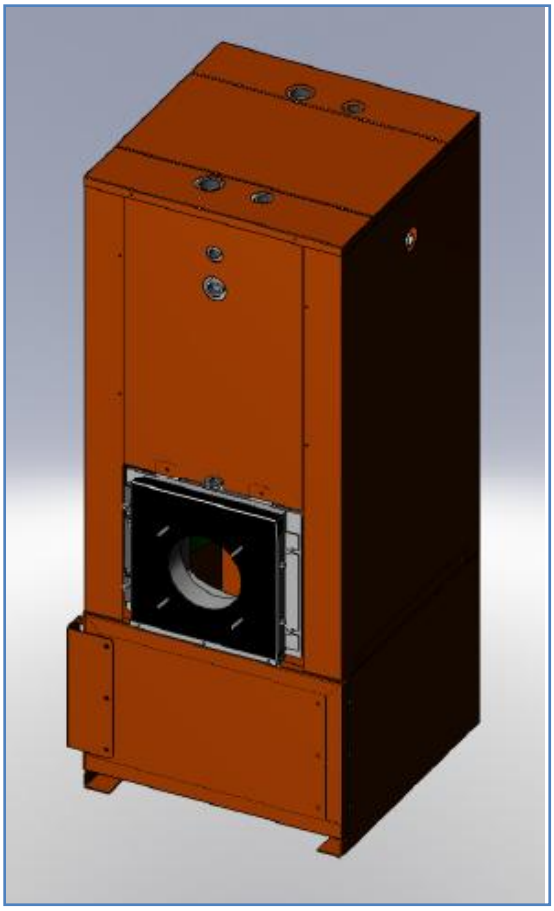
EcoBoiler™ - Acer series



Wood Pellet Boiler

Expressly Designed for Central Heating with Wood Pellets

INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

EcoHeat Solutions LLC / 153 Washington St / East Walpole, MA 02032

Welcome

Dear Customer,

Thank you for purchasing an EcoBoiler. We hope you will be very pleased with your decision in the years to come, and that your decision provides substantial benefits to your home heating budget, to the environmental impact of heating your home, and to the local and regional economy in which you live.

Please contact us any time you have questions, comments or suggestions about your EcoBoiler or about central heating with wood pellets.

Sincerely,
George Whiting

President, EcoHeat Solutions LLC
info@ecoheatsolutions.com
877-317-0700

Safety, Installation and Warranty Requirements

Please read these instructions before installation, and save this manual for future reference. **Failure to comply with the instructions in this manual can result in product/property damage, personal injury and loss of life. Improper installation, adjustment, alteration, service or maintenance can cause these problems.**

Basic Responsibilities

The role of professional heating contractors

A licensed heating contractor must perform the installation and service of this product. All installations must conform to the requirements of the authority having jurisdiction. Such applicable requirements may take precedence over instructions in this manual.

The role of the customer / end-user

It is incumbent on the homeowner to ensure that recommended system maintenance and cleaning is performed on schedule. This is for safety, for efficiency, and for system longevity.

Basic Safety Precautions

Carbon monoxide kills

Failure to properly install, maintain and/or service this boiler, or other system components including the chimney, can lead to dangerous levels of carbon monoxide and other gases leaking into the living space. Please ensure that recommended precautions contained in this manual, and all applicable building code standards, are met.

Warranty

Information about proper installation, maintenance and service contained in this manual must be followed. Failure to do so may render the warranty null and void.

Disclaimer

EcoHeat Solutions LLC is not responsible for any damages to our products caused by unsatisfactory installations, insufficient system maintenance, or from any services performed by heating contractors.

Contents

Introduction to Safety, Components & Requirements

Keeping Safe

As with any combustion system, it's important to maintain your system components, including your chimney, in good working order. Working with electrical components also requires safe practices. Safety guidelines are provided here for your protection, summarized in the following section, as well as within the operating and maintenance sections where appropriate.

The EcoBoiler has been tested and is certified by Guardian, an independent testing laboratory, to meet international safety standards specifically designed for wood-pellet-fueled boilers, burners and fuel feeding systems. Please review the codes and standards section for nationally recognized safety standards that apply to your heating system.

General Safety Requirements

- A qualified installation technician must perform system installation, testing, and service.
- Only an adult may operate the boiler.
- A properly dimensioned and maintained chimney is necessary to ensure a proper draft.
- A qualified electrician must perform all electrical hook-ups.

Homeowner: Tips for Maximizing Satisfaction with your EcoBoiler

- Become familiar with routine cleaning of the flue tubes and combustion chamber. Your installer should give you routine maintenance (cleaning) training. If you're not prepared to conduct routine maintenance, an individual designated by you should receive this training and assume the responsibility for ongoing maintenance.

- Maintenance instructions should be posted near the boiler and followed diligently.

- The recommended boiler water operating temperature is 150-200°F. If the temperature is below that range, condensate may form on internal boiler surfaces. If this is allowed to occur for extended periods, the service life of the boiler will be shortened. Under such circumstances, the warranty is nullified.

- Only pellets classified as Premium Grade by the Pellet Fuels Institute should be used as fuel. Lower grades don't burn as cleanly or consistently, create more ash, and can damage the burner.

- The choice of the right boiler size, that is its heating output, is a very important condition for economical operation of the boiler. The boiler must be chosen and set up so that its net output matches the maximum heat losses of the heated space.

- It's recommended that hydronic tubing passing through unheated space be insulated to improve the overall efficiency of your heating system.

- Long burner run-times are desirable, and contribute to the overall efficiency of your heating system. For longer run times in the Spring and Fall, the burner can be run at Power Stage 3, rather than Power Stage 4, which is a typical Winter setting.

