UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

September 26, 2023

Mr. Guillaume Thibodeau-Fortin
Laboratory Manager
Stove Builder International, Inc.
250 Rue De Copenhague
Saint-Augustin-de-Desmaures
Quebec, Canada
G3A 2H3

Re: Renewal of Certificate of Compliance Number 139-18 for 25-CBPAH, 55-SHPCBPAH, and 55-TRPCBPAH Pellet-Fired Freestanding Room Heater Models

Dear Mr. Thibodeau-Fortin:

I am pleased to inform Stove Builder International, Inc. that the above-referenced models have been approved for renewal of a Certificate of Compliance pursuant to the 2015 New Source Performance Standard (NSPS) for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces at 40 CFR Part 60, Subpart AAA (2015 NSPS) by the United States Environmental Protection Agency. Pursuant to the 2015 NSPS, this Certificate of Compliance is valid through September 26, 2028. As discussed below, this renewal is based, in part, on a certification test report documenting a retest of the above-referenced models. EPA has determined that the retest demonstrated compliance with the applicable emission standard and was conducted in accordance with the 2015 NSPS. Therefore, this Certificate of Compliance is being renewed with an updated emissions rate, heat output range, overall heating efficiency, and carbon monoxide emission rate resulting from the certification retest. This letter serves as your pellet heater Certificate of Compliance. Please refer to the above-referenced Certificate of Compliance number in all future correspondence.

In accordance with the 2015 Wood Heater Rule at 40 CFR Part 60, § 60.533(i)(2), a manufacturer of a heater model line may apply to EPA for renewal of the model line's Certificate

of Compliance. To do so, the manufacturer may submit all required documentation and follow all procedures as specified in §§ 60.533(b) and 60.533(f).

Based on a November 22, 2021,[1] certification test report prepared by Intertek Testing Services NA, Inc. (Intertek) documenting the retest for the above-referenced models and demonstrating compliance with American Society of Testing and Materials (ASTM) methods E2515 and E2779, a June 14, 2022,[2] Certification of Conformity by Intertek and the information provided in your September 11, 2023, request for renewal of the Certificate of Compliance, the above-referenced models continue to meet the certification requirements at § 60.533. Under the 2015 NSPS, the models' emission rate of 1.5 g/hr meets the 2020 NSPS particulate matter emissions limit of 2.0 g/hr. The heat output range and overall heating efficiency for the above-referenced models are 11,099 – 25,123 BTU/hr and 68%, respectively. This model line's carbon monoxide emission rate is 0.0017 g/min. Therefore, pursuant to §§ 60.533(i)(2) and (i)(3), EPA is renewing the Certificate of Compliance. You may not advertise for sale, offer for sale, or sell heaters under this Certificate of Compliance after September 26, 2028, without applying for and being issued another Certificate of Compliance with an updated expiration date.

All pellet heaters manufactured or sold under this Certificate of Compliance must comply with EPA labeling requirements found at § 60.536. These provisions require each pellet heater to have a permanent label affixed to it, including the month and year of manufacture, model name or number, serial number, updated certification test emission value, test method, standard met, and compliance certification statement.

In addition, you must comply with all applicable requirements of the regulation, including:

1. Conducting a third-party certifier-approved quality assurance program that ensures that all units within a model line are similar to the pellet heater submitted for certification testing in all respects that would affect emissions and are in compliance with the applicable emission limit, pursuant to § 60.533(m);

2. Applying for recertification whenever any change is made to the above-referenced models that affects or is presumed to affect the particulate matter emission rate for the model line, pursuant to § 60.533(k)(1);

3. Providing an owner's manual that includes the information listed in § 60.536(g)(1) with each affected pellet heater model offered for sale;

4. Placing a copy of the non-Confidential Business Information (non-CBI) certification test report on the manufacturer's website and available to the public within 30 days after the

[1] Revised on June 14, 2022, September 1, 2023, and September 19, 2023.
[2] Revised on September 7, 2023 and September 20, 2023.

EPA issues a Certificate of Compliance, pursuant to § 60.533(b)(12). If later revised, the up-to-date non-CBI certification test report should remain posted on the manufacturer's website for as long as the model line is manufactured and offered for sale in the U.S.;

5. Submitting a report to the EPA every two years following the issuance of a Certificate of Compliance for each model line. This report must include the sales for each model by state and certify that no changes in the design or manufacture of this model line have been made that require recertification under § 60.533(k);

6. Retaining records and submitting reports as required at § 60.537; and

7. Submitting pellet heaters for audit testing if selected by the EPA under §§ 60.533(n)(1)(i) and (2)(i).

Failure to comply with these requirements may result in revoking this Certificate of Compliance and enforcement action, including penalties as specified under the Clean Air Act. To promote transparency in implementing the Wood Heater Program, we request that manufacturers submit a copy of the Uniform Resource Locator (URL) or web address where the test report is posted to WoodHeaterReports@epa.gov within ten (10) days of posting.

Once we have verified that the revised test report documenting the certification retest has been posted on the manufacturer's website, the agency will continue to list the above-referenced models in the EPA-Certified Wood Heater Database.

If you have any questions concerning this letter, please contact the Wood Heater Program at WoodHeaterReports@epa.gov.

Sincerely,

ELIZABETH VIZARD

Digitally signed by ELIZABETH VIZARD
Date: 2023.09.26 18:29:52 -04'00'

Elizabeth Vizard
Acting Director
Monitoring, Assistance, and Media Programs Division
Office of Compliance
Office of Enforcement and Compliance Assurance

CERTIFICATE OF CONFORMITY

Emissions – Pellet Heater

EPA 40 CFR Part 60, Subpart AAA, ASTM E2779-10 (R2017), ASTM E2515-11 (R2017), CSA B415.1-2010 (R2020)

WHI22 – 21514321

Organization

Stove Builder International
250 de Copenhauge
St Augustin de Desmaures, QC G3A 2H3
Canada

Product: 25-CBPAH, 55-SHPCBPAH, 55-TRPCBPAH

Catalytic: No
Maximum Output: 25,123 Btu/hr
Weighted Average Emissions: 1.47 g/hr
Weighted Average Annual Delivered Efficiency (HHV): 67.6%
Test Fuel Type: Premium Wood Pellets
Weighted Average CO Emissions Rate (g/min): 0.0017
Conformance: Complies with 2020 particulate emissions standard
Test Report No.: 104805205MID-007R3
Product Evaluation Report: 105096672MID-001d

Certification Body: Intertek Testing Services NA, Inc.
Registered Address: 545 E. Algonquin Rd., Arlington Heights, IL 60005, USA
Initial Issue Date: 14-Jun-22
Issue Status: 3

This is a certificate of conformity to confirm that the bearer has successfully completed the requirements of the Intertek certification scheme which include the testing of products and the initial assessment. The bearer is subject to continuing assessments of their compliance through surveillance and testing of products samples taken from production (as applicable to the scheme) and has been registered within the scheme for the products detailed. The validity of this certificate is contingent to the listing's status on the Intertek Directory of Building Products: bpdirectory.intertek.com.

Jean-Philippe Kayl Vice President – Global Certification		19-Sep-23
Name	Signature	Date

Certificate of Conformity WHI22-21514321
Appendix A

Certificate of Conformity #:		Certificate of Conformity Issue Date:	
WHI22-2151421		June 14, 2022	
REVISION #	**REVISION DATE**	**REPORT PAGES**	**REVISION**
0	June 14, 2022	N/A	Original Report Issue. Ownership transferred from England's Stove Works to Stove Builder International. Previous CoC WHI15-208507006 issued 21-Jan-2022.
1	September 7, 2023	N/A	Revision to test report per EPA notification
2	September 20, 2023	N/A	Corrected CO emissions to two significant figures.

Revised Report #:		Report Issue Date:	
103461297MID-005		May 18, 2018	
REVISION #	**REVISION DATE**	**REPORT PAGES**	**REVISION**
0	May 18, 2018	N/A	Original Report Issue

Revised Report #:		Report Issue Date:	
104805205MID-007		November 15, 2021	
REVISION #	**REVISION DATE**	**REPORT PAGES**	**REVISION**
0	November 15, 2021	N/A	Replaces report #103461297MID-005 in its entirety with new emissions results. Original issue.
1	June 14, 2022	17	Added note for not measuring ambient particulates.
		24	Added Appendices
2	September 1, 2023	18	Corrected Table 1 to change the burn rates from a "dry" weight to a "wet" weight.
3	September 20, 2023	2, 18, 19	Corrected CO emissions to two significant figures.

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ENGLAND STOVE WORKS, INC.
TEST REPORT

SCOPE OF WORK
EPA EMISSIONS TESTING FOR MODEL 25-CBPAH

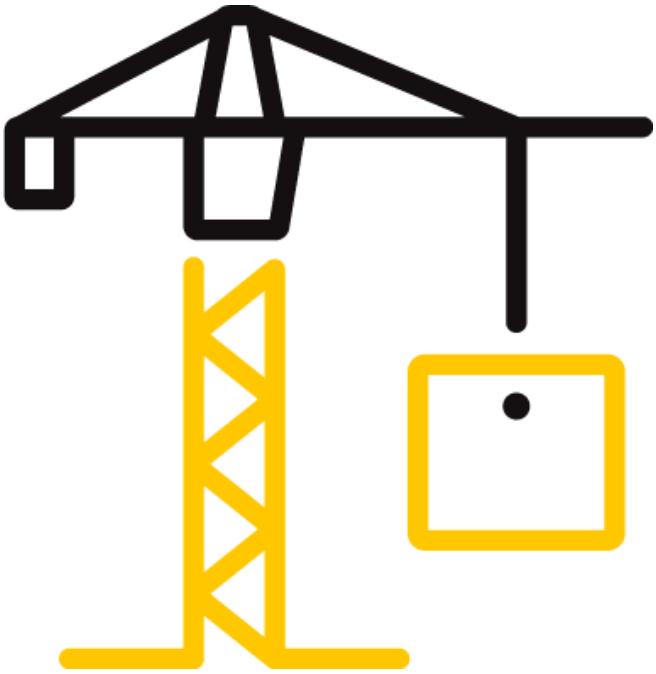
REPORT NUMBER
104805205MID-007R3

TEST DATE(S)
11/15/21

ISSUE DATE **[REVISED DATE]**
11/22/21 9/19/23

PAGES
23

DOCUMENT CONTROL NUMBER
GFT-OP-10c (05/10/17)



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TEST REPORT FOR ENGLAND STOVE WORKS, INC.
Report No.: 104805205MID-007R3
Date: 9/19/23

REPORT ISSUED TO

ENGLAND STOVE WORKS, INC.
589 South Five Forks Road
Monroe, VA 24574-2821

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by England Stove Works, Inc. to perform testing in accordance with EPA 40 CFR Part 60 "Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces", ASTM E2515-17 - Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel, ASTM E2779-17 - Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters, CSA B415.1-2010 (R2020) - Performance Testing of Solid-Fuel-Burning Heating Appliances on their Model 25-CBPAH, Pellet Fuel Room Heater. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek test facility in Middleton, WI.

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

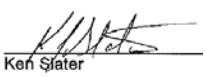
SECTION 2

SUMMARY OF TEST RESULTS

The appliance tests resulted in the following performance for test # 1:

Particulate Emissions: 1.47 g/hr
Carbon Monoxide Emissions: 0.0017 g/min
Heating Efficiency: 67.6 % (Higher Heating Value Basis)

For INTERTEK B&C:

COMPLETED BY:	Ken Slater	**REVIEWED BY:**	Brian Ziegler
TITLE:	Associate Engineer – Hearth	**TITLE:**	Technical Team Leader - Hearth
SIGNATURE:	 Ken Slater	**SIGNATURE:**	
DATE:	09/19/23	**DATE:**	09/19/23

aaa:bbb

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SECTION 3
TEST METHOD(S)

The specimen was evaluated in accordance with the following:

EPA 40 CFR Part 60-2015 - Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces

ASTM E2515-2017 - Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel

ASTM E2779-2017 - Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters

CSA B415.1-2010 (R2020) - Performance Testing of Solid-Fuel-Burning Heating Appliances

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 received at Intertek in Middleton, WI on 11/15/21 and was shipped via the client. The unit was assigned sample ID # MID2111150903-001. 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 beginning the emissions tests, the unit was operated for a minimum of 48 hours at high-to-medium burn rates to break in the stove. This break-in period was conducted by England Stove Works, Inc. staff and a copy of the data is included in the final report. The unit was found to be operating satisfactory during this break-in. The 48 plus hours of pre-burning were conducted from 9/23/21 through 10/1/21. The fuel used for the break-in process was wood pellets.

Following the pre-burn break-in process the unit was allowed to cool and ash and residue was removed from the firebox. The unit's chimney system and laboratory dilution tunnels were cleaned using standard wire brush chimney cleaning equipment. On 11/15/21 the unit was set-up for testing.

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SECTION 5
EQUIPMENT

Equipment	INV Number	Calibration Due	MU
Timer	1212	4/5/22	0.7 sec
Timer	646	4/5/22	0.7 sec
Pressure Transducer	1406	1/13/22	0.00007"H^2O
Data Acquisition	986	4/12/22	0.06°F
Platform Scale	1134	4/6/22	.118 lbs
Hygrometer	1450	11/23/21	0.35 RH
Flow Meter	1413	2/20/22	0.020 slpm
Flow Meter	1414	2/20/22	0.020 slpm
Flow Meter	1519	2/20/22	0.020 slpm
Balance	713	4/11/22	0.00006g
Anamometer	1457	5/14/22	4 fpm

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Ken Slater	Intertek B&C
Justin Buck	Intertek B&C
John Wray	England Stove Works, Inc.

SECTION 7
TEST PROCEDURE

On 11/15/21 the unit was tested for EPA emissions. For pellet stoves, the test was conducted in accordance with ASTM E2779-17. The fuel used for the test run was premium-Grade Pellets (Marthwood).

The applicable EPA regulatory limits are:

Step 1 – 2015 – 4.5 grams per hour.

Step 2 – 2020 – 2.0 grams per hour.

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TEST SET-UP DESCRIPTON

A 3" horizontal flue is connected by a 90° elbow and adapters to a standard 6" diameter vertical single wall pipe and insulated chimney system was installed to 15' above floor level. The singe wall pipe extended to 8 feet above the floor and insulated chimney extended the remaining height.

AIR SUPPLY SYSTEM

Combustion air enters a 2" inlet pipe located on the back of the heater, which is directed to the pellet burn pot. All gases exit through the 3" flue also located at the back of the heater. The exhaust gases are assisted by a combustion blower.

TEST FUEL PROPERTIES

Wood pellets used for the testing were Marth premium grade hardwood pellets, with a majority of the wood species consisting of oak and maple. The pellets have PFI a measured heating value of 8160 Btu/hr (18967 kJ/kg) and a moisture content of 3.36% on a dry basis and 3.25% on a wet basis.

SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 20 feet from the tunnel entrance. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. (See Figure 3.) The sampling section is a continuous 13 foot section of 6 inch diameter pipe straight over its entire length. Tunnel velocity pressure is determined by a standard Pitot tube located 60 inches from the beginning of the sampling section. The dry bulb thermocouple is located six inches downstream from the Pitot tube. Tunnel samplers are located 60 inches downstream of the Pitot tube and 36 inches upstream from the end of this section. (See Figure 1.)

Stack gas samples are collected from the steel chimney section 8 feet ± 6 inches above the scale platform. (See Figure 2.)

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Date: 9/19/23

FIGURE 1 – DILUTION TUNNEL

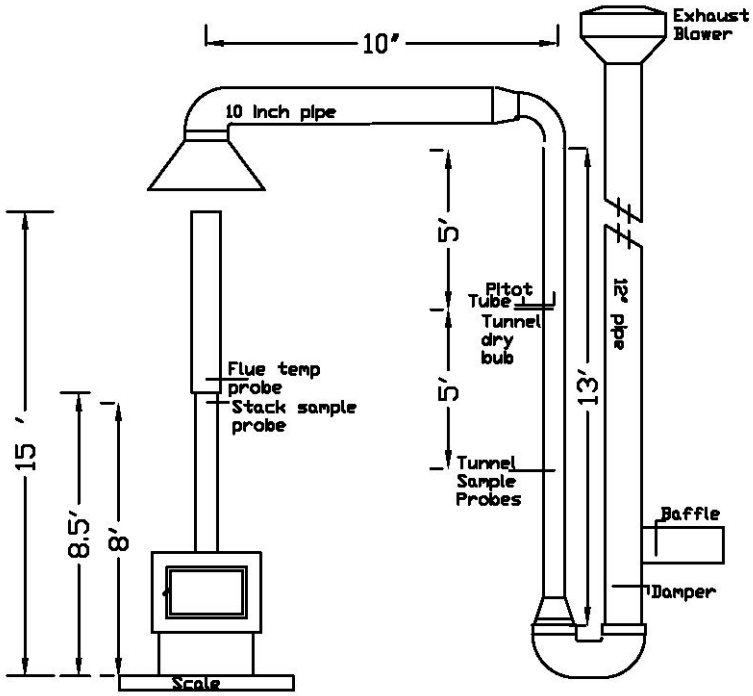
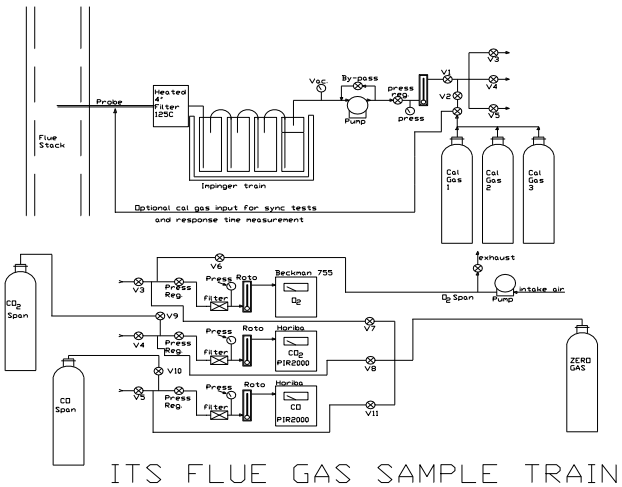


FIGURE 1

FIGURE 2 – STACK GAS SAMPLE TRAIN



ITS FLUE GAS SAMPLE TRAIN

FIGURE 2

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FIGURE 3 – DILUTION TUNNEL SAMPLE SYSTEMS

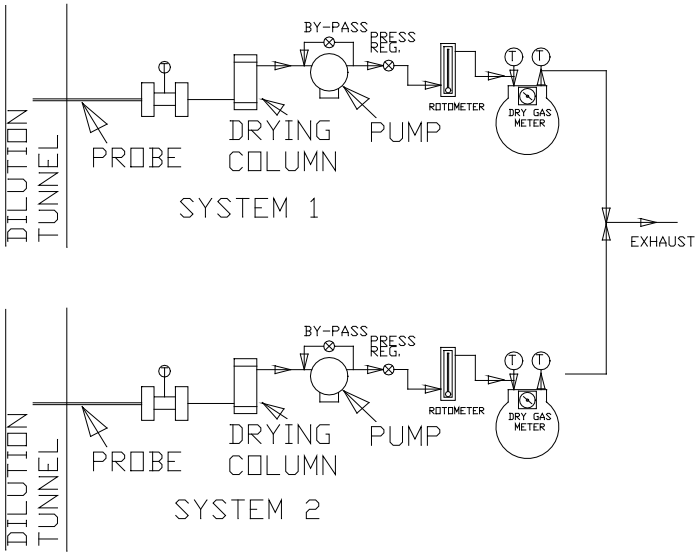

Figure 3

SAMPLING METHODS

PARTICULATE SAMPLING

Particulates were sampled in strict accordance with ASTM E2515. This method uses two identical sampling systems with Gelman A/E 61631 binder free, 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 analyzed individually to determine the first hour and total emissions rate.

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INSTRUMENT CALIBRATION

DRY GAS METERS

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 D.

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.

STACK SAMPLE ROTAMETER

The stack sample rotometer is checked by running three tests at each flow rate used during the test program. The flow rate is checked by running the rotometer in series with one of the dry gas meters for 10 minutes with the rotometer 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 analyzer 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.

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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 ASTM E2515. Final tunnel velocities and flow rates are calculated from ASTM E2515, Equations 3 and 9. (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.

PM SAMPLING PROPORTIONALITY

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

DEVIATIONS FROM STANDARD METHOD:

None

SECTION 8
TEST CALCULATIONS

WEIGHT OF TEST FUEL BURNED (DRY) – ASTM E2779

$$M_{Bdb} = (M_{Swb} - M_{Ewb})(100/(100 + FM))$$

where:

FM = average fuel moisture of test fuel, % dry basis,
M_{Swb} = weight of test fuel in hopper at start of test run, wet basis, kg (lb),
M_{Ewb} = weight of test fuel in hopper at end of test run, wet basis, kg (lb), and
M_{Bdb} = weight of test fuel burned during test run, dry basis, kg (lb).

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WEIGHT OF TEST FUEL BURNED PER TEST SEGMENT (DRY) – ASTM E2779

$$M_{BSidb} = (M_{SSiwb} – M_{ESiwb}) (100/(100 + FM))$$

where:
M_{SSiwb} = weight of test fuel in hopper at start of test run segment *i*, wet basis, kg (lb),
M_{ESiwb} = weight of test fuel in hopper at end of test run segment *i*, wet basis, kg (lb),
M_{BSidb} = weight of test fuel burned during test run segment *i*, dry basis, kg (lb), and
i = test run segments in accordance with 9.4, Table 1.

AVERAGE BURN RATE FOR FULL TEST (DRY) – ASTM E2779

$$BR = 60\ M_{Bdb}/\theta$$

where:
BR = average dry burn rate over the full integrated test run, kg/h (lb/h), and
θ = total length of full integrated test run, min.

AVERAGE BURN RATE PER TEST SEGMENT (DRY) – ASTM E2779

$$BR_{Si} = 60\ M_{BSidb}/\ \theta_{Si}$$

where:
BR_{Si} = average dry burn rate over test run segment *i*, kg/h (lb/h), and
θ_{Si} = total length of test run segment *i*, min.

AVERAGE EMISSION RATE FOR FULL TEST (g/hr) – ASTM E2779

$$PM_R = 60(E_T/\theta)$$

where:
E_T = total particulate emissions for full integrated test run measured using Test Method E2515, g (lb),
θ = total length of test run, min, and
PM_R = average particulate emission rate over the full integrated test run, g/h.

AVERAGE EMISSION FACTOR FOR FULL TEST (g/kg dry) – ASTM E2779

$$PM_F = E_T/M_{Bdb}$$

where:
PM_F = average particulate emission factor over the full integrated test run, g/dry kg of fuel burned.

AVERAGE EMISSIONS FOR FULL TEST (g/MJ or lb/MMBtu) – ASTM E2779

$$PM_H = E_T/E_O$$

where:

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E_O = average measured overall heat output over the full integrated test run from Annex A1, MJ (MMBTU), and

PM_H = average particulate emissions in accordance with unit of average heat output over the full integrated test run, g/MJ (lb/MMBtu).

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.

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).

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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.

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

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

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

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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

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

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

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

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.

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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}

$E_T = (c_s - c_r)\, Q_{sd}\, \theta = (0.000555 - 0.000074) \times 150 \times 180 = 13.00g$
$\delta E_T/\delta c_s = Q_{std} \bullet \Theta = 150 \bullet 180 = 27{,}000$
$\delta E_T/\delta c_r = Q_{std} \bullet \Theta = 150 \bullet 180 = 27{,}000$
$\delta E_T/\delta Q_{std} = c_s \bullet \Theta - c_r \bullet \Theta = 0.000555 \bullet 180 - 0.000074 \bullet 180 = 0.08667$
$\delta E_T/\delta \Theta = c_s \bullet Q_{std} - c_r \bullet Q_{std} = 0.000555 \bullet 180 - 0.000074 \bullet 180 = 0.07222$
$MU_{ET} = \sqrt{(27{,}000 \bullet 0.0000081)^2 + (27{,}000 \bullet 0.00001)^2\ (0.08667 \bullet 3)^2}$
$\sqrt{} + (0.07222 \bullet 0.1)^2 = 0.436$

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

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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

The mass flow rate shall be calculated as follows:

$$m = 3600VAp$$

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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)

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

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

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 model 25-CBPAH Pellet Fuel Room Heater is constructed of sheet steel. The outer dimensions are 25-inches deep, 35.5-inches high, and 24.5-inches wide. The unit has a door located on the front with a viewing glass.

SECTION 10
TEST RESULTS

DESCRIPTION OF TEST RUNS:

RUN #1 (11/15/21): The test for pellet heaters is a continuous test with three separate burn rates. At 8:52 am the unit was started and operated for a minimum of 1 hour for the pretest operation. At 10:03 am the unit was set to the maximum feed rate (level 9) with a burn rate of 2.05 kg/hr (wet), the scale was tared and a 25-lb weight was added to the scale to determine feed rate of the fuel, and the sampling system was started. At 11:03 am, the system #3 sampling filter was turned off and the unit was set to ≤50% feed rate (level 2) with a burn rate of 1.02 kg/hr (wet). At 1:03 pm, the heater was changed to the minimum feed rate (level 1) with a burn rate of 0.97 kg/hr (wet). At 4:03 pm, testing was completed. The total burn time was 360 minutes.

The test run has been found to be appropriate, with no anomalies, and the test run has been validated and is deemed compliant. No negative weight was found on the filters, as the filters and gaskets are weighed together to eliminate filter material transfer to gaskets. All weightings were handled property, with no negative weight on gaskets or probes.

No attempt was made to collect the ambient background particulate during testing. Any collection that would have been made, would subtract from the particulate collected in the dilution tunnel. The particulate collected in the dilution tunnel has been deemed worst case.

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TABLE 1 – EMISSIONS

RUN#	TEST DATE	BURN RATES (kg/hr)(Wet)		PARTICULATE EMISSION RATE (g/hr)	1st HOUR EMISSIONS (g)	CO EMISSIONS (g/min)	HEATING EFFICIENCY (%HHV)
1	11/15/21	H*	2.05	1.47	1.00	0.0017	67.6
		M*	1.02				
		L*	0.97				
		OA*	1.17				

*Notes: H= High burn rate, M= Medium burn rate, L= low burn rate, OA= overall burn rate.

TABLE 2 – TEST FACILITY CONDITIONS

RUN #	ROOM TEMP BEFORE (°F)	ROOM TEMP AFTER (°F)	BARO PRES BEFORE (in/Hg)	BARO PRES AFTER (in/Hg)	R. H. BEFORE (%)	R. H. AFTER (%)	AIR VEL BEFORE (ft/min)	AIR VEL AFTER (ft/min)
1	69	69	28.84	29.07	37.4	25.3	0	0

TABLE 3 – DILUTION TUNNEL FLOW RATE MEASUREMENTS AND SAMPLING DATA

RUN #	BURN TIME (min)	VELOCITY (ft/sec)	VOLUMETRIC FLOW RATE (dscf/min)	AVG TEMP (°R)	SAMPLE VOLUME (dscf)		PARTICULATE CATCH (mg)	
					1	2	1	2
1	360	21.75	233.89	548.29	49.12	48.57	5.10	5.10

TABLE 4 – DILUTION TUNNEL DUAL TRAIN PRECISION

RUN #	SAMPLE RATIOS		TOTAL EMISSIONS (g)		DEVIATION (%)	DEVIATION (g/kg)
	TRAIN 1	TRAIN 2	TRAIN 1	TRAIN 2		
1	1714.15	1733.53	8.74	8.84	0.56%	0.014

TABLE 5 – GENERAL SUMMARY OF RESULTS

RUN #	BURN RATE (kg/hr)(dry) (OVERALL)	INITIAL DRAFT (in/H_2O)	RUN TIME (min)	AVERAGE DRAFT (in/H_2O)
1	1.17	0.025	360	0.023

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TABLE 6 - CSA B415.1 RESULTS
RUN#1

BURN RATE (kg/hr)(dry)	CO EMISSIONS (g/min)	HEATING EFFICIENCY (% HHV)	HEAT OUTPUT (Btu/hr)
HIGH – 1.98	0.0020	70.5	25,123
MEDIUM – 0.98	0.0019	64.5	11,428
LOW – 0.94	0.0016	65.6	11,099
OVERALL – 1.13	0.0017	67.6	13,730

SECTION 11
CONCLUSION

This test demonstrates that the model 25-CBPAH is an affected facility under the definition given in the regulation. The emission rate of 1.47 g/hr meets the EPA requirements for the Step 2 limits.

Similar models 55-SHPCBPAH and 55-TRPCBPAH are identical to the model 25-CBPAH, therefore are deemed to be compliant with these requirements as well.

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SECTION 11
PHOTOGRAPHS

Photo # 1 Emissions test 1

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Photo No. 2
EPA Security Tape # 1

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Photo No. 3
EPA Security Tape # 2

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Photo No. 4
EPA Security Tape # 3

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SECTION 12
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	11/22/21	N/A	Original Report Issue
		17	Added note for not measuring ambient particulates.
1	6/14/22	24	Added Appendices
2	9/1/23	18	Corrected Table 1 to change the burn rates from a “dry” weight to a “wet” weight.
3	9/19/23	2, 18, 19	Corrected CO emissions to two significant figures.

