.7546
109	1.84	0.467	3.52	15.68	268.521	82.512
110	1.83	0.4643	3.51	15.7	263.696	82.985
111	1.82	0.4491	3.56	15.69	258.794	83.3362
112	1.81	0.4476	3.53	15.69	254.665	83.6409
113	1.81	0.44	3.56	15.67	250.672	83.7327
114	1.79	0.4412	3.54	15.68	247.51	83.7421
115	1.78	0.4374	3.52	15.7	244.493	83.5508
116	1.77	0.4414	3.53	15.69	241.64	83.6728
117	1.77	0.4395	3.51	15.7	239.191	83.3799
118	1.76	0.4423	3.51	15.7	236.679	83.6011
119	1.75	0.4427	3.49	15.7	234.254	83.6175
120	1.74	0.4438	3.45	15.72	232.156	83.7162
121	1.73	0.4471	3.48	15.74	230.065	83.5085
122	1.72	0.4521	3.45	15.77	228.049	83.552
123	1.72	0.4577	3.44	15.79	226.755	83.2204
124	1.71	0.4587	3.44	15.8	224.881	83.5227
125	1.70	0.4562	3.44	15.83	223.082	83.3816
126	1.68	0.4533	3.41	15.8	222.04	83.3861
127	1.68	0.447	3.43	15.83	220.485	82.9225
128	1.68	0.4558	3.45	15.84	219.057	82.9055
129	1.66	0.4566	3.47	15.83	217.633	83.3412

130	1.66	0.4549	3.52	15.82	216.551	83.2411
131	1.65	0.4517	3.49	15.83	215.465	82.9143
132	1.63	0.4483	3.55	15.82	214.128	83.0502
133	1.62	0.4538	3.56	15.83	213.315	83.0367
134	1.62	0.4418	3.58	15.85	212.376	82.99
135	1.61	0.4398	3.56	15.88	211.259	82.8074
136	1.60	0.4371	3.59	15.87	210.54	82.419
137	1.58	0.4327	3.61	15.88	210.101	82.4582
138	1.58	0.4391	3.62	15.9	209.146	82.7695
139	1.58	0.4529	3.6	15.9	208.201	82.502
140	1.56	0.4442	3.65	15.91	207.885	82.5503
141	1.55	0.4402	3.65	15.94	207.536	82.923
142	1.54	0.435	3.63	16	206.819	82.6679
143	1.53	0.4315	3.6	16.02	206.346	81.539
144	1.53	0.4378	3.67	16.03	205.922	82.1792
145	1.50	0.4388	3.64	16.1	205.6	81.8052
146	1.49	0.4417	3.66	16.09	205.14	82.0301
147	1.49	0.4385	3.6	16.15	204.709	81.8736
148	1.49	0.4267	3.56	16.22	204.6	81.2496
149	1.48	0.4213	3.6	16.27	204.151	81.8026
150	1.46	0.4223	3.61	16.33	203.682	81.9739
151	1.46	0.4221	3.67	16.38	203.184	82.0185
152	1.43	0.4147	3.61	16.41	202.487	82.1126
153	1.43	0.4099	3.67	16.42	201.872	82.2813
154	1.42	0.4373	3.72	16.4	201.657	82.3517
155	1.40	0.4305	3.69	16.42	201.055	82.3376
156	1.40	0.4253	3.71	16.45	200.787	82.0826
157	1.38	0.4265	3.72	16.52	200.38	81.7668
158	1.37	0.4237	3.61	16.64	199.791	82.1097
159	1.36	0.4069	3.6	16.7	199.564	82.1142
160	1.36	0.4079	3.64	16.71	199.413	82.0063
161	1.34	0.41	3.7	16.7	198.738	81.8769
162	1.33	0.4115	3.69	16.71	198.439	81.8727
163	1.31	0.4171	3.72	16.74	198.21	82.0722
164	1.30	0.4197	3.71	16.78	197.597	82.1367
165	1.28	0.4226	3.71	16.81	197.139	81.9544
166	1.28	0.4241	3.72	16.85	196.908	82.1194
167	1.27	0.4217	3.71	16.9	196.889	81.9188
168	1.26	0.4196	3.71	16.93	196.635	81.7368
169	1.24	0.419	3.7	16.97	196.249	81.7626
170	1.23	0.4107	3.73	17	196.022	82.0011
171	1.22	0.4073	3.71	17.04	195.878	82.069
172	1.21	0.4052	3.7	17.09	195.828	81.9187
173	1.19	0.4041	3.71	17.12	195.58	81.9713
174	1.18	0.4026	3.67	17.18	195.26	81.7889
175	1.18	0.4005	3.67	17.25	195.437	81.9868
176	1.16	0.397	3.65	17.29	195.283	81.731
177	1.15	0.3822	3.63	17.39	195.503	81.589
178	1.14	0.3793	3.49	17.53	195.311	81.5539
179	1.12	0.371	3.5	17.58	195.117	81.638
180	1.11	0.3717	3.47	17.65	194.943	81.6405
181	1.10	0.3673	3.37	17.73	194.814	81.5351
182	1.10	0.3679	3.39	17.78	194.65	81.4371
183	1.09	0.3663	3.37	17.81	194.08	81.4426
184	1.08	0.3645	3.41	17.84	193.532	81.5497
185	1.07	0.3642	3.35	17.88	193.208	81.4917
186	1.06	0.3631	3.37	17.93	192.661	81.4759
187	1.04	0.3617	3.39	17.96	191.899	81.4314
188	1.03	0.36	3.39	17.96	191.72	81.6006
189	1.02	0.364	3.39	17.98	191.217	81.5018
190	1.01	0.3641	3.36	18.03	190.884	81.5311
191	1.00	0.3659	3.39	18.04	190.308	81.2544
192	0.99	0.3635	3.35	18.1	189.966	80.9392
193	0.98	0.3583	3.35	18.13	189.569	81.2121
194	0.98	0.3589	3.34	18.14	189.511	81.3215
195	0.96	0.3521	3.22	18.24	188.81	81.3362
196	0.94	0.3425	3.18	18.31	188.682	81.2508
197	0.93	0.3401	3.13	18.37	188.258	81.2396
198	0.92	0.3395	3.14	18.41	188.073	81.1904
199	0.92	0.3391	3.14	18.52	187.774	80.8848
200	0.91	0.3373	3.11	18.51	187.246	80.9345
201	0.90	0.338	3.13	18.49	187.004	81.1255
202	0.89	0.3399	3.15	18.49	186.706	81.0809
203	0.88	0.3366	3.12	18.54	186.32	80.9208
204	0.87	0.3339	3.1	18.51	185.602	80.9484

205	0.85	0.3271	3.01	18.65	185.117	81.0088
206	0.84	0.3202	2.94	18.74	184.969	80.883
207	0.85	0.3172	2.94	18.79	184.778	80.8393
208	0.82	0.3149	2.95	18.83	184.258	80.855
209	0.82	0.3135	2.95	18.86	183.72	80.9382
210	0.80	0.3106	2.91	18.88	183.353	80.7561
211	0.80	0.3086	2.94	18.89	183.117	80.5455
212	0.79	0.3091	2.95	18.89	182.494	80.617
213	0.78	0.3095	2.97	18.91	181.984	80.7146
214	0.77	0.3099	2.96	18.91	181.743	80.9343
215	0.77	0.3099	2.9	18.97	181.255	80.8099
216	0.75	0.3077	2.9	19	180.918	80.3626
217	0.74	0.3085	2.92	19.01	180.497	80.526
218	0.74	0.3082	2.95	19	180.411	80.821
219	0.72	0.3091	2.93	19.02	179.68	80.378
220	0.71	0.3109	2.93	19	179.522	80.74
221	0.70	0.3115	2.93	19.04	179.082	80.3952
222	0.69	0.3115	2.95	19.04	178.852	80.5412
223	0.68	0.3186	2.97	19.06	178.512	80.5907
224	0.68	0.3194	2.96	19.05	178.263	80.463
225	0.66	0.317	2.94	19.08	177.951	80.354
226	0.65	0.3188	2.92	19.09	177.758	80.53
227	0.64	0.3209	2.92	19.07	177.58	80.6814
228	0.63	0.3223	2.93	19.09	177.564	80.6358
229	0.63	0.3224	2.92	19.11	177.058	80.2337
230	0.62	0.3197	2.89	19.12	176.704	80.3999
231	0.62	0.3217	2.91	19.15	176.57	80.0024
232	0.60	0.3207	2.92	19.15	176.386	80.2569
233	0.59	0.321	2.91	19.16	176.176	80.2937
234	0.58	0.3214	2.86	19.23	175.895	80.3178
235	0.58	0.3189	2.84	19.25	175.506	80.198
236	0.56	0.3116	2.84	19.26	175.149	79.9885
237	0.56	0.3034	2.8	19.3	175.326	79.9814
238	0.54	0.3042	2.81	19.31	174.933	80.131
239	0.54	0.3056	2.81	19.29	174.77	80.208
243	0.52	0.2648	2.83	19.7	174.091	79.7964
244	0.51	0.2812	2.87	19.42	173.963	78.9647
245	0.50	0.2907	2.85	19.32	173.632	79.316
246	0.48	0.2957	2.86	19.32	173.573	79.3726
247	0.49	0.3035	2.77	19.4	173.133	78.2707
248	0.48	0.308	2.78	19.41	172.891	79.1415
249	0.47	0.3111	2.76	19.43	172.721	79.1881
250	0.45	0.3156	2.78	19.45	172.403	79.3962
251	0.44	0.3182	2.79	19.46	171.921	79.3501
252	0.44	0.3232	2.79	19.49	171.385	79.5936
253	0.43	0.3285	2.81	19.48	171.069	79.1307
254	0.43	0.3265	2.76	19.51	170.887	79.4706
255	0.40	0.3266	2.76	19.54	170.712	79.3939
256	0.40	0.3196	2.59	19.68	170.282	79.3343
257	0.38	0.3083	2.57	19.76	170.275	79.2407
258	0.39	0.3024	2.53	19.81	170.07	79.6421
259	0.38	0.2983	2.37	19.94	169.56	79.5748
260	0.37	0.2983	2.32	20.02	169.324	79.2418
261	0.36	0.2937	2.35	20.05	168.784	79.4021
262	0.35	0.29	2.33	20.08	168.381	79.4889
263	0.34	0.2873	2.33	20.1	167.693	79.4729
264	0.34	0.2876	2.35	20.09	167.025	79.3071
265	0.33	0.2852	2.33	20.12	166.552	79.4585
266	0.33	0.2878	2.32	20.13	165.715	79.3271
267	0.32	0.2871	2.32	20.16	165.198	79.4871
268	0.31	0.2848	2.29	20.16	164.713	79.5653
269	0.30	0.2845	2.31	20.17	163.978	79.4466
270	0.30	0.2846	2.31	20.17	163.504	78.9799
271	0.29	0.2823	2.28	20.18	162.876	79.2537
272	0.29	0.2806	2.25	20.23	162.154	79.265
273	0.28	0.2647	2.19	20.32	161.703	78.6897
274	0.28	0.2601	2.16	20.36	161.365	78.7796
275	0.27	0.2553	2.14	20.37	160.907	78.8355
276	0.26	0.2537	2.16	20.37	160.429	79.0101
277	0.26	0.2484	2.09	20.42	159.739	78.9244
278	0.24	0.2443	2.07	20.46	159.158	78.7352
279	0.25	0.2421	2.07	20.45	158.784	78.8778
280	0.23	0.2446	2.07	20.46	158.213	78.8098
281	0.23	0.242	2.07	20.47	157.816	78.9231
282	0.23	0.2424	2.06	20.49	157.304	78.9791

283	0.22	0.2421	2.05	20.5	156.958	78.782
284	0.22	0.2427	2	20.53	156.298	78.7159
285	0.20	0.2426	2.03	20.54	155.848	78.6407
286	0.20	0.2412	2.01	20.55	155.284	78.7382
287	0.19	0.2403	2.04	20.54	154.978	78.3463
288	0.19	0.2445	2.06	20.52	154.441	78.7732
289	0.19	0.2419	2.02	20.53	153.802	78.6145
290	0.17	0.2401	2.03	20.55	153.263	78.7055
291	0.17	0.2404	2.06	20.54	152.963	78.6997
292	0.16	0.243	2.04	20.56	152.824	78.5347
293	0.16	0.2409	2.05	20.55	152.543	78.3352
294	0.15	0.243	2.06	20.54	151.772	78.5252
295	0.14	0.2412	2.06	20.54	151.778	78.3984
296	0.14	0.2409	2.06	20.55	151.323	78.4732
297	0.13	0.2425	2.03	20.58	151.169	78.6139
298	0.12	0.2397	2.03	20.58	150.701	78.3537
299	0.12	0.241	2.01	20.58	150.434	78.3851
300	0.11	0.2346	1.84	20.73	149.926	78.5681
301	0.11	0.2119	1.69	20.9	149.687	78.5833
302	0.11	0.2047	1.66	20.97	149.242	78.0837
303	0.10	0.1995	1.66	21	149.032	78.535
304	0.10	0.1978	1.64	21.02	148.647	78.2235
305	0.10	0.1961	1.63	21.04	147.963	78.044
306	0.09	0.1944	1.62	21.06	147.228	78.4189
307	0.09	0.1943	1.61	21.07	146.422	78.2123
308	0.09	0.1933	1.61	21.08	145.808	78.1402
309	0.09	0.1908	1.59	21.1	145.357	78.0437
310	0.07	0.189	1.59	21.11	144.583	78.0128
311	0.07	0.1874	1.58	21.11	143.865	77.9279
312	0.07	0.1875	1.58	21.1	143.22	78.0101
313	0.06	0.2236	1.68	20.98	142.345	77.9958
314	0.06	0.2517	1.71	20.93	141.821	77.9438
315	0.06	0.2584	1.71	20.92	141.355	78.0142
316	0.05	0.2622	1.7	20.93	140.807	77.732
317	0.05	0.2686	1.71	20.93	140.215	77.7498
318	0.04	0.2761	1.71	20.93	139.737	77.638
319	0.04	0.2786	1.72	20.95	139.174	77.5391
320	0.03	0.277	1.7	20.96	138.896	77.5761
321	0.04	0.2788	1.72	20.98	138.438	77.5793
322	0.03	0.2801	1.71	20.99	137.92	77.5386
323	0.02	0.2784	1.71	21	137.477	77.4749
324	0.02	0.2781	1.71	20.99	136.886	77.37
325	0.02	0.28	1.72	20.98	136.53	77.4226
326	0.02	0.2827	1.77	20.97	136.185	77.3408
327	0.01	0.2822	1.76	20.97	135.655	77.3301
328	0.01	0.2834	1.77	20.95	135.399	77.331
329	0.00	0.2844	1.76	20.95	135.033	77.2923
330	0.00	0.2813	1.75	20.93	134.574	77.1998

Stove Builder International Inc.