Required System Components

The EcoBoiler is designed for closed loop forced circulation hot water heating circuits. Adapting the EcoBoiler to service a forced air system will require a booster coil, buffer tank, and thermostatic bypass valve.

A fully functional heating system using the EcoBoiler requires the following components:

- Burner & Controller*
- Fuel Storage Hopper*
- Wood Pellet Feeding Auger (+ hanging chain, s-hooks, screw eye)*
- Maintenance supplies* (e.g. brushes, included with the boiler)
- Wood pellet fuel (premium grade)
- Class A chimney, Stainless Steel flue liner, or other meeting NFPA 211 Chapter 6 or 7
- Draft stabilizer (if unusually strong drafts are present such as -.12" W.C. or greater)
- Buffer tank (optional)
- Thermostatic by-pass valve with by-pass (when a buffer tank, low temp radiant, or high mass radiant is used)
- Booster coils for ducts or furnaces (if retrofitting to forced hot air)
- Piping, Circulators, Radiators, Manifolds, Expansion Tank, Flow-check valves, etc.
- 120 Volt electricity

The EcoBoiler can also be used for water heating, in which case the following additional items are required:

- Indirect domestic hot water tank and associated components

*Included in Basic Package, EcoHeat Solutions LLC

Chimney Requirements

EcoBoilers are tested and approved for natural draft operation. A chimney is required that provides adequate draft for efficient combustion and removal of flue gases. Minimal draft is -.04" W.C. over the fire in the combustion chamber. If excessive draft is present, or can be expected due to location of the chimney, for instance, a draft regulator should be used. Excessive draft is draft greater than -.12" W.C. All local codes must be followed in building or adapting a chimney to the EcoBoiler.

Chimney flues should be 6" in diameter. A 5" flue may be used only if sufficient draft is present.

The following chimneys are permitted for use:

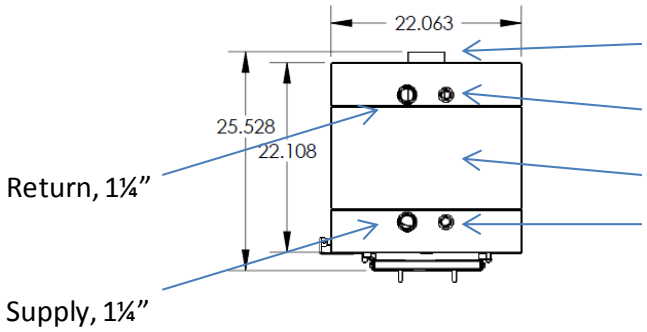
- A factory-built Type A chimney, such as a Type-HT chimney (UL 103 or CAN/ULC-S629-M87 compliant),
- A masonry chimney with a listed stainless steel lining complying with NFPA 211 Chapter 7
- Factory-built chimneys or chimney units listed for installation within masonry chimneys
- A masonry chimney with a clay flue lining or fireclay brick complying with High Heat chimney types in NFPA 211 Table 5.2.2.1 (contact EHS for details).
- Other approved materials that resist corrosion, erosion, softening, or cracking from flue gases and condensate at temperatures up to 1800˚F

The high-heat chimney types are required to protect against the possibility of inadequate chimney cleaning and the resulting possibility of a build-up of soot or creosote that can eventually catch fire.

A 4 inch "appliance adapter" is included with the EcoBoiler. It fits over the flue collar and is intended to make connection to the breeching easier. This adapter may not work for all stove pipe, in which case you will need to provide one.

EcoBoiler™ Components (features)

EXPANDED VIEW DIAGRAM

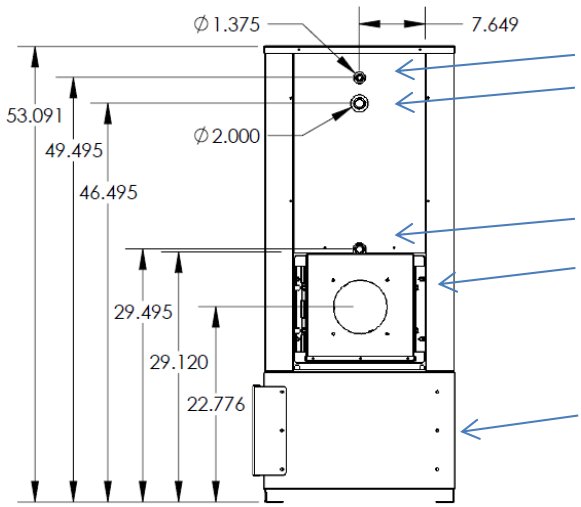


4" flue collar, center of which is 43 ¾ " above floor level.

¾" pressure release valve, included

Removable cover for access to flue tubes

¾" female for air vent
(air vent not included)



Temp & Pressure gauge, included

Well for temperature probe

Port for checking over-fire pressure

Burner door swings open to access combustion chamber. Door can be hinged either side, in the field.

Door to ash bin. Door can be hinged either side, in the field.

Items Shipped with EcoBoiler

1 – 3/4" Boiler Drain Valve
1 – 3/4" Pressure Relief Valve
1 – Dual Temperature/Pressure Gauge
1 – 1.2 ft³ Ash Bin
1 – Flue tube cleaning brush
1 – Combustion chamber cleaning brush
1 – Homeowner maintenance instruction sheet
1 – Manual
1 – Burner flange gasket
+ 5' chain, screw eye, and two s-hooks for securing auger to ceiling

Serial Number Identification

Every EcoBoiler is marked with a unique 7-digit serial number to assist tracking and identification. The serial number is located on the right side of the boiler cabinet. Any information requests and spare parts orders must include the serial number of the boiler.