The following are Appendices to this report:
Appendix A – Laboratory Operating Procedure
Appendix B – Data and Calculation Forms
Appendix C – Calibration Documents
Appendix D – Unit Drawings and Installation Manual (CBI), Installation Manual (Non-CBI)
Appendix E – Dry Gas Meter Calibration Data
Appendix F – Unit Preburn Documentation
Appendix G - Pictures

United States
Environmental Protection
Agency

RESIDENTIAL WOOD HEATER 30-DAY NOTIFICATION

INSTRUCTIONS

The manufacturer of an affected wood/pellet heater/central heater model line must notify the U.S. Environmental Protection Agency (EPA) of the date that certification testing is scheduled to begin. The EPA at least 30 days before the start of testing.

This notification must be signed by a responsible representative of the manufacturer or an authorized representative. Once completed, this notification must be submitted to WoodHeaterReports@epa.gov.

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. (40 CFR Part 60, Subpart AAA)

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"). (40 CFR Part 60, Subpart QQQQ)

Disclaimer: The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a substitute for those provisions or regulations, nor is it a regulation itself. In the event of a discrepancy, please refer to 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:
England's Stove Works, Inc

Manufacturer's Physical Address:
589 South Five Forks Road, Monroe, VA 24574

Manufacturer's Mailing Address (if different from physical address):PO Box 206, Monroe, Va 24574

Name and Title of Manufacturer's Responsible/Authorized Representative Submitting this Application:
Chris Terrell COO

Manufacturer's Contact E-mail:
cterrell@englanderstoves.com

Manufacturer's Phone Number:
434-929-0120

Manufacturer's Website Address:
www.heatredefined.com

Manufacturer's Website Address where the test report and owner's manual will be posted, if known:

www.heatredefined.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":25-CBPAH, 55-SHPSCPAH AND 55-TRPCBPAH

Model Number(s) (as appearing on the certification test report, if applicable):25-CBPAH, 55-SHPCBPAH AND 55-TRPCBPAH

Heater Type Check one):	☐Adjustable Burn Rate Wood Heater	☒Pellet Stove	☐Single Burn Rate Heater	☐Hydronic Heater	☐Forced Air Furnace
Hydronic Heater Type (Check one):	☐Full Storage	☐Partial Storage	☐No External 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	☒2020 (ALL HEATERS)		Equipped with a catalytic combustor? ☐Yes ☐No	

EPA-APPROVED TEST LABORATORY

Name of EPA-Approved Test Laboratory:
Intertek

Name(s) of Person(s) Authorized and/or Responsible for Conducting Certification Test:

Brian Ziegler – Technical Team Leader - Hearth

Phone: 608-824-7425	**E-mail:** brian.ziegler@intertek.com	**Website:** intertek.com
City: Middleton	**State:** WI	**ZIP Code:** 53562

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:
Jean-Phillippe Kayl - Vice President – Global Certification

Phone: 630-481-3114	**E-mail:** jp.kayl@intertek.com	**Website:** intertek.com
City: Arlington Heights	**State:** IL	**ZIP Code:** 60005

COMPLIANCE TEST INFORMATION

Test Method(s): ASTM E2515-2017, ASTM E2779-2017, and CSA B415.1-2010 (R2020).

Date(s) of Proposed Test:
11/15/2021, We are scheduled for the W01 11/15/2021 through 11/30/2021, we would like to substitute the 15th for this unit.

Testing Location (Name and Address):
Intertek
8431 Murphy Drive
Middleton, WI 53562

Technician's Contact Name: Ken Slater	Title: Associate Engineer
Phone Number: 608-824-7423	Email Address: kenneth.slater@intertek.com

___Chris Terrell COO_____
Print Name and Title of Authorized Official

_____
Signature

_____11/09/2021_____
Date

Telephone Number: _____434-929-2517_____

Email Address: _____cterrell@englanderstoves.com_____

Remarks:

v1

INTRODUCTION

This document provides a systematic guide for the technician conducting tests to EPA standard requirements. Procedures outlined here, when followed, will result in tests in conformance with ASTM E2779 and ASTM E2515. This guide cannot cover every possible contingency that may develop during a particular test program. Many questions that may arise can be answered by a complete understanding of the test standards and their intent. When in doubt on any detail check with the laboratory manager and be sure you understand the procedures involved.

The primary measurements to be obtained are particulate emission data and efficiency data. The technician's duties include the following steps. It is critical that all spaces on the data forms be properly filled in. Each test must be represented by a complete record of what was done and when.

I. APPLIANCE INSPECTION AND SET-UP
   - A. Incoming Inspection
   - B. Unit Set-Up

II. SAMPLING SYSTEMS - SET-UP
   - A. Gas Analysis
   - B. Dilution Tunnel

III. TEST CONDUCT
   - A. Pre-Test Fuel Load
   - B. Test Fuel Load
   - C. Unit Start - up
   - D. Test Run

IV. POST TEST PROCEDURE
   - A. Leak Checks
   - B. Particulate Sample Recovery

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

1. ASTM E2779
2. ASTM E2515

I. APPLIANCE INSPECTION AND SET-UP

A. Incoming Inspection

1. Check for completeness of unit including parts, accessories, installation and operating instructions, drawings and specifications, etc. Note any discrepancies or missing parts.
2. Check for shipping damage. If damage has occurred, notify the laboratory manager. In some cases repairs may be made, provided the manufacturer and laboratory manager concur that repairs will not affect the unit's performance. If damage is irreparable, a new unit will need to be obtained.
3. Mark unit with manufacturer's name, model number, work order number, and date received.
4. If unit is safety listed, note label data including listing agency and serial number.

B. Unit Set-Up

1. All units must be operated by the manufacturer or Intertek for a break-in period of 50 hours at a medium burn rate. NOTE: Inserts are tested as if they are freestanding stoves.
2. Once break-in is completed, allow unit to cool then clean unit thoroughly.
3. Prior to placing unit on scale, the scale must be turned on and allowed to warm up for 1-hour minimum.
4. Place unit on scale and align so chimney will be centered in hood. Record the weight of the unit and all accessories. (Do not weigh with chimney attached.)
5. Chimney and connector should be cleaned with a wire brush prior to mounting. Attach chimney and connector then seal all joints. Be sure the single wall stove pipe terminates and insulated pipe starts at proper level above scale platform. Chimney must be supported from scale so that it does not touch test enclosure or hood walls.
6. Plug thermocouples into data acquisition system jacks and verify that all instrumentation is working properly.
7. Dilution tunnel must be cleaned prior to each certification test series, and at anytime a higher burn rate follows a lower burn rate.

II. SAMPLING SYSTEMS SET-UP

A. Gas Analysis

1. All instruments should be turned on and allowed to warm up for 1-hour minimum.

2. Prior to calibrating, make sure that the outlet pressure on each calibration gas bottle reads 10 PSI. Adjust flow meters at each gas analyzer to required flow.

The gas analyzer (CO_2, CO, O_2) is zeroed on nitrogen. The O_2, CO_2 and CO analyzer is spanned with a certified span gas mixture.

Calibrate analyzers as follows:

a. With calibration switch at "SPAN", adjust all span controls to values specified on span gas label.
b. Switch to "ZERO" and adjust zero controls to provide 0.00 readout on all analyzers.
c. Repeat a. and b. until no further adjustment is required.
d. Record these values on the appropriate data sheet.
e. Switch to "CAL." and record all analyzer values.

3. Response time synchronization check.

a. With switch at "SAMPLE" and no fire in unit, allow readings to stabilize (O_2 analyzer should read 20.93, CO and CO_2 should read 0.00).
b. Switch to "CAL" setting and start the stopwatch. Note the time required for each unit to reach the calibration gas bottle value. If all three analyzers reach this value within 5 seconds of each other, synchronization is adequate. If not, contact the laboratory manager. Synchronization is adjusted by either internal instrument setting or adjustment of sample line length.
c. Use EPA Method 5H 6.7-6.9 procedures to check calibration of instruments.

4. Sample clean-up train.

a. Load a new filter in 4-inch glass filter holder.
b. Load four Impingers as follows:
   #1: 100 ml. distilled water
   #2: 100 ml. distilled water
   #3: Empty
   #4: 200-300 grams Drierite.

c. Place Impingers in container and connect with greased "U TUBES". (Grease carefully on bottom half of ball joint so that grease will not get into tubes.)
d. Connect filter to impinger #1 and sample line to impinger #4.
e. Connect stack probe to filter.
f. Leak check system as follows:

1) Plug probe.
2) Turn on sample system and increase flow rate slowly.
3) Set vacuum-adjust valve to obtain a vacuum of 10 inches mercury.
4) If sapphire float in rotometer does not stabilize below 10 on scale, system must be resealed.
5) Repeat leak-check procedure until satisfactory results are obtained.
6) Unplug probe slowly, then decrease flow rate slowly before shutting off system.

g. Just prior to starting test, fill impinger container with ice.

B. Dilution Tunnel Sample Train Set-Up:

1. Filters and holders.
   a. Clean probes and filter holder front housings carefully and desiccate to a constant weight prior to use.
   b. Filters and filter probe combinations should be numbered and labeled prior to use.
   c. Weigh desiccated filters and probe filter units on analytical balance. Record the weights on the appropriate form. Note that the probe and front half of the front filter holder is to be weighed as a unit.
   d. Carefully assemble the filter holder units and connect to sampling systems.
   e. System #1 (Filter set #1) will have one filter set and System #2 (Filter set #2 and #3) will have two filter sets. Filter set #2 will be changed 1-hour into the test.
   e. Change desiccate columns with dry absorbent before each test series.

2. Leak checking.

   a. Each sample system is to be checked for leakage prior to inserting probes in tunnel.
   b. Plug probes and start the samplers. Adjust pump bypass valve to produce a vacuum reading of 10 inches mercury. NOTE: During test, highest vacuum recorded is required for posttest leak check.
   c. Allow vacuum indication to stabilize at 10" mercury, record dry gas meter readings, (DGM_1, DGM_2). At a convenient DGM value start stopwatch. Time for 1 minute then stop vacuum pumps. Record dry gas meter readings again, (DGM_3, DGM_4). NOTE: If rotometer ball is floating above the 5-mm mark, system is leaking too much and all seals should be checked.

d. Calculate leakage rate as follows.

System 1: DGM3-DGM_1 = CFM_1
System 2: DGM4-DGM_2 = CFM_2

If CFM_1 or CFM_2 is greater than 0.02 cfm, or $_1S$ greater than 0.04 x Sample Rate, leakage is unacceptable and system must be resealed. For most tests the sample rate will be 0.25 cfm, thus leakage rates in excess of 0.04 x 0.25 = 0.010 cfm are not acceptable.

e. To prevent contamination, do not insert probes in tunnel until the start of the test run.

III. TEST CONDUCT

A. Pre-Test Fuel Load

1. Fill hopper with pellets, tare the scale, and place a 25lb weight on the scale to measure fuel consumed.

B. Test Fuel Load

1. Determine moisture content of pellets per ASTM E871 by weighing pellets before and after oven drying.
2. Verify and document the pellet manufacturer and grade of pellets used for test.
3. Confirm enough pellets are in the hopper to complete the test, add if necessary. Tare scale and place a 25lb weight on the scale to measure fuel consumed.

C. Unit Start-Up

1. With all doors and air controls closed, zero draft Magnehelic using screw located at bottom of meter.
2. Before lighting a fire turn on dilution tunnel and set flow rate to 140 scfm (approximately 715 fpm) if burn rate is to be less than 3 kg/hr. For higher burn rates set flow for a 150:1 air fuel ratio (see chart for approximate values).
3. Check draft imposed on cold stove. All inlets must be closed and a draft gauge in the chimney. If draft is greater than 0.005 inches water column, adjust tunnel to stack gap until draft is less than 0.005 inches water column.
4. With hot wire anemometer check for ambient airflow around unit (must be less than 50 ft/min).

5. Tare scale and start fire by turning the unit on per manufacturer's instructions. (Make sure stack sample probe is on the unit.)
6. Once fuel is burning well, operate at high fire for sufficient time to get the fuel burning well. Then adjust settings to intended test run levels.
7. Perform the dilution tunnel traverse as prescribed in ASTM E2515, Section 9.3.2 (Pitot tube should be carefully cleaned prior to each test.)
8. Pretest must burn for a minimum of 1 hour. Record room and flue temperatures.

D. Test Run

1. Stack gas analyzers should be on and in the sample mode.
2. When the 1-hour pre-burn is complete, the test is to be started.
   a. Insert the sample probes into the tunnel being careful not to hit sides of tunnel with probe tip.
   b. Check tunnel Pitot tube for proper position.
   c. Confirm heater is set to the maximum burn rate.
   d. Record initial readings.
   e. Turn on probe sample systems and start timing test.
   f. Tare platform scale and add 25lb weight.
   g. Every 10 minutes record the following:
      1) Dry gas meter readings.
      2) Weight remaining.
      3) All thermocouple temperatures.
      4) Tunnel Pitot tube reading.
      5) Draft reading.
      6) Rotometer readings.
   h. Filter temperatures shall not exceed 90ºF anytime during the test. If the filters are approaching 90ºF turn on cooling pump. Filters must be kept above the dilution tunnel wet bulb temperature in order to prevent condensation.
   i. Regularly check impinger train for ice level during test.
   j. At 1-hour, Filter set #2 is to be removed from the dilution tunnel and Filter set #3 is added. The heater is changed from the high burn setting to the ≤50% of maximum burn rate setting and operated for 2-hours.
   k. At the 3-hour point, the heater is changed to the lowest burn rate setting.
   l. At the 6-hour point, shut off sample trains and record last reading.
   m. Record final dry gas meter values.
   n. Shut down heater per manufacturer's instructions.

IV. POST TEST PROCEDURES

A. Leak Checks

1. Dilution Tunnel
   a. Remove sample probes from tunnel and plug with rubber stopper.
   b. Turn on sample system and set vacuum to 10" mercury or to the highest value reached during the test.
   c. At a convenient value start stopwatch and record the DGM starting value.
   d. After 1 minute stop sample system and record ending DGM value.
   e. Calculate leakage rate per pre-test description (see II.B.2.c.).

2. Gas Analyzers

   a. Set stack sample flow to about 75 mm on the rotometer.
   b. Plug with rubber stopper.
   c. Adjust vacuum to 10" mercury.
   d. Let system stabilize then record rotometer readings.
   e. If the rotometer readings do not equal zero, check with the laboratory manager.
   f. SLOWLY unplug probe and decrease flow rate to zero.
   g. Turn off stack sampling system.
   h. Zero, span and calibrate the analyzers (see Gas Analysis). RECORD ONLY these meter values.

B. Particulate Sample Recovery

1. Disassemble filter holder and collect all loose material on filters.
2. Weigh and record probes and filters for each train. NOTE: 24 hours of desiccation must pass before final "no change" weight values can be recorded.
3. Weigh and record probes and fillers at 6-hour intervals until weight change between weighing is less than 0.5 mg.

V. DISPOSITION OF TESTED UNIT.

In order to meet the requirements of section 60.533(b)(8) of the EPA's 40CFR Part 60 Standards of Performance for New Residential Wood Heaters, Intertek Testing Services seals certified wood heaters by:

1) Applying tamper-indicating tape to the firebox door, ash pan door, and the air controls.

2) Totally covering the unit with stretch wrap and stamping the stretch wrap with our WHI logo at various locations.
3) Strapping the door and ash pan closed with plastic banding so that the banding goes both around the unit laterally and from top to bottom. The banding is then stamped with our WHI logo so that the banding can't be simply replaced.
4) The certificate is then placed on the top of the unit and a second layer of stretch wrap is applied and stamped with our WHI logo.
5) The unit is placed on a pallet and strapped down with additional strapping to keep it on the pallet. It is then shipped back to the manufacturer.

Pellet Stoves
Wood Stoves
Multi-Fuel Stoves
Pellet Grills

P.O. Box 206 Monroe, VA 24574 www.heatredefined.com Phone: (800) 516-3636 Fax: (434) 929-4810

25-CBPAH

Turn the unit on and make sure that it is on 9, 9 and leave it on that setting for 1 hour to get the unit preheated. You do not have to fill the hopper completely full to test this unit, you can use a bag and a half to two bags and that should be enough.

For the first hour you will run the unit on 9,9 for your High Burn Test
Then, for your 2 Hour Medium Burn Test you will drop the settings down to 2,2
Lastly, for your 3 Hour Low Burn Test you will drop the settings down to 1,1

That should complete your test for this unit

John Wray

Manufacturer: England Stoves | Model : 25-CBPAH_____ | Date:5/14/18___
Job #_G103461297 | Run___#1_____ | Tech_

PRETEST DILUTION TUNNEL TRAVERSE RUN

Barometric pressure (P_{bar}) ___28.99___ (inches Hg.) Static pressure (P_q)_.255__ (inches w.c.)
Inside diameter: Port A ____in_ Port B __in Tunnel cross sectional area: ____Ft^2
Pitot tube type: Standard

Traverse Point	Position (inches)	Velocity Head Δ_p (inches H_2O)	Tunnel Temperature (°F)	$\sqrt{\Delta p}$
A-Centroid	3.00	.086		
B-Centroid	3.00	.110		
A-1	0.50	.076		
A-2	1.50	.086		
A-3	4.50	.084		
A-4	5.50	.075		
B-1	0.50	.083		
B-2	1.50	.105		
B-3	4.50	.106		
B-4	5.50	.080		
		AVERAGE		

Adjustment factor application

Pitot correction __.9531___

Where,
C_p = Pitot tube coefficient = 0.99 for standard pitot
Δ_p = manometer reading (inches H_2O)
T_s = average absolute dilution tunnel temperature (°F + 460)
P_s = absolute dilution tunnel gas pressure or Pbar + P_g

P_g = static pressure $\frac{inches H_2O}{13.6}$

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

Adjustment factor for alternative Pitot tube placement:

$$V_s = K_p C_p F_p \left(\sqrt{\Delta_p}\right) AVG \sqrt{\frac{T_s}{P_s M_s}} \qquad V_s = K_p C_p \left(\sqrt{\Delta_p}\right) avg. \sqrt{\frac{T_s}{P_s M_s}} \qquad F_p = \frac{\left(\sqrt{\Delta_p}\right) avg}{\left(\sqrt{\Delta_p}\right) centroid}$$

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

$\left(\sqrt{\Delta_p}\right) avg.$ = Average of the square roots of the velocity heads ($)_p$) measured at each traverse point.

$\left(\sqrt{\Delta_p}\right) centroid$ = Average of the square roots of the velocity heads measured at the tunnel centroid (inches of H_2O)

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

Pre/Post Checks

	Pre-Test	Post-Test
Facility Conditions:		
Air Velocity……	0 fpm	0 fpm
Smoke Capture Check…….	X	X
Wood Heater Conditions:		
Date Wood Heater Stack Cleaned……	5/11/18	
Date Dilution Tunnel Cleaned……..	5/11/18	
Induced Draft Check……	X	X
Tunnel Velocity……	0	.080
Pitot Leak Check:		
Side A…….	X	X
Side B……..	X	X
Temperature System:		
Ambient (65°- 90°F)……..		°F
Proportional Checks:		
CO Analyzer Drift Check……..		X
CO_2 Analyzer Check……..		X
O_2 Analyzer Check……		X
Thermocouple check……..		

Sampling Train ID Numbers:	Train 1	Train 2	Train 3
Probe……..	1	2	3
Filter Front…….	1	3	5
Filter Back……..	2	4	6
Filter Thermocouple……			
Filter 5G-3 (<90°F)…….			

mn

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

Pre-Test Scale Audit

Scale Type	Audit Weight		Measured Weight	
Platform	25.00	lbs., Class F	25.00	lbs.
Wood	10.00	lbs., Class F	10.00	lbs.
Analytical	100.000	mg, Class S	100.000	mg.

LIMITS OF WEIGHT RANGES

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

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

SAMPLING EQUIPMENT CHECK OUT

Leakage Checks Tunnel Samplers

	SAMPLE 1		SAMPLE 2		SAMPLE 3	
Unplugged Flow Rate = .25cfm	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-test	Post Test
Vacuum (inches Hg.)	10”	10”	10”	10”	10”	10”
Final 1 minute DGM (ft^3)	0	0	0	0	368.890	378.462
Initial 1 minute DGM (ft^3)	0	0	0	0	368.890	378.462
Change (C) (ft^3)	0	0	0	0	0	0
Allowable leakage .04 x Sample rate or .02cfm	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Check OK	X	X	X	X	X	X

Leakage Checks Flue Gas Sampler

Plugged Probe	Pre Test	Post Test
Vacuum (inches Hg.)	10”	10”
Rotometer Reading (mm)	0	0
Flow Rate (CFM)	0	0
Allowable (.04 x Sample Rate)		
Check OK	X	X

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

CONTINUOUS ANALYZERS

Pre-Test (Adjust and Record)

	ZERO		SPAN		CAL. (Record Only)	
CO_2	0	0	24.88	24.88	11.94	11.99
CO	0	0	8.97	8.976	3.96	4.001
O_2	0	0	20.95	20.95	9.96	10.01
	Actual	Should Be	Actual	Should Be	Actual	Should Be

Post Test (Record Only)

	Zero	Span	Cal.	Zero Drift	Span Drift	Cal. Drift	OK?	Not OK*
CO_2	0.02	24.61	11.81	.02	.27	.13	X	
CO	-0.01	8.86	3.90	.01	.11	.6	X	
O_2	-0.02	20.69	9.88	.02	.26	.8	X	

* Greater than ± 5% of the range used.

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

TEST DATA LOG

RAW DRY GAS METER READINGS

	System 1	System 2	System 3
Final (ft^3)	83.88	83.88	378.440
Initial (ft^3)	0	0	368.890

AMBIENT CONDITIONS

	Start	End
Barometer. (inches Hg)	28.99	28.94
Dry Bulb (°F)	70.3	79.2
Humidity (%)	58%	51 %

Manufacturer: England Stoves
Job #_G103461297

Model : 25-CBPAH_____
Run___#1_____

Date:5/14/18___
Tech_

COMMENTS

6:53am: Pretest started, Unit set to maximum feed rate (Setting #9)
8:25am: Test started. Scale tared and a 25 lb weight was added to scale, Feed rate set at (Setting#9) for 1 hr duration.
9:25am: Unit feed rate adjusted to (Setting #2) for 2 hr duration
11:25am: Unit feed rate adjusted to (Setting #1) for 3 hr duration
2:25pm: Test Complete

Page____of____

Manufacturer: England Stoves Model : 25-CBPAH_____ Date:5/14/18___

Job #_G103461297 Run___#1_____ Tech_

READING #	REAL TIME	ELAPSED TIME	DGM 1	ROTOMETER 1	DGM 2	ROTOMETER 2	DGM 3	ROTOMETER 3	DRAFT	MAX DGM PRESSURE
0	8:25am	0	0		0		368.890			
1		10	2.35		2.35		370.360			
2		20	4.69		4.69		372.980			
3		30	7.02		7.01		373.580			
4		40	9.35		9.35		375.190			
5		50	11.67		11.68		376.700			
6	9:25am	60	14.00		14.01		378.440			
7		70	16.34		16.34					
8		80	18.67		18.67					
9		90	21.02		21.00					
10		100	23.34		23.33					
11		110	25.67		25.65					
12		120	28.00		27.99					
13		130	30.33		30.33					
14		140	32.67		32.67					
15		150	35.01		35.01					
16		160	37.35		37.35					
17		170	39.68		39.69					
18		180	42.02		42.03					
19		190	44.36		44.36					
20		200	46.69		46.70					
21		210	49.03		49.03					
22		220	51.36		51.37					
23		230	53.69		53.70					
24		240	56.03		56.03					
25		250	58.36		58.35					
26		260	60.68		60.68					
27		270	63.01		63.01					
28		280	65.33		65.34					
29		290	67.65		67.66					
30		300	69.97		69.98					
31		310	72.30		72.30					
32		320	74.62		74.61					
33		330	76.94		76.94					
34		340	79.25		79.26					
35		350	81.57		81.57					
36		360	83.88		83.88					

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Total Quality. Assured.

Manufacturer: ENGLAND STOVE
Job # ~~A103461297~~ KS
G104805205

Model: 25-CBPAH
Run #1

Page of
Date 11-15-21
Tech Kem SLATer

DILUTION TUNNEL PARTICULATE SAMPLER DATA

FILTER TYPE: Gelman 47mm A/E

Pre-test Weight Record		SYSTEM 1			SYSTEM 2			SYSTEM 3			Temp	Humidity
		Probe & Housing Number	Front Filter + gasket Number	Back Filter + gasket Number	Probe & Housing Number	Front Filter + gasket Number	Back Filter + gasket Number	Probe & Housing Number	Front Filter + gasket Number	Back Filter + gasket Number		
Date	Time	1	1	2	2	3	4	3	5	6	°F	%
11-12-21	7:30A	91.3531	3.2935	3.2920	91.5607	3.3093	3.3177	93.0272	3.3025	3.3026	64.1	35.6
11-15-21	8:00A	91.3530	3.2934	3.2919	91.5606	3.3093	3.3176	93.0272	3.3024	3.3025	63.4	37.4
NA												
NA												
NA												
NA		Total:	6.5853		Total:	6.62769		Total:	6.6049		NA	NA

Post-test Weight Record		SYSTEM 1		SYSTEM 2		SYSTEM 3		Temp	Humidity
		Probe & Housing Number	Combined Filter/gasket Number	Probe & Housing Number	Combined Filter/gasket Number	Probe & Housing Number	Combined Filter/gasket Number		
Date	Time	1	1+2	2	3+4	3	5+6	°F	%
11-15-21	4:07P	91.3545	6.5913	91.5609	6.6327	93.0279	6.6060	69.2	25.3
11-16-21	7:00A	91.3532	6.5906	91.5606	6.6322	93.0272	6.6059	63.2	27.4
11-18-21	8:20A	91.3531	6.5905	91.5606	6.6321	93.0272	6.6059	66.2	26.6
11-19-21	7:30A	91.3530	6.5904	91.5606	6.6320	93.0272	6.6059	64.1	26.9
NA									
NA									

Dry Down Weight

Date	Time	P1	F1	P2	F2	P3	F3	Gr/hr	Lb/MMbtu	Btu
11-15-21	4:07P	1.5	6.0	0.3	5.8	0.7	1.1	1,953	NA	NA
11-16-21	7:00A	0.2	5.3	0.0	5.3	0.0	1.0	1,551		
11-18-21	8:20A	0.1	5.2	0.0	5.2	0.0	1.0	1,508		
11-19-21	12:00P	0.0	5.1	0.0	5.1	0.0	1.0	1,465		
NA										
NA										

002031
002032
002033

T(E) 8.79
1STHr 1.70

intertek Total Quality. Assured.	CLIENT:	England Stove		PERFORMED BY:	Ken Slater
	PROJECT #:	G104805205		REVIEWED BY:	Brian Ziegler
	PRODUCT:	Pellet Fuel Room Heater		MODEL:	25-CBPAH
SAMPLE ID #:	MID2111150903-001			DATE:	2021-11-15
STANDARD(S):	CSA B415.1	VERSION YEAR:	2010	LOCATION:	Middleton
EQUIPMENT					
ASSET # - DESCRIPTION:	See emissions TDP			CALIBRATION DUE:	See emissions TDP
CONDITIONING					
SAMPLE CONDITIONING (IF APPLICABLE):	See Client Folder				
AMBIENT TEMPERATURE (°F):	69.27				
RESULTS					

PASS	X	FAIL	na	NO PASS/FAIL	na

Run: 1
Test Duration: 60
Output Category: High

	HHV Basis	LHV Basis
Overall Efficiency	70.5%	76.0%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	71%	76.4%

Output Rate (kJ/h)	26,484	25,123	(Btu/h)
Burn Rate (kg/h)	1.98	4.37	(lb/h)
Input (kJ/h)	37,570	35,639	(Btu/h)

Test Load Weight (dry kg)	1.98	4.37	dry lb
MC wet (%)	3.25		
MC dry (%)	3.36		
Particulate (g)	8.79		
CO (g)	0		
Test Duration (h)	1.00		

Emissions	Particulate	CO	
g/MJ Output	0.33	0.00	
g/kg Dry Fuel	4.44	0.06	
g/h	8.79	0.12	0.0020
lb/MM Btu Output	0.77	0.01	

Air/Fuel Ratio (A/F)	29.20

intertek Total Quality. Assured.	CLIENT:	England Stove		PERFORMED BY:	Ken Slater
	PROJECT #:	G104805205		REVIEWED BY:	Brian Ziegler
	PRODUCT:	Pellet Fuel Room Heater		MODEL:	25-CBPAH
SAMPLE ID #:	MID2111150903-001			DATE:	2021-11-15
STANDARD(S):	CSA B415.1	VERSION YEAR:	2010	LOCATION:	Middleton
EQUIPMENT					
ASSET # - DESCRIPTION:	See emissions TDP			CALIBRATION DUE:	See emissions TDP
CONDITIONING					
SAMPLE CONDITIONING (IF APPLICABLE):	See Client Folder				
AMBIENT TEMPERATURE (°F):	68.51				
RESULTS					