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	2.1 series		
Date:	02-22-21		
Run:	1		
Control #:	G104576994		
Test Duration:	330		
Output Category:	Med		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	76.3%	81.7%
Combustion Efficiency	98.1%	98.1%
Heat Transfer Efficiency	78%	83.3%

Output Rate (kJ/h)	12,430	11,792	**(Btu/h)**
Burn Rate (kg/h)	0.87	1.91	**(lb/h)**
Input (kJ/h)	16,292	15,455	**(Btu/h)**

Test Load Weight (dry kg)	4.77	10.50	**dry lb**
MC wet (%)	16.7		
MC dry (%)	20.05		
Particulate (g)	7.217		
CO (g)	152		
Test Duration (h)	5.50		

Emissions	**Particulate**	**CO**
g/MJ Output	0.11	2.22
g/kg Dry Fuel	1.51	31.91
g/h	1.31	27.65
lb/MM Btu Output	0.25	5.17

Air/Fuel Ratio (A/F)	18.27

VERSION: **2.4** **2010-04-15**

VERSION: 2.4 2010-04-15

Manufacturer: SBI
Model: 2.1 series
Date: 2021-02-23
Run: 2
Control #: G104576994
Test Duration: 406
Output Category: Low

Appliance Type: Non-Cat (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Default Fuel Values

	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Fuel Data

	Beech	
HHV	18,800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Wood Moisture (% wet): 17.10
Load Weight (lb wet): 12.75
Burn Rate (dry kg/h): 0.71
Total Particulate Emissions: 6.508 g

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

	Averages	0.45	4.88	16.00	202.39	76.00
					Temp. (°F)	
Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Flue Gas	Room Temp
0	12.75	0.18	3.05	22.46	301.3	83.2
1	12.70	0.14	1.16	19.89	279.6	83.7
2	12.66	0.12	1.29	19.83	279.1	83.3
3	12.56	0.12	1.74	19.92	295.0	83.4
4	12.41	0.12	2.03	20.08	319.3	83.6
5	12.26	0.13	2.38	19.31	349.9	84.0
6	12.09	0.21	2.49	20.01	369.2	83.1
7	11.88	0.35	10.09	19.91	383.5	83.1
8	11.73	0.16	10.70	16.47	406.5	82.3
9	11.54	0.16	12.18	14.68	432.7	82.7
10	11.35	0.14	12.79	12.42	456.0	83.4
11	11.17	0.19	13.30	10.35	475.7	83.9
12	10.97	0.16	14.45	8.72	493.5	84.3
13	10.73	0.32	15.52	6.96	512.3	84.5
14	10.55	0.44	15.17	6.57	495.5	84.3
15	10.41	0.56	14.88	6.68	457.0	83.5
16	10.28	0.19	12.85	8.17	428.1	84.7
17	10.15	0.14	12.14	8.90	410.4	84.2
18	10.02	0.16	11.85	9.27	398.1	84.9
19	9.91	0.16	11.61	9.51	390.1	80.7
20	9.82	0.15	11.64	9.61	384.8	78.7
21	9.73	0.13	11.79	9.51	380.4	75.9
22	9.61	0.13	11.97	9.31	377.8	76.5
23	9.50	0.14	12.14	9.07	375.8	76.6
24	9.36	0.18	12.54	8.76	374.6	75.8
25	9.26	0.19	12.55	8.60	373.8	74.9
26	9.12	0.22	12.53	8.52	372.5	74.3
27	9.02	0.24	12.75	8.34	372.3	73.5
28	8.86	0.23	12.83	8.20	371.7	73.5
29	8.74	0.27	12.94	8.12	371.5	73.3
30	8.61	0.28	12.91	8.09	370.9	72.7
31	8.47	0.31	13.03	7.96	370.7	74.3
32	8.37	0.34	12.98	7.88	370.9	73.9
33	8.19	0.37	13.19	7.77	369.6	71.8
34	8.07	0.38	13.23	7.70	368.5	71.7
35	7.95	0.40	13.51	7.55	368.3	71.5
36	7.81	0.52	13.78	7.21	369.2	71.7
37	7.67	0.53	13.91	7.05	369.8	71.8
38	7.50	0.51	13.99	7.01	370.1	70.4
39	7.35	0.50	14.00	6.95	370.3	70.3
40	7.22	0.50	14.22	6.85	370.2	69.8
41	7.08	0.51	14.30	6.78	370.7	69.5
42	6.92	0.52	14.30	6.75	370.3	69.9
43	6.80	0.57	14.33	6.67	370.5	69.8
44	6.68	0.58	14.33	6.71	370.0	69.5
45	6.54	0.59	14.35	6.73	369.8	69.4
46	6.43	0.62	14.33	6.72	369.0	68.7
47	6.28	0.63	14.45	6.68	368.7	69.1
48	6.17	0.62	14.35	6.72	368.5	69.2
49	6.05	0.6491	14.43	6.65	368.296	68.7478
50	5.92	0.6798	14.38	6.63	368.159	68.7415
51	5.80	0.6905	14.32	6.68	367.001	68.7031
52	5.66	0.6998	14.43	6.66	367.327	68.8535
53	5.54	0.7286	14.39	6.7	366.166	69.2958
54	5.40	0.7516	14.39	6.72	366.111	69.3261

55	5.28	0.7615	14.34	6.73	365.798	69.8957
56	5.17	0.8227	14.31	6.72	364.803	70.2595
57	5.02	1.6828	14.82	6	365.092	70.1186
58	4.91	1.8805	14.89	5.88	363.945	70.2784
59	4.78	1.1725	14.44	6.33	362.594	70.495
60	4.69	0.739	13.68	7.02	358.704	69.6668
61	4.58	0.3972	12.84	7.9	353.424	68.6809
62	4.48	0.2312	12.41	8.46	347.871	68.4671
63	4.39	0.1052	12.14	8.99	342.164	68.353
64	4.30	0.0653	11.57	9.5	336.012	68.5886
65	4.21	0.0532	11.15	10.04	330.919	69.3785
66	4.17	0.0396	10.66	10.51	326.022	68.7116
67	4.11	0.0394	10.37	10.88	321.677	68.1998
68	4.00	0.0346	10.07	11.23	318.291	68.2518
69	3.94	0.0291	9.61	11.7	313.161	67.7732
70	3.87	0.0344	9.17	12.13	308.121	68.2223
71	3.81	0.0491	8.89	12.44	304.701	67.7893
72	3.77	0.0836	8.57	12.71	300.342	67.3685
73	3.70	0.1155	8.27	13.07	296.559	67.1964
74	3.65	0.1322	8.08	13.36	292.583	67.1972
75	3.57	0.1425	7.83	13.61	288.923	67.0493
76	3.55	0.1591	7.69	13.83	285.189	67.1801
77	3.48	0.1632	7.44	14.07	281.809	67.2127
78	3.46	0.1458	7.33	14.26	279.076	66.5095
79	3.41	0.1317	6.96	14.52	275.687	66.94
80	3.38	0.1469	6.65	14.87	271.974	67.1853
81	3.34	0.1568	6.44	15.15	268.41	66.9568
82	3.28	0.1492	6.36	15.35	265.813	66.8493
83	3.25	0.1489	6.17	15.54	263.015	66.669
84	3.21	0.1524	6.03	15.75	260.183	66.4485
85	3.17	0.2061	5.47	16.18	256.196	66.6712
86	3.18	0.267	5.01	16.62	251.412	68.6553
87	3.16	0.3912	4.15	17.34	245.26	69.4835
88	3.15	0.615	4.11	17.58	239.555	70.3975
89	3.13	0.5835	4.33	17.51	234.747	71.5313
90	3.10	0.5664	4.41	17.48	230.832	72.5708
91	3.07	0.5587	4.43	17.45	227.749	73.6434
92	3.06	0.5557	4.51	17.41	225.053	74.4919
93	3.03	0.5509	4.47	17.41	222.592	75.1332
94	2.99	0.5605	4.56	17.38	220.339	75.4243
95	2.97	0.5629	4.59	17.38	218.294	76.0207
96	2.95	0.5623	4.61	17.38	216.641	76.4518
97	2.91	0.5582	4.67	17.34	215.337	76.9028
98	2.87	0.5552	4.73	17.32	213.852	77.3275
99	2.86	0.5514	4.69	17.32	212.63	77.52
100	2.82	0.5508	4.75	17.27	211.795	77.6976
101	2.80	0.5543	4.84	17.2	211.063	78.0885
102	2.77	0.5486	4.85	17.16	210.313	78.331
103	2.75	0.5517	4.84	17.12	209.48	78.6228
104	2.72	0.5509	4.9	17.06	208.927	78.8717
105	2.67	0.5535	4.98	16.99	208.769	78.9516
106	2.64	0.5491	5.01	16.93	208.045	79.1109
107	2.62	0.5359	5.02	16.89	207.79	79.2828
108	2.58	0.5272	5.1	16.82	207.437	79.5393
109	2.56	0.5185	5.17	16.72	207.369	79.6141
110	2.53	0.4674	5.38	16.53	207.721	79.9697
111	2.50	0.4075	5.51	16.35	207.973	79.8727
112	2.47	0.3719	5.73	16.11	209.174	80.0268
113	2.44	0.3437	5.97	15.94	210.367	80.1836
114	2.40	0.3303	6.05	15.75	211.759	80.111
115	2.36	0.3186	6.22	15.56	213.295	80.4641
116	2.33	0.3331	6.28	15.43	214.626	80.2058
117	2.28	0.3278	6.09	15.46	215.21	80.4891
118	2.27	0.3216	5.64	15.71	214.217	80.7117
119	2.24	0.3447	4.97	16.15	213.001	80.6917
120	2.23	0.361	4.56	16.57	211.579	80.7652
121	2.20	0.3792	4.19	16.91	210.026	80.8388
122	2.20	0.4052	3.99	17.19	207.724	80.9814
123	2.18	0.5946	3.65	17.48	205.546	80.7491
124	2.17	0.6107	3.63	17.51	203.951	81.0855
125	2.15	0.5905	3.63	17.53	201.755	81.1222
126	2.15	0.5794	3.68	17.47	200.213	80.8332
127	2.13	0.5732	3.65	17.45	198.478	80.8186
128	2.11	0.5599	3.6	17.44	196.733	80.7564
129	2.10	0.5588	3.67	17.38	195.35	80.7634

130	2.10	0.5487	3.67	17.36	193.622	80.627
131	2.09	0.5453	3.64	17.34	192.186	80.9901
132	2.08	0.5438	3.7	17.31	191.125	80.6177
133	2.07	0.5395	3.68	17.29	190.02	80.9113
134	2.06	0.5407	3.66	17.25	188.772	80.8682
135	2.05	0.5418	3.7	17.22	187.783	80.8828
136	2.04	0.5389	3.69	17.24	186.625	80.8916
137	2.03	0.5377	3.7	17.23	185.86	80.9656
138	2.04	0.5293	3.66	17.25	185.16	79.8424
139	2.02	0.5371	3.67	17.21	183.807	79.6848
140	2.00	0.5408	3.68	17.18	182.82	80.1456
141	1.99	0.544	3.65	17.18	181.839	80.5169
142	1.99	0.5482	3.69	17.16	181.267	80.6945
143	1.97	0.555	3.68	17.15	180.684	80.6329
144	1.96	0.5545	3.7	17.15	180.056	80.4796
145	1.95	0.5537	3.71	17.15	179.659	80.6205
146	1.94	0.5416	3.64	17.2	179.329	79.5446
147	1.94	0.5306	3.6	17.27	178.759	78.622
148	1.94	0.5266	3.62	17.29	178.217	77.8882
149	1.94	0.5301	3.62	17.32	177.501	77.4956
150	1.93	0.5276	3.63	17.32	176.595	76.9934
151	1.94	0.5369	3.65	17.31	175.89	76.929
152	1.94	0.5509	3.62	17.35	175.231	76.7619
153	1.94	0.5691	3.63	17.39	174.634	76.7554
154	1.94	0.5525	3.63	17.44	173.983	76.5662
155	1.95	0.5465	3.68	17.47	173.679	76.6611
156	1.94	0.536	3.62	17.54	172.764	76.3942
157	1.95	0.5627	3.69	17.59	172.069	76.3902
158	1.94	0.5543	3.66	17.63	171.501	76.205
159	1.94	0.5564	3.69	17.67	171.006	76.2342
160	1.94	0.5567	3.66	17.77	170.554	76.229
161	1.94	0.5601	3.69	17.83	170.103	76.179
162	1.94	0.5628	3.67	17.89	169.603	76.2097
163	1.93	0.5675	3.69	17.98	169.194	75.8798
164	1.91	0.5697	3.67	18.04	168.872	75.7179
165	1.90	0.5664	3.67	18.13	168.351	76.0073
166	1.91	0.5619	3.7	18.18	167.868	76.014
167	1.90	0.562	3.67	18.27	167.58	75.7677
168	1.88	0.5622	3.63	18.36	167.123	75.6285
169	1.88	0.5573	3.64	18.45	166.528	75.792
170	1.87	0.5587	3.62	18.55	166.102	75.618
171	1.86	0.5504	3.62	18.64	165.78	75.7117
172	1.85	0.5383	3.54	18.75	165.399	75.4988
173	1.85	0.5314	3.55	18.83	165.254	75.6917
174	1.84	0.5431	3.59	18.87	164.803	75.2389
175	1.81	0.556	3.61	18.91	164.529	75.4508
176	1.81	0.555	3.59	18.97	164.292	75.6173
177	1.81	0.5436	3.55	19.07	164.04	75.5511
178	1.80	0.54	3.57	19.12	163.818	75.3678
179	1.78	0.5346	3.54	19.19	163.51	75.1795
180	1.78	0.5289	3.54	19.28	162.79	75.3168
181	1.78	0.5265	3.53	19.33	162.397	75.0602
182	1.77	0.5274	3.52	19.39	162.279	75.0394
183	1.77	0.5208	3.53	19.43	162.199	75.2016
184	1.75	0.5154	3.45	19.5	161.821	74.9116
185	1.75	0.513	3.48	19.55	161.768	75.0998
186	1.74	0.5076	3.42	19.62	161.429	74.8863
187	1.73	0.5031	3.46	19.66	160.936	75.0136
188	1.73	0.5066	3.45	19.71	160.804	74.7777
189	1.71	0.4993	3.44	19.76	160.447	74.948
190	1.71	0.4981	3.37	19.81	160.144	74.7926
191	1.70	0.4931	3.4	19.83	159.898	74.9077
192	1.69	0.4928	3.37	19.86	159.631	75.1157
193	1.69	0.4938	3.39	19.88	159.254	74.707
194	1.68	0.4963	3.39	19.9	158.859	74.8481
195	1.67	0.4999	3.42	19.86	158.848	74.6985
196	1.65	0.504	3.42	19.86	158.811	74.9689
197	1.65	0.5014	3.44	19.86	158.43	74.9844
198	1.64	0.4991	3.4	19.88	158.476	74.8946
199	1.63	0.4947	3.38	19.91	158.055	74.6584
200	1.63	0.4915	3.37	19.95	157.95	74.7285
201	1.61	0.4893	3.34	19.95	157.818	74.644
202	1.60	0.4894	3.38	19.95	157.697	74.6261
203	1.58	0.4839	3.28	20.02	157.204	74.6506
204	1.60	0.4839	3.3	20.03	157.145	74.6765