In addition, an ASME stamp and serial number are on a tag welded on the pressure vessel inside the boiler jacket.

EcoBoiler Acer with Swebo PB/20		
Heating Capacities	**Unit**	**Acer&PB/20**
Net Thermal Power (Max.)	BTU/Hr	65,000
Net Thermal Power (Min.)	BTU/Hr	28,000
Efficiency	%	82
Gross Capacity (Max. power)	BTU/Hr	80,000
Gross Capacity (Min. power)	BTU/Hr	34,000
Water		
Water capacity	Gallons	16
Water pressure	psi	12-15
Working temp range	°F	150-200
Minimum return temp	°F	140
Flue Gas		
Working temperature range	°F	300-400
Pressure, combustion chamber	inch W.C.	-0.04
Chimney connection	inches	4
Wood Pellet Fuel		
Energy content	BTU/lb	7500-8500
Density	lbs/ft^3	40 - 44
Water content (Maximum)	%	8.0
Inorganic Ash content (Maximum)	%	1.0
Ash Box		
Ash bin volume	ft^3	1.2
Pellet combustion to fill (Approx.)	lbs	2,000
Electrical		**120V, 60 Hz**
Boiler	Watts	0
Burner ignition	Watts	460
Burner operating	Watts	15-20
Auger	Watts	0-41
Dimensions		
Boiler Height	inches	53
Boiler Width	inches	22
Boiler Depth	inches	25
Safety Clearances		
Clearance behind	inches	16
Clearance on sides	inches	8
Clearance in front	inches	30
Clearance above	inches	32
Physical Specifications		
Boiler Weight	lbs	485
Cabinet material	gauge	Steel
Cabinet finish		Powder-coat

Boiler Control

EcoBoiler Acer boilers are controlled by a sophisticated burner controller. With the controller, it's possible to make adjustments to the burner and auger at different power levels to optimize combustion. Details can be found in the burner manual.

EcoBoiler™ Installation

Only a licensed plumber, who has been trained to install EcoBoilers, can install the EcoBoiler and other system components. Connection of the boiler must correspond to regulations, norms, standards and this manual.

The installation technician must fill in and submit to EcoHeat Solutions LLC the registration document, included at the end of this manual, upon installation of the boiler.

Installation Area Conditions

The ambient temperature at the location of the EcoBoiler should be higher than 32ºF and lower than 105ºF.

Surrounding air should not be contaminated with halogenated hydrocarbons (e.g. as contained in paint solvents or cleaning fluids), chlorine from laundry, and excessive dust. Emissions from dryer sheets can also cause problems and should not be used near a boiler or furnace.

Avoid high humidity. This is important for the longevity of the EcoBoiler, electrical components, and for the pellets.

Do not block or close existing ventilation openings.

The boiler should be placed on a level floor, as close to the chimney as possible.

Installation Location

It's a good idea to give consideration to the location of the boiler with respect to present and future fuel storage. That is, if bulk delivery is not currently available, bagged pellets will be coming in on pallets. Ideally, those pallets will be stored relatively near the location of the boiler. Also, keep in mind that, if not today, bulk delivery will someday be available in your area, so a storage location for bulk pellets near the driveway or street may be advantageous in the future.

Minimum Clearances

The boiler must be installed on a non-combustible surface. It is also necessary to install this boiler a safe distance from flammable material. Noncombustible materials (bricks, concrete blocks, ceramic tiles, mortar, plaster) are acceptable in close proximity. However, always keep easily ignited items away from the boiler. Such items include paper, polyurethane, PVC, foam rubber, Styrofoam, and flammable liquids and gases.

When locating the boiler in the boiler room, there must be free space of min. 30" in front of the boiler for cleaning, 8" from the sides and the 16" from the rear. Above the boiler there must be free space of at least 30". This space is necessary for basic operation, maintenance and service of the boiler.

Floor Protection

If the boiler is located on a floor made from combustible material, the floor must be covered with a concrete base, slab, or a stove board listed by a recognized testing laboratory and installed in accordance with the installation instructions.

Non-combustible floor coverings must be under the boiler, extend 16" in front of the boiler, and extend 8" on either side of the ash removal door. Non-combustible floor covering must also be placed below the chimney connector, extending 2" to both sides of the connector.

Building Codes& Standards

It is not within the scope of this manual to provide a comprehensive list of safety codes and standards that installers must meet. Installation must be in accordance with all local codes, or in the absence of local codes, state or national codes. It's recommended that where local or US codes are lacking, Canadian Standards be used instead. Every EcoBoiler that leaves the factory has been tested to ensure conformance with ASME standards.

US Standards

NFPA 70	National Electrical Code®
NFPA 211	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances
ASME	Boiler & Pressure Vessel Code

Canadian Standards

CSA B365-M91	Installation Code for Solid-Fuel-Burning Appliances and Equipment
CSA B214	Installation Code for Hydronic Heating Systems
CSA C22.1	Part 1 and/or local codes for Electrical Wiring

Ventilation and Combustion Air

It is necessary to have sufficient air coming into the boiler room to enable efficient combustion, and to replenish air and flue gas exiting through the chimney. Lack of adequate combustion air may result in erratic and inefficient operation of the burner and noisy combustion.