PASS	X	FAIL	na	NO PASS/FAIL	na

Run:	1
Test Duration:	180
Output Category:	Low

	HHV Basis	LHV Basis
Overall Efficiency	65.6%	70.8%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	66%	71.1%

Output Rate (kJ/h)	11,700	11,099	**(Btu/h)**
Burn Rate (kg/h)	0.94	2.07	**(lb/h)**
Input (kJ/h)	17,833	16,916	**(Btu/h)**

Test Load Weight (dry kg)	2.82	6.22	**dry lb**
MC wet (%)	3.25		
MC dry (%)	3.36		
Particulate (g)	8.79		
CO (g)	0		
Test Duration (h)	3.00		

Emissions	Particulate	CO	
g/MJ Output	0.25	0.01	
g/kg Dry Fuel	3.12	0.10	
g/h	2.93	0.10	0.0016
lb/MM Btu Output	0.58	0.02	

Air/Fuel Ratio (A/F)	57.04

intertek Total Quality. Assured.	CLIENT:	England Stove		PERFORMED BY:	Ken Slater
	PROJECT #:	G104805205		REVIEWED BY:	Brian Ziegler
	PRODUCT:	Pellet Fuel Room Heater		MODEL:	25-CBPAH
SAMPLE ID #:	MID2111150903-001			DATE:	2021-11-15
STANDARD(S):	CSA B415.1	VERSION YEAR:	2010	LOCATION:	Middleton
EQUIPMENT					
ASSET # - DESCRIPTION:	See emissions TDP			CALIBRATION DUE:	See emissions TDP
CONDITIONING					
SAMPLE CONDITIONING (IF APPLICABLE):	See Client Folder				
AMBIENT TEMPERATURE (°F):	69.02				
RESULTS					
PASS	X	FAIL	na	NO PASS/FAIL	na

Run: 1
Test Duration: 120
Output Category: Medium

	HHV Basis	LHV Basis
Overall Efficiency	64.5%	69.6%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	65%	69.9%

Output Rate (kJ/h)	12,047	11,428	(Btu/h)
Burn Rate (kg/h)	0.98	2.17	(lb/h)
Input (kJ/h)	18,678	17,719	(Btu/h)

Test Load Weight (dry kg)	1.97	4.34	dry lb
MC wet (%)	3.25		
MC dry (%)	3.36		
Particulate (g)	8.79		
CO (g)	0		
Test Duration (h)	2.00		

Emissions	Particulate	CO	
g/MJ Output	0.36	0.01	
g/kg Dry Fuel	4.46	0.11	
g/h	4.40	0.11	0.0019
lb/MM Btu Output	0.85	0.02	

Air/Fuel Ratio (A/F)	53.03

intertek Total Quality. Assured.	CLIENT:	England Stove		PERFORMED BY:	Ken Slater
	PROJECT #:	G104805205		REVIEWED BY:	Brian Ziegler
	PRODUCT:	Pellet Fuel Room Heater		MODEL:	25-CBPAH
SAMPLE ID #:	MID2111150903-001			DATE:	2021-11-15
STANDARD(S):	CSA B415.1	VERSION YEAR:	2010	LOCATION:	Middleton
EQUIPMENT					
ASSET # - DESCRIPTION:	See emissions TDP			CALIBRATION DUE:	See emissions TDP
CONDITIONING					
SAMPLE CONDITIONING (IF APPLICABLE):	See Client Folder				
AMBIENT TEMPERATURE (°F):	69.27				
RESULTS					
PASS	X	FAIL	na	NO PASS/FAIL	na

Run: 1
Test Duration: 360
Output Category: Overall

	HHV Basis	LHV Basis
Overall Efficiency	67.6%	72.9%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	68%	73.3%

Output Rate (kJ/h)	14,473	13,730	(Btu/h)
Burn Rate (kg/h)	1.13	2.49	(lb/h)
Input (kJ/h)	21,404	20,304	(Btu/h)

Test Load Weight (dry kg)	6.77	14.92	dry lb
MC wet (%)	3.25		
MC dry (%)	3.36		
Particulate (g)	8.79		
CO (g)	1		
Test Duration (h)	6.00		

Emissions	Particulate	CO	
g/MJ Output	0.10	0.01	
g/kg Dry Fuel	1.30	0.09	
g/h	1.47	0.10	0.0017
lb/MM Btu Output	0.24	0.02	

Air/Fuel Ratio (A/F)	48.10

intertek Total Quality. Assured.	**CLIENT:**	England Stove		**PERFORMED BY:**	Ken Slater
	PROJECT #:	G104805205		**REVIEWED BY:**	Brian Ziegler
	PRODUCT:	Pellet Fueled room heater		**MODEL:**	25-CBPAH
SAMPLE ID #:	MID2111150903-001			**DATE:**	2021-11-15
STANDARD(S):	ASTM E2779	**VERSION YEAR:**	2017	**LOCATION:**	Middleton
STANDARD TITLE:	Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters				

RESULTS					
PASS	X	**FAIL**	na	**NO PASS/FAIL**	na

Room Conditions							
Room Temp (^{o}F)		Barometric Pressure (in Hg)		Relative Humidity (%)		Air Velocity (ft/sec)	
69	69	28.84	29.07	37.4	25.3	0	0

Ave Dilution Tunnel Measurements				Sample Data			
Burn Time (min)	Velocity (ft/sec)	Flow Rate (dscf/min)	Temp (R) (^{o}F)	Total Sample		Particulate Catch	
				1	2	1	2
360	21.75	233.89	548.29	49.12	48.57	5.10	5.10

Dilution Tunnel Dual Train Precision					
Sample Ratios		Total Emissions (g)		Deviation	
Train 1	Train 2	Train 1	Train 2	(%)	(g/kg)
1714.15	1733.53	8.74	8.84	0.56%	0.014

Results			
Burn Rate (kg/hr)	Initial Draft (in/wc)	Run Time (min)	Ave Draft (in/wc)
1.17	0.025	360	0.023

Emissions	
(g/hr)	(g/kg)
1.465	1.257

Burn Rates (kg/hr)		
High	Medium	Low
2.05	1.02	0.97

Fuel Consumed (lbs)		
High	Medium	Low
4.51	4.49	6.43

Fuel Moisture (% wet)
3.3%

Timber Products Inspection, Inc.

CERTIFICATE OF QUALIFICATION

This is to signify that

MARTH WOOD SHAVING SUPPLY, INC.

6752 State Highway 107 North
Marathon, WI 54448

Is hereby qualified as registration #16006
May 30, 2014

Marth Wood Shaving Supply, Inc. is compliant with the PFI Standards Program as audited by Timber Products Inspection and accredited by the American Lumber Standards Committee. In order to maintain compliance, the producer agrees to:

- Maintain complete and up to date Densified Fuel production records
- Produce and market quality products, which conform to PFI & ALSC program documents
- Apply the quality mark only to products which have been proven through applicable monitoring

Chris Wiberg, Densified Fuel Program Manager
Timber Products Inspection, Inc.
1641 Sigman Road, Conyers GA 30012 770.922.8000

Fox Valley Metrology
3114 Medalist Drive
Oshkosh, WI 54902
(920) 426-5894 • Fax (920) 426-8120
http://www.FoxValleyMetrology.com

CERTIFICATE OF CALIBRATION

Certificate No. ACT-1272

CERTIFICATION NUMBER	CL095-41671-502
FOR	Intertek 8431 Murphy Drive Middleton, WI 53562
PURCHASE ORDER #	
TEST INSTRUMENT	Timer
MAKE	Cole-Parmer
MODEL	94440-10
SERIAL NUMBER	N/A
IDENTIFICATION	646
CUSTOMER LOCATION	Hearth
CONDITION RECEIVED	In Tolerance
CONDITION RETURNED	In Tolerance
CALIBRATED BY	Christopher Moore
CALIBRATION LOCATION	On Site
ENVIRONMENT	72.0°F, 22.2°C, 21.0%RH
CALIBRATION DATE	04/05/2021
RECALIBRATION DUE	04/05/2022

PROCEDURES FOLLOWED

FVE-033 rev. 1

Form Revision 7: 07/14/2020

STANDARDS USED

INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL
FVS-553	N/A	CL022-19908-397	01/31/2022
FVS-811B	N/A	CK281-24359-397	10/31/2021

Total expanded measurement uncertainties expressed are based on a confidence level of 95%; coverage factor of (k=2). The statement of compliance in this certificate was issued without taking the uncertainty of measurement into consideration. The customer shall assess the results and uncertainty when determining if the results meet their needs. (This is considered “shared responsibility.”) Uncertainties expressed in nominal units.

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). Calibration was completed in accordance with ISO/IEC 17025:2017, ANSI/NCSL Z540-1-1994 and ANSI/NCSL Z540.3-2006. Other standards listed upon request.

CALIBRATION RESULTS

*** DENOTES "OUT OF TOLERANCE"**

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Timer	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	60.0	59.5	60.5	60.0	60.0	0.06
	60.0	59.5	60.5	60.1	60.1	0.07
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	300.0	299.5	300.5	300.1	300.1	0.06
	300.0	299.5	300.5	300.0	300.0	0.07
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	1800.0	1799.5	1800.5	1800.2	1800.2	0.06
	1800.0	1799.5	1800.5	1800.1	1800.1	0.07

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CERTIFICATE OF CALIBRATION

ACCREDITED ISO/IEC 17025 CALIBRATION AND TESTING LABORATORY
Certificate No. ACT-1272

CERTIFICATION NUMBER	CL284-37923-679
FOR	Intertek 8431 Murphy Drive Middleton, WI 53562
TEST INSTRUMENT	Scales Analytical Balance
MAKE	Ohaus
MODEL	Explorer E12140
CUSTOMER LOCATION	
CONDITION RECEIVED	Out Of Tolerance
CONDITION RETURNED	In Tolerance
CALIBRATED BY	Danny Scherr
CALIBRATION LOCATION	On Site
ENVIRONMENT	70.0°F, 21.1°C, 53.0%RH
CALIBRATION DATE	10/11/2021
RECALIBRATION DUE	04/11/2022

IDENTIFICATION	713
SERIAL NUMBER	B258010639
PURCHASE ORDER #	

PROCEDURES FOLLOWED

FVE-020 rev. 2

STANDARDS USED

INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL
FVS-019J	4MMU	CK119-54752-522	04/30/2022
FVS-469	N/A	CL084-50197-397	03/31/2022

CALIBRATION RESULTS

* DENOTES "OUT OF TOLERANCE"

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Increasing Load	(g)	(g)	(g)	(g)	(g)	(g)
	0.0000	-0.0002	0.0002	0.0000	0.0000	0.00007
	5.0000	4.9998	5.0002	5.0000	5.0000	0.00007
	10.0000	9.9998	10.0002	10.0000	10.0000	0.00006
	20.0000	19.9996	20.0004	19.9996	20.0000	0.00006
	50.0000	49.9994	50.0006	49.9976*	50.0000	0.00007
	100.0000	99.9994	100.0006	99.9960*	99.9999	0.00007
	200.0000	199.9994	200.0006	199.9928*	200.0000	0.00006
	210.0000	209.9994	210.0006	209.9926*	210.0000	0.00006
Decreasing Load	(g)	(g)	(g)	(g)	(g)	(g)
	40.0000	39.9996	40.0004	39.9979*	40.0000	0.00006
	10.0000	9.9998	10.0002	9.9998	10.0000	0.00006
Shift Test	(g)	(g)	(g)	(g)	(g)	(g)
Front	70.0000	69.9994	70.0006	69.9973*	70.0000	0.00007
Left	70.0000	69.9994	70.0006	69.9975*	69.9999	0.00006
Right	70.0000	69.9994	70.0006	69.9974*	69.9999	0.00006
Back	70.0000	69.9994	70.0006	69.9972*	69.9999	0.00006

ADJUSTMENT NOTES

int cal done to bring in to tolernace

COMMENTS

Scale Capacity = 210 g; Precision = .0002 g; Class = I; Total Divisions = 1050000

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CERTIFICATE OF CALIBRATION

ACCREDITED
ISO/IEC 17025
CALIBRATION AND TESTING LABORATORY
Certificate No. ACT-1272

- This certificate shall not be altered in any form or reproduced, except in full, without prior written approval from originating lab. These results relate only to the item(s) calibrated. Form Revision 8: 08/19/2021
- Total expanded measurement uncertainties expressed are based on a confidence level of 95%; coverage factor of (k=2). The statement of compliance in this certificate was issued without taking the uncertainty of measurement into consideration. The customer shall assess the results and uncertainty when determining if the results meet their needs. (This is considered “shared responsibility.”) Uncertainties expressed in nominal units.
- The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). Calibration was completed in accordance with ISO/IEC 17025:2017, ANSI/NCSL Z540-1-1994 and ANSI/NCSL Z540.3-2006. Other standards listed upon request.

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CERTIFICATE OF CALIBRATION

ACCREDITED
ISO/IEC 17025
CALIBRATION AND TESTING LABORATORY
Certificate No. ACT-1272

CERTIFICATION NUMBER	CL285-37806-653
FOR	Intertek 8431 Murphy Drive Middleton, WI 53562
TEST INSTRUMENT	Data Acquisition
MAKE	Omega
MODEL	OMB-DAQ-56 (Intertek)
CUSTOMER LOCATION	Hearth
CONDITION RECEIVED	In Tolerance
CONDITION RETURNED	In Tolerance
CALIBRATED BY	Marcus Bradley
CALIBRATION LOCATION	On Site
ENVIRONMENT	70.0°F, 21.1°C, 30.0%RH
CALIBRATION DATE	10/12/2021
RECALIBRATION DUE	04/12/2022

IDENTIFICATION	986
SERIAL NUMBER	N/A
PURCHASE ORDER #	

PROCEDURES FOLLOWED

FVE-006 rev. 2

STANDARDS USED

INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL
FVS-822A	51710107	CL032-29160-653	02/28/2022
FVS-822C	N/A	CL035-34887-397	02/28/2022
STL-585	2125144	CL090-39332-594	06/30/2022

CALIBRATION RESULTS

* DENOTES "OUT OF TOLERANCE"

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
TEMPERATURE	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
INPUT						
K -Type						
CH1	1000.0	998.2	1001.8	999.8	999.8	0.06
CH2	1000.0	998.2	1001.8	1000.3	1000.3	0.06
CH3	1000.0	998.2	1001.8	1000.3	1000.3	0.07
CH4	1000.0	998.2	1001.8	998.7	998.7	0.07
CH5	1000.0	998.2	1001.8	999.9	999.9	0.07
CH6	1000.0	998.2	1001.8	999.3	999.3	0.07
CH7	1000.0	998.2	1001.8	999.7	999.7	0.06
CH8	1000.0	998.2	1001.8	999.8	999.8	0.07
CH9	1000.0	998.2	1001.8	999.7	999.7	0.06
CH11(#1 on right side of box)	5.0000	4.9989	5.0012	5.0004	5.0004	0.00006
	10.0000	9.9977	10.0023	10.0003	10.0003	0.00007
CH12	1000.0	998.2	1001.8	1000.1	1000.1	0.06

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CERTIFICATE OF CALIBRATION

ACCREDITED ISO/IEC 17025 CALIBRATION AND TESTING LABORATORY

Certificate No. ACT-1272

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
CH13	1000.0	998.2	1001.8	999.6	999.6	0.06
CH14	1000.0	998.2	1001.8	999.6	999.6	0.07
CH15	1000.0	998.2	1001.8	999.7	999.7	0.07
CH16	1000.0	998.2	1001.8	999.8	999.8	0.07
CH17	1000.0	998.2	1001.8	999.5	999.5	0.07
CH18	1000.0	998.2	1001.8	999.3	999.3	0.07
CH19	1000.0	998.2	1001.8	999.4	999.4	0.07
CH20	1000.0	998.2	1001.8	999.2	999.2	0.06
	(VDC)	(VDC)	(VDC)	(VDC)	(VDC)	(VDC)
CH21	5.0000	4.9989	5.0012	5.0006	5.0006	0.00007
	10.0000	9.9977	10.0023	10.0007	10.0007	0.00007
CH22	5.0000	4.9989	5.0012	5.0006	5.0006	0.00006
	10.0000	9.9977	10.0023	10.0007	10.0007	0.00007
CH23	5.0000	4.9989	5.0012	5.0006	5.0006	0.00006
	10.0000	9.9977	10.0023	10.0006	10.0006	0.00007
CH24	5.0000	4.9989	5.0012	5.0006	5.0006	0.00007
	10.0000	9.9977	10.0023	10.0006	10.0006	0.00007

COMMENTS

Channel 11 is actually number 1 on the right side of junction block. Channel 11 is also wired backwards.

4300 N Bell School Rd.
Loves Park, IL 61111

490 Enterprise Dr.
Lake Mills, WI 53551

CREAM CITY SCALE LLC
STATELINE

www.creamcityscale.com

PJLA Calibration
Accreditation # 82374

Certificate of Calibration

Customer:	Intertek Testing Services	**Certificate ID:**	1134210610_286292
Address:	8431 Murphy Drive	**ISO Number:**	ISO/IEC 17025 82374
City, State Zip:	Middleton, WISCONSIN 53562	**Date**	10/6/2021

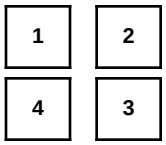
Indicator Mfg.	**Base Mfg.**	**Cal Date**	**Scale ID**	**Scale Location**
Rice Lake	Rice Lake	10/6/2021	1134	Hearth
Indicator Model	**Base Model**	**Due Date**	**Scale Class**	**Scale Range**
520	4x4 HP-1K	4/6/2022	III	0 - 1000 lb x 0.1 lb
Indicator Serial	**Base Serial**	**Procedure**	**Scale Status**	
1494600044	C42769	QWI 6.4.2	In Service	
Test Interval				
6 Months				

EQUIPMENT CONDITIONS

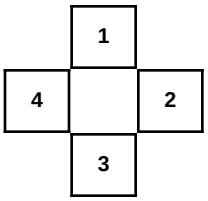
[Working] Non-Working **[Clean]** Dirty Out Of Level

SHIFT TEST **Shift Test Result:** **[Pass]** Fail Adjust Not Applicable

Position



Position



All tolerances calculated in conformance with Handbook 44 Table 6.

LOAD TEST

Preliminary Load Test		
Test Wt.	**Reading**	**Error**
0.0 lb	0.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
250.0 lb	250.0 lb	0.0 lb
500.0 lb	500.0 lb	0.0 lb
1000.0 lb	1000.0 lb	0.0 lb

In maintenance tolerance? **[Yes]** No N/A

Final Load Test		
Test Wt.	**Reading**	**Error**
0.0 lb	0.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
250.0 lb	250.0 lb	0.0 lb
500.0 lb	500.0 lb	0.0 lb
1000.0 lb	1000.0 lb	0.0 lb

In acceptance tolerance? **[Yes]** No N/A

TEST INFORMATION

Test Weight Classification:	F
Traceability Certificate Number(s):	W20-004A Cal Date: 1/6/2020 Recal Date: 1/6/2022, W20-004B Cal Date: 1/6/2020 Recal Date: 1/6/2022
Standards Used:	1000 lb #81; 50 lb #81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Expanded Uncertainty:	See Comments
Test Location:	**[Onsite]** Offsite
Overall Result:	**[Pass]** Fail Adjust
Was the scale within customers required accuracy?	**[Yes]** No N/A
Environmental Conditions:	**[Acceptable]** Unacceptable
Temperature:	71°F
Humidity:	46%
Comments / Notes:	Scale is accurate and correct. Measurement of Uncertainty: 100 lbs.= .0118 lb./ 250 lbs.= .0295 lb./ 500 lbs.= .059 lb./ 1000 lbs.= .118 lb.
Technician:	Mark Baker

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by the National Institute of Standards and Technology as specified in Handbook 44 Section 2.20, manufacturers specifications or other written agreement with customer. Best measurement of uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%. Acceptance rule w=0. Overall result of PASS or ADJUST indicates measurement below or equal to the acceptance limit: AL=TL. Overall result of FAIL indicates measurement result above acceptance limit AL=TL. This certificate shall not be reproduced, except in full, without the written approval of the laboratory. Measurement uncertainty available upon request.This calibration test is accredited and meets the requirements of ISO/IEC 17025:2017 & ANSI/NCSL Z540-1-1994 as verified by Perry Johnson Laboratory Accreditation. Refer to certificate and scope of accreditation 82374.

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CERTIFICATE OF CALIBRATION

ACCREDITED
ISO/IEC 17025
CALIBRATION AND TESTING LABORATORY
Certificate No. ACT-1272

CERTIFICATION NUMBER	CL095-41794-502
FOR	Intertek 8431 Murphy Drive Middleton, WI 53562
PURCHASE ORDER #	
TEST INSTRUMENT	Timer
MAKE	Cole-Parmer
MODEL	94440-10
SERIAL NUMBER	101587800
IDENTIFICATION	1212
CUSTOMER LOCATION	Hearth
CONDITION RECEIVED	In Tolerance
CONDITION RETURNED	In Tolerance
CALIBRATED BY	Christopher Moore
CALIBRATION LOCATION	On Site
ENVIRONMENT	72.0°F, 22.2°C, 21.0%RH
CALIBRATION DATE	04/05/2021
RECALIBRATION DUE	04/05/2022

PROCEDURES FOLLOWED

FVE-033 rev. 1

Form Revision 7: 07/14/2020

STANDARDS USED

INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL
FVS-553	N/A	CL022-19908-397	01/31/2022
FVS-811B	N/A	CK281-24359-397	10/31/2021

Total expanded measurement uncertainties expressed are based on a confidence level of 95%; coverage factor of (k=2). The statement of compliance in this certificate was issued without taking the uncertainty of measurement into consideration. The customer shall assess the results and uncertainty when determining if the results meet their needs. (This is considered “shared responsibility.”) Uncertainties expressed in nominal units.

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). Calibration was completed in accordance with ISO/IEC 17025:2017, ANSI/NCSL Z540-1-1994 and ANSI/NCSL Z540.3-2006. Other standards listed upon request.

CALIBRATION RESULTS

*** DENOTES "OUT OF TOLERANCE"**

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Timer	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	60.0	59.5	60.5	60.0	60.0	0.06
	60.0	59.5	60.5	59.9	59.9	0.07
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	300.0	299.5	300.5	300.0	300.0	0.06
	300.0	299.5	300.5	300.0	300.0	0.06
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	1800.0	1799.5	1800.5	1800.0	1800.0	0.07
	1800.0	1799.5	1800.5	1799.9	1799.9	0.06

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CERTIFICATE OF CALIBRATION

Certificate No. ACT-1272

CERTIFICATION NUMBER	CL194-30656-679
FOR	Intertek 8431 Murphy Drive Middleton, WI 53562
PURCHASE ORDER #	
TEST INSTRUMENT	Pressure Transducer Differential Pressure Transducer
MAKE	Omega
MODEL	PX263-01D5V (Intertek)
SERIAL NUMBER	X15160229
IDENTIFICATION	1406
CUSTOMER LOCATION	
CONDITION RECEIVED	In Tolerance
CONDITION RETURNED	In Tolerance
CALIBRATED BY	Danny Scherr
CALIBRATION LOCATION	On Site
ENVIRONMENT	70.0°F, 21.1°C, 48.0%RH
CALIBRATION DATE	07/13/2021
RECALIBRATION DUE	01/13/2022

PROCEDURES FOLLOWED

FVE-060 rev. 0

Form Revision 7: 07/14/2020

STANDARDS USED

INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL
FVS-469	N/A	CL084-50197-397	03/31/2022
FVS-789	7543203	CL138-51841-614	05/31/2022
FVS-789A	7461971	CL138-52996-466	05/31/2022

Total expanded measurement uncertainties expressed are based on a confidence level of 95%; coverage factor of (k=2). The statement of compliance in this certificate was issued without taking the uncertainty of measurement into consideration. The customer shall assess the results and uncertainty when determining if the results meet their needs. (This is considered “shared responsibility.”) Uncertainties expressed in nominal units.

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). Calibration was completed in accordance with ISO/IEC 17025:2017, ANSI/NCSL Z540-1-1994 and ANSI/NCSL Z540.3-2006. Other standards listed upon request.

CALIBRATION RESULTS

*** DENOTES "OUT OF TOLERANCE"**

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Pressure/Vacuum	(inH20)	(inH20)	(inH20)	(inH20)	(inH20)	(inH20)
Low	-0.0000	-0.0025	0.0025	0.0002	0.0002	0.7
Vacuum	-0.0500	-0.0525	-0.0475	-0.0501	-0.0501	0.7
	-0.1000	-0.1025	-0.0975	-0.1003	-0.1003	0.7
	-0.5000	-0.5025	-0.4975	-0.4998	-0.4998	0.6
	-1.0000	-1.0025	-0.9975	-0.9989	-0.9989	0.7
High	0.0000	-0.0025	0.0025	0.0002	0.0002	0.6
pressure	0.0500	0.0475	0.0525	0.0500	0.0500	0.7
	0.1000	0.0975	0.1025	0.0996	0.0996	0.6
	0.5000	0.4975	0.5025	0.4999	0.4999	0.6
	1.0000	0.9975	1.0025	0.9990	0.9990	0.7

130 Derry Court
York, PA 17406
Phone: 717-764-7700
www.intertek.com/building

LIMITED
CERTIFICATE OF CALIBRATION

Certificate Number: 43897

CALIBRATION LABORATORY

INTERTEK B&C
130 DERRY COURT
YORK, PA 17406

OWNER

INTERTEK - 625
8431 MURPHY DRIVE
MIDDLETON, WI 53562

EQUIPMENT INFORMATION

Asset Number: 001450
Serial Number: 16962472
Manufacturer: COMET
Model Number: T7510
Description: TEMPERATURE AND HUMIDITY SENSOR
Size/Range: -30 to 80°C, 0 to 100% RH
Resolution: 2

CALIBRATION INFORMATION

Procedure: 31-33 RH - TEMP
Temp./RH: 76.1 °F / 36.8 %
Cal Date: 11/23/20
Due Date: 11/23/21
Initial Calibration Result:
Calibration Result: PASS
Performed By: ED SULLIVAN

CALIBRATION NOTES

No Visual Defects.
Uncertainties 15% RH: 1.65, 50% RH: 0.35, 80% RH: 1.16, 59 F: 0.22, 73.4 F: 0.21

IAS ACCREDITED Calibration Laboratory

Architectural Testing, Inc., an Intertek company ("Intertek B&C"), certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST). Intertek B&C's Calibration Laboratory is accredited by the International Accreditation Service, Inc. (IAS) to ISO/IEC 17025:2005 (Certificate CL-118). The measurement uncertainties for this calibration are based upon 95% (k=2) confidence limits. This report may not be reproduced, except in full, without the written approval of Intertek B&C.

Servicing Technician:

Edwin W. Sullivan

ED SULLIVAN
METROLOGY TECHNICIAN
Intertek B&C

Approved By:

MATT ROSARIO
CALIBRATIONS MANAGER
Intertek B&C

This certificate is complete only when all data pages are included.

intertek
Total Quality. Assured.