205	1.58	0.481	3.27	20.05	156.778	74.6195
206	1.58	0.4815	3.27	20.04	156.729	74.5789
207	1.57	0.481	3.27	20.05	156.453	74.3903
208	1.57	0.4829	3.28	20.06	156.207	74.5086
209	1.56	0.4817	3.28	20.05	156.075	74.6316
210	1.55	0.4808	3.27	20.04	155.903	74.6097
211	1.54	0.4861	3.26	20.02	155.598	74.9231
212	1.53	0.4977	3.33	19.96	155.451	74.3713
213	1.50	0.5	3.35	19.93	155.387	74.3697
214	1.50	0.513	3.32	19.92	155.372	74.7545
215	1.50	0.5275	3.35	19.88	155.511	74.4853
216	1.49	0.5172	3.36	19.87	155.123	74.4977
217	1.47	0.5138	3.37	19.85	155.215	74.4127
218	1.47	0.5096	3.36	19.81	155.297	74.6118
219	1.45	0.5097	3.35	19.8	155.179	74.5567
220	1.44	0.5069	3.32	19.82	155.058	74.6448
221	1.43	0.5089	3.32	19.79	155.124	74.4282
222	1.44	0.5177	3.28	19.83	154.997	74.3276
223	1.41	0.5157	3.21	19.89	154.785	74.5514
224	1.40	0.5084	3.24	19.88	154.833	74.6164
225	1.40	0.5041	3.22	19.9	154.753	74.4251
226	1.39	0.4971	3.23	19.88	154.674	74.6083
227	1.38	0.4967	3.2	19.89	154.638	74.323
228	1.36	0.4941	3.19	19.89	154.448	74.3397
229	1.35	0.4906	3.19	19.93	154.228	74.3869
230	1.35	0.4855	3.16	19.93	154.155	74.4051
231	1.34	0.4792	3.09	19.95	154.134	74.2884
232	1.34	0.4789	3.12	19.96	153.926	74.2783
233	1.32	0.4796	3.11	19.97	153.748	74.2801
234	1.32	0.4691	3.07	19.97	153.478	74.111
235	1.31	0.4664	3.08	19.96	153.407	74.4212
236	1.29	0.4592	3.05	19.99	153.084	74.1369
245	1.21	0.4229	3.02	17.45	151.74	73.8642
246	1.20	0.4302	3.03	17.4	151.568	73.9475
247	1.20	0.4356	2.97	17.35	151.337	73.8194
248	1.19	0.4369	2.96	17.4	151.014	74.2119
249	1.19	0.4388	2.96	17.34	151.089	74.1996
250	1.18	0.4465	2.98	17.35	150.846	74.0433
251	1.18	0.4449	2.97	17.33	150.635	73.878
252	1.16	0.4481	2.97	17.35	150.322	73.7057
253	1.16	0.449	2.95	17.31	150.155	73.8494
254	1.15	0.4474	2.91	17.36	150.189	73.8805
255	1.14	0.4534	2.96	17.32	149.675	74.2214
256	1.12	0.4652	3.01	17.29	149.515	74.7251
257	1.10	0.4659	3	17.29	149.205	75.0627
258	1.08	0.4677	2.99	17.25	149.167	75.3476
259	1.05	0.4661	2.98	17.24	148.942	75.4816
260	1.03	0.4684	2.96	17.12	149.063	75.6655
261	1.02	0.467	2.92	17.22	148.929	75.8405
262	1.00	0.4735	2.96	17.22	148.946	75.981
263	0.98	0.4712	2.94	17.16	148.93	76.0504
264	0.96	0.4699	2.9	17.15	148.71	76.181
265	0.95	0.4733	2.93	17.14	148.789	76.331
266	0.92	0.4773	2.92	17.08	148.819	76.4243
267	0.92	0.4768	2.91	17.09	148.631	76.5206
268	0.91	0.4757	2.9	17.02	148.556	76.6104
269	0.89	0.4768	2.92	17	148.501	76.6968
270	0.88	0.4746	2.9	16.95	148.509	76.6537
271	0.86	0.4776	2.88	16.92	148.179	76.8161
272	0.85	0.4763	2.88	16.88	148.42	76.8946
273	0.83	0.4748	2.89	16.84	148.333	76.8785
274	0.82	0.4741	2.86	16.79	148.314	77.0637
275	0.81	0.4695	2.85	16.73	147.921	77.1146
276	0.80	0.4695	2.88	16.66	148.15	77.2007
277	0.78	0.4684	2.85	16.66	147.829	77.1528
278	0.78	0.4667	2.84	16.6	147.754	77.2636
279	0.77	0.4666	2.83	16.55	147.64	77.2059
280	0.78	0.4681	2.82	16.54	147.623	77.3049
281	0.76	0.4679	2.79	16.53	147.636	77.2858
282	0.75	0.4728	2.76	16.5	147.258	77.3542
283	0.74	0.4716	2.74	16.46	147.47	77.4329
284	0.72	0.4767	2.76	16.44	147.317	77.5892
285	0.72	0.476	2.73	16.4	147.279	77.4561
286	0.70	0.476	2.74	16.36	147.189	77.485
287	0.70	0.4754	2.74	16.32	147.146	77.5043

288	0.69	0.4761	2.71	16.32	146.934	77.5009
289	0.69	0.4882	2.71	16.3	146.636	77.4435
290	0.67	0.4813	2.68	16.27	146.568	77.5274
291	0.67	0.4788	2.64	16.26	146.641	77.5585
292	0.67	0.4794	2.66	16.24	146.448	77.5095
293	0.66	0.479	2.62	16.22	146.318	77.5686
294	0.64	0.4763	2.65	16.21	146.356	77.4145
295	0.64	0.4723	2.59	16.21	146.153	77.6403
296	0.63	0.4736	2.61	16.22	146.003	77.422
297	0.63	0.469	2.6	16.18	145.799	77.698
298	0.61	0.47	2.56	16.2	145.657	77.6989
299	0.61	0.4647	2.59	16.19	145.488	77.5811
300	0.60	0.4655	2.59	16.19	145.415	77.3147
301	0.60	0.4662	2.57	16.19	145.242	77.5555
302	0.58	0.4671	2.54	16.2	144.989	77.5286
303	0.59	0.4618	2.53	16.2	145.044	77.5652
304	0.57	0.4608	2.51	16.19	145.125	77.5029
305	0.57	0.461	2.53	16.19	144.785	77.6043
306	0.56	0.462	2.52	16.18	144.647	77.5305
307	0.56	0.4576	2.53	16.19	144.503	77.362
308	0.54	0.4577	2.52	16.19	144.096	77.6833
309	0.55	0.4589	2.52	16.18	144.153	77.5146
310	0.54	0.4644	2.54	16.18	144.063	77.3596
311	0.53	0.4645	2.53	16.17	143.903	77.4571
312	0.52	0.4596	2.51	16.19	143.643	77.6089
313	0.50	0.4562	2.5	16.2	143.574	77.4371
314	0.51	0.4557	2.5	16.19	143.365	77.3498
315	0.50	0.4589	2.49	16.19	143.293	77.1898
316	0.48	0.4624	2.5	16.17	143.237	77.3408
317	0.48	0.4591	2.49	16.23	143.035	77.456
318	0.48	0.4571	2.5	16.22	142.947	77.3799
319	0.47	0.4583	2.52	16.23	142.975	77.3323
320	0.46	0.454	2.51	16.24	142.592	77.3937
321	0.46	0.4519	2.49	16.26	142.619	77.3802
322	0.45	0.453	2.49	16.27	142.308	77.4277
323	0.45	0.5586	2.49	16.3	142.207	77.4811
324	0.44	0.4506	2.49	16.31	142.039	77.4654
325	0.43	0.4493	2.48	16.34	141.863	77.3185
326	0.43	0.4476	2.48	16.34	141.708	77.5294
327	0.42	0.4481	2.47	16.36	141.705	77.4176
328	0.42	0.4475	2.45	16.4	141.703	77.5698
329	0.40	0.4467	2.45	16.4	141.434	77.5042
330	0.40	0.4451	2.43	16.41	141.545	77.3572
331	0.40	0.447	2.41	16.41	141.324	77.4776
332	0.40	0.4427	2.43	16.44	140.961	77.2718
333	0.39	0.4437	2.43	16.44	140.909	77.1268
334	0.38	0.4447	2.43	16.45	140.732	77.3453
335	0.38	0.4421	2.45	16.47	140.704	77.474
336	0.37	0.439	2.43	16.49	140.619	77.1626
337	0.36	0.438	2.39	16.51	140.479	77.2309
338	0.37	0.4445	2.4	16.51	140.27	77.2754
339	0.35	0.4469	2.46	16.51	140.218	77.1922
340	0.34	0.442	2.44	16.53	140.223	77.1834
341	0.34	0.4439	2.46	16.53	140.032	77.2858
342	0.33	0.4432	2.47	16.54	139.886	77.1959
343	0.33	0.4413	2.45	16.56	139.711	77.2225
344	0.32	0.4358	2.42	16.59	139.645	77.3345
345	0.31	0.4386	2.43	16.58	139.429	77.1358
346	0.31	0.4366	2.42	16.62	139.284	77.0625
347	0.30	0.4372	2.42	16.62	139.395	77.4037
348	0.30	0.4404	2.44	16.64	139.402	77.2608
349	0.29	0.4409	2.44	16.65	139.231	77.0485
350	0.29	0.4349	2.44	16.69	139.301	77.1312
351	0.28	0.4357	2.43	16.68	139.175	76.9142
352	0.28	0.4313	2.42	16.69	138.949	77.3658
353	0.27	0.485	2.41	16.69	138.827	77.2137
354	0.26	0.4859	2.41	16.69	138.956	77.0769
355	0.25	0.4752	2.42	16.72	139.038	77.2488
356	0.25	0.4653	2.43	16.73	138.993	77.1527
357	0.24	0.4575	2.41	16.76	138.91	77.1824
358	0.24	0.4497	2.39	16.79	138.818	77.0894
359	0.24	0.4464	2.4	16.81	138.651	77.17
360	0.23	0.4461	2.39	16.82	138.632	76.8692
361	0.21	0.4465	2.36	16.84	138.655	77.2008
362	0.21	0.4433	2.36	16.87	138.42	77.2874

363	0.21	0.4414	2.37	16.88	138.372	77.233
364	0.21	0.4349	2.32	16.92	138.226	77.1865
365	0.20	0.4329	2.31	16.94	138.244	77.0444
366	0.19	0.4306	2.31	16.99	138.218	76.9935
367	0.19	0.4281	2.3	16.86	137.947	77.1197
368	0.18	0.4259	2.31	16.98	138.017	77.1162
369	0.17	0.4215	2.28	17.02	137.994	76.9964
370	0.18	0.4167	2.26	17.05	137.928	76.9283
371	0.18	0.4157	2.27	17.08	137.769	77.0441
372	0.16	0.4163	2.27	17.08	137.763	76.981
373	0.16	0.4142	2.26	17.15	137.539	77.024
374	0.14	0.4117	2.24	17.22	137.371	77.0616
375	0.15	0.4133	2.23	17.09	137.144	77.0207
376	0.14	0.4106	2.23	17.14	137.093	76.925
377	0.14	0.4184	2.25	17.15	137.077	76.9696
378	0.12	0.4126	2.24	17.17	136.932	76.9823
379	0.12	0.4061	2.21	17.23	136.659	76.932
380	0.13	0.4028	2.2	17.24	136.61	77.1625
381	0.12	0.4041	2.19	17.28	136.459	77.053
382	0.11	0.4004	2.19	17.29	136.275	77.008
383	0.10	0.4021	2.19	17.29	136.032	77.0608
384	0.10	0.4086	2.17	17.31	135.914	77.0523
385	0.09	0.4018	2.15	17.32	135.874	77.015
386	0.09	0.3996	2.15	17.38	135.576	76.9836
387	0.08	0.3974	2.15	17.35	135.439	77.0572
388	0.09	0.4005	2.15	17.37	135.323	76.8337
389	0.08	0.4033	2.15	17.38	135.085	77.0555
390	0.07	0.4038	2.15	17.53	134.901	76.9844
391	0.07	0.4018	2.15	17.33	134.755	77.0791
392	0.06	0.4015	2.14	17.39	134.532	76.9842
393	0.06	0.3963	2.12	17.43	134.37	77.0706
394	0.06	0.3879	2.14	17.44	134.1	77.0603
395	0.06	0.3925	2.09	17.45	134.05	76.9788
396	0.04	0.3958	2.12	17.48	133.849	77.0055
397	0.04	0.3955	2.11	17.45	133.777	77.1273
398	0.03	0.3892	2.09	17.47	133.755	76.9919
399	0.02	0.3836	2.05	17.5	133.444	76.8244
400	0.03	0.3861	2.07	17.52	133.313	76.9119
401	0.02	0.3854	2.06	17.5	133.128	76.8441
402	0.02	0.3774	2.05	17.53	133.064	76.8897
403	0.01	0.3809	2.04	17.56	132.981	76.9507
404	0.01	0.3784	2.01	17.6	132.819	77.0689
405	0.00	0.3739	2	17.62	132.572	77.0773
406	0.00	0.3697	1.99	17.64	132.459	76.9915

Stove Builder International Inc.

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	2.1 series		
Date:	02-23-21		
Run:	2		
Control #:	G104576994		
Test Duration:	406		
Output Category:	Low		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	74.7%	80.1%
Combustion Efficiency	95.6%	95.6%
Heat Transfer Efficiency	78%	83.7%

Output Rate (kJ/h)	9,957	9,446	**(Btu/h)**
Burn Rate (kg/h)	0.71	1.56	**(lb/h)**
Input (kJ/h)	13,324	12,639	**(Btu/h)**

Test Load Weight (dry kg)	4.80	10.57	**dry lb**
MC wet (%)	17.1		
MC dry (%)	20.63		
Particulate (g)	6.508		
CO (g)	313		
Test Duration (h)	6.77		

Emissions	**Particulate**	**CO**
g/MJ Output	0.10	4.65
g/kg Dry Fuel	1.36	65.31
g/h	0.96	46.29
lb/MM Btu Output	0.22	10.80

Air/Fuel Ratio (A/F)	18.29

VERSION: **2.4** **2010-04-15**

VERSION: 2.4 2010-04-15

Manufacturer: SBI
Model: 2.1 series
Date: 2021-02-24
Run: 3
Control #: G104576994
Test Duration: 464
Output Category: Low

Appliance Type: Non-Cat (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Default Fuel Values

	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Fuel Data

	Beech	
HHV	18,800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Wood Moisture (% wet): 16.60
Load Weight (lb wet): 12.92
Burn Rate (dry kg/h): 0.63
Total Particulate Emissions: 7.501 g

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

	Averages	0.35	4.37	16.94	192.45	79.45
					Temp. (°F)	
Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Flue Gas	Room Temp
0	12.92	0.18	1.73	19.37	287.1	72.8
1	12.85	0.30	2.93	18.73	265.9	74.4
2	12.78	0.11	0.99	20.02	266.4	75.9
3	12.71	0.10	1.10	20.31	279.9	77.2
4	12.58	0.16	1.80	19.99	288.4	77.5
5	12.44	0.20	1.92	19.86	293.9	78.2
6	12.23	0.31	2.37	19.48	305.8	78.1
7	12.04	0.40	3.07	18.85	316.0	78.6
8	11.91	0.60	7.40	15.50	325.3	78.4
9	11.78	0.55	7.58	14.69	350.5	78.7
10	11.60	0.40	10.00	12.85	394.5	79.1
11	11.44	0.23	12.52	10.30	399.1	79.4
12	11.31	0.15	11.83	10.15	399.5	79.6
13	11.18	0.11	11.50	10.26	404.2	80.1
14	11.01	0.16	11.94	10.00	399.2	80.4
15	10.88	0.28	12.18	9.63	381.1	80.9
16	10.79	0.35	11.90	9.81	368.0	79.0
17	10.69	0.15	10.74	10.68	357.1	79.8
18	10.58	0.14	10.45	11.07	349.9	80.6
19	10.47	0.13	10.24	11.35	345.1	81.2
20	10.36	0.15	10.19	11.44	341.2	81.7
21	10.27	0.20	10.30	11.40	340.4	81.9
22	10.15	0.28	10.42	11.26	339.6	82.3
23	10.05	0.31	10.61	11.08	339.3	82.5
24	9.94	0.31	10.79	10.92	339.1	82.7
25	9.82	0.33	10.90	10.81	340.0	83.0
26	9.71	0.32	11.01	10.67	340.2	83.2
27	9.61	0.31	11.18	10.51	341.4	82.7
28	9.49	0.31	11.36	10.36	342.8	81.6
29	9.36	0.33	11.62	10.12	343.9	82.1
30	9.25	0.41	11.72	9.92	345.9	82.2
31	9.14	0.40	11.83	9.77	348.1	79.4
32	9.05	0.36	12.00	9.66	348.7	79.0
33	8.96	0.35	11.94	9.63	348.7	79.9
34	8.86	0.31	12.11	9.54	349.2	80.1
35	8.74	0.29	12.06	9.57	348.6	79.5
36	8.65	0.22	12.01	9.57	348.0	79.3
37	8.52	0.19	12.04	9.56	347.5	79.4
38	8.43	0.19	12.11	9.60	346.3	79.9
39	8.32	0.19	12.11	9.58	346.4	78.5
40	8.19	0.18	12.12	9.57	346.3	79.3
41	8.10	0.18	12.24	9.51	346.1	79.4
42	7.99	0.16	12.30	9.51	346.0	79.8
43	7.87	0.16	12.25	9.49	346.3	78.0
44	7.78	0.16	12.33	9.46	345.5	78.2
45	7.68	0.15	12.24	9.51	345.7	78.5
46	7.54	0.15	12.29	9.57	345.0	78.9
47	7.45	0.17	12.27	9.60	345.0	78.9
48	7.35	0.17	12.28	9.62	344.7	78.9
49	7.23	0.183	12.2	9.7	345.007	78.7646
50	7.14	0.1618	12.43	9.65	344.709	78.9611
51	7.04	0.1724	12.36	9.68	344.485	78.9971
52	6.95	0.1809	12.38	9.67	343.658	79.1811
53	6.86	0.1764	12.25	9.75	343.296	79.0538
54	6.75	0.1749	12.3	9.82	343.151	79.5881