Combustion Air (Minimum Opening) Requirements

Unconfined Area*	Confined Area**
Inside Air Supply	Outside Air Supply
1 in^2/1000 BTUH	1 in^2/ 4000 BTUH (vertical duct)
Minimum 100 square inches	1 in^2/ 2000 BTUH (horizontal duct)

*A space whose volume is not less than 50 cubic feet per 1000 BTUH of all appliances installed in that space. However, if the building has been constructed or altered so as to minimize infiltration, the boiler room should be classified as confined space.

**A space whose volume is less than 50 cubic feet per 1000 BTUH of all appliances installed in that space.

If there is any doubt, install air openings in accordance with Section 5.3, Air for Combustion and Ventilation, of the most recent revision of NFPA 54, or local codes.

WARNING: YOUR NEED FOR INCOMING OUTSIDE AIR WILL BE GREATLY INCREASED IF YOU HAVE A VENTED DRYER IN THE BASEMENT, OR OTHER VENTING SUCH AS WINDOW, ATTIC, OR LARGE COOKING FANS ELSEWHERE IN THE BUILDING.

WARNING: AIR OPENINGS TO THE COMBUSTION AREA MUST NOT BE OBSTRUCTED

WARNING: INSTALLATION AND VENTING WITH IMPROPER MATERIALS OR METHODS MAY RESULT IN SERIOUS INJURY OR DEATH DUE TO ASPHYXIATION FROM POISONOUS GASES SUCH AS CARBON MONOXIDE. A CARBON MONOXIDE DETECTOR SHOULD BE INSTALLED PER THE DEVICE MANUFACTURER'S INSTRUCTIONS.

EcoBoiler Connections

Boiler Connection to Hydronic System

Before the installation of the boiler to an older heating system the installer should rid the system of any substances such as particles that may interfere with the proper operation of the system and its components. The heating system must be filled with water corresponding to specify with hardness not exceeding 500 ppm Calcium carbonate ($CaCO_3$). Very hard water may shorten the life of the boiler and other system components, and may nullify the warranty if a major cause of boiler failure.

Connection of Regulation and Control Elements

It's recommended to combine the regulation of the boiler with other system regulation elements in order to maximize comfort and economical operation.

Electrical Connections

The burner is connected to 120 Volts, 60 Hz, single-phase AC by the supply cord and plug provided with the burner. A licensed electrician must perform any work of extending wiring from the circuit box to the plug receptacle. Electrical wiring should conform to the latest editions of ANSI /NFPA 70 and/or local authority having jurisdiction.

Exhaust Gas Connection

The exhaust gases must have outlet into the flue. If the boiler cannot be attached to the flue directly, the adapter to the exhaust pipe must be as short as possible and not longer than 36" and it must rise upwards to the chimney at least ¼" per foot of run. Exhaust pipes must be tight and resistant to flue gas leakage. They must be cleanable from inside the boiler room. The inside section of the flue must not narrow to the chimney. Exhaust pipes must not pass through living and utility spaces.

Chimney Connection

Attachment of the EcoBoiler to a chimney must be always done according to the NFPA 211 standard. There must always be sufficient draft in the flue and flue gases must be drawn to the atmosphere in all possible operation conditions. For the right operation of the boiler the independent flue must be properly dimensioned. The section of the flue, height and roughness of the internal wall influence the draft. The flue must be insulated sufficiently such that it resists condensation.

No other appliance can be attached to the same flue (except where allowed, and then, only if it can be demonstrated that there is no positive pressure in the EcoBoiler while both boilers are running, and while the other boiler is running by itself*****). The flue diameter must never be smaller than the outlet on the boiler (4"), and should transition to 5" or 6" as soon as possible after leaving the boiler. Flue draft must fall within the specified values (-.06 to -.12" W.C.). The best draft for efficiency and consistency is -.08" W.C.. Excessive draft will decrease the efficiency of boiler. If the draft is above the specified value range, a draft stabilizer must be installed in the breeching.

Single wall stove pipe for breeching (connection from boiler to chimney) is adequate where combustibles are at least 18" away. Single wall usually comes in 22 or 24 gauge metal, and can be cut to length if necessary. Double wall black stove pipe can be 6" from combustibles. A 4" flue collar to stove pipe connector is included with the boiler.

A Barometric draft stabilizer is desirable, and set to -.06" to -.08" W.C.

**Very few jurisdictions allow sharing a flue. Pressure must be checked in the EcoBoiler's combustion chamber through the small port intended for this.*

Please read about mandatory annual chimney cleaning in the Maintenance section.

Pellet Auger & Storage Bin

1. Set up the bin and place to one side of the EcoBoiler. The distance is dependent on the length of auger and the bin size. The bins are light enough to shift around before pellets are loaded.
2. Attach the screw eye to the ceiling. Placement should be at a slight offset rather than directly above the burner.
3. Attach one s-hook to the screw eye and the other to the hole near the auger motor.
4. Insert the auger into the outlet at the base of the storage bin and suspend with the chain to the s-hooks.
5. Measure the angle of the auger. **It's very important that the incline does not exceed 45˚.**
6. Secure the flexible supply hose with clamps to the outlet pipe of the auger and trim to the proper length so there's a slight bend in the supply hose in advance of its connection to the burner drop pipe.

Operation of your Heating System

Preparation of the Boiler

Before putting the boiler into operation, make sure the system is filled with water and de-aerated.

Check that the system water pressure remains steady.

Check the tightness and assembly of the flue.

Start-up of the Boiler

The boiler is put into the operation by means of the main switch on the control box that comes with the Swebo burner. Start is signaled by the green control light on the main switch. A starting dose of pellets is automatically fed to the burner after ash from the previous burn is blown to the ash tub. An electric element in the burner ignites the pellets automatically. Ignition usually takes place in just a few minutes. The operation of the burner is automatic and regulated by the controller that comes with the Swebo burner.