130 Derry Court
York, PA 17406
Phone: 717-764-7700
www.intertek.com/building

CERTIFICATE OF CALIBRATION

Certificate Number: 43897

TEST POINTS

Seq.	Description	Standard	Tolerance -	Tolerance +	As Found	As Left	Units	Uncertainty
1	59.0 Degr F	59.0	58.0	60.0	59.1	59.1	Degr F	0
2	59.0 Degr F	59.0	58.0	60.0	59.0	59.0	Degr F	0
3	59.0 Degr F	59.0	58.0	60.0	58.8	58.8	Degr F	0
4	15% RH (15 C)	15.0	12.5	17.5	16.0	16.0	%	0
5	15% RH (15 C)	15.0	12.5	17.5	16.0	16.0	%	0
6	15% RH (15 C)	15.0	12.5	17.5	15.8	15.8	%	0
7	50% RH (15 C)	50.0	47.5	52.5	49.7	49.7	%	0
8	50% RH (15 C)	50.0	47.5	52.5	49.7	49.7	%	0
9	50% RH (15 C)	50.0	47.5	52.5	49.5	49.5	%	0
10	80% RH (15 C)	80.0	77.5	82.5	78.4	78.4	%	0
11	80% RH (15 C)	80.0	77.5	82.5	78.5	78.5	%	0
12	80% RH (15 C)	80.0	77.5	82.5	78.5	78.5	%	0
13	73.4 Degr F	73.4	72.4	74.4	73.9	73.9	Degr F	0
14	73.4 Degr F	73.4	72.4	74.4	73.7	73.7	Degr F	0
15	73.4 Degr F	73.4	72.4	74.4	73.7	73.7	Degr F	0
16	15% RH (23 C)	15.0	12.5	17.5	17.3	17.3	%	0
17	15% RH (23 C)	15.0	12.5	17.5	17.0	17.0	%	0
18	15% RH (23 C)	15.0	12.5	17.5	16.9	16.9	%	0
19	50% RH (23 C)	50.0	47.5	52.5	49.6	49.6	%	0
20	50% RH (23 C)	50.0	47.5	52.5	49.6	49.6	%	0
21	50% RH (23 C)	50.0	47.5	52.5	49.8	49.8	%	0
22	80% RH (23 C)	80.0	77.5	82.5	78.2	78.2	%	0
23	80% RH (23 C)	80.0	77.5	82.5	78.2	78.2	%	0
24	80% RH (23 C)	80.0	77.5	82.5	78.3	78.3	%	0

STANDARDS USED TO CALIBRATE EQUIPMENT

Company	I.D.	Description	Last Cal.	Cal. Due Date
INTERTEK - 118	005581	HUMIDITY & TEMPERATURE GENERATOR	7/10/2020	7/10/2021
INTERTEK - 118	INT01927	TEMPERATURE AND HUMIDITY SENSOR	5/22/2020	5/22/2021

END OF DATA

CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 90275

Customer Information

Customer: Intertek

Address : 8431 Murphy Drive
Middleton WI 53562

Customer PO #: Verbal - Christine Schultze

Calibration Procedure Information

Procedure ID: GTP AIRVEL Revision #: 7 Revision Date: 10/17/2018

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10086	Furness Controls	FC0332	DP Transmitter	5/7/2022
10100	Graftel	n/a	Temperature	10/18/2022
10171	Furness	FC0332-2W	0 - .4" H2O	5/7/2022
10187	Vaisala	PTB210	Barometric Pressure Gauge	12/1/2021
10157	HOBO	UX100-011	RH/Temp logger	10/15/2021
10017	Hart Scientific/Burns	1502A/3925	PRT, Temperature	8/3/2021

Sensor Information

Manufacturer: Lutron Description: Anemometer Method Used: Pitot Tube

Model #: LM-81AM Rated Accuracy: ± See Attachment Accuracy Specified By: Lutron

Instrument ID#: 001457 Range: 80 to 5910 fpm Condition: Functional

Serial #: AB.50584

Comments: Calibration Date: 05/14/2021
Calibration Due: 05/14/2022

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2017, ANSI/NCSL Z540-I-1994 and ISO 9001. All results contained within this certificate relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.

Performed By: Date: 5/14/2021

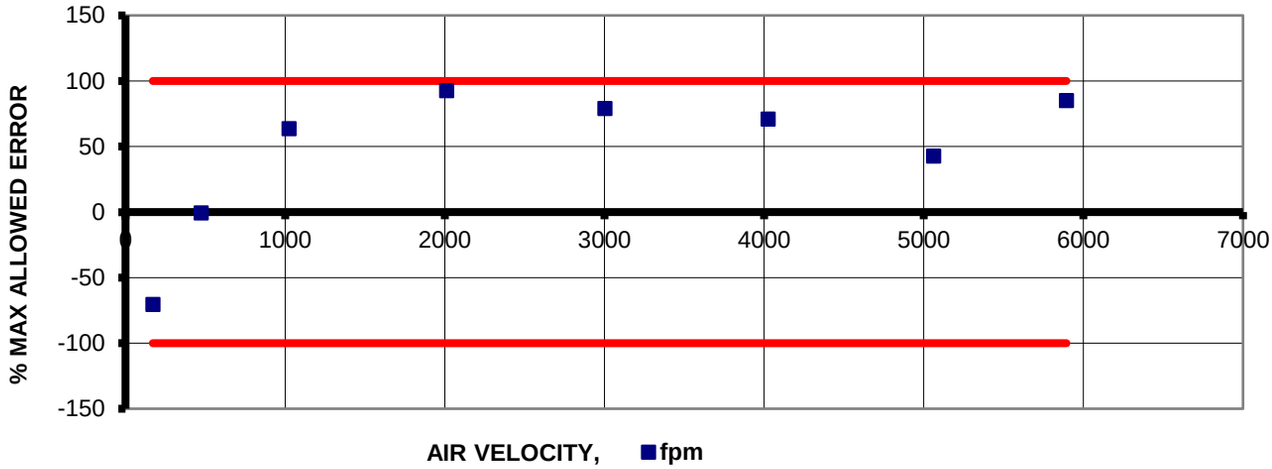
Kevin Garcia
Calibration Technician

95 Chancellor Drive | Roselle, Illinois 60172 | +1 (847) 364-2600 | +1 (847) 364-2600 (fax) | Graftel.com

ATTACHMENT TO CALIBRATION CERTIFICATE 90275
AS FOUND / AS LEFT DATA

Reading From Standard,	Lower Limit of Meter Reading,	Measured Reading From Meter,	Upper Limit of Meter Reading,	Error,	Measurement Uncertainty (k=2)	CMC (k=2)	STATUS
Actual Air Velocity							
fpm	fpm	fpm	fpm	fpm	fpm	fpm	STATUS
171	-6	46	348	-125	4	4	Pass
473	296	472	650	-1	8	8	Pass
1025	848	1138	1202	113	15	15	Pass
2011	1834	2175	2188	164	28	28	Pass
3002	2825	3142	3179	140	41	41	Pass
4025	3789	4193	4261	168	54	54	Pass
5062	4826	5163	5298	101	68	68	Pass
5894	5658	6095	6130	201	79	79	Pass

ERROR CHART



Instrument Specifications		
Test Fluid:	Air	
Lower Velocity Range:	80	fpm
Upper Velocity Range:	5910	fpm
Velocity Resolution:	1	
Velocity Accuracy:	+/-(3%FS <=3937)(4%FS >3937)	

Laboratory Ambient Conditions		
Pressure:	14.46	psia
Humidity:	22.60	%RH
Temperature:	75.90	ºF

GRAFTEL
WWW.GRAFTEL.COM
FLOW - TEMPERATURE - HUMIDITY - PRESSURE - DESIGN - CONSULTING - ENGINEERING
NIST Traceable Calibration Data Sheet
95 Chancellor Dr., Roselle, IL 60172 Phone: 847-364-2600 Fax: 847-364-3899

Intertek
W/N# 21948

MODEL ☐ 25-CBPAH ☐ 55-TRPCBPAH ☐
☐ 55-SHPCBPAH ☐ ☐

Pellet Fuel Room Heater; Free Standing Model Also for Use in Mobile Homes
Certified to ASTM E 1509 / ULC S627 / ASTM E2779 / ASTM E2515 / CSA B415.1

U.S Test Santdard: US EPA 40 CFR Part 60, Subpart 60.536

Manufactured by:
Stove Builder International inc.
589 S. Five Forks Rd.
Monroe, VA 24574

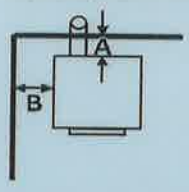
Manufacture Date	20190512
Serial Number	0
Work Order	(# test)

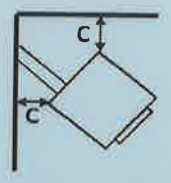
PREVENT HOUSE FIRES

- Install and use only in accordance with the Owner's manual provided with this appliance.
- Contact local building or fire officials about restrictions and installation inspections in your area.
- For use with wood pellet fuel only, 1/4 inch in diameter.
- Do not connect this unit to a chimney flue serving another appliance
- Keep viewing and ash removal doors tightly closed during operation.
- Maximum input rating: 4.4 lbs/hr
- 1.47 Grams/hr
- U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards.
- Use only approved type L or P pellet vent pipe.
- Room heater, pellet fuel-burning type, also for use in mobile homes.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Replace with ceramic glass only.
- A source of fresh air must be provided to the room. When installed in a mobile home, air from outdoors must be provided.
- Do not obstruct combustion air opening.

FREESTANDING INSTALLATION REQUIREMENTS - Refer to local codes and the chimney manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. The unit must be installed on a non-combustible floor protection, which extends 6-inches to the front and 6-inches on each side of the door opening. See owner's manual for additional clearance information.

Clearances to combustibles





A: 0 in. 0 mm
B: 8 in. 203 mm

C: 6 in. 152 mm

Floor protection
Protection de plancher
E: 6 in. 152 mm
F: 6 in. 152 mm

Electrical rating: 115 V, 60 Hz, 5 A. ROUTE THE POWER CORD SO THAT IT DOES NOT COME INTO CONTACT WITH ANY HOT SURFACES ON THE UNIT AND DOES NOT CROSS IN FRONT OF THE UNIT.

Refer to Intertek's directory of building products (https://bpdirectory.intertek.com) for detailed information.

CAUTION - Moving parts may cause injury. Do not operate with panels removed.
CAUTION - Hot parts. Do not operate unit with panels removed.
DANGER - Risk of electric shock. disconnect power before servicing unit.

CAUTION - Operate this unit only with the fuel hopper lid closed. Failure to do so may result in emission of products of combustion from the hopper under certain conditions. Maintain hopper seal in good condition. Do not overfill the hopper.

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.

CAUTION

- HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS. OPERATE THIS UNIT ONLY WITH THE FUEL HOPPER LID CLOSED. FAILURE TO DO SO MAY RESULT IN EMISSION OF PRODUCTS OF COMBUSTION FROM THE HOPPER UNDER CERTAIN CONDITIONS. DO NOT OVERFILL THE HOPPER. MOVING PARTS MAY CAUSE INJURY. HOT PARTS. DO NOT OPERATE UNIT WITH THE SIDE OR REAR PANELS REMOVED. MAINTAIN HOPPER SEAL IN GOOD CONDITION.

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)

Fabricant de poêles international
Stove Builder International

27916

INSTALLATION & OPERATION MANUAL

25-CBPAH
55-SHPCBPAH
55-TRPCBPAH

Manufactured By:
Stove Builder International inc.
PO Box 206
Monroe, VA 24574

www.englander-stoves.com
Support: (877) 356-6663
Email: tech@sbi-international.com

CAUTION

PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS PELLET FUEL-BURNING APPLIANCE. KEEP CHILDREN, FURNITURE, AND ALL COMBUSTIBLES AWAY FROM ANY HEATING APPLIANCE.

SAFETY NOTICE

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH. FOR YOUR SAFETY AND PROTECTION, FOLLOW THE INSTALLATION INSTRUCTIONS OUTLINED IN THIS MANUAL. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS (INCLUDING PERMITS) IN YOUR AREA.

THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.

SAVE THESE INSTRUCTIONS

46319A
2022-06-14

IMPORTANT: IF YOU HAVE A PROBLEM WITH THIS UNIT, DO NOT RETURN IT TO THE DEALER. CONTACT TECHNICAL SUPPORT @ 1-877-356-6663

Tamper Warning:
This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.

Mobile Home Use:
This freestanding pellet unit is approved for mobile home or doublewide installation with the outside combustion air hook-up See the "Installation" section of this manual for details pertaining to mobile home installations. Mobile home installation must be in accordance with the Manufactured Home and Safety Standard (HUD), CFR 3280, Part 24.

WARNING:
USE OF OUTSIDE COMBUSTION AIR IS MANDATORY WITH THIS UNIT.
DO NOT OPERATE WITH THE HOPPER OPEN; LID MUST BE SHUT AND TIGHTLY LATCHED DURING OPERATION. DO NOT OVER-FIRE YOUR UNIT.

Note: England's Stove Works does not recommend using a pellet stove as your only source of heat.

Retain for your files

Model Number_____

Date of Purchase_____

Date of Manufacture_____

Serial Number_____

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.
ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

Welcome!

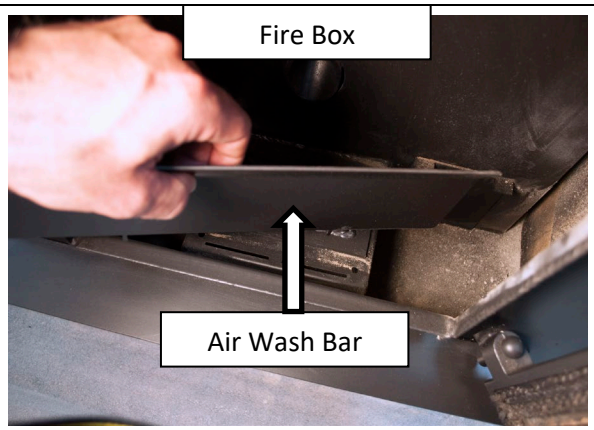
IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

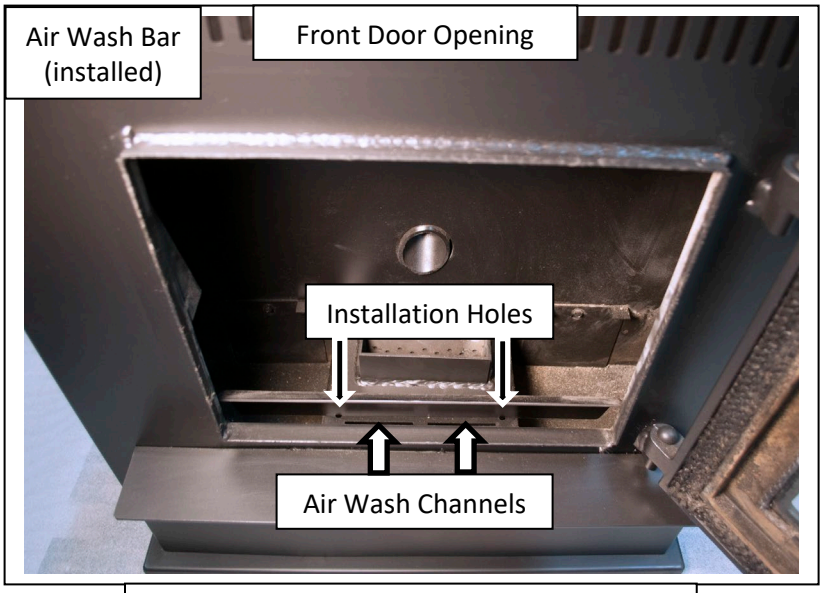
AIR WASH BAR PLACEMENT

CAUTION: The Air Wash Bar may become jarred loose during shipping.

BE SURE that the Air Wash Bar is installed properly before each fire, including after cleaning and maintenance.



The bend of the air wash bar should face TOWARD the front door



Install the Air Wash Bar tabs into the holes and not into the air wash channels

The Air Wash Bar should fit into the two installation holes and 'lean forward' on the front wall of the stove.

The bend in the bar should bend toward the front door opening, and not backward toward the burn pot.

INTRODUCTION

Thank you for purchasing this fine product from England's Stove Works!
England's Stove Works was started, and is still owned by, a family that believes strongly in a "Do It Yourself" spirit; that's one reason you found this product at your favorite "Do It Yourself" store.
We intentionally design and build our stoves so that any homeowner can maintain their stove with basic tools, and we're always more than happy to help you do the job as easily and as inexpensively as possible. However, while remaining simple, our stoves are designed to perform extremely efficiently, helping deliver more heat from less fuel.
Please look at the extensive Help section on our website and call our Technical Support Department at (877) 356-6663 if you need any help with your stove. We are nearly always able to "walk you through" any installation issues, repairs, problems or other questions that you may have.

Wishing you years of efficient, quality and "comfy" heating,
Everyone at England's Stove Works

Please Note: While information obtained from our web site and through our Technical Support line is always free of charge, there will be a service charge incurred with any "on-site" repairs or maintenance that we may arrange.

This manual encompasses all versions of the 25-CBPAH, including the 55-SHPCBPAH and the 55-TRPCBPAH. However, for simplicity of description, the stove will be referred to by the generic 25-CBPAH designation.

CAUTION: Stove is heavy.
In addition, when handling any sheet metal products, be aware that there may be sharp edges or burrs. Although we make every effort to eliminate any sharp edges, please use caution when handling any metal parts. Remember to disconnect (unplug) the stove from the power source and allow it to completely cool down before performing any maintenance.

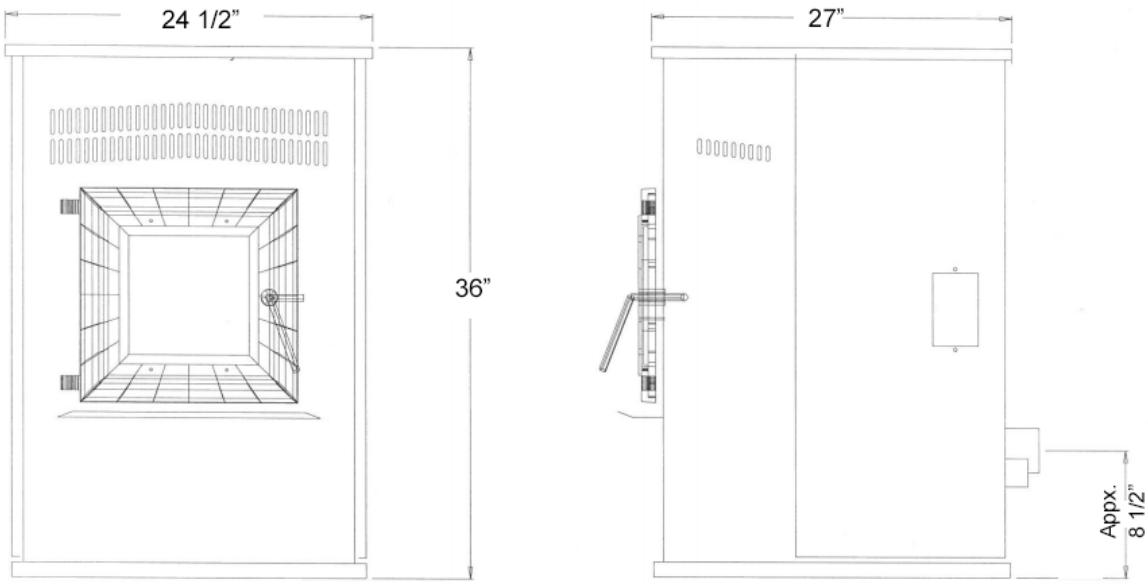
IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.
ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

SPECIFICATIONS

Heating Specifications

- Approximate Pellet Burn Rate**……0.9 to 2 kg/hr (2 to 4.4 lbs/hr)
- Maximum Burn Time**…….. 76 hours
- Heat Output ** …… 11,098-25,122 BTU/hr.
- Approximate Square Footage Heated***…….up to 2,200 sq. ft.
- Hopper Capacity……..120 pounds

Dimensions



EPA and Safety Compliance Specifications

- EPA Compliance Status …….. Certified to comply with 2020 particulate emission standards using pellet fuel.
- U.S. Test Standard …….. EPA 40 CFR Part 60-2015
- Heat output range****…….11,098 BTU/h to 25,122 BTU/h (3.25 kW to 7.36 kW)
- Particulate Emissions …… 1.47 grams/hr.
- CO Emissions …….. 0.000 grams/min.
- Efficiency…… 67.6% (HHV)
- Certified To ASTM E 1509 / ULC S627, ASTM E2779, ASTM E2515, CSA B415.1

Notes for this unit: Product may vary slightly from diagram. Clearances are the minimum for **this unit** and may need to be increased in the rear to have proper vent clearances. **Follow all venting manufacturer clearances and local codes.**

* - As tested per ASTM 2779

** - Heat output, burn rate and maximum burn time are heavily dependent on the type of pellets burned in the stove; as such, these numbers may vary.

*** - The maximum heating capacity of this unit can vary greatly based on climate, construction style, insulation and a myriad of other factors. Use this information in conjunction with a BTU loss calculation for your home to determine if this unit will be sufficient for your needs.

**** - As measured per CSA B415.1-10 stack loss method.

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

INSTALLATION

Installation Overview

When choosing a location for your new stove, there are a multitude of factors that should be taken into account before beginning the installation.

1. Traffic Patterns – To help prevent accidents, the stove should be placed in a location where it is out of the way of normal travel through the home.

2. Heat Flow and Efficiency – When deciding on a location for the stove, consider the way heat moves throughout your home. Install the stove where you need the heat; basement installations often do not allow sufficient heat to flow to the upper floors and a top floor installation will not allow any heat to reach the floors below. Always consider that heat rises and will take the path of least resistance while it is still hot.

3. Exhaust Location – Outside walls are generally the best place to install a stove, since they allow easy exhaust and intake air installation (using our Dura Vent AC-3000 Kit, AC-33000 if Canada). If there is not a feasible way to install the stove on an outside wall, there are methods for venting the stove up through the roof, but they tend to be more costly because they involve the use of more pellet vent pipe and can often make outside air installation more difficult.

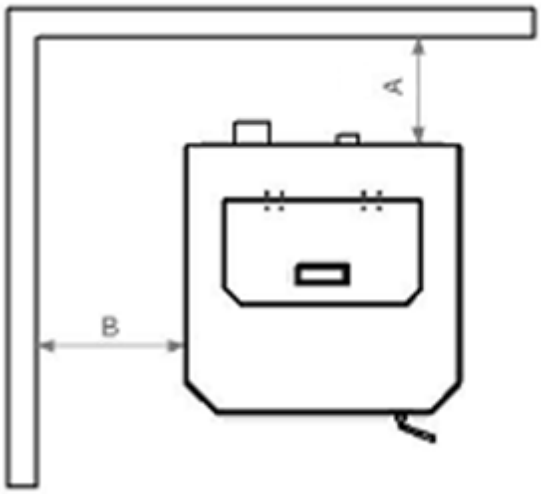
4. Wall Construction – Locating the stove so that the exhaust system can pass between studs will simplify the installation and eliminate the need to reframe any sections of the wall to accommodate the wall thimble.

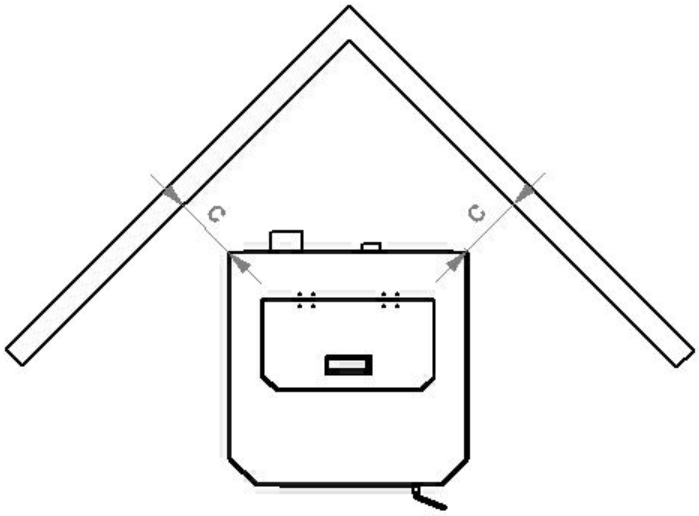
Warning

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do Not Over fire – If any external part starts to glow, you are over firing. Reduce feed rate. Over firing will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may result in a house fire.
- Tested and approved for **wood pellets only**. Burning any other fuel will void your warranty.
- For use with Premium grade wood pellets only.

INSTALLATION

Clearances to Combustibles





Unit to Rear Wall (A)	Unit to Side Wall (B)	Unit to Corner (C)
0 in.	8 in.	6 in.
0 mm	203 mm	152 mm

CAUTION

- Unit can be very HOT while in operation. Keep children away.
- Supervise children in the same room as this appliance.
- Alert children and adults to the hazards of high temperatures.
- Do NOT operate with protective barriers open or removed.
- Keep clothing, furniture, draperies and other combustibles away.
- Installation MUST comply with local, regional, state and national codes and regulations.
- Consult local building, fire officials or authorities having jurisdiction about restrictions, installation inspection, and permits.

DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

INSTALLATION

Venting Introduction

This pellet stove operates on a negative draft system, which pulls combustion air through the burn pot and pushes the exhaust air through the vent pipe and out of the building. This unit must be installed in accordance with the following detailed descriptions of venting techniques; not installing the stove in accordance with the details listed here can result in poor stove performance, property damage, bodily injury or death. England's Stove Works is not responsible for any damage incurred due to a poor or unsafe installation.

If questions arise pertaining to the safe installation of the stove, our Technical Support line (877 356-6663) is available. Contact your local code official to be certain your installation meets local and national fire codes and if you're uncertain about how to safely install the stove, we strongly recommend contacting a local NFI certified installer to perform the installation.

Venting Guidelines

- WARNING - INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER**.**
- **ALWAYS** install vent pipe in strict adherence with the instructions and clearances included with your venting system.
- **DO NOT** CONNECT THIS PELLET STOVE TO A CHIMNEY FLUE WHICH ALSO SERVES ANOTHER APPLIANCE.
- **DO NOT** install a flue pipe damper or any other restrictive device in the exhaust venting system of this unit.
- **USE** an approved wall thimble when passing through a wall and a ceiling support/fire stop when passing through a ceiling.
- **ONLY** use 3.0" or 4.0" Type L or Type PL pipe approved for pellet stove venting; **DO NOT** use galvanized or B-Vent pipe.
- **SEAL** each joint of pellet vent with high temperature silicone (Part # AC-RTV3) to prevent smoke spillage into the home.
- **AVOID** excessive horizontal runs and elbows, as both will reduce the draft of the venting system and will result in poor stove performance.
- **INCLUDE** as much vertical pipe as possible to prevent smoke from the unit from entering your home in the event of a power outage.
- **INSPECT** your venting system often, to be certain it is clear of fly-ash and other restrictions.
- **CLEAN** the venting system as detailed in the maintenance section of this manual.

WARNING

- **INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER.**
- **HOT! Do not touch! Severe burns or clothing ignition may result.**
- **Glass and other surfaces are hot during operation.**
- **Do not attempt to touch or open the front or side panels during operation. This could result in severe burns or injury.**

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

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INSTALLATION

Additional Venting Information

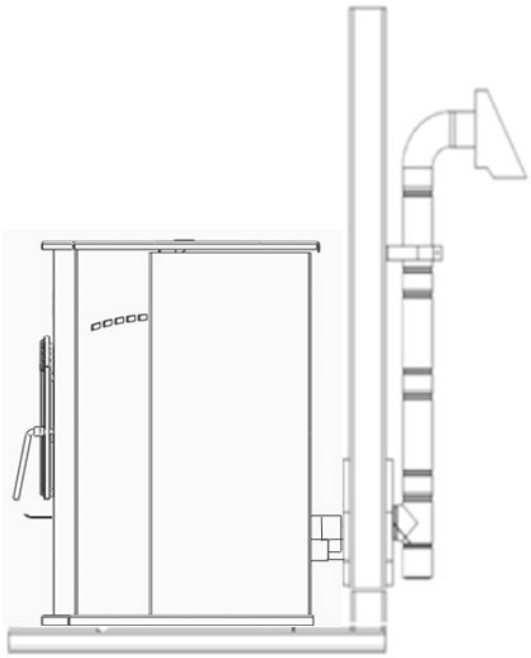
- Do not mix and match components from different pipe manufacturers when assembling your venting system (i.e. Do **NOT** use venting pipe from one manufacturer and a thimble from another).
- We **require** a minimum vertical rise of 36 in. (3 ft.) of pipe to create natural draft in the system. This helps evacuate smoke from the stove in the event of a power failure or combustion blower failure.
- Venting systems 15.0 ft. or shorter may be composed entirely of 3.0 in. pellet pipe; to reduce frictional losses, venting systems longer than 15.0 ft. should be composed of 4.0 in. pellet pipe.
- Do not terminate the venting system directly beneath any combustible structure such as a porch or deck.
- Follow NFPA 211 rules listed below for venting system termination location relative to windows and other openings in the dwelling.
    - NFPA 211 (2006 ed.) Section 10.4 Termination: 10.4.5
      (1) The exit terminal of a mechanical draft system other than direct vent appliances (sealed combustion system appliances) shall be located in accordance with the following:
        - (a) Not less than 3 ft. (.91 m) above any forced air inlet located within 10 ft. (3.0m).
        - (b) Not less than 4 ft. (1.2 m) below, 4 ft. (1.2 m) horizontally from or 1 ft. (305 mm) above any door, window or gravity air inlet into any building.
        - (c) Not less than 2 ft. (0.61 m) from an adjacent building and not less than 7 ft. (2.1 m) above grade when located adjacent to public walkways.
- Distance between the termination opening and grade should be a minimum of 2 ft. (24 in.) contingent on the grade surface below the termination. When determining the termination height above grade, consider snow drift lines and combustibles such as grass or leaf accumulation. In areas where significant snowfall is possible, the termination height must be sufficiently high to keep the termination free of snow accumulation.
- Do not use makeshift compromises during installation or install any component of the unit or venting system in such a manner that could result in a hazardous installation.
- A chimney connector shall not pass through an attic or roof space, closet or similar concealed space, or a floor, or ceiling.
- Where passage through a wall or partition of combustible material is desired, the installation shall conform to CAN/CSA-B365.

WARNING:
Venting system surfaces get HOT, and can cause burns if touched.
Noncombustible shielding or guards may be required.

INSTALLATION

Approved Venting Method 1: Through the Wall

For high altitude installations (above 4,000 ft.), the vent pipe should be increased from 3-inch (3") to four-inch (4").