55	6.63	0.2017	12.12	9.9	342.571	79.6336
56	6.56	0.2095	12.18	9.92	341.613	79.1643
57	6.48	0.1889	12	10.06	341.229	79.7501
58	6.39	0.1962	12.01	10.13	341.1	78.9674
59	6.29	0.1863	11.89	10.22	338.706	78.6315
60	6.21	0.1513	11.4	10.62	334.775	79.0527
61	6.12	0.07	10.67	11.32	330.126	78.8617
62	6.04	0.0435	10.02	11.99	326.544	78.7752
63	6.00	0.0505	10	12.23	323.391	78.703
64	5.92	0.0503	9.83	12.52	320.41	78.5628
65	5.84	0.0548	9.7	12.75	318.209	78.7023
66	5.76	0.0574	9.64	12.94	315.559	78.55
67	5.70	0.062	9.4	13.2	312.561	78.8043
68	5.63	0.0689	9.23	13.44	310.526	78.5731
69	5.56	0.0647	9.17	13.56	308.62	78.6516
70	5.48	0.0641	9.23	13.64	306.971	78.3702
71	5.42	0.076	9.19	13.7	306.219	78.6836
72	5.36	0.0661	9.41	13.57	307.163	78.896
73	5.30	0.0495	9.43	13.51	306.074	78.53
74	5.25	0.0486	8.96	13.84	303.277	77.7398
75	5.20	0.0631	8.29	14.48	298.994	78.4359
76	5.16	0.0944	7.16	15.5	293.114	78.5366
77	5.11	0.1542	6.47	16.28	287.282	78.6328
78	5.07	0.2476	6.16	16.77	281.75	78.8392
79	5.03	0.2703	6.03	17.04	276.645	78.5554
80	4.98	0.2848	5.98	17.19	272.523	78.7819
81	4.95	0.2955	5.96	17.25	268.752	78.6054
82	4.92	0.3044	5.93	17.32	265.692	78.7468
83	4.89	0.2975	5.98	17.31	263.299	78.5209
84	4.84	0.2829	6.07	17.26	260.685	78.447
85	4.81	0.271	6.11	17.22	258.937	78.6722
86	4.78	0.2413	6.24	17.11	257.478	78.5313
87	4.72	0.2436	6.2	17.18	255.002	79.6267
88	4.67	0.2377	6.16	17.17	254.054	80.503
89	4.64	0.2335	6.24	17.19	251.785	81.0025
90	4.57	0.2315	6.2	17.18	250.676	81.5447
91	4.52	0.235	6.17	17.19	249.325	81.7779
92	4.45	0.252	6.18	17.16	248.462	81.7652
93	4.42	0.28	6.1	17.19	247.37	82.1067
94	4.38	0.2986	6.03	17.21	245.431	82.172
95	4.33	0.3323	5.82	17.36	243.043	82.235
96	4.28	0.3734	5.77	17.43	241.108	82.4582
97	4.24	0.3775	5.79	17.39	239.155	82.3779
98	4.20	0.3759	5.77	17.4	237.311	82.5083
99	4.15	0.3796	5.75	17.39	235.798	82.7781
100	4.12	0.385	5.69	17.39	234.18	82.5717
101	4.06	0.3832	5.68	17.39	233.138	82.7385
102	4.02	0.3844	5.63	17.41	231.567	82.3787
103	3.98	0.3932	5.55	17.43	230.432	82.8155
104	3.94	0.3909	5.54	17.4	229.007	82.6545
105	3.90	0.3883	5.45	17.38	227.85	82.5142
106	3.88	0.3977	5.43	17.37	226.389	82.5616
107	3.84	0.3756	5.43	17.31	226.014	82.7711
108	3.80	0.3675	5.41	17.28	225.203	82.8395
109	3.76	0.3817	5.38	17.25	224.063	82.8298
110	3.72	0.3794	5.4	17.25	223.314	82.6285
111	3.67	0.3827	5.41	17.21	222.484	82.7835
112	3.65	0.386	5.38	17.16	221.854	82.6517
113	3.61	0.3829	5.39	17.11	221.064	82.7892
114	3.57	0.3823	5.38	17.03	220.254	82.6718
115	3.54	0.3797	5.45	16.96	219.887	82.699
116	3.52	0.3776	5.47	16.9	219.807	82.6261
117	3.48	0.3768	5.5	16.82	219.146	82.4747
118	3.43	0.3673	5.5	16.78	218.585	82.5065
119	3.41	0.3667	5.52	16.67	219.003	82.4312
120	3.36	0.3558	5.56	16.63	218.387	82.5233
121	3.32	0.3425	5.6	16.57	218.273	82.784
122	3.29	0.3314	5.68	16.48	218.474	82.6632
123	3.25	0.3283	5.64	16.45	218.375	82.6167
124	3.22	0.3176	5.67	16.43	218.775	82.5437
125	3.18	0.3074	5.65	16.45	218.458	82.4939
126	3.14	0.3094	5.59	16.46	218.097	82.4412
127	3.11	0.3035	5.6	16.43	217.66	82.7095
128	3.07	0.3364	5.51	16.43	217.346	82.6695
129	3.04	0.3646	5.43	16.48	217.118	82.699

130	3.00	0.3714	5.38	16.52	216.428	82.526
131	2.97	0.3632	5.35	16.54	215.639	82.4175
132	2.94	0.3712	5.33	16.54	215.47	82.4683
133	2.90	0.3797	5.29	16.53	215.004	82.7691
134	2.88	0.3778	5.26	16.6	214.439	82.5783
135	2.83	0.3985	5.14	16.64	213.372	82.4778
136	2.81	0.3995	5.14	16.67	212.984	82.7182
137	2.77	0.4031	5.11	16.7	212.439	82.5273
138	2.74	0.4028	5.12	16.69	211.924	80.908
139	2.72	0.3809	5.07	16.76	211.357	81.1761
140	2.68	0.3901	4.99	16.83	210.519	81.2515
141	2.66	0.398	4.9	16.88	209.832	81.0117
142	2.64	0.4083	4.81	16.94	208.832	81.3024
143	2.60	0.4317	4.71	17.03	207.732	81.3994
144	2.59	0.4343	4.67	17.06	206.833	81.5342
145	2.56	0.4247	4.63	17.09	205.98	81.5254
146	2.55	0.4242	4.59	17.13	205.204	81.2068
147	2.53	0.4268	4.52	17.21	204.521	81.2125
148	2.49	0.4341	4.49	17.24	204.235	81.2258
149	2.47	0.4257	4.54	17.25	203.733	81.0594
150	2.45	0.4023	4.57	17.24	203.43	80.8761
151	2.43	0.3987	4.61	17.24	203.096	80.9472
152	2.40	0.3993	4.66	17.22	202.848	80.9262
153	2.36	0.3805	4.64	17.23	202.837	80.6399
154	2.35	0.3771	4.72	17.22	202.784	80.8882
155	2.33	0.3654	4.79	17.21	202.815	80.7219
156	2.30	0.3496	4.82	17.16	202.689	80.7392
157	2.27	0.3506	4.88	17.11	203.209	80.6813
158	2.24	0.3282	4.94	17.08	203.321	80.6074
159	2.22	0.3268	4.97	17.08	203.684	80.6486
160	2.19	0.3054	5.05	17.04	204.112	80.5685
161	2.17	0.2663	4.99	17.04	203.964	80.5478
162	2.16	0.2752	4.7	17.28	203.137	80.5035
163	2.13	0.2673	4.39	17.55	202.562	80.5156
164	2.11	0.3163	4.21	17.76	201.781	80.4886
165	2.11	0.3727	4.04	17.9	200.484	80.3875
166	2.10	0.4405	3.57	18.26	198.041	80.37
167	2.07	0.7053	3.21	18.75	195.873	80.4144
168	2.07	0.6993	3.16	18.85	193.627	80.4787
169	2.05	0.655	3.13	18.92	191.644	80.2973
170	2.05	0.6504	3.15	18.93	190.057	80.3748
171	2.04	0.6247	3.12	19.01	188.179	80.3565
172	2.02	0.5863	3.15	18.98	186.7	80.0368
173	2.01	0.6198	3.16	19.01	185.377	80.1682
174	2.00	0.6053	3.18	19.02	183.842	80.246
175	1.98	0.5985	3.21	19.02	182.724	80.262
176	1.99	0.5821	3.2	19.05	181.668	80.1671
177	1.98	0.5911	3.21	19.09	180.47	79.8443
178	1.96	0.5785	3.23	19.06	179.499	79.9086
179	1.95	0.572	3.23	19.11	178.271	79.9279
180	1.94	0.5736	3.28	19.14	177.631	79.6999
181	1.92	0.5833	3.32	19.13	176.699	80.0005
182	1.92	0.5748	3.29	19.13	175.615	79.825
183	1.90	0.5634	3.34	19.14	174.891	79.646
184	1.90	0.5616	3.28	19.19	174.236	79.7977
185	1.88	0.5596	3.27	19.18	173.56	79.6804
186	1.87	0.5577	3.32	19.19	172.808	79.8583
187	1.86	0.5561	3.3	19.24	172.03	79.6763
188	1.86	0.5463	3.26	19.26	171.714	79.3327
189	1.85	0.5347	3.25	19.32	171.258	78.9793
190	1.85	0.5298	3.22	19.39	170.798	78.3822
191	1.84	0.5302	3.24	19.43	170.166	78.1145
192	1.84	0.5271	3.24	19.44	169.499	77.7412
193	1.84	0.5259	3.24	19.47	168.663	77.7679
194	1.84	0.5207	3.21	19.53	167.837	77.8606
195	1.83	0.5234	3.24	19.56	167.183	77.6386
196	1.84	0.5198	3.24	19.61	166.61	77.4353
197	1.83	0.5221	3.23	19.66	166.174	77.3245
198	1.82	0.5205	3.23	19.71	165.704	77.4039
199	1.82	0.519	3.26	19.74	165.208	77.3812
200	1.82	0.523	3.25	19.79	164.675	77.384
201	1.82	0.5211	3.28	19.83	164.137	77.3113
202	1.81	0.5206	3.26	19.9	163.544	77.483
203	1.80	0.5244	3.25	19.93	163.24	77.7623
204	1.80	0.5244	3.28	19.98	162.831	77.7245

205	1.78	0.5232	3.31	20.01	162.737	77.8804
206	1.78	0.5177	3.28	20.12	162.273	77.8861
207	1.76	0.5154	3.26	20.2	162.033	77.7319
208	1.75	0.5102	3.27	20.22	161.924	77.9039
209	1.72	0.5099	3.27	20.31	161.497	77.8127
210	1.72	0.5028	3.25	20.35	161.249	77.8759
211	1.70	0.4982	3.26	20.38	161.126	77.8652
212	1.70	0.5122	3.23	20.46	160.86	77.7965
213	1.69	0.5094	3.27	20.51	160.542	77.9168
214	1.68	0.5101	3.23	20.59	160.212	77.8313
215	1.68	0.4841	3.17	20.69	159.963	77.908
216	1.66	0.4901	3.06	20.8	159.892	77.8126
217	1.66	0.4844	2.97	20.93	159.511	77.8437
218	1.64	0.4779	2.98	20.98	159.16	77.8319
219	1.64	0.4722	2.94	21.01	158.744	77.8391
220	1.63	0.4681	2.95	21.04	158.537	77.6243
221	1.62	0.4647	2.96	21.06	158.392	77.7622
222	1.62	0.4643	2.92	21.07	157.921	77.5643
223	1.60	0.4622	2.88	21.12	157.566	77.6908
224	1.59	0.4549	2.93	21.11	157.164	77.5716
225	1.58	0.4527	2.89	21.14	156.653	78.0541
226	1.57	0.457	2.93	21.12	156.403	78.5889
227	1.54	0.4608	2.93	21.1	155.944	78.8658
228	1.52	0.4588	2.94	21.08	155.56	79.0691
229	1.52	0.4554	2.92	21.08	155.191	79.2601
230	1.50	0.4544	2.93	21.04	154.922	79.3927
231	1.48	0.4526	2.95	21.01	154.823	79.5343
232	1.47	0.4527	2.93	21.02	154.456	79.579
233	1.45	0.4532	2.95	20.99	154.393	79.7223
234	1.44	0.4541	2.96	20.92	154.269	79.8187
235	1.41	0.4539	2.98	20.9	153.821	79.9251
236	1.41	0.4543	2.95	20.87	153.816	79.9648
237	1.40	0.4544	2.96	20.84	153.395	80.0406
238	1.38	0.4516	2.96	20.85	153.378	80.097
246	1.29	0.4063	2.94	17.55	151.998	78.7315
247	1.29	0.4155	2.96	17.43	151.692	78.7977
248	1.27	0.419	2.94	17.35	151.278	78.4992
249	1.26	0.4203	2.96	17.33	151.171	78.5806
250	1.26	0.4236	2.99	17.3	151.087	78.5378
251	1.25	0.4214	2.96	17.31	150.837	78.4206
252	1.23	0.4244	2.94	17.28	150.865	78.4242
253	1.23	0.4243	2.94	17.23	150.48	78.3351
254	1.23	0.4221	2.94	17.21	150.389	78.2325
255	1.22	0.4222	2.96	17.2	150.203	78.1261
256	1.21	0.4213	2.96	17.15	149.874	78.2656
257	1.20	0.4222	2.94	17.11	149.853	78.1564
258	1.19	0.425	2.97	17.12	149.834	78.1849
259	1.19	0.4234	2.97	17.11	149.487	78.1022
260	1.18	0.4241	2.97	17.08	149.449	78.0133
261	1.17	0.4256	2.99	17.09	149.242	78.0681
262	1.16	0.4231	2.97	17.07	149.014	78.0829
263	1.16	0.4241	2.96	17.04	148.943	77.9008
264	1.16	0.4242	2.96	16.98	149.097	77.9636
265	1.14	0.4232	2.97	17	148.762	78.0152
266	1.12	0.4206	2.95	17.03	148.753	77.8195
267	1.12	0.4176	2.94	17.03	148.506	77.8278
268	1.12	0.4163	2.95	17	148.391	77.9111
269	1.10	0.4164	2.95	16.99	148.314	78.0342
270	1.10	0.4103	2.9	17	148.093	77.9347
271	1.09	0.4107	2.93	16.97	148.028	78.3237
272	1.09	0.4198	3	16.92	148.01	78.746
273	1.07	0.4208	3.01	16.87	147.85	78.9383
274	1.07	0.4185	2.98	16.88	147.65	79.0446
275	1.05	0.4169	2.97	16.9	147.591	79.1449
276	1.04	0.4142	2.98	16.91	147.549	79.276
277	1.03	0.4091	2.91	16.93	147.318	79.3177
278	1.02	0.4094	2.94	16.92	147.392	79.3591
279	1.01	0.4096	2.91	16.92	147.316	79.4325
280	1.01	0.4065	2.81	16.97	147.288	79.4857
281	0.98	0.3819	2.52	17.21	147.043	79.5329
282	0.98	0.3773	2.5	17.27	146.821	79.5672
283	0.98	0.3734	2.47	17.32	146.595	79.5776
284	0.97	0.3696	2.49	17.33	146.369	79.5543
285	0.95	0.3658	2.45	17.35	145.986	79.6486
286	0.94	0.3643	2.47	17.4	145.709	79.6549