Setting up the burner parameters is described in detail in the Swebo burner manual, and separate installer worksheet. Burner parameters (fan speed, pellet feed intervals) may be changed while the burner is running.

During the initial firing, condensate may form and leak from the pipe connecting the boiler with the chimney. As the system heats up, no further condensate will form, and any remaining condensate will re-vaporize and be eliminated through the chimney.

WARNING: ALL THE DOORS ON THE BOILER MUST BE KEPT TIGHTLY SHUT DURING OPERATION.

Tuning for Safety and Efficiency

The flue gas temp three feet from the top of the chimney should be at least 165°F to ensure good natural draft and prevent condensation in the chimney.

If flue gas has excessive levels of Carbon Monoxide (>100 ppm), the burner fan speed should be adjusted to increase the combustion efficiency. Fan speed should not be increased so high as to create positive pressure in the combustion chamber. More details are available in the burner manual.

Wood Pellet Fuel

Your EcoBoiler and associated components are designed for burning wood pellets that meet important specifications. Only wood pellets classified as Premium Grade or Super Premium by the Pellet Fuels Institute may be used as fuel to maintain the warranty, to ensure good combustion, and to protect components from harm.

Authorized Fuel Specification

Premium Wood Pellets	
Bulk density:	40-46 lbs/ft^3
Energy Content:	7,250 BTU/lb. Minimum.
Size/diameter:	.250" to .285"
Size/length:	Less than 1% longer than 1"
Moisture content:	<8%
Inorganic Ash content/weight:	0 to 1%
Fines (dust) content max.:	<0.5% (at the mill gate)

WARNING: NON-PREMIUM GRADES OF WOOD PELLETS CAN CONTAIN IMPURITIES WHICH WHEN BURNED MAY CAUSE DAMAGE TO THE BOILER OR BURNER. BURNING NON-PREMIUM GRADES OF WOOD PELLETS, OR PELLETS MADE FROM ANYTHING OTHER THAN WOOD WILL VOID THE WARRANTY.

Pellet Storage

It's a good idea to give consideration to the location of the boiler with respect to future pellet storage. That is, bulk delivery of fuel pellets, if not currently available, may become available in the future. In such a case, the homeowner might want to receive bulk deliveries. The logical placement of bulk storage is in the basement on the street side of the building, or adjacent to the driveway.

Pellets leave the factory with less than 8% moisture. It's very important to store the pellets in a dry location. Contact with water, or prolonged humidity will damage the wood pellets. They become unusable as fuel if they fall apart due to moisture.

Bagged pellets can still be affected by moisture if stored in a damp or humid location.

Pellets ruined by moisture or rough handling need to be discarded. Fortunately, ruined wood pellets are not dangerous and so can be simply discarded in the woods or the compost.

Loading Wood Pellets into Hopper

Wood pellet dust is not healthy to breathe and can ignite under certain conditions. Be sure to lift pellet bags with your knees, not your back. Place the bag on the rack over your pellet bin, cut off one end of the bag, then empty contents into the bin. Do not let the bin get empty between fillings as this will cause the auger to empty out and will reduce the pellet doses fed to the burner.

CAUTION: WHEN LOADING PELLETS, WEAR A PROTECTIVE DUST MASK

CAUTION: ALWAYS REPLACE COVER ON PELLET BIN AFTER LOADING WOOD PELLETS TO CONTAIN DUST

SWEBO PB20 Wood Pellet Burner

Please see the separate SWEBO Pellet Burner PB/20 manual.

Maintenance of the Heating System and Boiler

Regular and thorough cleaning is very important for long service life of the boiler. Insufficient cleaning will cause the boiler to run inefficiently, waste fuel, and reduce the amount of heat available for your living space. Insufficient cleaning can also damage the boiler.

Tools Needed for Maintenance

In order to perform maintenance/cleaning of your boiler and burner, you will need an 11/16" or 17mm socket wrench to remove the nuts to open the burner door and also to remove the hatch door at the top of the boiler for brushing out flue tubes. A flue tube cleaning brush and a brush for cleaning the combustion chamber are included with your boiler.

A metal scraper is included with the burner.

Homeowner's Maintenance Responsibilities Intervals

Every 1 to 2 weeks during the heating season

1. Brush out boiler flue tubes and combustion chamber
2. Scrape out ash and slag from burner with the tool provided.
3. Visual check of ash bin

Four times per year, or at least every 1-2 tons of pellets (50 to 100 bags)

1. Disassemble burner and scrape or sweep out ash and slag from outer pipe. Clear air holes.
2. Removal of ash from ash bin (allow to cool 24 hours before contact with combustibles)

Annually

1. Auger and Pellet Bin Clean-out (this service may be offered by your installer)
2. Chimney clean out (professional)
3. Replace igniter (recommended, as part of annual service)

Boiler Cleaning

It's recommended that the combustion chamber and the flue passages through the heat exchanger be cleaned every 1-2 weeks during the heating season. Cleaning is very important, as some soot will build up on the boiler surfaces exposed to the flue gases whenever the burner starts up and ends its burning cycle. Soot build-up causes the boiler to operate less efficiently, wastes fuel, and reduces the amount of heat available to heat your space.

For cleaning, shut down the burner with the controller. Allow the burner fire to "damp down". Turn off the burner. Allow the boiler to cool down. **Wear protective gloves and a long sleeve shirt or jacket if the boiler is still warm to the touch.** Open the top, remove the turbulators, and brush out flue tubes. Replace the turbulators. Close and secure the top. Access the combustion chamber through the burner door and brush off any soot on the chamber surfaces.