- Generally the simplest installation method, venting through the wall using our AC-3000 kit, AC-33000 if Canada (or similar venting system) is also the preferred venting method. It minimizes horizontal pipe, allows the stove to be installed close to the wall and keeps the clean-out tee on the outside of the house, for ease of cleaning.
- When installing any venting system, **Type L** or **Type PL** pipe must be used and all clearances to combustibles (listed by the pipe manufacturer) must be strictly adhered to.
- Use the pipe manufacturer's approved thimble for passing through a combustible wall, and maintain at least the minimum clearances to combustibles.
- Use an appliance collar where the pellet vent connects to the exhaust output of the pellet stove and attach the appliance collar to the exhaust blower output using three sheet metal screws.
- Secure the pellet vent to the outside of the house using a wall strap just below the 90 degree elbow.
- Seal each pipe connection joint with high temperature RTV Silicone, to ensure the system is leak free (Check with the specific venting system manufacturer's instructions before doing so).
- If the pellet vent pipe being used is not a "Twist Lock" system, three (3) sheet metal screws are required at each pipe joint.
- Connect the pellet stove to outside combustion air using the kit included with your stove or using an alternative method, as described in the "Outside Air" section, on page 16.

This installation type can be modified for basement **(Basement installations should always be performed by a professional installer)** or other installations wherein the tee and vertical section of the pipe would be inside the home and the venting system would simply pass horizontally through the thimble and then terminate.

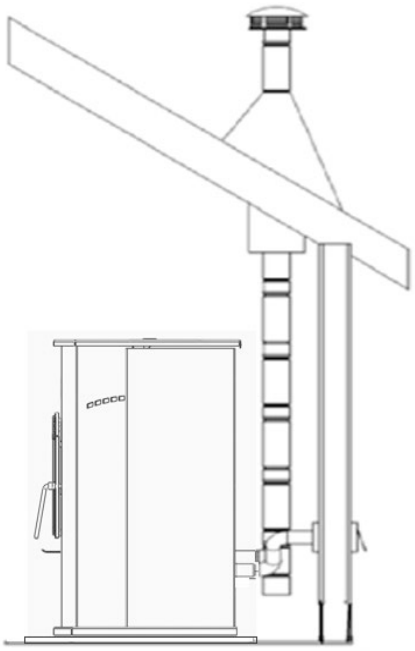
Please Note:

Installation diagrams are for reference purposes only and are not drawn to scale, nor meant to be used as plans for each individual installation. Please follow all venting system requirements, maintain the required clearances to combustibles, and follow all local codes.

INSTALLATION

For high altitude installations (above 4,000 ft.), the vent pipe should be increased from 3-inch (3") to four-inch (4").

Approved Venting Method 2: Through the Ceiling



- Venting through the ceiling/roof may be the only feasible venting option in some cases and is a factory recommended installation.
- When installing any venting system, **Type L** or **Type PL** pipe must be used and all clearances to combustibles listed by the pipe manufacturer must be strictly adhered to.
- Use the pipe manufacturer's approved ceiling support for passing through a combustible ceiling, as well as the required fire stops, radiation shields, flashing and storm collar.
- Be certain to follow the manufacturer's required height of termination above the roof line, and maintain at least the minimum clearances to combustibles.
- Use an appliance collar where the pellet vent connects to the exhaust output of the pellet stove and attach the appliance collar to the exhaust blower output using three sheet metal screws.
- Seal each pipe connection joint with high temperature RTV Silicone, to ensure the system is leak free (Check with the specific pipe manufacturer's instructions before doing so).
- If the pellet vent pipe being used is not a "Twist Lock" system, three (3) sheet metal screws are required at each pipe joint.
- Connect the pellet stove to outside combustion air using the kit included with your stove or using an alternative method, as described in the "Outside Air" section, on page 16.
- This venting method can also be modified so that the venting system runs horizontally through the wall from the stove, then transitions to vertical and terminates above the roofline. When using this modified version of this installation be certain to carefully follow the venting system manufacturer's instructions diligently.

Please Note:

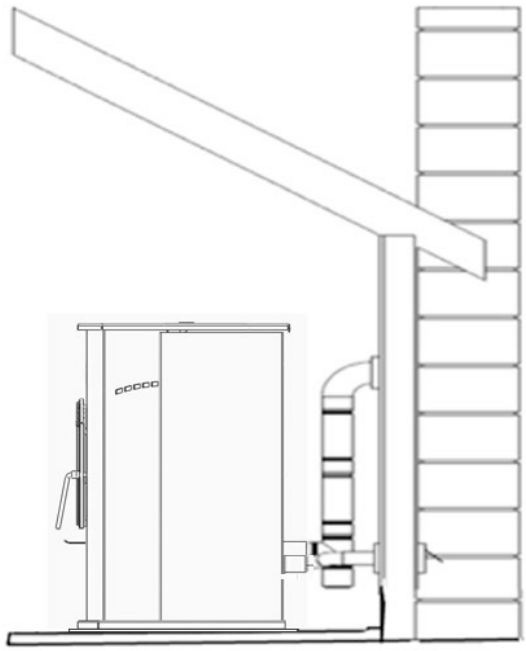
Installation diagrams are for reference purposes only and are not drawn to scale, nor meant to be used as plans for each individual installation. Please follow all venting system requirements, maintain the required clearances to combustibles, and follow all local codes.

INSTALLATION

For high altitude installations (above 4,000 ft.), the vent pipe should be increased from 3-inch (3") to four-inch (4").

Approved Venting Method 3: Existing Chimney System

- Using an existing masonry or factory built chimney for venting is the only other acceptable method for venting this pellet unit.



- Use **Type L** or **Type PL** venting pipe until entering the existing chimney. Use the appropriately sized adapter when transitioning from the pellet vent pipe to the masonry or factory built thimble and be certain that the adapter is sealed tightly to both the pellet venting system and the existing chimney.
- Before using an existing chimney, be certain it is in good condition (A chimney sweep inspection is highly recommended). Also, make sure the chimney meets the minimum standards listed in NFPA 211 (A chimney professional can confirm this upon inspection).
- If connecting this stove to a factory built chimney, it may **ONLY** be a 6" flue, UL103 HT venting system (ULC S629 if Canada). Connection to any other factory built chimney may result in a poorly operating or dangerous stove installation.
- When connecting to an existing masonry chimney, the cross-sectional area of the flue must be considered. A chimney with a flue larger than 6" round (28.27 sq. in.) may require relining with an approved pellet stove chimney lining system.
- Use an appliance collar where the pellet vent connects to the exhaust output of the pellet stove and attach the appliance collar to the exhaust blower output using three sheet metal screws.
- Seal each pipe connection joint with high temperature RTV Silicone, to ensure the system is leak free (Check with the specific pipe manufacturer's instructions before doing so).
- If the pellet vent pipe being used is not a "Twist Lock" system, three (3) sheet metal screws are required at each pipe joint.
- Connect the pellet stove to outside combustion air using the kit included with your stove or using an alternative method, as described in the "Outside Air" section, on page 16.

Please Note:

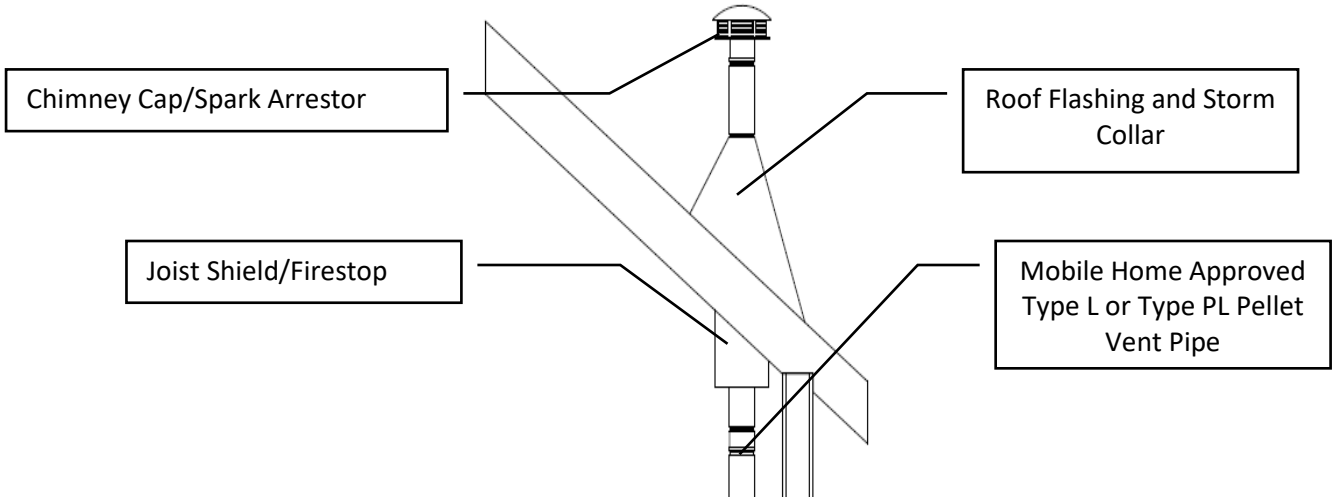
Installation diagrams are for reference purposes only and are not drawn to scale, nor meant to be used as plans for each individual installation. Please follow all venting system requirements, maintain the required clearances to combustibles, and follow all local codes.

INSTALLATION

For high altitude installations (above 4,000 ft.), the vent pipe should be increased from 3-inch (3") to four-inch (4").

Mobile Home Installation

- The England's Stove Works, Inc. outside air kit **MUST** be used for installation of this unit in a mobile home. Please see the "Outside Air" section on page 16 for more information regarding outside air connections.
- The outside air inlet must be kept clear of leaves, ice and other debris. Keeping the outside air inlet free of restriction is crucial to preventing air starvation and smoke spillage.
- The pellet stove **MUST** be secured to the floor of the mobile home using lag bolts and the holes provided in the bottom of the base for this purpose. Outdoor-aired space heaters must be attached to the structure.
- The pellet stove **MUST** be grounded with #8 solid copper grounding wire (or equivalent), terminated at each end with an NEC approved grounded device.
- Carefully follow all clearances listed in the appropriate section of this manual AND follow the venting manufacturer's minimum clearance requirements. Similarly, be certain the venting system used is approved for mobile home use.
- Installation must be in accordance with Manufacturers Home & Safety Standard (HUD) CFR 3280, Part 24 as well as any applicable local codes.
- Use silicone to create an effective vapor barrier at the location where the chimney or outside air ducting passes through to the exterior of the structure.



CAUTION

THE STRUCTURAL INTEGRITY OF THE MANUFACTURED HOME FLOOR, WALL AND CEILING/ROOF MUST BE MAINTAINED. DO NOT CUT THROUGH FLOOR JOISTS, WALL STUDS, CEILING TRUSSES OR ANY OTHER SUPPORTING MATERIAL WHICH COULD BE DETRIMENTAL TO THE STRUCTURAL INTEGRITY OF THE HOME.

WARNING: DO NOT INSTALL IN A SLEEPING ROOM.

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

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VENT TERMINATION CLEARANCES

A) Min. 4-ft clearance below or beside any door or window that opens.

B) Min. 1-ft clearance above any door or window that opens.

C) Min. 2-ft clearance from any adjacent building.

D) Min. 7-ft clearance from any grade when adjacent to public walkways.

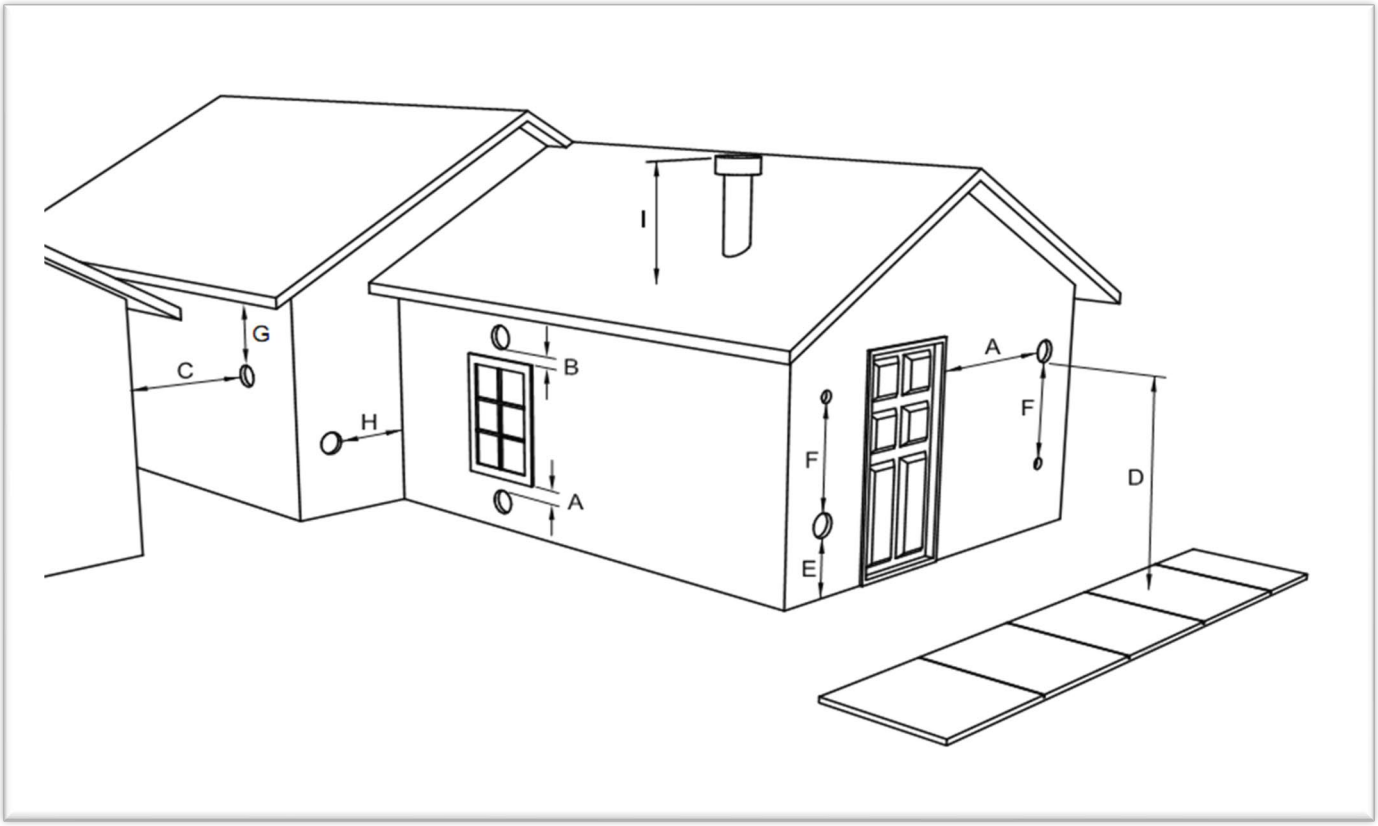
E) Min. 2-ft clearance above any grass, plants, or other combustible materials.

F) Min. 3-ft clearance from a forced air intake of any appliance.

G) Min. 2-ft clearance below eaves or overhang.

H) Min. 1-ft clearance horizontally from combustible wall.

I) Vents installed with mechanical exhausters shall terminate not less than 12 in. (305mm) above the highest point where they pass through the roof surface.



Notes on termination of Pellet Vent Pipe from NFPA 211 (2006 ed.) Section 10.4 Termination: 10.4.5
(See also "INSTALLATION" section of manual AND additional notes above):

- Not less than three (3) feet above any forced air inlet located within ten (10) feet.
- Not less than four (4) feet below, four (4) feet horizontally from, or one (1) foot above any door, window or gravity air inlet into any building.
- Not less than two (2) feet from an adjacent building, and not less than seven (7) feet above grade where located adjacent to public walkways.

The exhaust exit shall be arranged so that the flue gases are not directed so that it will affect people, overheat combustible structures, or enter buildings. Forced draft systems and all parts of induced draft systems under positive pressure during operation shall be installed gastight or to prevent leakage of combustion products into a building. Through-the-wall vents shall not terminate over public walkways, or where condensate or vapor could create hazards or a nuisance.

Be sure to follow local codes and all manufacturer's instructions (including exhaust pipe).
Consult a professional installer and/or call Technical Support if you have any questions.

OUTSIDE AIR HOOK-UP

- The use of outside combustion air is **mandatory** on this pellet stove.
- The outside air connection pipe protrudes from the lower rear center of the stove; use the included outside air kit to attach your stove to outside combustion air. Instructions and all the parts needed to make the outside air connection to your pellet stove are included with the outside air kit.
- If it is not feasible to use the included outside air hookup kit in your stove installation, other materials may be used, provided the following rules are followed:
    - The pipe used for outside air hookup must be metal, with a minimum thickness of .0209 in. (25 gauge mild steel) or greater and an inside diameter of approximately 2.0 in.
    - All pipe joints and connections should be sealed with pipe clamps or other mechanical means, to insure a leak free outside air connection.
    - Long runs of pipe and excessive elbows for outside air should be avoided. Due to frictional resistance in pipe, any excessive outside air piping can result in poor stove performance.
    - A screen or other protection device must be fitted over the outside air termination point to prevent rain, debris and nuisance animals from entering the piping system.
    - Increase the outside air pipe size to 3.0 in. diameter pipe if the outside air connection is more than 6 ft. in length, more than two (2) elbows are used or if the stove is installed in a basement.
- The outside air connection system should be inspected at least annually to be certain it is free from blockage.

Caution

NEVER draw outside combustion air from:

1. Wall, floor or ceiling cavity.

2. Enclosed space such as an attic, garage or crawl space.

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

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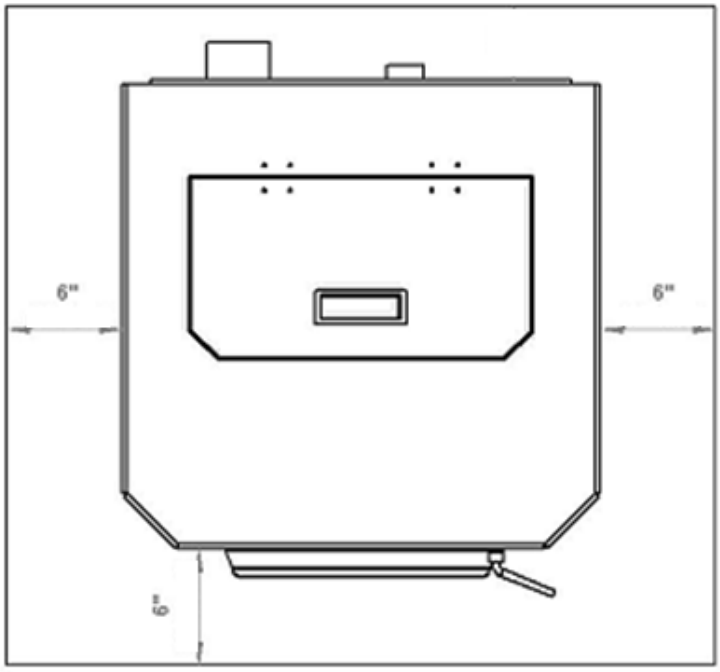
FLOOR PROTECTION

- This pellet stove requires a non-combustible floor protector if the stove is to be installed on a combustible floor. If the floor the stove is to be installed on is already non-combustible (i.e. a concrete floor in a basement) and has an R value equal to or higher than .2, no floor protection is needed (although a decorative floor protector can still be used for aesthetic reasons).
- Prefabricated floor protectors which are UL listed (ULC if Canada) or equivalent can be purchased or a floor protector can be built from standard materials: two sheets of .5" thick cement board covered with ceramic tile would be a suitable floor protector which meets the .2 R-value requirement.
- When using any floor protector, consider that this stove is not only heavy but will induce heating and cooling cycles on the floor protector which can damage tile and loosen mortar and grout joints. A hearth rug is **NOT** an approved substitute for a proper hearth pad.
- **For the US and Canada**: The floor protector must extend at least 6 in. (152 mm) from the front & sides.
- **In Canada**, it is required that the non-combustible floor protector is underneath and extends 2 in. (50.8 mm.) on either side of any horizontal venting runs **AND/OR** is directly underneath any vertical venting pipe.



DAILY OPERATION

Getting Started

- Check to see that the hopper is clean and free from foreign materials. Be sure to connect this unit to a working outlet; we recommend using a surge protector to help protect the electronic components from damage.
- **BEFORE** your first fire, dry run your unit (no pellet fuel in the hopper) for twenty minutes; pressing the "ON" button with the unit plugged in will initiate the dry run.
    - Once the "ON" button is pressed, you should immediately hear the exhaust blower start and operate continuously.
    - After about three to five minutes, look for the red glow of the igniter in the igniter port of the burn pot to be certain it is operating normally.
    - Hold the hopper lid switch (See "Illustrated Parts Diagram" pg. 44) down with your finger and check to see that the auger is turning. Release the hopper lid switch and be certain that the auger stops turning. **DO NOT PUT YOUR FINGERS IN THE HOPPER OR NEAR THE ROTATING AUGER**.
- After about twenty minutes, the control board should display "E-2" in the two display windows (More information on Error Codes can be found in the Error Code section of this manual).
- At this point, the dry run is complete and your pellet heating appliance is ready for normal operation.

Lighting a Fire

- In order for this stove to operate, the hopper must first be filled with pellet fuel. Lift the hopper lid using the flush-mount handle and pour the pellet fuel directly into the hopper.
    - ❖ We recommend using only pellets manufactured by PFI Certified facilities, since pellets bearing the PFI stamp of approval will be low in ash and moisture, high in BTU's, and uniform in size and quality.
- This pellet stove will perform equally well using softwood and hardwood pellets, and although the ash may differ slightly in appearance or texture, both types of pellets will burn cleanly and efficiently in this stove.
- This pellet stove is equipped with an automatic pellet ignition system; the only user input required to light the stove is a simple press of the "On" button.
- Shortly after pressing the "On" button, the letters "**S U**" will appear in the heat range and blower speed windows of the control board. This indicates the stove has entered the start-up sequence and is operating normally.
- The fuel feed rate and combustion air during start-up is determined by the control board, so the stove may be started on any heat range.
- After approximately fifteen minutes, the fire should be burning brightly and the "**S U**" should disappear from the control board. At this point, the stove has begun normal operation and the display windows on the control board will remain empty, unless the Heat Range or Blower Speed is adjusted.

- It is normal for the unit to smoke during the first fire, as paints and oils cure. This should dissipate within the first hour. Open a door and/or window during the first fire to ventilate the area.

Daily Operation Notes

- Only high quality, Premium Grade ¼" (.25 in.) diameter wood pellets should be used in this stove. Using low grade wood pellets with high ash content OR wood pellets with a high moisture content can cause the burn pot to fill with ash at a more rapid pace and can cause intervals between periodic maintenance to become significantly shorter. Please read the "Maintenance" section of this manual thoroughly to understand how fuel selection affects stove operation, maintenance and cleaning.

- Variation in the flame height is normal; not all wood pellet fuel is uniform in size, which can affect the way pellets are fed into the burn pot. Although the flame height may increase and decrease during operation, there is no loss of efficiency.

- Always store wood pellet fuel in a dry location; storing wood pellet fuel in a dry location ensures the fuel will remain pelletized and low in moisture content. Also, be certain that all wood pellet fuel is stored at a safe distance from the pellet heater; storing fuel in close proximity to the stove can result in a fire. **Do not install or operate this unit outside, in a greenhouse, or in any area that is high in moisture.**

- This pellet burning room heater is equipped with a specially designed burn pot which comes preinstalled from the factory. This burn pot elevates the burning pellets and delivers air at the precisely-required locations. Pellets must only be burned in the factory burn pot; no modifications should be made to this burn pot and no additional grates or other fire elevators should be used.

CAUTION

NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER WHILE IN USE. ADDITIONALLY, NEVER APPLY FIRE-STARTER TO ANY HOT SURFACE OR EMBERS IN THE STOVE. DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.

DO NOT BURN FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL. DO NOT BURN GARBAGE; LAWN CLIPPINGS OR YARD WASTE; MATERIALS CONTAINING RUBBER, INCLUDING TIRES; MATERIALS CONTAINING PLASTIC; WASTE PETROLEUM PRODUCTS, PAINT OR PAINT THINNERS, OR ASPHALT PRODUCTS; MATERIALS CONTAINING ASBESTOS; CONSTRUCTION OR DEMOLITION DEBRIS; RAILROAD TIES OR PRESSURE-TREATED WOOD; MANURE OR ANIMAL REMAINS; PAPER PRODUCTS, CARDBOARD, PLYWOOD OR PARTICLEBOARD. THE PROHIBITION AGAINST BURNING THESE MATERIALS DOES NOT PROHIBIT THE USE OF FIRESTARTERS MADE FROM PAPER, CARDBOARD, SAWDUST, WAX AND SIMILAR SUBSTANCES FOR THE PURPOSE OF STARTING A FIRE IN AN AFFECTED WOOD HEATER. BURNING THESE MATERIALS MAY RESULT IN RELEASE OF TOXIC FUMES OR RENDER THE HEATER INEFFECTIVE AND CAUSE SMOKE.

CONTROL BOARD SETTINGS

The control board on this stove allows the user to adjust the heat output and convection blower speed, turn the unit on and off, and test components for function (more on diagnostic mode later).

- The lower buttons on the control board (Low Fuel Feed, Low Burn Air, and Air on Temp) are not meant to be adjusted during normal operation of the unit. These buttons are factory preset and can not be adjusted by the user.

- To energize the unit and initiate a fire, press the "On" button. The LED above the button should turn green and the control board should display "S U" shortly after pressing the button.

- To shut the unit down, press the "Off" button. The LED above the button should turn red and the board should display "S d" shortly after pressing the button. This initiates the shut down sequence, and the stove will remain in shut down mode until it has cooled down.

- To increase the heat output of the stove, press the "Up" heat range button. The number in the heat range display window will increase, signifying that the control board is now adjusting the heat output to your desired level. The blower speed will increase the same amount as the heat range, because the stove is designed to operate with the blower speed greater than or equal to the heat range. Pressing the "Down" arrow will decrease the heat range and blower speed.

- To increase the blower speed without increasing the heat range, press the Blower Speed "Up" arrow until the desired blower speed is shown in the display window. Pressing the "Down" arrow will decrease the blower speed; however, the control board will not allow the blower speed to be set lower than the heat range.

Caution

This unit is meant to operate only with the main viewing door closed. Smoke spillage and an inefficient, lazy burn will result from attempting to operate the stove with the door open.

In addition, using fuel other than wood pellets can create an unsafe situation and can also generate excess carbon monoxide. Carbon monoxide is an odorless, colorless gas which can be deadly.

Burn ONLY wood pellets.

Carbon Monoxide Detector

England's Stove Works, Inc. highly recommends the use of a carbon monoxide detector in the proximity of the stove and one per floor of the home.

A certain amount of carbon monoxide is produced within the stove as a by-product of combustion. All exhaust vent connections must be sealed with RTV Silicone to assure a tight seal. Any leaks into a confined area caused by faulty installation or improper operation of the stove could produce dizziness, nausea and in extreme cases, death. The CO concentration during testing was found to be 0.013 g/min.

ERROR CODES

Error codes, or "E-Codes," are alphanumeric codes that will appear in the Heat Range and Blower Speed windows of the Control Board if the unit experiences an abnormal condition. Error codes are the control board's way of telling the user that something isn't operating correctly within the stove, and that the unit should be carefully inspected before reigniting. See the "Trouble-Shooting Guide," page 31, for additional information on error codes.

E-0

- When this is displayed in the control board windows (typically when restarting after an "E-Code" shutdown), it means there are currently no errors and the stove will begin normal operation.

E-1

- This error code is not used on this stove. If it is displayed in the control board windows, please contact Technical Support and they will diagnose the cause of the false code.

E-2

- When this code is displayed in the control board window it indicates a failure to light. Although the stove may have ignited the pellets, the control board did not register a high enough temperature to determine the fire was lit. If a fire was ignited, wait for the unit to cool, clean the burnpot and restart the unit.

E-3

- This error code indicates the preset maximum allowable exhaust temperature was exceeded. Commonly referred to as "Over-Firing," the E-3 code means something in the stove is causing the exhaust gas to be hotter than expected.

E-4

- This code is displayed based on a drop in the exhaust temperature. This code means the fire or "proof of flame" has been lost. It usually results from the hopper being empty.

If an error code continues to display, if the error code seems unexplainable, or if you have any other questions about error codes and what they mean, please contact Technical Support at (877) 356-6663.

Hopper Lid Safety Switch - This unit is also equipped with a hopper lid safety switch (Part # AC-HLSB) which is directly connected to the auger motor. In the event the hopper lid is left open while the stove is in operation, the hopper lid switch will prevent the auger from turning. This is to prevent byproducts of combustion from entering the home through the open hopper lid and also to simply prevent operation with the hopper lid open. Improper hopper lid safety switch operation will result in an auger that will not turn and therefore a stove that will not burn. NEVER place your hand or any object near the auger while the stove is connected to power.