287	0.95	0.3621	2.45	17.38	145.355	79.6758
288	0.93	0.3619	2.45	17.41	145.373	79.7097
289	0.92	0.3568	2.42	17.35	145.001	79.5778
290	0.91	0.3559	2.44	17.39	144.952	79.7728
291	0.91	0.3551	2.4	17.38	144.567	79.7575
292	0.90	0.3539	2.39	17.38	144.378	79.7655
293	0.90	0.3508	2.4	17.39	144.108	79.8064
294	0.89	0.3542	2.41	17.39	143.925	79.782
295	0.89	0.3529	2.39	17.38	143.566	79.7979
296	0.87	0.3505	2.41	17.39	143.287	79.7806
297	0.87	0.3508	2.4	17.41	143.283	79.7793
298	0.86	0.3508	2.39	17.49	142.962	79.7169
299	0.86	0.3493	2.37	17.42	142.757	79.8395
300	0.84	0.3487	2.37	17.4	142.618	79.7303
301	0.84	0.3482	2.37	17.44	142.445	79.774
302	0.84	0.3491	2.36	17.43	142.071	79.6015
303	0.83	0.3495	2.34	17.43	142.016	79.6932
304	0.83	0.3507	2.37	17.43	141.787	79.7591
305	0.82	0.3497	2.35	17.43	141.464	79.7741
306	0.81	0.3507	2.35	17.46	141.124	79.6182
307	0.81	0.3509	2.36	17.44	141.119	79.7217
308	0.80	0.3525	2.34	17.45	140.993	79.6606
309	0.79	0.3517	2.37	17.43	140.686	79.6785
310	0.79	0.3513	2.36	17.46	140.475	79.5858
311	0.80	0.3524	2.36	17.47	140.538	79.5967
312	0.77	0.3545	2.4	17.46	140.274	79.5804
313	0.77	0.3569	2.37	17.47	140.126	79.622
314	0.77	0.3568	2.41	17.41	139.961	79.6737
315	0.75	0.3583	2.42	17.39	139.96	79.56
316	0.75	0.3655	2.4	17.39	139.779	79.4198
317	0.74	0.3618	2.41	17.38	139.516	79.5497
318	0.73	0.3617	2.41	17.38	139.298	79.6146
319	0.73	0.364	2.43	17.41	139.276	79.5526
320	0.72	0.3625	2.4	17.38	139.025	79.4443
321	0.72	0.3641	2.41	17.41	139.027	79.4453
322	0.72	0.3629	2.4	17.39	138.959	79.4833
323	0.71	0.3639	2.42	17.39	138.796	79.508
324	0.70	0.362	2.43	17.39	138.538	79.3576
325	0.70	0.3625	2.41	17.45	138.511	79.3811
326	0.69	0.363	2.42	17.43	138.396	79.4735
327	0.69	0.3647	2.41	17.43	138.451	79.3421
328	0.68	0.3653	2.43	17.48	138.315	79.4024
329	0.68	0.3686	2.43	17.41	138.209	79.4638
330	0.67	0.3676	2.44	17.45	138.218	79.4726
331	0.66	0.3667	2.41	17.41	138.092	79.3822
332	0.66	0.3747	2.43	17.42	137.897	79.4163
333	0.65	0.3733	2.4	17.42	137.642	79.3565
334	0.64	0.3678	2.43	17.45	137.628	79.2497
335	0.64	0.3604	2.38	17.46	137.474	79.1229
336	0.63	0.3591	2.39	17.65	137.39	79.2527
337	0.62	0.3597	2.4	17.57	137.161	79.2638
338	0.62	0.3623	2.4	17.54	137.353	79.0794
339	0.61	0.3625	2.42	17.55	137.217	79.1902
340	0.60	0.3608	2.39	17.54	137.01	79.2683
341	0.60	0.3593	2.37	17.56	136.872	79.1886
342	0.60	0.358	2.37	17.54	136.765	79.1681
343	0.59	0.3556	2.4	17.57	136.706	79.1752
344	0.58	0.3554	2.39	17.65	136.552	79.2241
345	0.58	0.3548	2.37	17.59	136.475	79.2285
346	0.57	0.3495	2.37	17.61	136.189	79.1165
347	0.56	0.3476	2.34	17.64	136.096	79.1534
348	0.56	0.348	2.36	17.65	135.954	79.1243
349	0.55	0.3508	2.37	17.62	135.981	79.1785
350	0.55	0.3474	2.37	17.63	135.83	79.1867
351	0.54	0.3488	2.37	17.61	135.637	79.19
352	0.54	0.3483	2.37	17.63	135.694	79.1443
353	0.53	0.3499	2.38	17.62	135.58	79.1562
354	0.53	0.3521	2.42	17.6	135.574	79.1129
355	0.52	0.3599	2.43	17.56	135.451	79.0697
356	0.51	0.3595	2.42	17.57	135.477	79.0979
357	0.50	0.3625	2.46	17.58	135.448	79.0605
358	0.51	0.3608	2.41	17.56	135.321	79.1102
359	0.50	0.3604	2.43	17.59	135.223	79.1645
360	0.48	0.3596	2.43	17.6	135.183	79.0774
361	0.48	0.362	2.43	17.61	135.339	78.9923

362	0.48	0.3613	2.45	17.62	135.356	79.0739
363	0.47	0.3599	2.43	17.61	135.288	78.9732
364	0.47	0.3556	2.38	17.62	135.057	78.9336
365	0.46	0.3533	2.34	17.71	135.098	78.9604
366	0.45	0.3535	2.38	17.68	135.229	79.0151
367	0.46	0.3507	2.33	17.72	135.08	78.9502
368	0.45	0.3499	2.35	17.75	135.159	78.9162
369	0.44	0.3468	2.32	17.75	134.85	78.8867
370	0.44	0.3451	2.32	17.77	134.678	78.9576
371	0.42	0.3449	2.3	17.82	134.605	78.9639
372	0.43	0.3444	2.31	17.79	134.616	78.9068
373	0.43	0.3444	2.3	17.82	134.55	78.9023
374	0.43	0.3459	2.3	17.79	134.535	78.9546
375	0.41	0.3453	2.28	17.87	134.356	78.8425
376	0.42	0.342	2.26	17.84	134.157	78.7995
377	0.40	0.3422	2.25	17.84	134.166	78.8974
378	0.40	0.3447	2.29	17.83	134.174	78.839
379	0.39	0.3444	2.31	17.84	134.099	78.8871
380	0.39	0.3417	2.28	17.85	133.92	78.758
381	0.38	0.3422	2.27	17.87	133.874	78.7633
382	0.39	0.3425	2.28	17.82	133.92	78.8506
383	0.37	0.3406	2.29	17.87	133.644	78.8409
384	0.37	0.3416	2.29	17.87	133.662	78.7949
385	0.36	0.3429	2.27	17.87	133.514	78.8116
386	0.37	0.3405	2.28	17.87	133.42	78.7433
387	0.35	0.3409	2.28	17.84	133.176	78.8005
388	0.35	0.3422	2.25	17.85	133.259	78.822
389	0.34	0.342	2.27	17.83	133.139	78.7905
390	0.33	0.3419	2.31	17.83	132.926	78.7331
391	0.34	0.3412	2.26	17.84	132.867	78.7848
392	0.32	0.3381	2.27	17.86	132.855	78.7234
393	0.32	0.34	2.29	17.84	132.798	78.7982
394	0.31	0.3403	2.28	17.85	132.666	78.7074
395	0.31	0.3395	2.3	17.85	132.568	78.6938
396	0.31	0.3401	2.28	17.89	132.646	78.7357
397	0.29	0.3402	2.26	17.86	132.634	78.6484
398	0.29	0.3394	2.26	17.84	132.55	78.6366
399	0.29	0.3387	2.24	17.85	132.469	78.7099
400	0.28	0.3405	2.21	17.96	132.285	78.6143
401	0.29	0.3389	2.22	17.94	132.252	78.6884
402	0.28	0.3383	2.2	17.94	132.152	78.52
403	0.28	0.3347	2.16	17.95	131.998	78.7025
404	0.26	0.3341	2.18	17.94	132.053	78.7516
405	0.27	0.334	2.17	17.95	131.906	78.6502
406	0.25	0.3335	2.18	17.9	131.74	78.6502
407	0.24	0.3296	2.16	17.94	131.686	78.7187
408	0.24	0.3328	2.16	18.01	131.572	78.715
409	0.24	0.3297	2.14	17.99	131.459	78.6304
410	0.24	0.3317	2.17	17.95	131.34	78.6151
411	0.23	0.3321	2.15	17.98	131.337	78.6586
412	0.23	0.3349	2.16	18.1	131.248	78.6282
413	0.22	0.3307	2.14	18.06	130.978	78.6238
414	0.22	0.3308	2.14	18.02	131.051	78.635
415	0.22	0.3265	2.11	17.98	130.845	78.5797
416	0.21	0.3272	2.14	18.01	130.769	78.5407
417	0.21	0.3285	2.12	18.03	130.774	78.6172
418	0.19	0.3273	2.11	18.03	130.578	78.5712
419	0.19	0.3277	2.12	18.01	130.539	78.4959
420	0.19	0.3277	2.11	18.04	130.441	78.5943
421	0.19	0.3287	2.11	18.02	130.38	78.5282
422	0.17	0.3286	2.11	18.06	130.185	78.583
423	0.17	0.3349	2.14	18.04	130.204	78.556
424	0.17	0.3411	2.12	18.03	130.132	78.5271
425	0.16	0.3402	2.14	17.99	130.109	78.4393
426	0.16	0.3417	2.12	18.01	129.965	78.5347
427	0.16	0.3377	2.12	18.01	129.901	78.4557
428	0.15	0.3336	2.12	18.05	129.843	78.4759
429	0.14	0.3319	2.08	18.02	129.633	78.4927
430	0.14	0.3332	2.11	18.18	129.508	78.3679
431	0.13	0.3322	2.08	18.21	129.543	78.5337
432	0.13	0.3319	2.06	18.16	129.432	78.4542
433	0.13	0.3361	2.04	18.16	129.425	78.3811
434	0.12	0.3349	1.96	18.18	129.39	78.2379
435	0.12	0.3418	1.99	18.2	129.208	78.3876
436	0.11	0.3417	1.98	18.2	129.099	78.3901

437	0.12	0.3332	1.96	18.12	129.02	78.4253
438	0.10	0.3271	1.97	18.1	128.964	78.2709
439	0.10	0.3209	1.94	18.15	128.871	78.3685
440	0.10	0.3178	1.92	18.16	128.795	78.4053
441	0.09	0.3159	1.95	18.2	128.546	78.3262
442	0.09	0.3193	1.93	18.29	128.611	78.3762
443	0.09	0.3174	1.96	18.27	128.579	78.3383
444	0.08	0.3137	1.94	18.27	128.333	78.3608
445	0.07	0.3107	1.93	18.25	128.117	78.3059
446	0.08	0.3098	1.93	18.26	128.012	78.2476
447	0.08	0.3039	1.92	18.25	127.869	78.329
448	0.06	0.3035	1.91	18.22	127.814	78.2612
449	0.05	0.3023	1.9	18.21	127.753	78.2684
450	0.05	0.2991	1.91	18.21	127.697	78.1933
451	0.05	0.2969	1.9	18.27	127.559	78.2414
452	0.04	0.2964	1.87	18.24	127.35	78.1615
453	0.04	0.2946	1.87	18.33	127.236	78.1693
454	0.05	0.2934	1.86	18.31	126.9	78.2094
455	0.04	0.2904	1.86	18.3	126.811	78.1979
456	0.04	0.2927	1.87	18.19	126.905	78.2525
457	0.03	0.296	1.87	18.23	126.783	78.1014
458	0.02	0.2951	1.86	18.21	126.708	78.1215
459	0.01	0.2935	1.85	18.23	126.677	78.1889
460	0.02	0.2917	1.85	18.24	126.396	78.2305
461	0.01	0.2913	1.85	18.3	126.351	78.0191
462	0.01	0.2904	1.84	18.35	126.207	78.1861
463	0.01	0.2926	1.86	18.34	126.1	78.1127
464	0.00	0.3071	1.87	18.22	126.055	78.116

Stove Builder International Inc.

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	2.1 series		
Date:	02-24-21		
Run:	3		
Control #:	G104576994		
Test Duration:	464		
Output Category:	Low		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	75.1%	80.5%
Combustion Efficiency	95.9%	95.9%
Heat Transfer Efficiency	78%	84.0%

Output Rate (kJ/h)	8,930	8,471	**(Btu/h)**
Burn Rate (kg/h)	0.63	1.39	**(lb/h)**
Input (kJ/h)	11,885	11,274	**(Btu/h)**

Test Load Weight (dry kg)	4.89	10.78	**dry lb**
MC wet (%)	16.6		
MC dry (%)	19.90		
Particulate (g)	7.501		
CO (g)	316		
Test Duration (h)	7.73		

Emissions	**Particulate**	**CO**
g/MJ Output	0.11	4.57
g/kg Dry Fuel	1.53	64.62
g/h	0.97	40.85
lb/MM Btu Output	0.25	10.63

Air/Fuel Ratio (A/F)	20.12

VERSION: **2.4** **2010-04-15**

VERSION: 2.4 2010-04-15

Manufacturer: SBI
Model: 2.1 series
Date: 2021-02-25
Run: 4
Control #: G104576994
Test Duration: 88
Output Category: High

Appliance Type: Non-Cat (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Default Fuel Values

	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Fuel Data

	Beech	
HHV	18,800	kJ/kg
%C	48.7	
%H	5.8	
%O	44.9	
%Ash	0.6	

Wood Moisture (% wet): 16.80
Load Weight (lb wet): 9.71
Burn Rate (dry kg/h): 2.50
Total Particulate Emissions: 6.344 g

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurence and the next reading showing a decrease in weight.