Scrape out ash and slag from the burner with the tool provided. Close and secure the burner door. Turn on burner.

After the heating season is finished, clean the boiler thoroughly, and replace damaged or worn parts such as nuts, cleaning springs, and seals. It's recommended to replace the ignition coil also. The annual service is usually performed by your system installer.

Burner Cleaning

The burner's inner pipe, where combustion takes place, should be scraped out whenever boiler cleaning is performed. That is, every 1 to 2 weeks during the heating season.

The burner's outer pipe should be cleaned after every two tons of pellets, or four times a year, whichever is more often. To clean the burner, shut down via the controller. If burning, allow the burner to shut itself down gradually. This may take several minutes, and the burner may still be hot. Allow to cool. Disconnect the cord once the burner has fully shut itself down (depress tabs on both sides of the plug to unhitch).

Remove the blue cover and disconnect the flexible pellet drop chute. Brush or blow out any dust in the metal drop chute at the top of the burner. Unhitch the back portion of the burner and lift away. Remove the inner pipe and scrape clean with the burner cleaning tool that comes with the burner. Unclog any air holes and make a note in your cleaning notes. Clogged air holes can mean substandard pellets and lead to incomplete combustion. Remove any ash from between the inner and outer pipe with the burner cleaning tool. Replace the inner pipe half-way. Re-seat the drop pipe outlet from the rear portion of the burner into the hole at the top of the inner pipe before pushing these units back into the outer pipe. Ensure that the back portion is seated low before securing with the clips. If the back portion is not properly seated, you may have trouble with the ignition, as the igniter needs to be in contact with the inner pipe.

Release of Trapped Air

A small amount of air may collect in the rear section of the boiler particularly when the system is filled for the first time. This air should be eliminated manually, at the first boiler cleaning. For manual venting, simply lift, for just 1 or 2 seconds, the small pressure release valve handle on the valve at the top of the boiler. Collect the small amount of water that escapes, and discard. This should be done again any time the boiler is refilled.

An automatic air vent should be installed on the top front tapping.

Ash removal

During operation, ash falls into a metal ash tub. Ash removal must be done at varying intervals; more often in cold weather, and less often in warmer weather. The ash tub furnished with your EcoBoiler typically will not need to be emptied more often than every one to two tons (fifty to one hundred 40-lb bags) of premium wood pellets. However, the homeowner will need to check at the regular cleaning intervals in case the pellets used have a higher than expected mineral content, resulting in more ash.

To remove ash, it is necessary to turn the burner off with the main switch, and allow the boiler to cool down for 30 minutes. Using heat-resistant gloves, empty or switch out the ash collector can and sweep the boiler bottom. The ash collector tub is in the lower part of the boiler, through the door underneath the burner.

Ash should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal. The ash should remain in the closed metal container until all cinders have thoroughly cooled. **24 hours is considered a safe interval, as hot ash may not be apparent, but may exist and can start a fire if put in contact with combustibles.** Once safely cooled down, the ash can be disposed of in the garden, on the lawn, in the woods, in the compost pile, or in the trash.

After returning the ash tub to its place in the boiler, please close the door securely to prevent air infiltration from affecting the draft, lowering the efficiency of the unit.

WARNING: THE ASH TUB MAY BE VERY HOT. USE PROTECTIVE GLOVES TO PREVENT GETTING BURNED.

WARNING: THE ASH TUB MIGHT CONTAIN HOT ASHES OR COALS. THESE CAN CAUSE A FIRE. IT'S IMPERATIVE THAT THE ASHES NOT COME INTO CONTACT WITH FLAMMABLE MATERIALS INCLUDING TRASH OR DRY LEAVES UNTIL ANY CHANCE OF FIRE HAS PASSED.

Auger & Pellet Bin Cleaning

This cleaning should take place at least annually, and more often if a high level of dust is present in your pellets.

Empty the remaining pellets from the pellet bin. Unplug and remove the auger. Vacuum out any dust in the bin and in the connector at the bottom. Hold the auger vertically and empty out any pellets from the auger. Knock any dust out by lightly tapping lower end of auger on the floor. Reconnect the auger. Refill the pellet bin. Refill the auger (see burner manual). Reconnect the auger to the controller.

Chimney Cleaning

This should be performed annually by a professional chimney sweep. It's important that creosote is not allowed to build up within the chimney as dangerous chimney fires can result. Creosote build-up typically results from low temperature smoldering fires, low temp flue gases that condense in the chimney. Another cause is high moisture content in the fuel. These conditions are more often seen with burning wood, but they can occur with wood pellets as well.

WARNING: CREOSOTE FIRES BURN AT VERY HIGH TEMPERATURES AND CAN SPREAD. USE THE RIGHT CHIMNEY, AND MAINTAIN CLEARANCES SPECIFIED BY CHIMNEY MANUFACTURER.

Troubleshooting

Smoke
If any smoke is getting into the boiler room, check flue connections and the tightness of nuts on the burner door and cover above flue tubes. It may be that the door needs adjustment or the door seals need to be replaced. Make sure the air supply to the boiler room is not blocked, which will reduce the draft pulling flue gases out the chimney.

Insufficient heat
If there are pellets in the pellet bin and the burner is working, it may mean that the burner needs adjustment, or the auger has too much accumulated dust, slowing it down. It also could mean the pellets are not feeding properly. Have they gotten wet or caked together? If so, these pellets need to be replaced after cleaning out the pellet bin and auger.

Please refer to the burner manual for burner troubleshooting.