POWER FAILURE

If the power to the unit is interrupted for approximately three minutes or less, the unit will resume operation when power is restored according to the following table:

Unit's State Before Power Loss	State When Power Returns
ON	Start-Up
Start-Up	Start-Up
Shut-Down	Shut-Down
OFF	OFF

- If the power is interrupted for more than (approximately) three minutes, the unit will be "OFF" when power returns.
- **IMPORTANT** – Do **NOT** open the hopper lid or the door to the unit during power outage. Open the closest outside door and a window to reduce the chance of any combustion byproducts entering the home from the stove.
- Wait for the power to be restored and then press the "ON" button to restart the unit, if necessary.

Smoke Detectors

England's Stove Works, Inc. highly recommends the use of smoke detectors in every room of the house. However, locating a smoke detector directly above this unit can result in nuisance alarms.

Caution – Shock Hazard

Press the "Off" button and let the appliance completely cool BEFORE unplugging the appliance and beginning any maintenance or component replacement.

Risk of shock if appliance is not unplugged before service.

Failure to properly clean your stove can cause poor performance and possibly a burn back!

Disposal of Ashes – Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.

DAILY MAINTENANCE

Important Notes

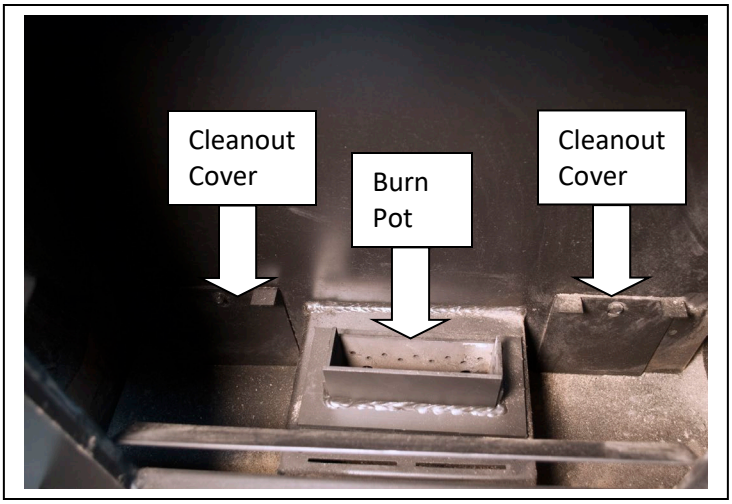
- As with any maintenance concerning this unit, be sure the unit is "OFF" and has completed the Shut-Down cycle **BEFORE** beginning.
- Be aware that metal parts in the firebox can remain **HOT** long after the fire has gone out and **EVEN** after the Shut-Down cycle is complete. Always use extreme caution when handling potentially hot stove parts, even if you think they should be cold.
- Ashes should only be removed when the stove has been shutdown and has been allowed to cool thoroughly. Hot embers can remain under ashes long after the fire has gone out, so always be extra careful when handling any ashes from this (or any) stove.
- Different pellets will generate varying amounts of ash and burn pot deposits. Carefully monitor the ash build up in the stove when first operating the unit, as well as whenever a different brand of pellets is burned.
- While the amount of ashes generated by this unit is not excessive compared to a traditional log-burning woodstove, keeping the unit clean and free of ash is ESSENTIAL for peak performance and maximum efficiency. Ash build-up hampers airflow, reduces efficiency, and can cause a smoke back.
- England's Stove Works® is not responsible for any damages incurred due to a poorly maintained and/or dirty stove. This pellet stove is a highly efficient machine and, as such, requires sufficient maintenance to keep it operating at its peak.

Ash Removal and Disposal

- Press the "Off" button and allow the stove to complete the shutdown cycle and cool completely.

- Because of the open design of the firebox, the majority of the ash will be on either side of the cradle. Open the door of the stove and use an old paint brush or putty knife to move ash from around the burn pot and into the open areas beside the cradle.
- Using the cleaning tool provided, remove any deposits left in the burn pot, being careful to remove them from the burn pot and not allow them to filter down into the cradle area. Excessive ash build-up in the cradle can cause poor stove performance (See "Cleaning the Burn pot," below).

  WARNING: Use caution when using the cleaning tool, as it has a sharp point and may have some sharp edges (as with any metal tool). As we recommend with any maintenance, use gloves, safety glasses and any necessary safety apparel when handling the cleaning tool.



Cleaning the Burn Pot

Along with removing ashes from the stove, cleaning the burn pot is the other essential part of daily maintenance that will keep the stove operating at its peak. Pellets contain varying amounts of impurities and fusible material that will accumulate in the burn pot over time. Some pellets will contain much higher amounts of these fusible impurities, therefore extra vigilance may be required to maintain a clean burn pot. Allowing impurities to build up in the burn pot can restrict the air flow to the fire, resulting in a dirty, inefficient burn and can shorten the life of the burn pot.

NOTE: The burn pot should be cleaned out **before each start-up** (before pressing the ON button), and daily.

- Always allow the stove to finish the shut-down cycle and cool completely before performing any maintenance inside the firebox.
- Open the front door and remove the burn pot by lifting it straight up and out of the cradle. **WARNING** – The burn pot can remain HOT long after the fire has gone out, so wear protective gloves whenever handling a potentially hot burn pot.
- Once the burn pot is out of the stove, use the cleaning tool to remove any deposits from the inside of the burn pot.
- **Be certain all air holes are clear and unrestricted** by fusible ash matter; the cleaning tool provided is designed to fit these holes and will be useful in removing stubborn deposits from these holes.

- Remove any ash material from the bottom of the cradle and brush any ash from the top of the cradle into the sides of the firebox. Keeping the top of cradle free of ash is crucial in allowing the burn pot to seat properly in the cradle.
- Insert the burn pot back into the cradle using the reverse of the procedure detailed above.

WEEKLY MAINTENANCE

Baffle Removal

- As with any maintenance concerning this unit, be sure the unit is "OFF," has completed the Shut-Down cycle, and is completely cool **BEFORE** beginning. Be aware that metal parts in the firebox can remain **HOT** long after the fire has gone out and **EVEN** after the Shut-Down cycle is complete. Always use extreme caution when handling potentially hot stove parts, even if you think they should be cold.
- Weekly maintenance should include the steps listed in this section **AS WELL AS** the steps listed in the "Daily Maintenance" section.
- Remove the top baffle (inside the firebox, above the door) by lifting it up and pulling it forward, then tilting it sideways to remove it from the stove. The part number for the top baffle is AC-PAHTB.
- Remove any ash that has accumulated behind the baffle in the stove.
- The use of a utility vacuum is highly recommended because it will prevent fly-ash from falling through the exhaust holes and into the exhaust chamber.
- Replace the baffle by reversing the above steps. Be sure the tabs in the baffle fit into the matching holes in the firebox wall of the stove. The top of the baffle will rest against the front wall of the stove when it is properly installed.

Clean-Out Covers

- The exhaust chamber of the stove was intentionally designed as an ash accumulation area. Allowing ash to accumulate here prevents excess ash build-up in the combustion blower and the venting system. Similarly, the exhaust chamber is easily accessible via the two exhaust chamber clean-out ports located in the firebox.
- Remove the exhaust chamber clean-out port covers *(lower left and right, on either side of the burn pot, see image on previous page*). Use a 5/16" socket wrench to loosen the screw on each cover, then pull the cover upwards to remove it from the screw.
- BEFORE vacuuming the chamber out, observe the type and quantity of ash build-up. The ash deposited in the exhaust chamber should be light, fluffy, grey or white in color, and should be no higher than half way up the clean-out port.

- Using a utility type vacuum cleaner, vacuum the fly ash out of the exhaust chamber. A short piece of hose can be attached to the end of the utility vacuum line and can be useful in reaching the ash. Replace the clean-out port covers when finished.
- A specially designed ash vacuum is available from the England's Stove Works website; please see: Englander-stoves.com .

MONTHLY MAINTENANCE

- NOTE: As with any maintenance concerning this unit, be sure the unit is "OFF," has completed the Shut-Down cycle, and is completely cool BEFORE beginning.
- Be aware that metal parts in the firebox can remain HOT long after the fire has gone out and EVEN after the Shut-Down cycle is complete. Always use extreme caution when handling potentially hot stove parts, even if you think they should be cold.
- Monthly maintenance should include the steps listed in this section AS WELL AS the steps listed in the "Daily Maintenance" and "Weekly Maintenance" section.
- Intervals between monthly cleanings will depend on the duration that the stove is burning on a daily basis. A stove which is operated continuously will need more frequent monthly cleanings than a stove which is used periodically as supplemental heat.
- A good rule of thumb for monthly maintenance is that it should be done each time an entire ton of pellets is burned OR once per month, whichever comes first.
- If excess ash accumulation is found in the exhaust chamber or venting system during monthly maintenance, the interval between cleanings should be reduced to eliminate the possibility of poor stove performance due to ash accumulation.
- A specially designed ash vacuum is available from the England's Stove Works website; please see: Englander-stoves.com

(Continued next page)

MONTHLY MAINTENANCE

Venting Pipe Cleaning

- Low spots and direction changes in the venting system (such as tees and elbows) are areas for potential fly-ash and creosote accumulation. INSPECT these areas diligently to keep the venting system in safe operating condition.
- Depending on the specific type of venting system your stove is connected to, it may be possible to remove the clean-out tee cover and simply run a pipe brush up the pipe to remove any fly-ash accumulation.
- Horizontal runs of pipe, such as from the exhaust connection on the stove to the vertical transition, will accumulate fly ash and should be inspected carefully and brushed clean.
- Check the termination cap to be certain it is not clogged or restricted by any fly-ash accumulation.
- After thoroughly cleaning the venting system, reseal any disassembled seams with high temperature silicone (Part # AC-RTV3) if applicable to your venting system.
- Inspect seams that were not disassembled to be certain a smoke-tight seal is still being made.
- After prolonged use, leaks in the venting system can usually be found by searching for fly-ash deposits on the outside of the pipe. Carefully check for leaks in the venting system and seal them accordingly.
- Although most pellet venting systems are designed to last a lifetime, pellet fly-ash can be corrosive under certain conditions. When cleaning your venting system, examine the pipe carefully for any signs of deterioration and replace sections that show excessive wear. It is unlikely that this will ever be a concern, but maintaining your venting system in safe operating condition is crucial to safe stove operation.

YEARLY MAINTENANCE

Important Notes

- As with any maintenance concerning this unit, be sure the unit is "OFF," has completed the Shut-Down cycle, and is completely cool BEFORE beginning.
- Be aware that metal parts in the firebox can remain HOT long after the fire has gone out and EVEN after the Shut-Down cycle is complete. Always use extreme caution when handling potentially hot stove parts, even if you think they should be cold.
- Yearly (or end of season) maintenance should include the steps listed in this section AS WELL AS the steps listed in the "Daily Maintenance," "Weekly Maintenance" and "Monthly Maintenance" sections of this manual.
- Yearly maintenance should be performed at the end of the burning season. Leaving ash and other build-up in the stove during the non-heating months can lead to premature metal degradation in the stove and venting system. Using extra attention to detail and being certain to be very thorough in the end of season cleaning will help increase the operating life of the stove and venting system.
- The unit should be unplugged during the summer months (and periods of non-use), to help protect against the possibility of damage due to lightning strikes and other power disruptions.

SOOT AND FLY ASH: FORMATION AND NEED FOR REMOVAL

The products of combustion will contain small particles of fly ash. The fly ash will collect in the exhaust venting system and restrict the flow of the flue gases. Incomplete combustion, such as that which occurs during startup, shutdown or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. The exhaust venting system should be inspected at least once every year to determine if cleaning is necessary.

Caution – Shock Hazard

Press the "Off" button and let the appliance completely cool BEFORE unplugging the appliance and beginning any maintenance or component replacement.

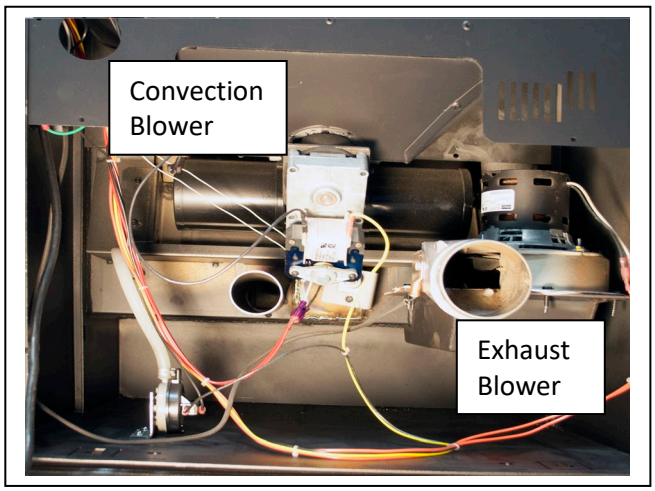
Risk of shock if appliance is not unplugged before service.

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

YEARLY MAINTENANCE

Exhaust Blower Cleaning



Although the exhaust blower and blower housing were designed to minimize ash build-up, some fly-ash will still accumulate there throughout the burning season. The amount and type of ash will depend on the type of pellets and venting system, but generally this accumulation will be mild. If, when cleaning the exhaust blower, a large accumulation of fly-ash is found, cleaning the exhaust blower and housing should be performed monthly or bimonthly to prevent this excess buildup.

Instructions

- Before beginning the exhaust blower cleaning procedure, be certain the unit is unplugged and thoroughly cooled down.
- Remove the left side panel of the stove, using a 5/16" wrench or nut driver.
- Disconnect the venting system from the exhaust blower just enough that you will be able to remove the exhaust blower from the stove.
- Once the panel is off, the exhaust blower will be clearly visible.
- Unplug the two wires which connect the stove wiring harness to the exhaust blower, using the quick connect plugs. Disconnect the heat sensor that is mounted (with a screw) to the exhaust blower.
- Loosen the five (5) $^{5}/_{16}$" self-drilling screws which hold the exhaust blower to the exhaust blower tube.
- Lift the exhaust blower up and out of the stove. The gasket which seals the exhaust blower to the exhaust blower tube is fragile, so take extra care when removing the blower. Even when being careful, though, it is easy to tear this fragile gasket, and since an airtight seal is crucial here, it is best to replace this gasket (Part # - PU-CBMG) every time the exhaust blower is removed.
- With the exhaust blower removed, use a utility vacuum to remove any ash accumulation in the exhaust blower tube.
- Use a soft paint brush and carefully remove any ash accumulation from the inside of the exhaust blower, and from the exhaust blower fan blade.
- Inspect the exhaust blower motor for dust accumulation and carefully remove it, ensuring that all air cooling holes into the motor are open and free of dust deposits.
- Install the blower in the reverse order as described above. Remember to check the condition of the exhaust blower gasket and to replace the heat sensor onto the exhaust blower.
- Reinstall the venting system and panels.

Convection Blower Cleaning

As always, be certain the stove is cool and **unplugged** before servicing any components within the unit. Since the convection blower does not handle any by-products of combustion, it does not require serious cleaning like the exhaust blower. However, dust from the home and other debris in the air can accumulate on the blades of the convection blower. Remove the rear panel of the unit, using a 5/16" wrench or nut driver. The convection blower is located in the middle of the stove (see image, above). Any dust that has built up on

the fan blades (on both sides of the blower) can usually be easily removed with a vacuum or a soft paint brush. Remove (4) $^{5}/_{16}$" screws that hold the bracket in place to remove the blower, if necessary.

Cleaning Pellet Fines from the Hopper and Auger

Depending on the type and quality of pellets burned in the stove, some accumulation of pellet fines and dust is possible in the hopper. The lowest part of the auger, near the back of the stove, is where most fines will accumulate. With the stove off, **unplugged**, completely cool and with the hopper empty, use a utility vacuum to remove the fines from the auger tube. If the fines cannot be removed from the top of the hopper:

- Remove the back panel, using a $^{5}/_{16}$" socket or nut driver to remove the screws.
- Locate the auger motor assembly at the middle rear of the stove, and once it is found, find the two set screws on either side of the cast iron mounting collar.
- Using a $^{1}/_{8}$" allen wrench, loosen the set screw on either side of the auger mounting collar.
- With a utility vacuum in hand, let the auger assembly slide out of the auger tube just enough so that the vacuum can be used to remove any fines from this area.
- Reinstall the auger assembly and tighten the two set screws; reinstall the back panel, being certain to tighten the retaining screws on the rear of the stove.

Cleaning Pellet Fines Inside Auger Tube

- Remove the auger cover plate (located above the auger at the bottom of the hopper) by removing the (8) 5/16" screws that hold it in place. Using a utility vacuum remove any excess dust or fines that have collected in the auger tube around the auger.
- Re-install auger cover plate in reverse method.

Checking Gaskets

An airtight seal at the door opening is crucial to proper stove performance. Any air leaks in this area can not only cause a dirty, inefficient burn but can also pose a serious safety threat. Because of this, the door gasket should always be maintained in good condition, and replaced annually or sooner if necessary. Gasket tightness can be checked using the "dollar-bill" method:

- Place a dollar bill between the gasket and the stove body (at the location where the gasket meets the stove).
- Close the door tightly and attempt to pull the dollar bill out. If the dollar bill slides in and out easily, the gasket needs to be replaced. This test should be repeated around the entire gasket perimeter, as gaskets will sometimes seal tightly on one side, but will be worn and seal poorly on another side.

Trouble-Shooting Guide

WARNING: To avoid **ELECTRICAL SHOCK** always *disconnect* the unit from the power source **BEFORE** attempting any repair. If this guide does not correct the problem, call your local dealer or Technical Support at 1-877-356-6663.

*See ERROR CODES section earlier in this manual for information on troubleshooting Error Codes

Problem	Cause	Solution
Auger not turning	1. Bad auger motor. 2. Foreign matter jamming auger. 3. Vacuum sensor.	1. Replace auger motor. 2. Remove pellets and object. 3. Check exhaust blower.
Smoke smell or dust in house	1. Improper exhaust connection.	1. Check exhaust connections for leaks, especially the exhaust blower connect. Seal leaks with silicone, aluminum tape or a hose clamp.
Room blower not operating	1. Loose thermal sensor. 2. Blower speed set higher than heat range, causing stove to cool and blower to cycle. 3. Loose connection.	1. Tighten connection on sensor. 2. Lower blower speed. 3. Check control board connection.
Exhaust blower not operating	1. Loose connection. 2. Bad blower. 3. Bad vacuum sensor.	1. Check control board connection. 2. Replace blower. 3. Replace vacuum sensor.
Lazy Fire	1. Bad exhaust blower. 2. Excessive pellet moisture. 3. Excessive ash build-up. 4. Low quality pellets.	1. Inspect and replace blower. 2. Keep pellets dry. 3. Thoroughly clean unit. 4. Use only **PFI** premium pellets.
Blown Fuse	1. Power surge. 2. Exposed wire. 3. Electrical component shorting.	1. Replace fuse; use surge protector. 2. Check for exposed or frayed wire and loose connections. 3. Check motors and blowers for obstructions or short circuits.
High Pellet Consumption	1. Low quality or non-uniformly sized pellets.	1. Use premium pellets or try another pellet brand.
Squeaking Noise	1. Obstruction in auger tube. 2. Blower Noise.	1. Check auger tube for foreign objects. 2. Remove, clean, and oil blower.
Pinging or Rattling Noise	1. Foreign material in blower.	1. Check both blowers for material.
	2. Loose exhaust fan set screw.	2. Check set screw for tightness.

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Unit Shuts Down in 15-20 minutes with an "FS" code on control board. (Failed Start)	1. Loose thermal sensor.	1. Check both sides of thermal sensor connection (exhaust blower and control board).
	2. Control board settings.	2. Start stove on minimum Heat Range 5 to ensure a good fire is started.
	3. Failure to light pellets.	3. Check igniter for buildup or failure.
"OT" Code on Control Board (OverTemp)	1. Convection (Room Air) blower failure.	1. Check convection blower for proper function, replace if necessary.
	2. Partially blocked flue.	2. Check flue for obstructions.
	3. Using fuel other than premium wood pellets.	3. Use ONLY premium wood pellets in this stove.

Notes:

1. Whenever instructed to check/replace the vacuum sensor, also check for loose or cracked vacuum hose. Also, be certain the vacuum measurement port in the firebox is kept clean (clean with a pipe cleaner or brush, **do not use a vacuum** to clean this port).

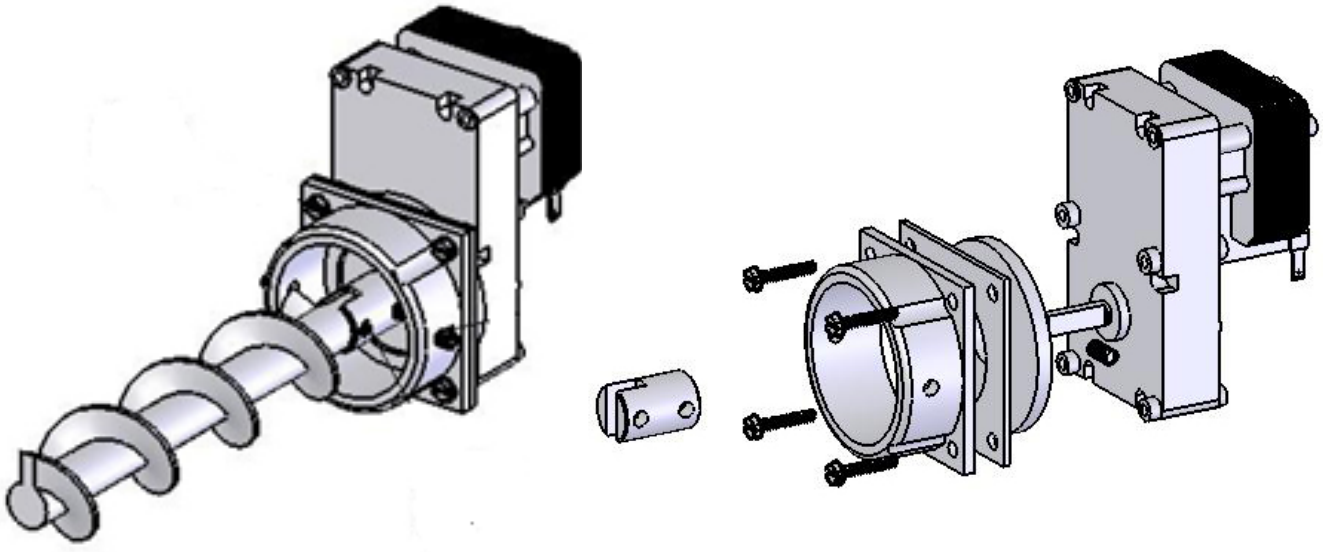
2. To restart and clear an error code displayed on the control board, push the "ON" button and the unit should reset the error and restart.

3. If you are uncertain about the meaning of an error code or have any questions at all, **PLEASE** contact Technical Support at (877) 356-6663.

REPLACING COMPONENTS

Auger Motor

- Before beginning any component replacement, be certain the unit is unplugged and thoroughly cooled down. Also, make sure the hopper is empty before attempting to remove or replace the auger motor assembly.
- Remove the back panel of the unit, using a $^{5}/_{16}$" wrench. Before loosening any auger motor bolts, detach the wiring harness from the auger motor.
- Locate the auger motor assembly at the rear of the stove, and begin by loosening the (2) $^{1}/_{8}$" allen set screws on either side of the cast iron auger motor coupler.
- Slide the auger assembly out of the tube.
- Remove the (4) screws which hold the cast iron auger motor coupler to the auger motor, using a $^{5}/_{16}$" wrench. Slide the cast iron auger motor coupler and the steel spacer plate off of the auger motor.
- Loosen the $^{1}/_{8}$" allen set screw which holds the steel auger coupler to the auger motor output shaft, and remove the steel auger coupler, as well as the rubber vibration dampener.
- Reinstall the parts in reverse order on the new auger motor, being careful not to over-tighten the bolts which hold the cast iron auger coupler to the auger motor.



REPLACING COMPONENTS

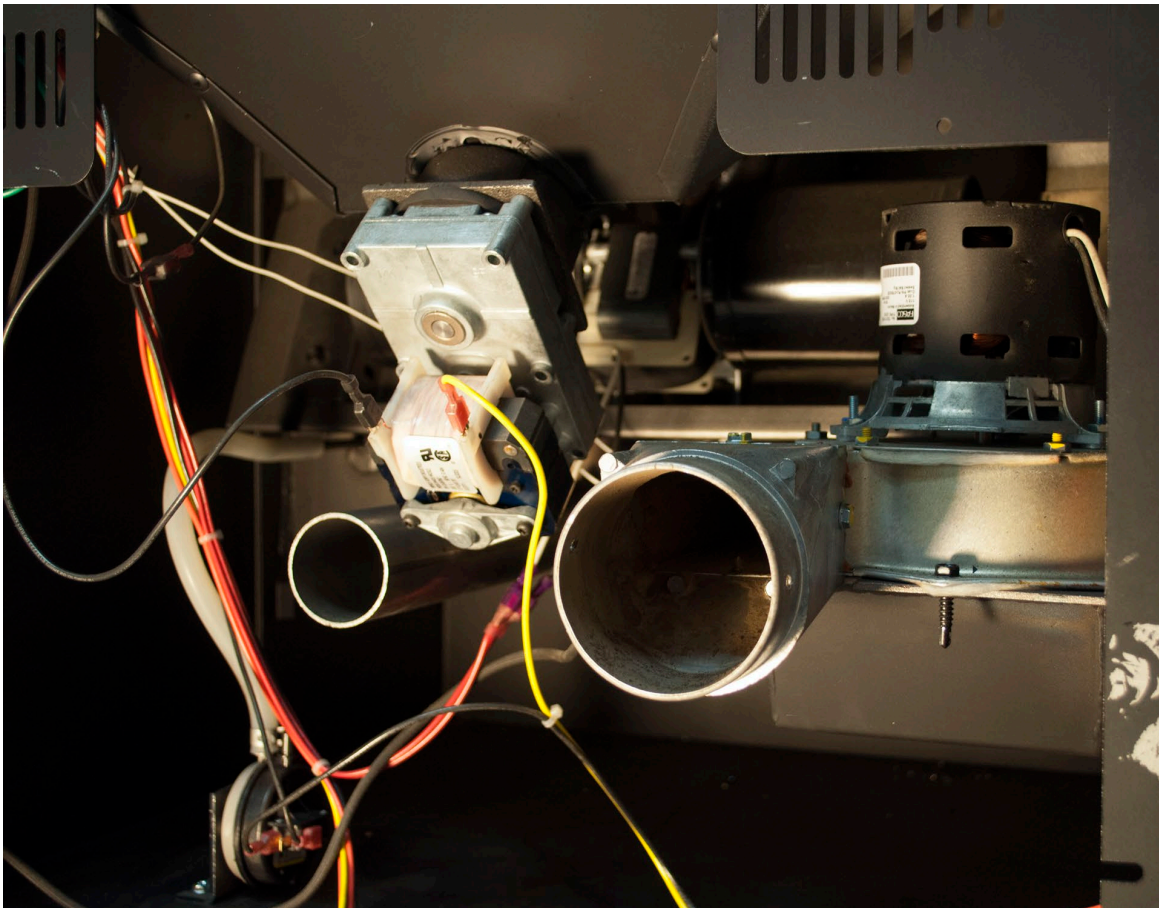
Convection Blower

- Before beginning any component replacement, be certain the unit is unplugged and thoroughly cooled down.
- Remove the rear panel (using a $^{5}/_{16}$" wrench) and locate the convection blower.
- Detach the convection blower from the wiring harness before going any further.
- Loosen and remove the (4) $^{5}/_{16}$" screws which hold the blower assembly to the stove; remove the blower assembly from the stove.
- Installation of the new blower is performed in reverse of removal; remember to reconnect the new blower to the wiring harness. (When installing the new blower, place the blower motor opening pointing UP, towards the top of the stove.)