	Averages	0.07	9.31	11.97	443.15	73.35
					Temp. (°F)	
Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%) CO	CO_2	O_2	Flue Gas	Room Temp
0	9.71	0.07	4.18	15.92	415.3	77.0
1	9.56	0.17	1.64	18.25	360.6	77.6
2	9.45	0.18	1.53	18.93	335.0	77.8
3	9.23	0.23	2.24	18.85	343.8	78.0
4	9.11	0.26	7.72	15.11	360.1	78.1
5	9.00	0.20	7.83	14.11	373.5	77.8
6	8.86	0.13	9.24	12.75	393.1	77.9
7	8.73	0.09	9.35	12.17	408.2	77.8
8	8.59	0.10	9.23	12.01	417.8	77.9
9	8.46	0.11	9.70	11.64	426.7	78.0
10	8.31	0.08	10.44	11.04	435.2	77.7
11	8.17	0.05	11.47	10.21	449.0	75.1
12	8.01	0.03	11.71	9.76	459.7	75.2
13	7.87	0.03	11.78	9.56	467.6	74.0
14	7.70	0.02	11.83	9.43	471.9	73.4
15	7.54	0.02	11.89	9.43	476.1	73.4
16	7.38	0.02	11.69	9.47	478.4	73.2
17	7.23	0.02	11.55	9.55	478.9	72.6
18	7.06	0.02	11.45	9.66	479.3	72.6
19	6.94	0.02	11.47	9.65	478.8	72.4
20	6.76	0.03	11.61	9.59	480.5	73.4
21	6.61	0.03	11.93	9.35	483.0	73.7
22	6.47	0.04	11.95	9.20	485.9	74.1
23	6.30	0.05	11.77	9.31	487.1	72.2
24	6.13	0.05	11.78	9.34	489.7	72.4
25	5.99	0.06	11.81	9.34	490.7	73.3
26	5.82	0.06	12.03	9.14	491.9	72.6
27	5.68	0.07	12.19	8.94	494.2	72.6
28	5.49	0.06	12.24	8.90	495.5	73.3
29	5.35	0.06	12.23	8.91	496.3	73.0
30	5.19	0.07	12.31	8.85	497.2	72.8
31	5.03	0.07	12.36	8.80	499.2	72.8
32	4.86	0.08	12.31	8.81	499.8	72.7
33	4.72	0.08	12.34	8.79	500.2	73.1
34	4.56	0.08	12.54	8.72	501.9	72.6
35	4.40	0.09	12.43	8.70	503.4	73.0
36	4.24	0.09	12.49	8.66	503.5	72.2
37	4.09	0.09	12.58	8.64	503.9	73.0
38	3.95	0.10	12.48	8.68	504.7	72.9
39	3.80	0.09	12.49	8.69	505.1	73.2
40	3.64	0.08	12.41	8.71	505.7	73.5
41	3.50	0.07	12.40	8.77	504.0	73.0
42	3.35	0.05	12.35	8.82	503.6	72.7
43	3.22	0.06	12.31	8.90	503.0	72.7
44	3.07	0.05	12.13	9.03	501.6	72.2
45	2.94	0.04	11.88	9.26	499.0	72.4
46	2.80	0.03	11.76	9.43	496.7	72.6
47	2.65	0.03	11.60	9.61	493.9	72.4
48	2.55	0.02	11.55	9.64	492.2	72.0
49	2.42	0.0227	11.62	9.64	489.509	71.9088
50	2.31	0.0226	11.28	9.83	487.049	72.0801
51	2.19	0.0142	10.61	10.37	483.793	72.7123
52	2.08	0.012	10.19	10.84	477.427	72.5681
53	2.00	0.013	9.97	11.09	473.913	72.3791
54	1.89	0.0143	9.92	11.22	470.209	73.3363

55	1.78	0.0135	9.7	11.39	467.698	73.5536
56	1.69	0.0159	9.57	11.58	463.096	73.1311
57	1.59	0.0168	9.43	11.72	459.586	72.756
58	1.53	0.0185	9.36	11.81	457.431	72.5805
59	1.43	0.0171	9.25	11.92	455.359	73.1499
60	1.33	0.0172	9.34	11.93	453.591	73.2055
61	1.24	0.0174	9.21	12.01	451.976	72.6774
62	1.20	0.0152	8.64	12.43	448.386	72.8498
63	1.09	0.0208	8.18	12.9	442.885	72.7916
64	1.02	0.0298	7.8	13.28	437.544	73.0165
65	0.97	0.0347	7.66	13.54	432.503	72.7712
66	0.88	0.0321	7.42	13.81	425.823	72.9278
67	0.84	0.0336	7.23	14.03	421.124	72.7016
68	0.77	0.0367	7.06	14.22	416.471	72.8843
69	0.74	0.0395	6.95	14.4	411.567	72.2567
70	0.67	0.0423	6.89	14.49	407.042	72.8749
71	0.62	0.0465	6.8	14.61	403.769	72.5935
72	0.58	0.0494	6.67	14.73	400.11	72.1461
73	0.51	0.0474	6.61	14.81	396.376	72.0232
74	0.45	0.0519	6.56	14.9	392.045	72.006
75	0.42	0.0582	6.26	15.17	387.664	72.6109
76	0.39	0.0747	5.97	15.5	381.639	72.0412
77	0.35	0.1161	5.6	15.84	375.132	72.2151
78	0.32	0.136	5.36	16.13	369.495	72.0806
79	0.28	0.1564	5.24	16.34	363.896	72.1718
80	0.24	0.1775	5.09	16.5	358.766	72.0098
81	0.20	0.1807	5.22	16.47	354.279	71.5633
82	0.19	0.1731	5.21	16.51	350.592	72.007
83	0.14	0.1693	5.14	16.57	347.844	72.0788
84	0.12	0.1648	5.09	16.64	344.903	72.1121
85	0.11	0.1655	5.05	16.7	341.646	71.5954
86	0.06	0.162	5.08	16.7	340.289	71.8154
87	0.04	0.1594	5.07	16.73	339.082	71.8027
88	0.00	0.1582	5.01	16.79	336.375	71.9573

Stove Builder International Inc.

Manufacturer:	SBI	**Technicians:**	Claude Pelland
Model:	2.1 series		
Date:	02-25-21		
Run:	4		
Control #:	G104576994		
Test Duration:	88		
Output Category:	High		

Test Results in Accordance with CSA B415.1-10

	HHV Basis	LHV Basis
Overall Efficiency	72.5%	77.7%
Combustion Efficiency	99.4%	99.4%
Heat Transfer Efficiency	73%	78.1%

Output Rate (kJ/h)	34,042	32,293	**(Btu/h)**
Burn Rate (kg/h)	2.50	5.51	**(lb/h)**
Input (kJ/h)	46,965	44,551	**(Btu/h)**

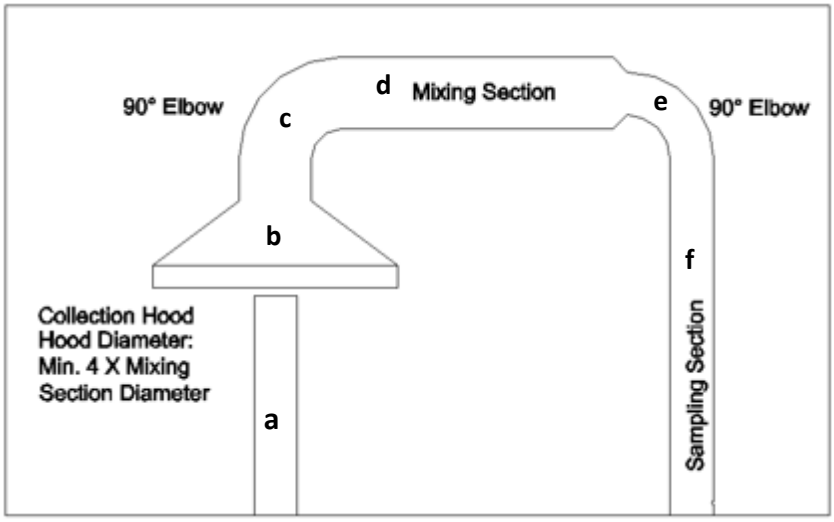
Test Load Weight (dry kg)	3.66	8.08	**dry lb**
MC wet (%)	16.8		
MC dry (%)	20.19		
Particulate (g)	6.344		
CO (g)	48		
Test Duration (h)	1.47		

Emissions	**Particulate**	**CO**
g/MJ Output	0.13	0.96
g/kg Dry Fuel	1.73	13.12
g/h	4.33	32.79
lb/MM Btu Output	0.30	2.24