Certificate of Authenticity & Testing

The product delivered with this manual, identified with the unique production number on the jacket label, is certified to meet all applicable ASME standards for boilers, and has been quality tested to ensure its conformance with all current applicable standards for the US and Canada.

Service Record

PLEASE PRINT LEGIBLY -- CUSTOMER, PLEASE KEEP THIS SERVICE RECORD UP TO DATE

Date boiler is put into service: _____

Customer Name: _____

Customer Address: _____

Service Date	Services Performed	Service Stamp

Warranty

LIMITED WARRANTY

The limited warranty provided by EcoHeat Solutions LLC ("EHS") applies only to the EcoBoiler(s) ("Product") sold to you, the first user and purchaser, provided that the Product was purchased:
(1) new at retail (not a display, "as is", or previously returned model), and not for resale, or commercial use;
(2) within the United States or Canada.

The warranties stated herein apply only to the first purchaser of the Product and are not transferable.

When this Warranty Begins & How Long this Limited Warranty Lasts:
EcoHeat Solutions LLC warrants that the EcoBoiler (including its heat exchanger) is free from defects in materials and workmanship for a period of five (5) years from the date of purchase. The warranty period begins on the date of installation, or six months from the shipping date from EHS, whichever comes first. Labor and shipping costs are not included in the coverage of this warranty. Any claims must be made within 90 days.

Terms of Limited Warranty:
EcoHeat Solutions will provide replacement parts for any component that proves to be defective in materials or workmanship (excluding labor charges) within the time period set forth above.

Factors That Will Nullify the Warranty
The warranty will be voided for the EcoBoiler and other system components sold by EcoHeat Solutions LLC if:

- *Pellets are used that are not classified as premium grade by the Pellet Fuels Institute*
- *A buffer tank or high mass heating system is used without a thermostatic mixing valve (TMV) being present in the system to ensure a minimum return water temperature of 140°F during operation.*
- *The EcoBoiler is retrofitted to service a forced air system, without the use of a buffer tank and TMV.*
- *Precautions are not taken to remove air from the boiler water loop.*
- *Maintenance procedures as described in the Maintenance section are not carried out consistently, with diligence, and at the recommended intervals.*
- *The EcoBoiler is not connected to and part of a closed, pressurized system for any period of time after initial set-up*
- *A poorly sized, flooded, or defective expansion tank is used that leads to excessive feedwater (and O_2)*

EcoHeat Solutions LLC's warranty shall not apply to any of the following:

- *Components which have been replaced but found not to have been defective;*
- *Components which are damaged or destroyed from mishandling;*
- *Faulty installation of equipment;*
- *Incorrect use of, or insufficient maintenance of equipment*
- *Equipment used for purposes other than as defined in the manual*
- *Any component that is not supplied by EHS, regardless of the cause of failure*
- *Any product on which payment to EHS or the installer is in default*

Repair/Replace as Your Exclusive Remedy:
During this limited warranty period, EcoHeat Solutions LLC or one of its authorized service providers will provide replacement parts for the EcoBoiler without charge to you (subject to certain limitations stated herein) if your Product proves to have been manufactured with a defect in materials or workmanship. All removed parts and components shall become the property of EcoHeat Solutions LLC. All replaced and/or repaired parts shall assume the identity of the original part for purposes of this warranty and this warranty shall not be extended with respect to such parts. EcoHeat Solutions LLC's sole liability and responsibility hereunder is to provide replacements for defective Product only, to an

EcoHeat Solutions LLC's-authorized service provider. For safety and property damage concerns, EcoHeat Solutions LLC highly recommends that you do not attempt to repair the Product yourself, or use an unauthorized servicer; EcoHeat Solutions LLC will have no responsibility or liability for repairs or work performed by a non-authorized servicer. If you choose to have someone other than an authorized service provider work on your Product, THIS WARRANTY WILL AUTOMATICALLY BECOME NULL AND VOID. Authorized service providers are those persons or companies that have been specially trained for customer service and technical ability (note that they are independent entities and are not agents, partners, affiliates or representatives of EcoHeat Solutions LLC).

EcoHeat Solutions is not responsible for: (1)The costs of any system components supplied by others, or associated labor to repair or replace the same, which is incurred as a result of a defective part covered by EHS's Limited Express Warranty; (2) The costs of labor, materials or service incurred in diagnosis and removal of the defective part, or in obtaining and replacing the new or repaired part; (3) Transportation costs of the defective part from the installation site to EHS, or of the return of that part if not covered by EHS's Limited Express Warranty; or (4) The costs of normal maintenance and cleaning.

Warranty Exclusions:
The warranty coverage described herein excludes all defects or damage that are not the direct fault of EcoHeat Solutions LLC, including without limitation, one or more of the following: (1) Third party damage to the product, or damage caused by plumbing errors, omissions, or component faults; (2) use of the Product in anything other than its normal, customary and intended manner; (3) any party's willful misconduct, abuse, negligence, misuse, abuse, accidents, neglect, improper operation, failure to maintain, improper or negligent installation, tampering, failure to follow operating instructions, mishandling, unauthorized service (including self-performed "fixing" or exploration of the appliance's internal workings); (4) adjustment, alteration or modification of any kind; (5) a failure to comply with any applicable state, local, city, or county electrical, plumbing and/or building codes, regulations, or laws, including failure to install the product in strict conformity with local fire and building codes and regulations; (6) ordinary wear and tear; and (7) any external, elemental and/or environmental forces and factors, including without limitation, fire, floods, basement flooding, rain, wind, sand, floods, fires, mud slides, freezing, mold, fungus or bacterial contamination, excessive moisture or extended exposure to humidity, lightning, power surges, structural failures surrounding the Products and acts of God. In no event shall EcoHeat Solutions LLC have any liability or responsibility whatsoever for damage to surrounding property and other structures or objects around the Product. Also excluded from this warranty are scratches, nicks, minor dents, and cosmetic damages on external surfaces and exposed parts; Products on which the serial numbers have been altered, defaced, or removed; visits where there is nothing wrong with the Product; correction of installation problems (you are solely responsible for any structure and setting for the Product, including all electrical, plumbing or other connecting facilities, for proper foundation/flooring, and for any alterations); and resetting of breakers or fuses.