REPLACING COMPONENTS

Combustion Blower

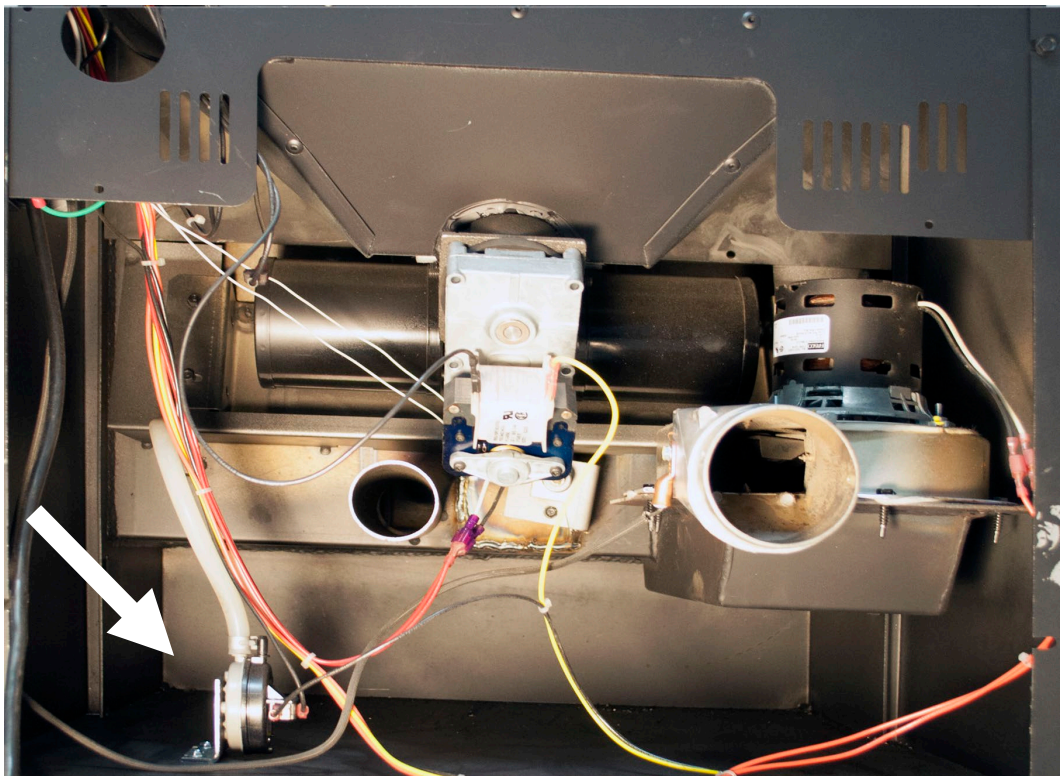
- Before beginning any component replacement, be certain the unit is unplugged and thoroughly cooled down.
- Remove the left side panel and locate the combustion (exhaust) blower.
- Disconnect the venting system from the exhaust blower, and disconnect the exhaust blower from the stove wiring harness. To remove the venting pipe, removal of the rear panel (using a $^{5}/_{16}$" wrench) may be necessary.
- Remove all (5) screws which hold the exhaust blower to the exhaust blower tube. Remove the heat sensor which is connected (with a screw) to the exhaust blower. Once the screws have been removed, the blower can be lifted up and out of the stove.
- Reinstallation is the exact opposite of the steps above; however, be certain to check the condition of the exhaust blower gasket and replace if necessary.



REPLACING COMPONENTS

Vacuum Switch

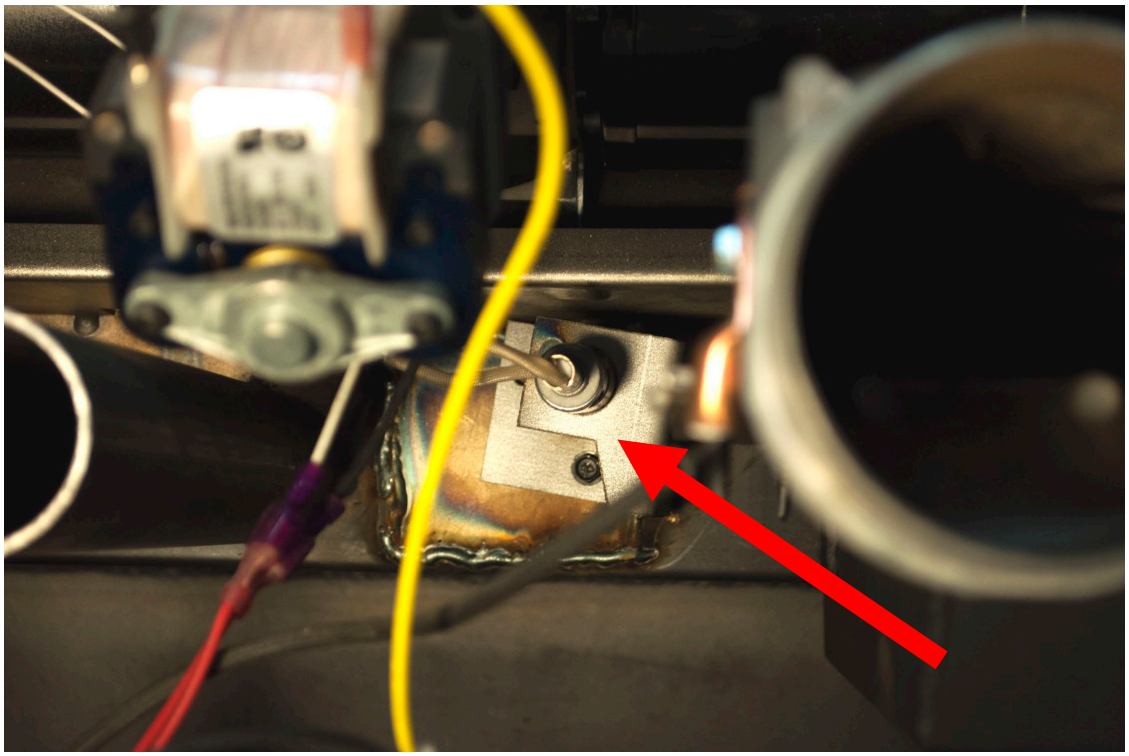
- Before beginning any component replacement, be certain the unit is unplugged and thoroughly cooled down.
- Remove the right side panel (see pg. 43 for panel instructions). Removal of the rear panel may help, as well.
- Locate the vacuum switch as shown in the diagram below.
- Disconnect the stove wiring harness and vacuum hose from the vacuum switch, *taking note of where connections were made*.
- Remove the (2) screws which hold the vacuum switch to the vacuum switch bracket, using a Phillips screw driver.
- Installation is the reverse of removal; be absolutely certain the wires and vacuum hose are connected as they previously were (and according to the wiring diagram in this manual).



REPLACING COMPONENTS

Igniter

- Before beginning any component replacement, be certain the unit is unplugged and thoroughly cooled down.
- Remove the rear panel of the unit, using a $^{5}/_{16}$" wrench.
- Locate the igniter as shown in the diagram below.
- Disconnect the igniter wiring from the control board and use a $^{5}/_{16}$" wrench to remove the two igniter retaining screws that fasten the assembly to the stove. Remove the assembly from the stove.
- Loosen the Allen set screw ($^{1}/_{8}$" Allen wrench) from the igniter tube and remove the old igniter cartridge.
- Install the new igniter in the igniter tube, retighten the set screw and reinstall the assembly into the stove (remember to reconnect the wiring).
- Reinstall the rear panel.



REPLACING COMPONENTS

IMPROPER GASKET MAINTENANCE, INCLUDING FAILURE TO REPLACE GASKETS,
CAN CAUSE AIR LEAKS RESULTING IN SMOKE-BACKS.

Gaskets

1. Door
   - This unit comes with a ¾" rope gasket in the channel around the door opening that should be replaced at least once every year. To replace the door gasket (Part # AC-DGKC), the old gasket must first be removed entirely — prior to adding the new adhesive, you may have to scrape the old cement from the channel. Once the cement and gasket have been added, the door should be closed and latched for twenty-four hours to allow the cement to harden. See next page for more info.

2. Window
   - If you are replacing the window gasket (Part # AC-GGK), the new gasket will already have adhesive on one side. Remove the paper on the adhesive side and place the gasket around the outside edge of the glass, centered over the edge. Fold the gasket edges over on the glass, forming a "U" shape.

3. Combustion Blower
   - The Combustion Blower Gasket (Part # PU-CBMG) should be inspected whenever you remove or clean the Combustion Blower, and replaced if necessary.

4. Combustion Blower Motor
   - The combustion blower motor gasket (Part # PU-CBMG) generally does not need replacement, as it is not normally removed from the unit. However, if the exhaust blower is cleaned by removing the motor, rather than the entire blower assembly, this gasket must be inspected and replaced as necessary.

REPLACING COMPONENTS

Glass Replacement *(includes Door Gasket replacement instructions)*

1. Remove the door from the stove and rest it face-down on a firm work surface.
2. Remove the door gasket using a pair of pliers to pull it out of the channel.
3. Using a $^{5}/_{16}$" wrench, remove the (4) screws that hold the glass tabs in place on the door and remove the glass tabs.
4. Lift the old glass panel out and discard (be especially careful if the old glass is broken or cracked).
5. The new glass panel must be wrapped with a self-adhesive fiberglass tape gasket (Part # AC-GGK). This gasket serves to cushion the glass from the steel door and brackets.
6. Reinstall the glass tabs using the screws previously removed. Do not over-tighten the screws.
7. Install the new door gasket (Part# AC-DGKC) using the provided high temperature adhesive.
8. Hang the door back on the stove and close tightly and allow 24 hours for adhesive to cure.

Ceramic Glass Specifications

- Glass Size: 9.125 in. (232 mm) x 9.125 in. (232 mm)
- Glass Type: 5mm Ceramic Glass (Keralite Pyroceram)
- Glass Manufacturer: Eurokera

Glass Precautions

- Never replace ceramic glass with tempered or any other type of glass.
- Never operate this unit with cracked or broken glass.
- Do not slam the door or strike the glass with any objects.

Glass Cleaning

1. Be certain the stove **and** the glass are completely cool.
2. The build-up on the glass will generally be light and water is normally sufficient to remove the deposits.
   If stubborn soot persists, use a cleaner made specifically for this purpose. Do not scrape the glass or use abrasive cleaners.
3. Rinse the glass with clean water and dry the glass before resuming normal operation.

REPLACING COMPONENTS

Control Board

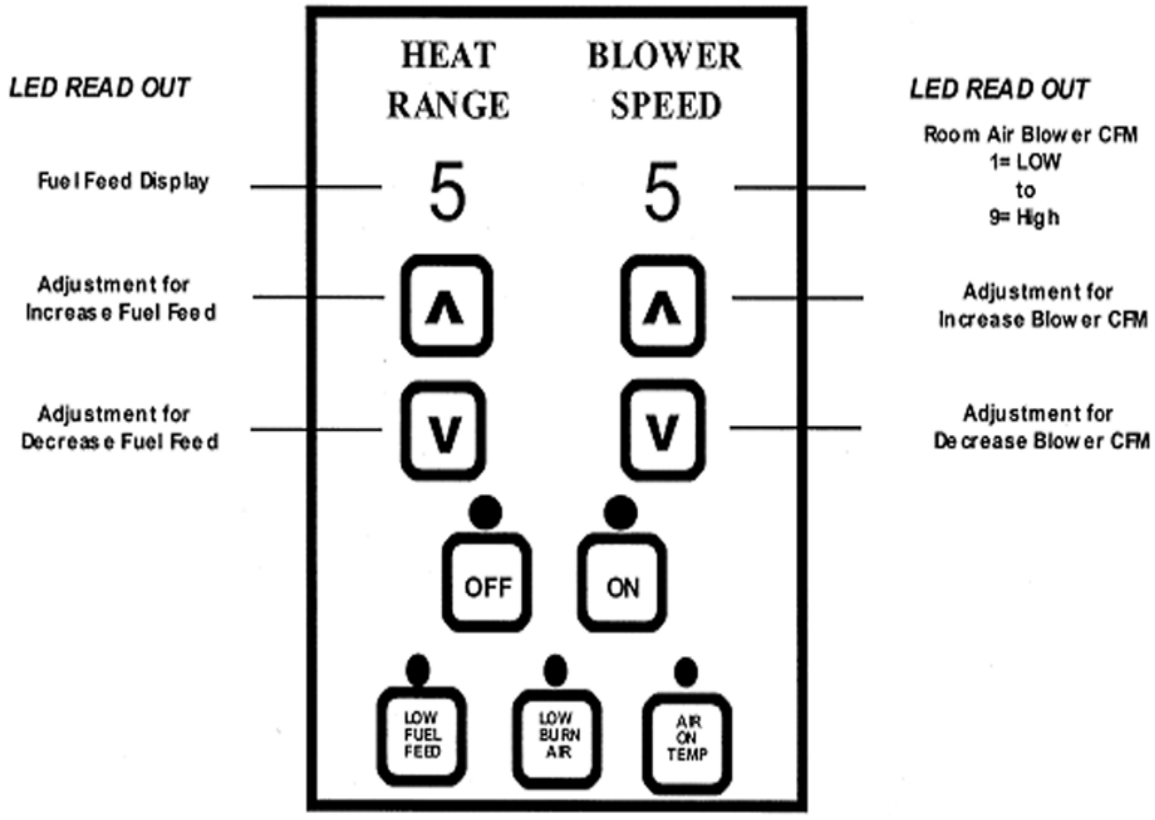
The Control Board (Part # PU-CB19) is a digital read-out board. This board offers a wide variety of settings to operate the unit. The right side panel should be removed prior to removing the control board, using a $^{5}/_{16}$" wrench or nut driver. The control board can be removed from the unit by loosening the two outside screws and pulling the board back to the inside of the stove. A 6-amp "quick-blow" fuse is used on this Control Board.

NOTE: The bottom three control buttons are preset at the factory and are not user adjustable. See the "Daily Operation" section on page 18 of the manual for more instructions on Control Board settings.

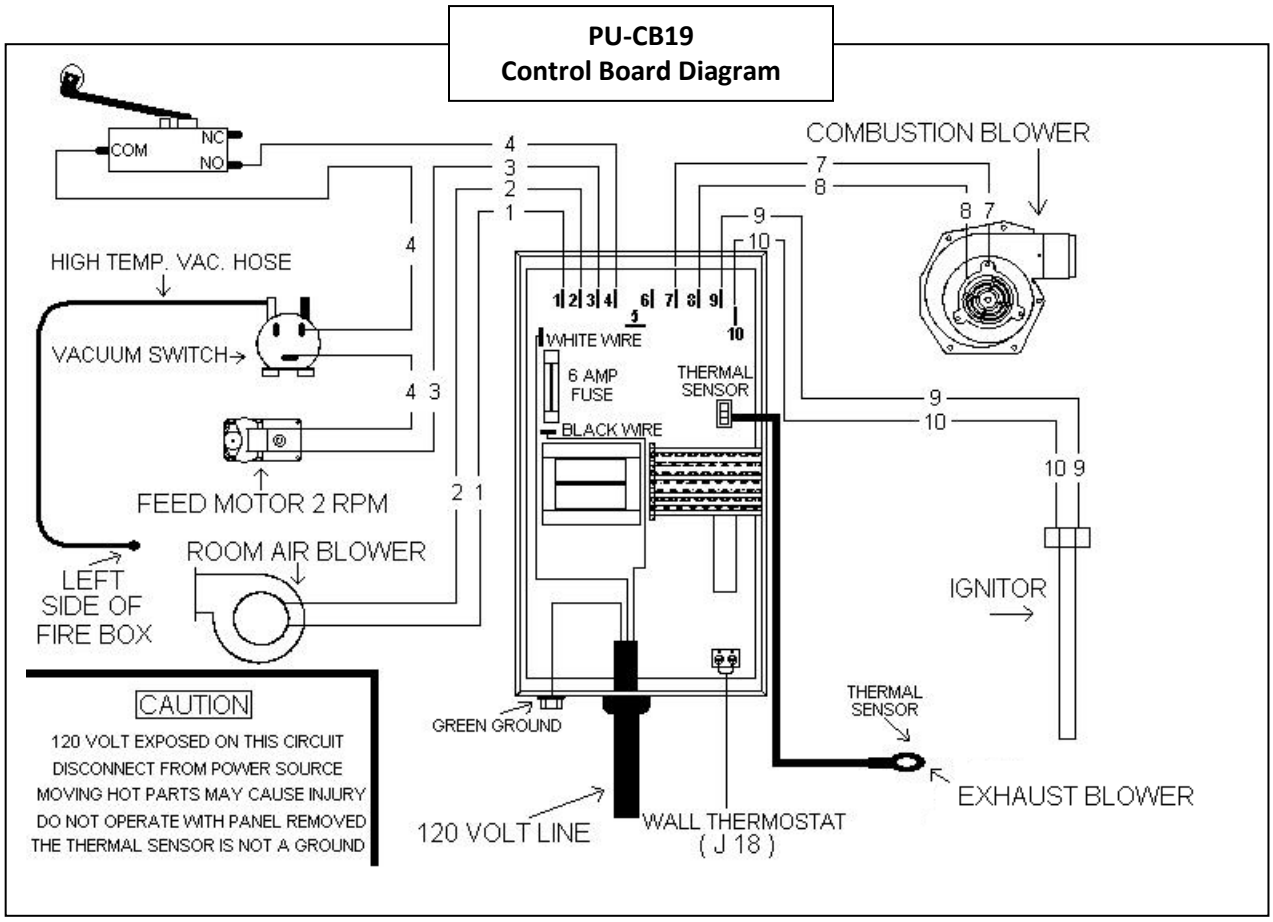
Recommended Heat Ranges:

Low Burn:	Heat Range setting: 1	Room Air Blower setting: 1
Medium Low:	Heat Range setting: 2 – 3	Room Air Blower setting: *
Medium High:	Heat Range setting: 4 – 8	Room Air Blower setting: *
High Burn:	Heat Range setting: 9	Room Air Blower setting: 9

* NOTE: Blower Speed will automatically be adjusted to the desired Heat Range that you select.



WIRING DIAGRAM



Caution – Shock Hazard

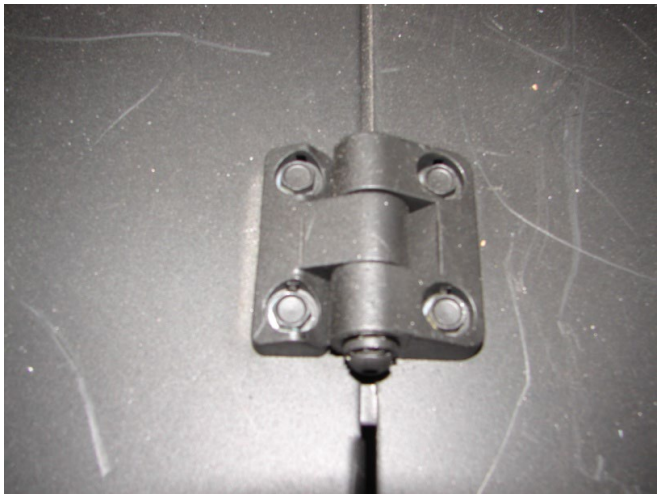
- Press the "Off" button and let the appliance completely cool BEFORE unplugging the appliance and beginning any maintenance or component replacement.
- Risk of shock if appliance is not unplugged before service.

HOPPER LID HINGES

The hopper lid is attached to the top of the stove by two removable hinges.

To remove the hopper lid hinges:

- Remove the (4) screws that hold each hinge in place, using a $^{5}/_{16}$" socket.
- Re-Install hinges in the reverse method.



HOPPER LID HANDLE

The hopper lid handle snaps into place in the opening in the hopper lid.

To remove the hopper lid handle:

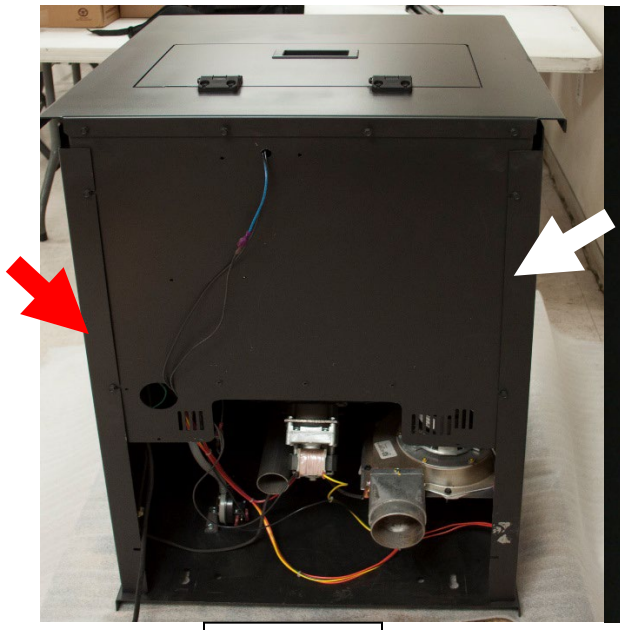
- Lift the hopper lid up (in the open position).
- Press up on the bottom of the handle and it will pop out of place.
- To install new handle, insert at the top of the hopper lid and press down until handle snaps into place.

SIDE PANELS

The side panels are designed to hang onto the sides of the stove and can easily be removed to perform regular cleaning (and any maintenance that may need to be done in the back of the stove).

To remove a side panel:

- Loosen (DO NOT REMOVE) the (3) 5/16" screws that hold the side panel to rear of the stove.
- Grasp the panel and pull until the panel is removed from the side tracks and comes off of the stove.
- Re-install the side panels using the reverse of this method.



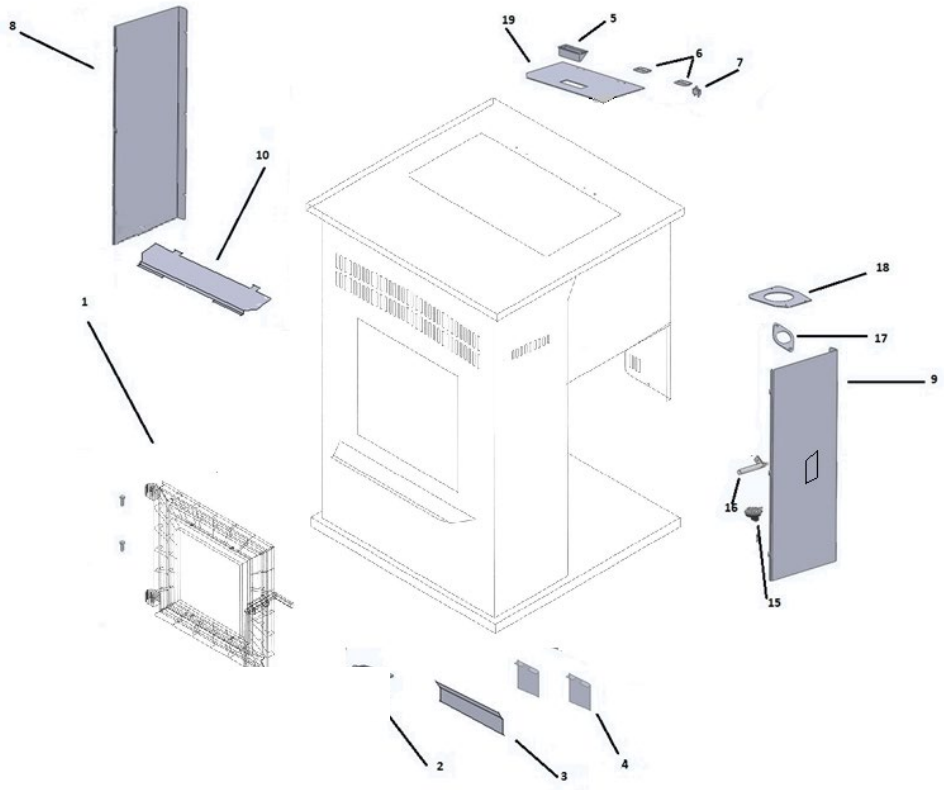
Side Panels

Side panel (viewed from front of stove)

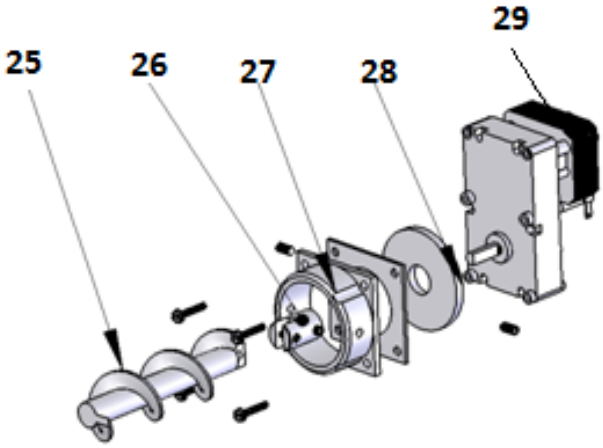
FINISH

This new unit has been painted with High-Temperature paint that should retain its original look for years. If the unit should get wet and rust spots appear, the spots can be sanded with fine steel wool and repainted. It is crucial that only High-Temperature Spray Paint is used (Part# AC-MBSP), as others may not adhere to the surface or withstand the high temperatures. Similarly, some brands of paint will not adhere to different brands of paint, so we highly recommend using our proprietary High-Temperature Spray Paint.

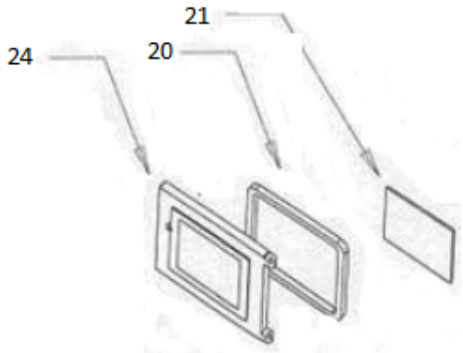
ILLUSTRATED PARTS DIAGRAM



Auger Motor Assembly



Door Assembly



IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

ENGLAND'S STOVE WORKS IS NOT RESPONSIBLE FOR ANY DAMAGE OR INJURY INCURRED DUE TO NEGLECT, OR DUE TO UNSAFE INSTALLATION OR USAGE OF THIS PRODUCT. CALL TECHNICAL SUPPORT WITH ANY QUESTIONS.

REPLACEMENT PARTS LIST

Part No	Description	From Diagram
BM-1288	Room Air Blower	Not Shown
CU-047042	2.4 RPM Auger motor CW Rotation	29
PU-076002B	Combustion Exhaust Blower(Neg)	Not Shown
AC-DGKC	Door Gasket Kit	20
PU-HLSB	Hopper Lid Safety Switch	7
CU-VS	.05 Vacuum Switch	15
PU-CB19	Control Board	Not Shown
R-WIRE-H06	Control Board Wiring Harness	Not Shown
AC-HPS	Hinge Pin (qty. 2)	1
AC-MBSP	Stove Paint	Not Shown
AC-SHN	Nickel Spring Handle	Not Shown
CA-AC	Auger Coupler	26
CA-AMPP	Auger Mounting Plate	27
PU-AFS	Steel Auger	25
AC-CHAPAH	Igniter Assembly	16
PU-IH	Hopper Lid Hinge	6
PU-VH	Vacuum Hose	Not Shown
AC-GGK	Glass Gasket	Not Shown
AC-G9	Door Glass	21
AC-GS19	Glass Tabs	Not Shown
AC-HLH	Hopper Lid Handle	5
AC-PAHTB	Top Baffle	10
AC-SSDTG	Drop Tube Gasket	17
CA-19A	Cast Iron Door	24
PU-BPAH	Burn Pot	2
PU-CBMG	Combustion Blower & Motor Gasket	18
PU-SSACP	Auger Cover Plate	Not Shown
PU-ECPCB120	Heat Exchange Cleanout Plate (Qty. 2)	4
PU-RABMP	Room Air Blower Mounting Plate	Not Shown
CU-RG	Rubber Vibration Dampener	28
PU-RSP	Right Side Panel	9
PU-LSP	Left Side Panel	8

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PU-SSHL	Hopper Lid	19
PU-CBAWB	Air Wash Bar	3
PU-SSRP	Rear Panel	Not Shown
AC-CT	Cleaning Tool	Not Shown
PU-CHA	Cartridge Heater (Igniter)	Not Shown

You may write your unit's Manufacture Date and Serial Number in the blank spaces on this sample tag (next page), for future reference.

This sample tag also shows the safety info such as UL/ULC testing standard, etc. for your local officials, or anyone else who may need it for reference information.

MODEL ☐ 25-CBPAH ☐ 55-TRPCBPAH ☐
☐ 55-SHPCBPAH ☐ ☐

Intertek
W/N# 21948

Pellet Fuel Room Heater; Free Standing Model Also for Use in Mobile Homes
Certified to ASTM E 1509 / ULC S627 / ASTM E2779 / ASTM E2515 / CSA B415.1

U.S Test Santdard: US EPA 40 CFR Part 60, Subpart 60.536

Manufactured by:
Stove Builder International inc.
589 S. Five Forks Rd.
Monroe, VA 24574

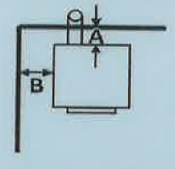
Manufacture Date	20190512
Serial Number	0
Work Order	(# test)

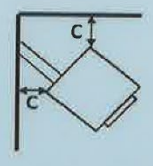
PREVENT HOUSE FIRES

- Install and use only in accordance with the Owner's manual provided with this appliance.
- Contact local building or fire officials about restrictions and installation inspections in your area.
- For use with wood pellet fuel only, 1/4 inch in diameter.
- Do not connect this unit to a chimney flue serving another appliance
- Keep viewing and ash removal doors tightly closed during operation.
- Maximum input rating: 4.4 lbs/hr
- 1.47 Grams/hr
- U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards.
- Use only approved type L or P pellet vent pipe.
- Room heater, pellet fuel-burning type, also for use in mobile homes.
- Inspect and clean chimney frequently. Under certain conditions of use, creosote buildup may occur rapidly.
- Replace with ceramic glass only.
- A source of fresh air must be provided to the room. When installed in a mobile home, air from outdoors must be provided.
- Do not obstruct combustion air opening.

FREESTANDING INSTALLATION REQUIREMENTS - Refer to local codes and the chimney manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. The unit must be installed on a non-combustible floor protection, which extends 6-inches to the front and 6-inches on each side of the door opening. See owner's manual for additional clearance information.