Air/Fuel Ratio (A/F)	11.38

VERSION: **2.4** **2010-04-15**

1. Tunnel cleaning pictures



a. Picture of the chimney



b. Picture of the collecting hood



c. Picture of the first elbow



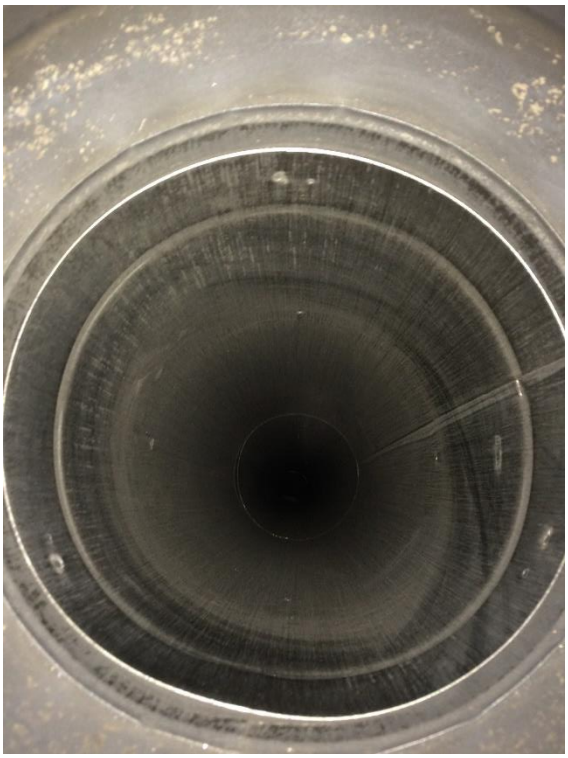
d. Picture of the mixing section



e. Picture of the second elbow



f. Picture of the sampling section



2. Identification pictures

a. Front view



b. Rear view



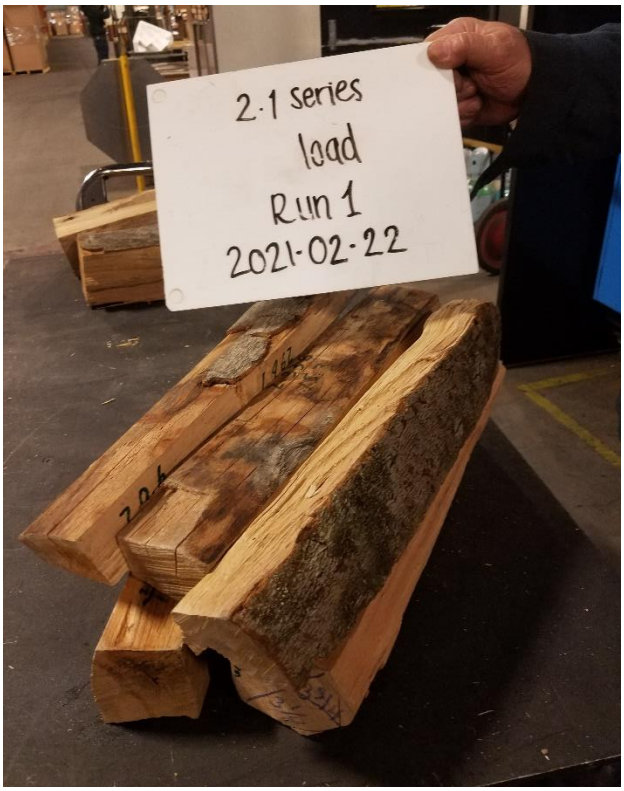
c. Iso view



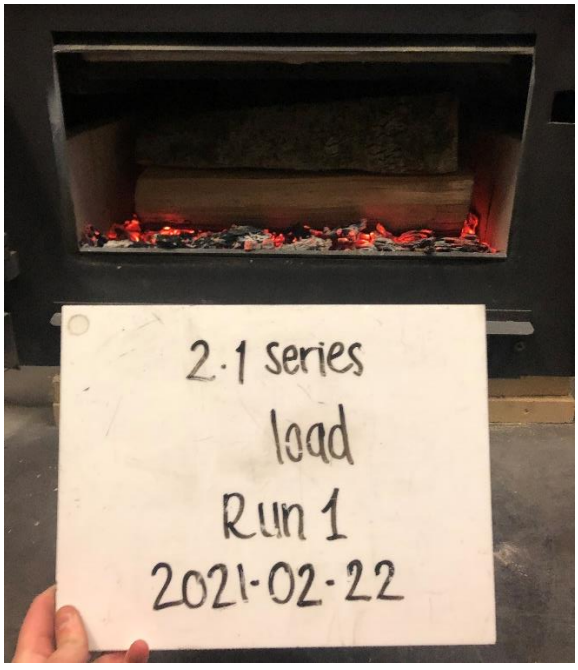
3. Test run pictures

a. Run #1

i. Picture of the load

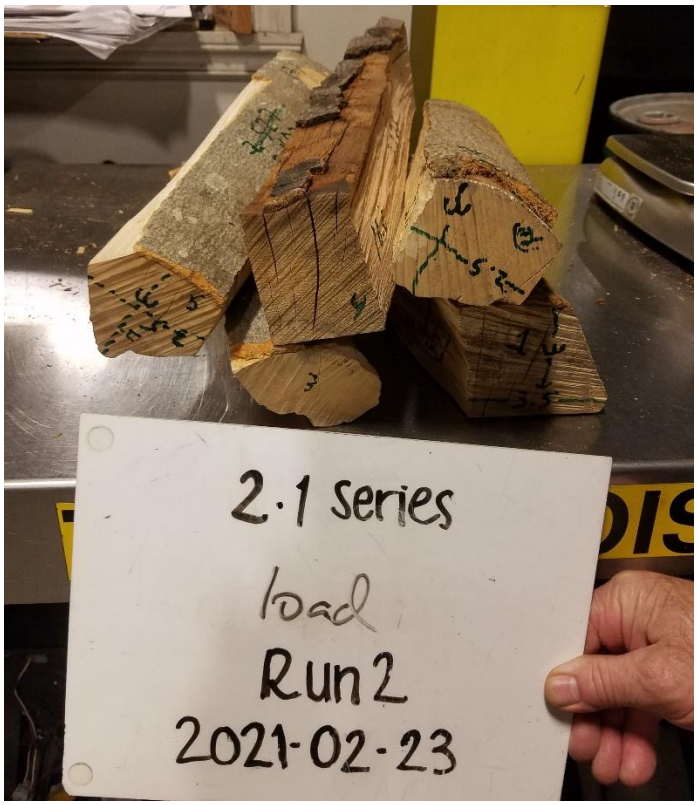


ii. Picture of the load inside of the combustion chamber

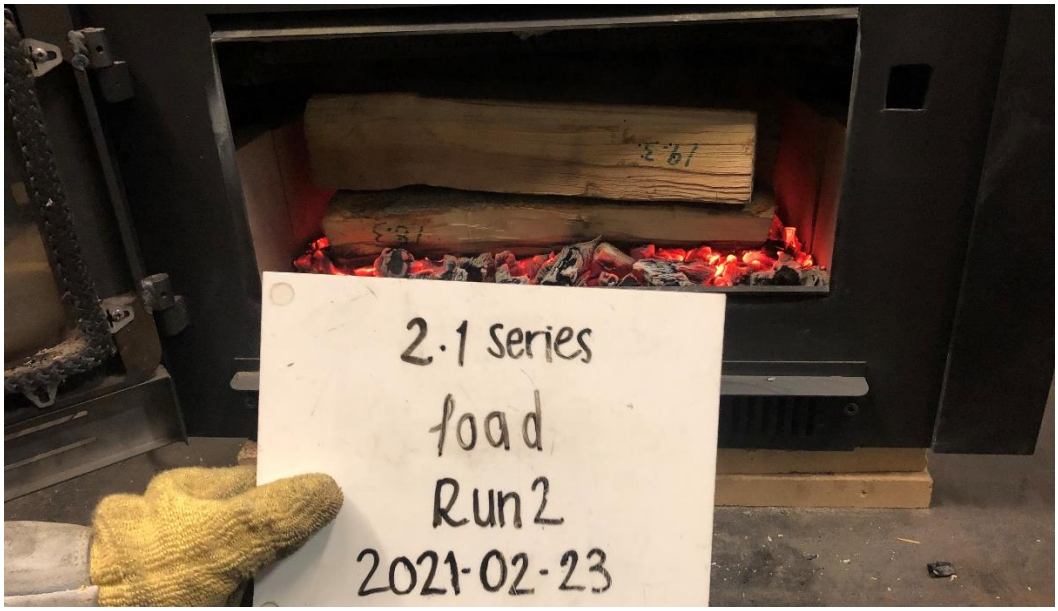


b. Run #2

i. Picture of the load

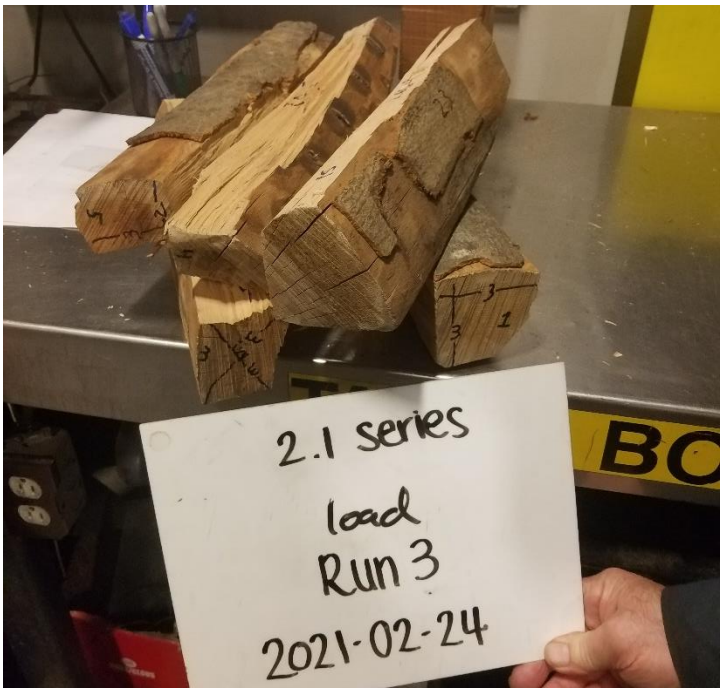


ii. Picture of the load inside the combustion chamber

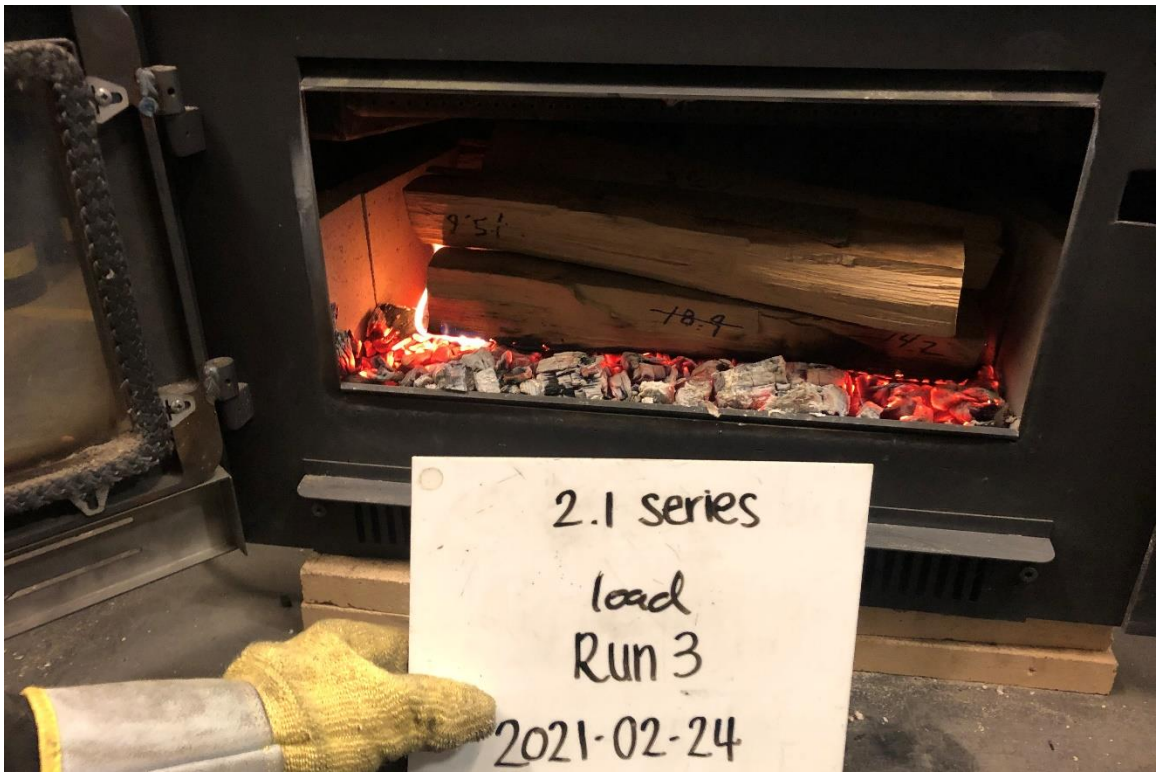


c. Run #3

i. Picture of the load



ii. Picture of the load inside the combustion chamber

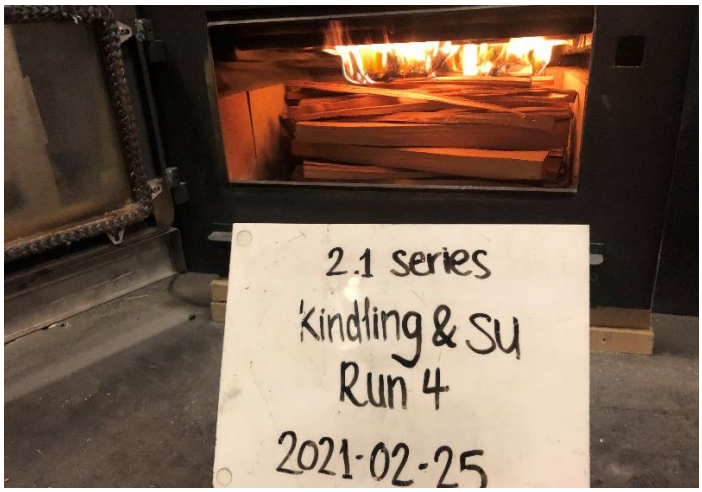


d. Run #4

i. Picture of the kindling and start-up fuel.



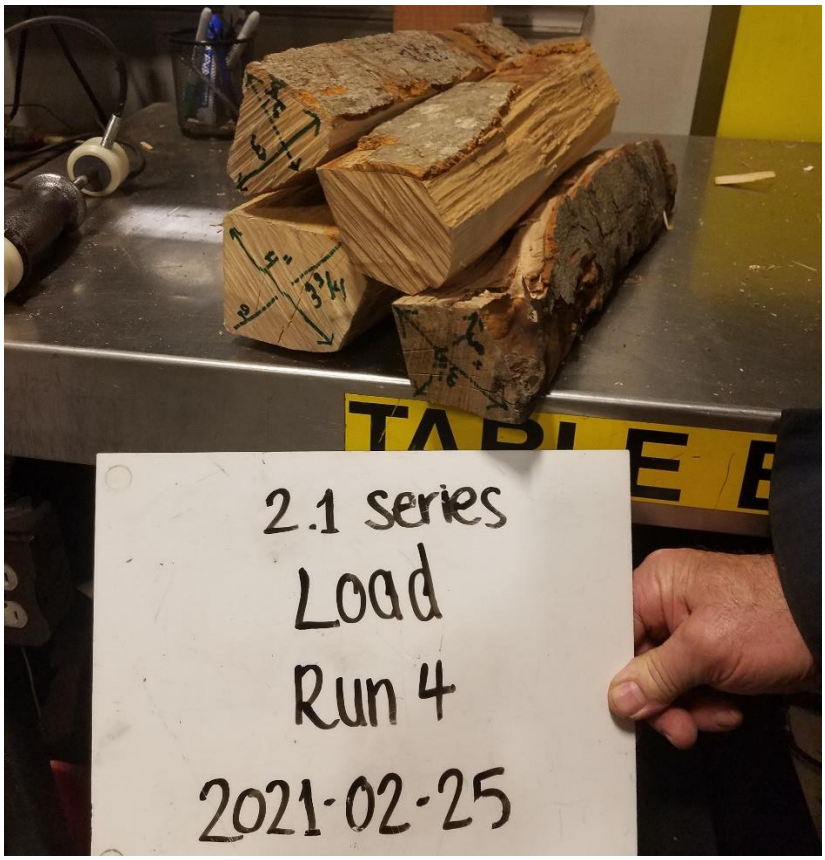
ii. Picture of kindling and start-up fuel after loading.



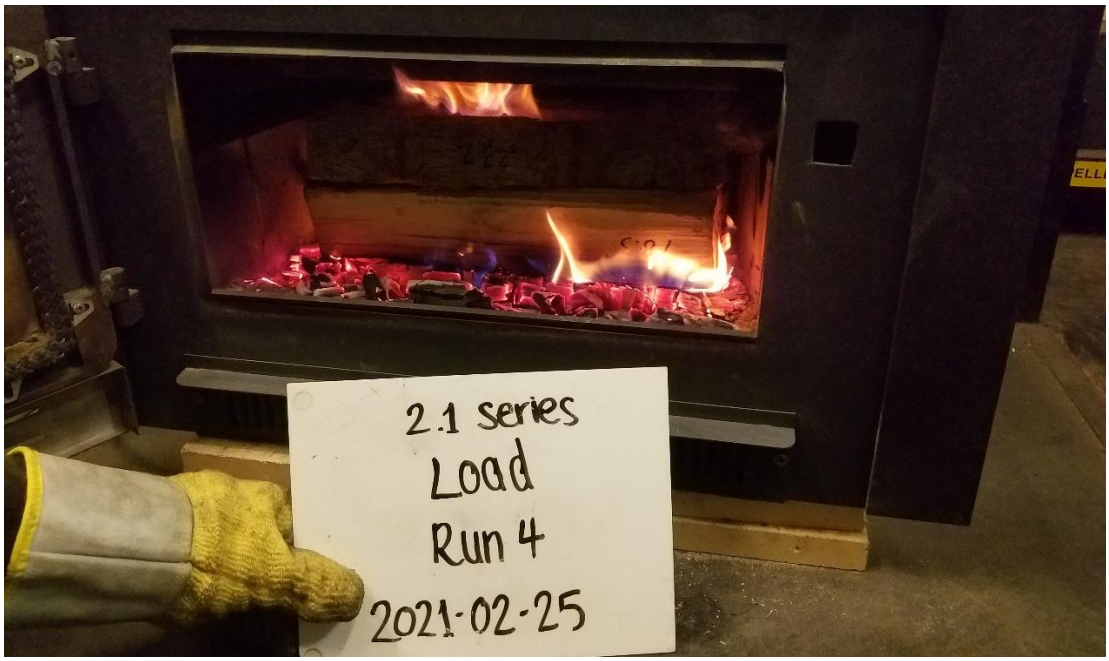
iii. Picture of re-ajusted kindling (10:13 AM)



iv. Picture of the high fire test fuel load.



v. Picture of the load inside of the combustion chamber.



4. Picture of the sealed unit

a. Front view



b. Rear View



c. Iso view



United States Environmental Protection Agency

OMB Control No. 2060-0161
Approval expires 03/31/2019

OMB Control No. 2060-0693
Approval expires 03/31/2019

EPA Form 6400-05

Office of Enforcement and Compliance Assurance

30-DAY NOTIFICATION

2015 CLEAN AIR ACT (CAA) STANDARDS OF PERFORMANCE FOR NEW RESIDENTIAL WOOD HEATERS, NEW RESIDENTIAL HYDRONIC HEATERS AND FORCED-AIR FURNACES 40 CFR PART 60 SUBPARTS AAA AND QQQQ

The public reporting and recordkeeping burden for this collection of information is estimated to average 2 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Regulatory Support Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

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Instructions: The manufacturer of an affected wood/pellet heater/central heater model line must notify the Administrator of the date that certification testing is scheduled to begin by email to WoodHeaterReports@epa.gov. This notice must be received by the EPA at least 30 days before the start of testing.

GENERAL INFORMATION						
Manufacturer's Name: Stove Builder International						
Heater Type Check one):	☒Adjustable Burn Rate Wood Heater	☐Pellet Stove	☐Single Burn Rate Heater	☐Hydronic Heater	☐Forced Air Furnace	☐Other:
Hydronic Heater Type (Check one):	☐Full Storage	☐Partial Storage	☐Indoor	☐Outdoor	☐Other:	
Forced-Air Furnace Type (Check one):	☐Small (less than 65,000 BTU/hr heat output)		☐Large (greater than 65,000 BTU/hr heat output)			
Fuel Tested (Check one):	☐Crib	☐Pellet	☒Cordwood	☐Wood Chips	☐Other:	
Model Name(s) (as will appear on test report): 2.1 Series						
Model Number(s) (as will appear on test report): These are preliminary names subject to change. Official names will be on Test Report : Destination 1.9, Matrix 1900, CW2100, Green Mountain Insert 50, HEI50, Archway 1500						
Equipped with a catalytic combustor? ☐Yes ☒No						

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Mailing Address: Same as street address		
Street Address: 250 rue de Copenhague		
City: Saint-Augustin-de-Desmaures	**State: Québec**	**ZIP Code: G3A 2H3**
Phone:1-418-878-3040 x5224	**Fax: 1-418-878-3001**	**Web Site:** www.sbi-international.com
Address of Manufacturer: **Same as above.**		
City:	**State**	**ZIP Code:**
EPA APPROVED TEST LABORATORY		
Name and Title of Authorized Representative: Claude Pelland, Project Engineer		
Company: Intertek		
Phone: 1-514-631-3100 x277	**E-mail:** **claude.pelland@intertek.com**	**Fax: 1-514-631-1133**

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City: Lachine	**State: Québec**	**ZIP Code: H8T 3J1**
EPA APPROVED THIRD-PARTY CERTIFIER		
Name and Title of Authorized Representative: Charles Meyers, Director, Product Certification		
Company: Intertek Testing Services NA, Inc.		
Phone: 312-906-7783	**E-mail: charles.meyers@intertek.com**	**Fax:**
City: Arlington Heights	**State: IL**	**ZIP Code: 60005**
COMPLIANCE TEST INFORMATION		
Test Method(s): ASTM E3053-17 as per letter the Broadly Applicable Alternative Test Method from EPA of 2/28/2018 (Alt-125)		
Date(s) of Proposed Test: February 22nd, 2021		

United States
Environmental Protection
Agency

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Testing Location (Name and Address): Stove Builder International Laboratory **250 rue de Copenhague, Saint-Augustin-de-Desmaures,** **Québec, Canada, G3A 2H3**	
Contact Name: Guillaume Thibodeau-Fortin	**Title: Engineer**
Phone Number: 1-418-878-3040 x5224	**Email Address:** gthibodeaufortin@sbi-international.com

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Environmental Protection
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Guillaume Thibodeau-Fortin
_____
Print Name and Title of Authorized Official



_____
Signature

01-21-2021
_____
Date

Telephone Number: 1-418-878-3040 x 5224

Email Address: gthibodeaufortin@sbi-international.com

Remarks:

v1

Guillaume Thibodeau-Fortin

De: Guillaume Thibodeau-Fortin
Envoyé: 21 janvier 2021 10:10
À: WoodHeaterReports
Cc: Sanchez, Rafael; 'Claude Pelland Intertek'
Objet: 30-days notification

Hello,
This is to notify that SBI will start a test program on 2.1 series wood heater on February 22nd, 2021.