Limitation of Remedies
In the event of a breach of the Limited Express Warranty, EHS will only be obligated at EHS's option to repair or replace the failed part or unit, or to furnish a new or rebuilt part or unit in exchange for the part or unit which has failed. If after written notice to EHS's operations in East Walpole, MA of each defect, malfunction or other failure, and a reasonable number of attempts by EHS to correct the defect, malfunction or other failure, and the remedy fails its essential purpose, EHS shall refund the purchase price paid to EHS in exchange for return of the sold good(s). Said refund will be the maximum liability for EHS. THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER OR PURCHASER AGAINST EHS FOR BREACH OF CONTRACT, FOR THE BREACH OF ANY WARRANTY OR FOR EHS'S NEGLIGENCE OR IN STRICT LIABILITY

Limitation of Liability
EHS shall have no liability for any damages if EHS's performance is delayed for any reason, or is prevented to any extent by any event such as but not limited to war, civil unrest, government restrictions or restraints, strikes or work stoppages, fire, flood, accident, shortages of transportation, fuel, material, or labor, act of God or any other reason beyond the sole control of EHS. EHS EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR

CONSEQUENTIAL OR INCIDENTIAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR EHS'S NEGLIGENCE OR AS STRICT LIABILITY.

TO THE EXTENT ALLOWED BY LAW, THIS WARRANTY SETS OUT YOUR EXCLUSIVE REMEDIES WITH RESPECT TO PRODUCT, WHETHER THE CLAIM ARISES IN CONTRACT OR TORT (INCLUDING STRICT LIABILITY, OR NEGLIGENCE) OR OTHERWISE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED. ANY WARRANTY IMPLIED BY LAW, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, SHALL BE EFFECTIVE ONLY FOR THE PERIOD THAT THIS EXPRESS LIMITED WARRANTY IS EFFECTIVE. IN NO EVENT WILL THE MANUFACTURER BE LIABLE FOR CONSEQUENTIAL, SPECIAL, INCIDENTAL, INDIRECT, "BUSINESS LOSS", AND/OR PUNITIVE DAMAGES, LOSSES, OR EXPENSES, INCLUDING WITHOUT LIMITATION TIME AWAY FROM WORK, HOTELS AND/OR RESTAURANT MEALS, EXPENSES IN EXCESS OF DIRECT DAMAGES WHICH ARE DEFINITIVELY CAUSED EXCLUSIVELY BY ECOHEAT SOLUTIONS LLC, OR OTHERWISE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

Service Records must be made available to EcoHeat Solutions LLC for each qualifying failure which shall include:

- *Serial number including the date code of manufacture;*
- *Date product was installed and placed in operation;*
- *Date component failure reported;*
- *Description of condition that prompted the service call; and*
- *Part number of component that failed.*

No attempt to alter, modify or amend this warranty shall be effective unless authorized in writing by an officer of EcoHeat Solutions LLC.

Contact Information

EcoHeat Solutions LLC

153 Washington St

East Walpole, MA 02032

Tel: 877-317-0700

E-mail: service@EcoHeatSolutions.com

www.EcoHeatSolutions.com

Dealer Stamp

Pre-Commissioning Checklist

EcoBoiler Serial Number: _____ Date of Installation: _____

EcoBoiler Installation Location: Address: _____

Town: _____ State: _____ Zip: _____

Is the EcoBoiler on a non-combustible base? □ Yes □ No

Is there sufficient room to access the boiler from above for cleaning flue tubes? □ Yes □ No

Is there sufficient room to access the combustion chamber from the front? □ Yes □ No

Is the system filled with water and air eliminated? □ Yes □ No

Have all parts been removed from the ash tub? □ Yes □ No

What chimney is being used? □ Class A □ Masonry with SS liner □ Other _____

Does the air supply to the boiler room meet local requirements? □ Yes □ No

Is the flue size of the chimney 6"?: □ Yes □ Other _____

What is the system type? □ 100% hydronic □100% forced air □ Mixed hydronic & forced air

Is there a buffer tank? □ Yes □ No If yes, what size? _____ gallons

Is there a thermal mixing valve in this set-up? □ Yes □ No

Is there a draft stabilizer fitted? □ Yes □ No

Is there negative pressure in the combustion chamber? □ Yes □ No What is the pressure over fire? _____" W.C.

What is the pressure at the flue collar? _____" W.C.

Are fan and pellet feed settings made for all four power levels? □ Yes □ No

What are those settings? Power Level 1: _____ Power Level 2: _____

Power Level 3: _____ Power Level 4: _____

What are the settings for the High, Low and Target temperatures? _____˚F

Has the customer been instructed on all cleaning and maintenance procedures? □ Yes □ No

Customer Signature: _____ Print Name: _____

Date: _____ Telephone: _____ E-mail: _____

Installer Signature: _____ Print Name: _____

Company Name: _____

Return to: EcoHeat Solutions, 153 Washington St, East Walpole, MA 02032

877-317-0700