Clearances to combustibles





Floor protection
Protection de plancher

A: 0 in. 0 mm
B: 8 in. 203 mm
C: 6 in. 152 mm
E: 6 in. 152 mm
F: 6 in. 152 mm

Electrical rating: 115 V, 60 Hz, 5 A. ROUTE THE POWER CORD SO THAT IT DOES NOT COME INTO CONTACT WITH ANY HOT SURFACES ON THE UNIT AND DOES NOT CROSS IN FRONT OF THE UNIT.

Refer to Intertek's directory of building products (https://bpdirectory.intertek.com) for detailed information.

CAUTION - Moving parts may cause injury. Do not operate with panels removed.
CAUTION - Hot parts. Do not operate unit with panels removed.
DANGER - Risk of electric shock. disconnect power before servicing unit.

CAUTION - Operate this unit only with the fuel hopper lid closed. Failure to do so may result in emission of products of combustion from the hopper under certain conditions. Maintain hopper seal in good condition. Do not overfill the hopper.

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.

CAUTION

- HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS. OPERATE THIS UNIT ONLY WITH THE FUEL HOPPER LID CLOSED. FAILURE TO DO SO MAY RESULT IN EMISSION OF PRODUCTS OF COMBUSTION FROM THE HOPPER UNDER CERTAIN CONDITIONS. DO NOT OVERFILL THE HOPPER. MOVING PARTS MAY CAUSE INJURY. HOT PARTS. DO NOT OPERATE UNIT WITH THE SIDE OR REAR PANELS REMOVED. MAINTAIN HOPPER SEAL IN GOOD CONDITION.

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)

SBI
Fabricant de poêles international
Stove Builder International

27916

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.

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LIMITED FIVE (5) YEAR WARRANTY

From the date of purchase to the original owner.

Model Numbers 25-CBPAH / 55-SHPCBPAH / 55-TRPCBPAH

The manufacturer extends the following warranties:

Five Year Period:

1. Carbon steel and welded seams in the firebox are covered for five (5) years against splitting.
2. The steel door and hinges are covered for five (5) years against cracking.

One Year Period:

1. Component parts such as the hopper, auger, burn-pot, auger shaft and fasteners are covered for one (1) year against cracking, breakage and welded seam separation.
2. Electrical components, accessory items, glass and the painted surface of the stove are covered for one (1) year from the date of purchase.

Conditions and Exclusions

1. Damage resulting from over-firing will void your warranty.
2. This warranty does not apply if damage occurs because of an accident, improper handling, improper installation, improper operation, abuse or unauthorized repair made or attempted to be made.
3. The manufacturer is not liable for indirect, incidental, or consequential damages in connection with the product including any cost or expense, providing substitute equipment or service during periods of malfunction or non-use.*
4. All liability for any consequential damage for breach of any written or implied warranty is disclaimed and excluded.
5. This unit is EPA certified using high quality, Premium Grade pellet fuel. Warranty is void if the unit is used to burn materials for which the unit is not certified by the EPA. Warranty is void if unit is not used according to the owner's manual.

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*Some states do not allow the exclusion of limitations of incidental or consequential damages, so the above may not apply to you

Procedure

Purchaser must give notice of claim of defect within the warranty period and pay transportation to and from a service center designated by the manufacturer. The dealer from which the unit was purchased or the factory, at our option, will perform the warranty service.

Other Rights

This warranty gives you specific legal rights; you may also have other rights, which may vary from state to state.

To submit a Warranty Claim, call (877) 356-6663 to speak with our Technical Support department. You may also file a Warranty Claim at www.englander-stoves.com

For parts, warranty replacement procedures may be found at our parts store site: englander-stoves.com

IMPORTANT! READ AND FOLLOW **ALL** INSTALLATION AND MAINTENANCE INSTRUCTIONS, INCLUDING CLEANING THE UNIT AS SPECIFIED, AND REPLACING GASKETS ANNUALLY, AND PARTS AS NEEDED.
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Important Notice

This registration information **MUST** be on file for this warranty to be valid. Please send this information within thirty (30) days from the original date of purchase.

Use any of these three easy ways to send your warranty information in!

Mailing Address

Stove Builder International inc.

250, rue de Copenhague
St-Augustin-de-Desmaures
(Québec) Canada
G3A 2H3

Please Note: This warranty is null and void if the attached warranty registration AND a copy of the sales receipt is not returned within thirty (30) days from the date of purchase.

Warranty is not transferable.

Fax Number

(418) 878-3001 – Twenty-four hours a day

Online Registration

To register online, visit our warranty registration website at:

http://www.englander-stoves.com

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WARRANTY REGISTRATION for England's Stove Works®

Purchaser Information*

I. Purchased By (Name)_____

II. Address_____

III. City_____State_____Zip Code_____

IV. Telephone Number_____

V. Email Address_____

Dealer Information*

VI. Purchased From_____

VII. Address_____

VIII. City_____ State_____ Zip Code_____

Unit Information*

IX. Model Number_____ Purchase Date_____

X. Purchase Price _____

XI. Serial Number_____ Mfg. Date_____

Purchase Questions

How did you first hear about our product? (Please check one)

Word of Mouth _____Burn Trailer Demonstration_____Internet____

Other:_____

Where did you receive information about our product?

Via Telephone_____Dealer (Name of dealer) _____Internet____

Other: _____

*** Required Information**

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CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 92433

Customer Information

Customer: Intertek

Address : 8431 Murphy Drive
Middleton WI 53562

Customer PO #: Verbal - Brian Brunson

Calibration Procedure Information

Procedure ID: GTP TMASS-LAM Revision #: 11 Revision Date: 6/18/2019

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10062	Graftel	9202	5-Channel Temperature Sensor	8/6/2024
10074	Meriam	50MJ10-14	Laminar Flowmeter	11/21/2021
10075	Meriam	50MJ10-9	Laminar Flowmeter	11/26/2021
10128	Furness	FCO352	Diff Pressure	5/7/2022
60030	Paroscientific	760-100A	Pressure, 100 psia	5/20/2022
T1830482	Vaisala	HMW95D	RH/Temp. Logger	12/22/2021
1A01JMGKP36	Graftel	N/A	Digital Barometer	12/22/2021
50789	Paroscientific	760-100A	Pressure Gauge	8/17/2022

Sensor Information

Manufacturer: Sierra Description: Mass Flow Meter Method Used: Laminar

Model #: M50L-AL-DD-2-PV2-V1-5PC Rated Accuracy: ± 1 % of Full Scale Accuracy Specified By: Sierra

Instrument ID#: 001519 Range: 0 to 10 slpm Condition: Functional

Serial #: 231326

Comments: Calibration Date: 08/20/2021
Calibration Due: 02/20/2022

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2017, ANSI/NCSL Z540-I-1994 and ISO 9001. All results contained within this certificate relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.

Performed By: L. Chan Date: 8/20/2021

Lap Chan
Calibration Technician

Approved By: Date: 8/20/2021

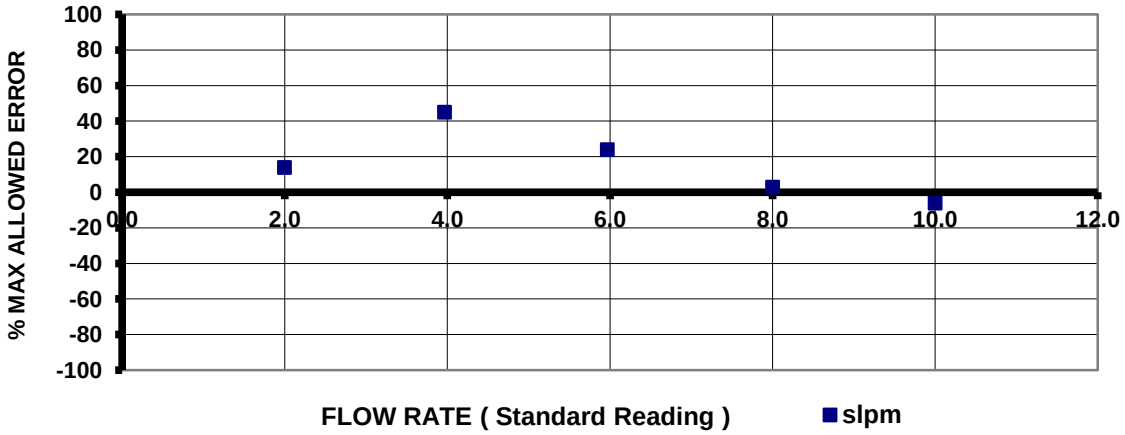
Scott Pickett
Vice President, Lab Services

95 Chancellor Drive | Roselle, Illinois 60172 | +1 (847) 364-2600 | +1 (847) 364-2600 (fax) | Graftel.com

ATTACHMENT TO CALIBRATION CERTIFICATE 92433
AS FOUND / AS LEFT DATA

Reading From Standard, slpm	Lower Limit of Meter Reading, slpm	Measured Reading From Meter, slpm	Upper Limit of Meter Reading, slpm	Error, slpm	Measurement Uncertainty (k=2) slpm	CMC (k=2) slpm	STATUS
1.998	1.898	2.012	2.098	0.014	0.010	0.010	Pass
3.966	3.866	4.011	4.066	0.045	0.020	0.020	Pass
5.967	5.867	5.991	6.067	0.024	0.030	0.030	Pass
8.002	7.902	8.005	8.102	0.003	0.040	0.040	Pass
9.999	9.899	9.993	10.099	-0.006	0.050	0.050	Pass

ERROR CHART (Inlet Pressure = 10 psig)



Instrument Specifications		
Meter's Calibrated Fluid:	Air	
Test Fluid:	Air	
Meter's Standard Pressure:	14.7	psia
Meter's Standard Temperature:	70	ºF
Lower Range:	0	slpm
Upper Range	10	slpm
Resolution:	0.001	
Rated Accuracy:	1.0	% of Full Scale
Laboratory Ambient Conditions		
Pressure:	14.37	psia
Humidity:	54.67	%RH
Temperature:	70.04	ºF

GRAFTEL
WWW.GRAFTEL.COM
FLOW - TEMPERATURE - HUMIDITY - PRESSURE - DESIGN - CONSULTING - ENGINEERING
NIST Traceable Calibration Data Sheet
95 Chancellor Dr., Roselle, IL 60172 Phone: 847-364-2600 Fax: 847-364-3899

CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 92435

Customer Information

Customer: Intertek

Address : 8431 Murphy Drive
Middleton WI 53562

Customer PO #: Verbal - Brian Brunson

Calibration Procedure Information

Procedure ID: GTP TMASS-LAM Revision #: 11 Revision Date: 6/18/2019

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10062	Graftel	9202	5-Channel Temperature Sensor	8/6/2024
10074	Meriam	50MJ10-14	Laminar Flowmeter	11/21/2021
10075	Meriam	50MJ10-9	Laminar Flowmeter	11/26/2021
10128	Furness	FCO352	Diff Pressure	5/7/2022
60030	Paroscientific	760-100A	Pressure, 100 psia	5/20/2022
T1830482	Vaisala	HMW95D	RH/Temp. Logger	12/22/2021
1A01JMGKP36	Graftel	N/A	Digital Barometer	12/22/2021
50789	Paroscientific	760-100A	Pressure Gauge	8/17/2022

Sensor Information

Manufacturer: Sierra Description: Mass Flow Meter Method Used: Laminar

Model #: M50L-AL-DD-2-PV2-V1-5PC Rated Accuracy: ± 1 % of Full Scale Accuracy Specified By: Sierra

Instrument ID#: 1413 Range: 0 to 10 slpm Condition: Functional

Serial #: 189158

Comments: Calibration Date: 08/20/2021
Calibration Due: 02/20/2022

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2017, ANSI/NCSL Z540-I-1994 and ISO 9001. All results contained within this certificate relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.

Performed By: L. Chan Date: 8/20/2021

Lap Chan
Calibration Technician

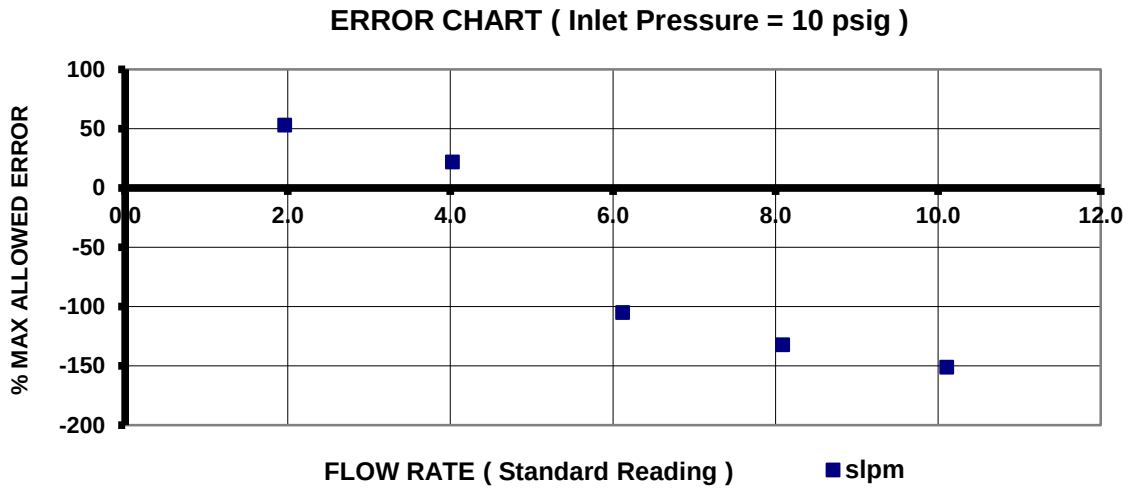
Approved By: Date: 8/20/2021

Scott Pickett
Vice President, Lab Services

95 Chancellor Drive | Roselle, Illinois 60172 | +1 (847) 364-2600 | +1 (847) 364-2600 (fax) | Graftel.com

ATTACHMENT TO CALIBRATION CERTIFICATE 92435
AS FOUND DATA

Reading From Standard, slpm	Lower Limit of Meter Reading, slpm	Measured Reading From Meter, slpm	Upper Limit of Meter Reading, slpm	Error, slpm	Measurement Uncertainty (k=2) slpm	CMC (k=2) slpm	STATUS
1.964	1.864	2.017	2.064	0.053	0.010	0.010	Pass
4.026	3.926	4.048	4.126	0.022	0.020	0.020	Pass
6.118	6.018	6.013	6.218	-0.105	0.031	0.031	Fail
8.089	7.989	7.957	8.189	-0.132	0.040	0.040	Fail
10.104	10.004	9.953	10.204	-0.151	0.051	0.051	Fail



Instrument Specifications		
Meter's Calibrated Fluid:	Air	
Test Fluid:	Air	
Meter's Standard Pressure:	14.7	psia
Meter's Standard Temperature:	70	ºF
Lower Range:	0	slpm
Upper Range	10	slpm
Resolution:	0.001	
Rated Accuracy:	1.0	% of Full Scale
Laboratory Ambient Conditions		
Pressure:	14.36	psia
Humidity:	53.47	%RH
Temperature:	70.05	ºF

GRAFTEL
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NIST Traceable Calibration Data Sheet
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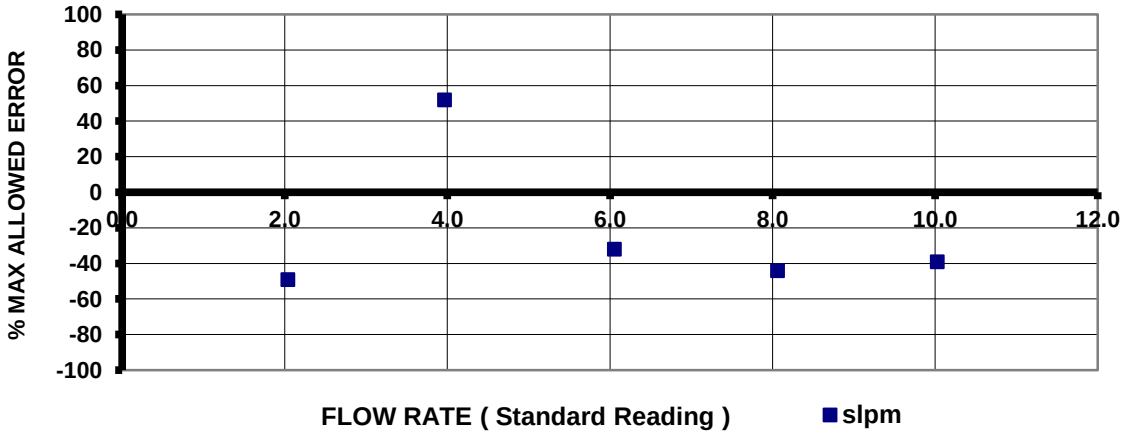
ATTACHMENT TO CALIBRATION CERTIFICATE 92435
AS LEFT DATA
Page 3 of 3

Reading From Standard, slpm	Lower Limit of Meter Reading, slpm	Measured Reading From Meter, slpm	Upper Limit of Meter Reading, slpm	Error, slpm	Measurement Uncertainty (k=2) slpm	CMC (k=2) slpm	STATUS
2.037	1.937	1.988	2.137	-0.049	0.010	0.010	Pass
3.964	3.864	4.016	4.064	0.052	0.020	0.020	Pass
6.053	5.953	6.021	6.153	-0.032	0.030	0.030	Pass
8.061	7.961	8.017	8.161	-0.044	0.040	0.040	Pass
10.026	9.926	9.987	10.126	-0.039	0.050	0.050	Pass

ERROR CHART (Inlet Pressure = 10 psig)



Instrument Specifications		
Meter's Calibrated Fluid:	Air	
Test Fluid:	Air	
Meter's Standard Pressure:	14.7	psia
Meter's Standard Temperature:	70	ºF
Lower Range:	0	slpm
Upper Range	10	slpm
Resolution:	0.001	
Rated Accuracy:	1.0	% of Full Scale
Laboratory Ambient Conditions		
Pressure:	14.36	psia
Humidity:	53.61	%RH
Temperature:	70.05	ºF

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CERTIFICATE OF NIST TRACEABLE CALIBRATION

Calibration Certificate No: 92434

Customer Information

Customer: Intertek

Address : 8431 Murphy Drive
Middleton WI 53562

Customer PO #: Verbal - Brian Brunson

Calibration Procedure Information

Procedure ID: GTP TMASS-LAM Revision #: 11 Revision Date: 6/18/2019

Calibration Standards Information

Graftel ID	Manufacturer	Model #	Description	CAL Due
10062	Graftel	9202	5-Channel Temperature Sensor	8/6/2024
10074	Meriam	50MJ10-14	Laminar Flowmeter	11/21/2021
10075	Meriam	50MJ10-9	Laminar Flowmeter	11/26/2021
10128	Furness	FCO352	Diff Pressure	5/7/2022
60030	Paroscientific	760-100A	Pressure, 100 psia	5/20/2022
T1830482	Vaisala	HMW95D	RH/Temp. Logger	12/22/2021
1A01JMGKP36	Graftel	N/A	Digital Barometer	12/22/2021
50789	Paroscientific	760-100A	Pressure Gauge	8/17/2022

Sensor Information

Manufacturer: Sierra Description: Mass Flow Meter Method Used: Laminar

Model #: M50L-AL-DD-2-PV2-V1-5PC Rated Accuracy: ± 1 % of Full Scale Accuracy Specified By: Sierra

Instrument ID#: 1414 Range: 0 to 10 slpm Condition: Functional

Serial #: 189157

Comments: Calibration Date: 08/20/2021
Calibration Due: 02/20/2022

The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). The reported calibration uncertainty has a confidence level of 95% (k=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2017, ANSI/NCSL Z540-I-1994 and ISO 9001. All results contained within this certificate relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.

Performed By: L. Chan Date: 8/20/2021

Lap Chan
Calibration Technician

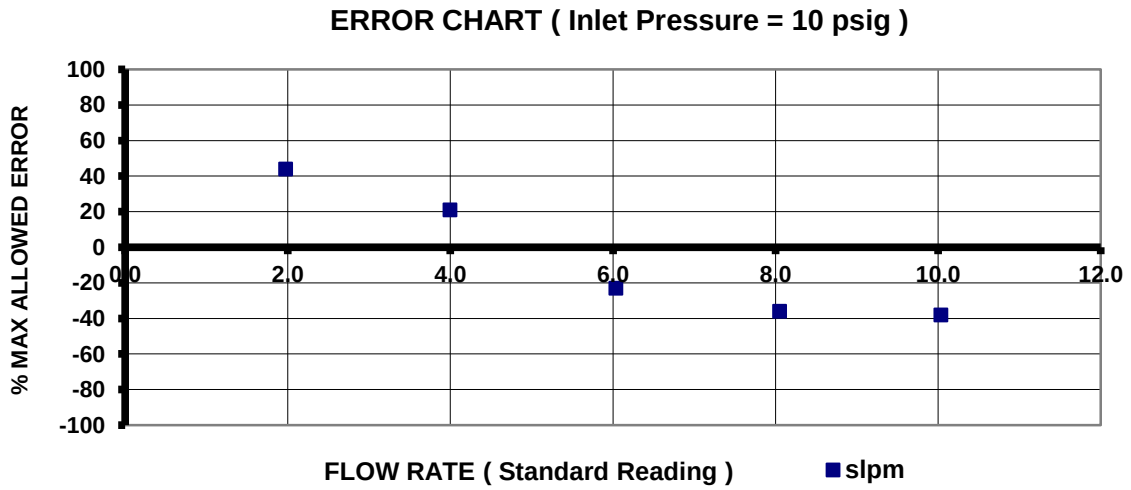
Approved By: Date: 8/20/2021

Scott Pickett
Vice President, Lab Services

95 Chancellor Drive | Roselle, Illinois 60172 | +1 (847) 364-2600 | +1 (847) 364-2600 (fax) | Graftel.com

ATTACHMENT TO CALIBRATION CERTIFICATE 92434
AS FOUND / AS LEFT DATA

Reading From Standard, slpm	Lower Limit of Meter Reading, slpm	Measured Reading From Meter, slpm	Upper Limit of Meter Reading, slpm	Error, slpm	Measurement Uncertainty (k=2) slpm	CMC (k=2) slpm	STATUS
1.975	1.875	2.019	2.075	0.044	0.010	0.010	Pass
3.996	3.896	4.017	4.096	0.021	0.020	0.020	Pass
6.034	5.934	6.011	6.134	-0.023	0.030	0.030	Pass
8.049	7.949	8.013	8.149	-0.036	0.040	0.040	Pass
10.032	9.932	9.994	10.132	-0.038	0.050	0.050	Pass



Instrument Specifications		
Meter's Calibrated Fluid:	Air	
Test Fluid:	Air	
Meter's Standard Pressure:	14.7	psia
Meter's Standard Temperature:	70	ºF
Lower Range:	0	slpm
Upper Range	10	slpm
Resolution:	0.001	
Rated Accuracy:	1.0	% of Full Scale
Laboratory Ambient Conditions		
Pressure:	14.37	psia
Humidity:	53.48	%RH
Temperature:	70.02	ºF

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NIST Traceable Calibration Data Sheet
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intertek Total Quality. Assured.	CLIENT:	England's Stove Works	PERFORMED BY:	John Wray
	PROJECT #:		REVIEWED BY:	
	PRODUCT:	25- CBPAH Pellet Stove	MODEL:	25-CBPAH
SAMPLE ID #:			DATE:	9-23- 10-1- 2021
STANDARD(S):		VERSION YEAR:	LOCATION:	Monroe, VA

Conditioning Burn Test Data

Must have a total of at least 50 hours of burn time with the flue temperature above room ambient. Record fuel weight at the beginning of the test and whenever additional fuel is added to unit. Flue and room temperature must be recorded at no greater than 1 hour intervals.

Fuel Type: Pellets (cordwood or pellets) Pellet Brand: Lignetics

5,5 setting

Date	Time	Flue Temp	Room Temp	Fuel Added	
9-23-21	7:25AM	76.0	61	110.2lbs	start up
9-23-21	8:25AM	273.6	61	0	1 hour
9-23-21	9:25AM	285.7	63	0	2 hour
9-23-21	10:25AM	289.4	63	0	3 hour
9-23-21	11:25AM	293.7	64	0	4 hour
9-23-21	12:25pm	282.5	64	0	5 hour
9-23-21	1:25pm	283.9	66	0	6 hour
9-23-21	2:25pm	296.4	68	0	7 hour
9-24-21	6:25AM	209.4	55	0	
9-24-21	7:25AM	279.6	60	0	8 hour
9-24-21	8:25AM	279.8	61	0	9 hour
9-24-21	9:25AM	284.8	64	0	10 hour
9-24-21	10:25AM	290.9	66	0	11 hour
9-24-21	11:25AM	295.2	66	0	12 hour
9-24-21	12:25PM	295.0	68	0	13 hour
9-24-21	1:25PM	295.8	68	0	14 hour
9-24-21	2:25PM	294.3	70	0	15 hour
9-27-21	6:25AM	202.3	55	0	
9-27-21	7:25AM	277.7	61	0	16 hour

intertek Total Quality. Assured.	CLIENT:		PERFORMED BY:	
	PROJECT #:		REVIEWED BY:	
	PRODUCT:		MODEL:	Z5-CBPAH
SAMPLE ID #:			DATE:	
STANDARD(S):		VERSION YEAR:	LOCATION:	

Conditioning Burn Test Data

Must have a total of at least 50 hours of burn time with the flue temperature above room ambient. Record fuel weight at the beginning of the test and whenever additional fuel is added to unit. Flue and room temperature must be recorded at no greater than 1 hour intervals.

Fuel Type: Pellets (cordwood or pellets) Pellet Brand: Lignetics

Date	Time	Flue Temp	Room Temp	Fuel Added	
9-27-21	8:25AM	282.3	63	0	17 hour
9-27-21	9:25AM	284.8	66	0	18 hour
9-27-21	10:25AM	288.2	70	0	19 hour
9-27-21	11:25AM	298.4	72	0	20 hour
9-27-21	12:25 PM	297.4	72	0	21 hour
9-27-21	1:25 PM	298.2	73	0	22 hour
9-27-21	2:25PM	301.1	77	0	23 hour
9-28-21	6:25AM	268.2	60	0	———
9-28-21	7:25AM	290.2	64	0	24 hour
9-28-21	8:25AM	282.4	66	0	25 hour
9-28-21	9:25AM	285.4	68	0	26 hour
9-28-21	10:25AM	300.9	72	0	27 hour
9-28-21	11:25AM	309.5	77	65 lbs	28 hour
9-28-21	12:25PM	301.9	77	0	29 hour
9-28-21	1:25PM	309.2	75	0	30 hour
9-28-21	2:25PM	301.6	77	0	31 hour
9-29-21	6:25AM	246.3	61	0	———
9-29-21	7:25AM	281.9	66	0	32 hour
9-29-21	8:25AM	280.2	68	0	33 hour

intertek Total Quality. Assured.	CLIENT:		PERFORMED BY:	
	PROJECT #:		REVIEWED BY:	
	PRODUCT:		MODEL:	Z5-CBPAH
SAMPLE ID #:			DATE:	
STANDARD(S):		VERSION YEAR:	LOCATION:	

Conditioning Burn Test Data

Must have a total of at least 50 hours of burn time with the flue temperature above room ambient. Record fuel weight at the beginning of the test and whenever additional fuel is added to unit. Flue and room temperature must be recorded at no greater than 1 hour intervals.

Fuel Type: Pellets (cordwood or pellets) Pellet Brand: Lignetics

Date	Time	Flue Temp	Room Temp	Fuel Added	
9-29-21	9:25AM	287.3	68	0	34 hour
9-29-21	10:25AM	295.9	72	0	35 hour
9-29-21	11:25AM	303.0	70	0	36 hour
9-29-21	12:25PM	302.7	72	0	37 hour
9-29-21	1:25PM	299.7	72	0	38 hour
9-29-21	2:25PM	303.6	77	0	39 hour
9-30-21	6:25AM	306.2	66	0	
9-30-21	7:25AM	291.1	72	0	40 hour
9-30-21	8:25AM	292.5	72	0	41 hour
9-30-21	9:25AM	291.1	68	0	42 hour
9-30-21	10:25AM	301.1	73	0	43 hour
9-30-21	11:25AM	303.0	75	0	44 hour
9-30-21	12:25PM	304.2	75	0	45 hour
9-30-21	1:25PM	304.3	77	0	46 hour
9-30-21	2:25PM	305.5	77	0	47 hour
9-30-21	3:25PM	309.7	79	0	48 hour
10-1-21	6:40AM	265.5	61	0	
10-1-21	7:40AM	286.0	66	0	49 hour
10-1-21	8:40AM	285.2	66	0	50 hour


Endland Steve
GC3461297
Model 25 CB PH
ASTM 779
11/15/2021
Test #1
MARTH
100% Renewable
Wood Resource
Net Wt. 40 LB / 18.1 kg
FUEL PELLETS
Marth Wood Fuel


JLG
CAUTION
FORKLIFT
TRAFFIC
KEEP CLEAR
CAUTION
DO NOT DRINK
THIS WATER
CINTAS


CAUTION


EQUIPMENT
CABINET FOR
HEARTH
CRAFTSMAN
Dept