Thank you,

Guillaume Thibodeau-Fortin, Ing./Eng.
Ingénieur mécanique
Mechanical Engineer

| T : 418-878-3040 ext.5224 |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

FEB 2 8 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

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

Dear Mr. White,

I am writing in response to your letter dated January 12, 2018, regarding wood heaters manufactured by Hearthstone QHPP, Inc. (Hearthstone). This response, dated February 28, 2018, supercedes our previous response (dated February 26, 2018) to correct an inaccuracy regarding required changes to ASTM E3053-17.

You are requesting to use an alternative test method, using cord wood, as referenced in section 60.532(c) of 40 CFR part 60, Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA) to meet the 2020 cord wood alternative compliance option. The 2020 cord wood alternative compliance option states that each affected wood heater manufactured or sold at retail for use in the United States on or after May 15, 2020, must not discharge into the atmosphere any gases that contain particulate matter in excess of 2.5 g/hr. Compliance must be determined by a cord wood test method approved by the Administrator along with the procedures in 40 CFR 60.534. You have requested approval to use the procedures and specifications found in ASTM Method E3053-17, a cord wood test method titled, "Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel," in conjunction with ASTM E2515-11 and Canadian Standards Administration (CSA) Method CSA-B415.1-10, which are specified in 40 CFR 60.534.

We understand that Hearthstone is also requesting that the alternative method proposed above be approved to apply broadly to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA, from the approval date of this request until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, providing all requirements of section 60.533 of Subpart AAA are met.

With the caveats set forth below, we approve your alternative test method request for certifying wood heaters using ASTM E3053-17 in conjunction with section 60.534 of Subpart AAA to meet the 2020 cord wood compliance option until such time that Subpart AAA is revised or replaced to require a different cord wood certification method. We also approve application of this alternative method to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA.

As required in Subpart AAA, section 60.354(d), you or your approved test laboratory must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run. Also, as required by Subpart AAA, section 60.534(e), you must have your approved laboratory measure the efficiency, heat output, and carbon monoxide emissions of the tested wood heater using CSA-B415.1-10. For measurement of particulate matter emission concentrations, ASTM 2515-11 must be used.

The following change to ASTM E3053-17 must be followed:

1. Coal bed conditions prior to loading test fuel. The coal bed shall be a level plane without valleys or ridges for all test runs in the high, low, and medium burn rate categories.

The following changes to ASTM E2515-11 must be followed:

1. The filter temperature must be maintained between 80 and 90 degrees F during testing.

2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.

3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 47 mm, 90 mm, 100 mm, or 110 mm in diameter.

4. Only one point is allowed outside the +/- 10 percent proportionality range per test run.

A copy of this letter must be included in each certification test report where this alternative test method is utilized.

It is reasonable that this alternative test method approval be broadly applicable to all wood heaters subject to the requirements of 40 CFR part 60, Subpart AAA. For this reason, we will post this letter as ALT-125 on our website at *http://www3.epa.gov/ttn/emc/approalt.html* for use by other interested parties. As noted earlier in this letter, this alternative method approval is valid until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, and at such time, this alternative will be reconsidered and possibly withdrawn.

If you have additional questions regarding this approval, please contact Michael Toney of my staff at 919-541-5247 or toney.mike@epa.gov.

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Amanda Aldridge, EPA/OAQPS/OID
Adam Baumgart-Getz, EPA/OAQPS/OID
Rafael Sanchez, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD

March 22nd, 2021

Air Branch/Wood Heater Program Lead
Monitoring, Assistance, and Media Programs Division
Office of Compliance
U.S. EPA
1200 Pennsylvania Ave., NW
MS:2227A
Washington, DC 20004
Attn: EPA Administrator

Subject: Compliance Statements and Acknowledgements for 2.1 Series

Dear Administrator,
As stated in the application for certificate of compliance, Stove Builder International Inc (SBI) states and acknowledges the 13 items below.

1. SBI provided all engineering drawing (including specifications for each component listed in paragraphs (k)(2), (3) and (4) of 60.533(b) and 60.5475(b) available in Intertek Test Report 104576994MTL-001 at Appendix D. Tolerances are identified on all part draft and cannot reasonably be anticipated to cause wood heater in the model line to exceed the applicable emission limits. The user's manual shows how to replace and inspect emission-critical part such as the secondary tubes.
2. SBI confirm that the firebox or any firebox component (including the materials listed in paragraph (k)(3) of 60.533(b) and 60.5475(b) will be composed of material similar from the material used for the firebox or firebox component in the wood heater on which certification testing was performed. Individual brick size and color may vary but the specification of the material remains the same. The inner firebox brick coverage remains also always the same. If other differences occur over time, a description of any such differences and demonstration that any such differences may not reasonably be anticipated to adversely affect emissions or efficiency will be communicate with Residential Wood Heater Compliance Program Lead.
3. SBI will provide to Residential Wood Heater Compliance Program Lead the Confidential Business Information (CBI) report including all test data and drawings by e-mail to Sanchez.Rafael@epa.gov.
4. SBI provided all documentation that proves that the certification tests were valid. Raw data sheets, laboratory technician notes, calculations and test results were provided to Residential Wood Heater Compliance Program Lead in the appendix of Intertek Test Report 104576994MTL-001. SBI confirms that the burn rate for the low burn rate category is no greater than the rate that an operator can achieve in home use and no greater than is advertised by the manufacturer or retailer.
5. SBI provided in Appendix D of Intertek Test Report 104576994MTL-001 a copy of the warranty that stated: "This warranty is void if the unit is used to burn materials other than cordwood (for which the unit is not certified by the EPA) and void if not operated according to the owner's manual. This warranty applies to normal residential use only. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, venting problems or under-estimated heating area are not covered by this warranty. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum

acceptable temperature in the designated area in case of a power failure."

6. SBI, with the help of the certification laboratory, Intertek, built a Quality Assurance Program. A quality control is performed for each unit produced and 4 times a year, Intertek audits our production line to make sure that the models in production comply with the certification unit.
7. SBI confirms that the certification model was sealed by Intertek as per picture of Appendix H. Permanent straps holds the unit on a wooden palette and prevent the door from opening. Intertek logo is painted over the unit and the strap as a protection. The sealed unit will be store at SBI laboratory as long as the unit is in production, but a least for 5 years after certification test.
8. SBI states that the units produce under this certificate will be:
    a. Similar in all material respects that would affect emissions as defined in § 60.531 to the wood heater submitted for certification testing, and labeled as prescribed in § 60.536 and 60.5478.
    b. Accompanied by an owner's manual that meets the requirements in § 60.536 and 60.5478. A copy of the owner's manual was submitted to the Administrator and will be available to the public on the manufacturer's web site at production launch.
9. SBI has entered into contracts with an approved laboratory and third-party certifier which is Intertek. Intertek Montreal is the approved laboratory and the third-party certifier is the Arlington Heights chapter of Intertek.
10. SBI allows the approved laboratory and approved third-party certifier to submit information to Residential Wood Heater Compliance Program Lead on behalf of SBI, including any claimed to be CBI.
11. SBI will place a copy of the certification test report, summary and all non-CBI on the manufacturer's web site available to the public within 30 days after the Administrator issues a certificate of compliance.
12. SBI acknowledges that the certificate of compliance cannot be transferred to another manufacturer or model line without written approval by the Administrator.
13. SBI acknowledges that it is unlawful to sell, distribute or offer to sell or distribute an affected wood heater without a valid certificate of compliance.

Print name and title : Guillaume Thibodeau-Fortin, Eng. Laboratory Date : 2021-03-22

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

2021-03-22

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

United States
Environmental Protection
Agency

OMB Control No. 2060-0161
Approval expires 3/31/2019

OMB Control No. 2060-0693
Approval expires 3/31/2019

EPA Form 6400-03

RESIDENTIAL WOOD HEATER CERTIFICATE OF COMPLIANCE APPLICATION

INSTRUCTIONS

Pursuant to the 2015 Clean Air Act Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces, 40 CFR Part 60 Subparts AAA and QQQQ (2015 Wood Heater Rule), any manufacturer of an affected residential wood heater must apply to the EPA for a certificate of compliance for each model line. Without applying for and obtaining a certificate of compliance, a manufacturer may not manufacture, advertise for sale, offer for sale, or sell affected residential wood heaters in the United States.

Under Subpart AAA, affected residential wood-burning room heaters currently include, but are not limited to, adjustable burn rate stoves, catalytic adjustable burn rate stoves; hybrid adjustable burn rate stoves; single burn rate stoves; and pellet stoves.

Under Subpart QQQQ, affected residential wood-burning central heaters currently include, but are not limited to, indoor hydronic heaters ("wood boilers"); outdoor hydronic heaters ("outdoor wood boilers"); and forced-air furnaces ("warm air furnaces").

By completing and submitting this application to EPA, you will satisfy the requirement to apply for a certificate of compliance. To submit a complete application, this application must include the following:

(1) Certification test report prepared by an EPA-approved test laboratory
(2) Certification of conformity by an EPA-approved third party certifier
(3) Quality assurance plan
(4) All required supporting documentation and manufacturer statements pursuant to the 2015 Wood Heater Rule (Sections 60.533 or 60.5475)

This application must be signed by a responsible representative of the manufacturer or an authorized representative. Once completed with all required information/documentation included, this application must be submitted to WoodHeaterReports@epa.gov.

The public reporting and recordkeeping burden for this collection of information is estimated to average 8 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Regulatory Support Division, U.S. Environmental Protection Agency (EPA) (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed application to this address.

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to Part 60 Subparts AAA AND QQQQ, Sections 60.537 and 60.5479. If you have additional questions, please contact Rafael Sanchez at 202-

564-7028, Residential Wood Heater Compliance Program Lead, or via email at sanchez.rafael@epa.gov.

MANUFACTURER INFORMATION

Manufacturer's Name: Stove Builder International

Manufacturer's Physical Address:
250 rue de Copenhague
Saint-Augustin-de-Desmaures,
Canada, G3A 2H3

Manufacturer's Mailing Address (if different from physical address):

Name and Title of Manufacturer's Responsible/Authorized Representative Submitting this Application:
Guillaume Thibodeau-Fortin

Manufacturer's Contact E-mail: gthibodeaufortin@sbi-international.com

Manufacturer's Phone Number: 1-418-878-3040 x5224

Manufacturer's Website Address:
www.sbi-international.com

Manufacturer's Website Address where the test report and owner's manual will be posted, if known:
www.enerzone-intl.com www.osburn-mfg.com
www.century-heating.com www.occanada.com
www.empirestove.com
https://www.hearthstonestoves.com/

AFFECTED WOOD HEATER MODEL INFORMATION

Model Name(s) (as appearing on the certification test report). Please note: the model name and design number must clearly distinguish one model from another. The name and design number cannot include the EPA symbol or logo or name or derivatives such as "EPA": 2.1 Series

Model Number(s) (as appearing on the certification test report): Destination 1.9, Matrix 1900, CW2100, Green Mountain Insert 50, HEI90, Archway 1500

Heater Type Check one):	☒Adjustable Burn Rate Wood Stover		☐Pellet Stove	☐Single Burn Rate Wood Stove	☐Hydronic Heater	☐Forced-Air Furnace (FAF)
Hydronic Heater Type (Check one):	☐Full Storage		☐Partial Storage	☐Indoor	☐Outdoor	
Forced-Air Furnace Type (Check one):	☐Small (less than 65,000 BTU/hr heat output)			☐Large (greater than 65,000 BTU/hr heat output)		
Fuel Tested (Check one):	☐Crib		☐Pellet	☒Cordwood	☐Wood Chips	☐Other:
Certification Step:	☐2015	☐2016 (FAFs only)	☐2017 (FAFs only)	☒2020 (ALL HEATERS)		

Was this heater tested using an EPA-approved Alternative Test Method (ATM)? ☒Yes ☐No

If yes, provide date of EPA approval and attach copy of EPA approved ATM letter):
2/28/2018

If not, what Test Method(s) did the test laboratory use for the certification test? (List all applicable test methods):

Heater equipped with a catalytic combustor? ☐Yes ☒No

Date of submission of 30-Day Notice to the EPA:1/21/2021

What was the proposed date(s) of testing? 02/22/2021

What was the actual date(s) of testing? 02/22/2021

Was the compliance test postponed or suspended? ☐Y ☒N If yes, date of EPA notification of postponement or suspension:

Explain reason for postponing or suspending the certification test:

EPA-APPROVED TEST LABORATORY

Name of EPA-Approved Test Laboratory: Intertek

Name(s) of Person(s) Authorized and/or Responsible for Conducting Certification Test: Claude Pelland, Eng.

Position/Title: Project Engineer

Address: 1829, 32nd avenue

City: Lachine	**State: Québec**	**ZIP Code: H8T 3J1**
Phone: 1-514-631-3100 x277	**Email: claude.pellant@intertek.com**	

EPA-APPROVED THIRD PARTY CERTIFIER

Name of EPA-Approved Third-Party Certifier: Intertek

Name(s) of Person(s) Authorized and/or Responsible for Reviewing Test Report and/or Issuing Certification of Conformity: Charles Meyers

Position/Title: Director, Product Certification

Address: 545 E Algonquin Rd

City: Arlington Heights	**State: IL**	**ZIP Code: 60005**
Phone: 312-906-7783	**Email: charles.meyers@intertek.com**	

REQUIRED SUPPORTING DOCUMENTATION/MANUFACTURER STATEMENTS

NOTE: TO COMPLETE THIS APPLICATION, ALL REQUIRED DOCUMENTATION AND MANUFACTURER STATEMENTS MUST ACCOMPANY THIS APPLICATION.

1. Engineering Drawings

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

2. Firebox Statement Requirement

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

3. Confidential Business Information

Clear identification of any claimed confidential business information (CBI). Submit such information under separate cover to the EPA CBI Office; Attn: Residential Wood Heater Compliance Program Lead, 1200 Pennsylvania Ave., NW, Room 7149-D, MS:2227A, Washington, DC 20460. **Note that all emissions data, including all information necessary to determine emission rates in the format of the standard, cannot be claimed as CBI.**

4. All Documentation Pertaining to a Valid Certification Test

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

5. Warranties

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

6. Quality Assurance Program Statement

A statement that the manufacturer will conduct a quality assurance program for the model line that satisfies the requirements of § 60.533(m).

7. Laboratory Sealing of Unit

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

8. Statements that the Wood Heaters Manufactured under this Certificate will be:

(i) Similar in all material respects that would affect emissions as defined in § 60.531 to the wood heater submitted for certification testing, and

(ii) Labeled as prescribed in § 60.536 and 60.5478, and

(iii) Accompanied by an owner's manual that meets the requirements in § 60.536 and 60.5478. In addition, a copy of the owner's manual must be submitted to the EPA and be available to the public on the manufacturer's web site.

9. Third Party Certification Statement

A statement that the manufacturer has entered into contracts with an approved laboratory and an approved third-party certifier that satisfy the requirements of § 60.533(f).

10. Approved Laboratory/Third Party Statement

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

11. Manufacturer's Website Certification Test Reports Availability Statement

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

12. Transferability Acknowledgement Statement

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

13. Statement about Selling Wood Heaters without an EPA Certificate

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

PLEASE ACKNOWLEDGE THAT ALL REQUIRED SUPPORTING DOCUMENTATION AND MANUFACTURER STATEMENTS ACCOMPANY THIS APPLICATION.

Initials 

SIGNATURE OF RESPONSIBLE OFFICER OR AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER CERTIFYING THE ACCURACY AND COMPLETENESS OF THIS APPLICATION:

Signature: 

Print Name: Guillaume Thibodeau-Fortin, Eng.

Title: Laboratory Engineer

Date: 2021-03-22

The responsible officer or authorized representative of the manufacturer whose signature is above is certifying that the manufacturer has complied with all requirements of the 2015 Wood Heater Rule for compliance certification and will continue to do so. The manufacturer remains responsible for compliance regardless of any error by the EPA-approved test laboratory or third-party certifier.