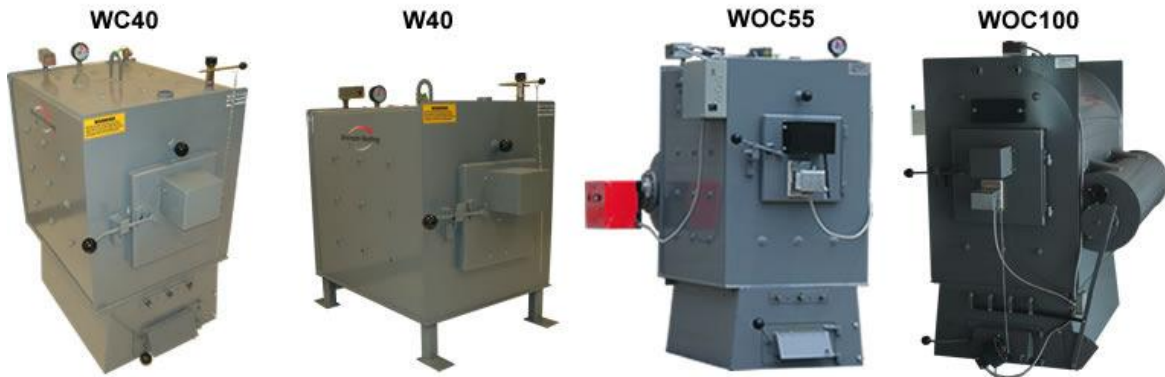




# INSTALLATION AND OPERATOR'S MANUAL

MULTI-FUEL HAND-FIRED BOILER  
Models: WC40, WOC40, WC55, WOC55,  
WC70, WOC70, WC100, WOC100



**IMPORTANT:** IN ORDER TO ACHIEVE SAFE AND SATISFACTORY RESULTS FROM YOUR ALTERNATE HEATING SYSTEMS, LLC. BOILER, READ SAFETY RULES AND INSTRUCTIONS CAREFULLY BEFORE INSTALLING AND OPERATING. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH STATE AND LOCAL CODES.



**WARNING:** Your Alternate Heating Systems Boiler is capable of generating very hot temperatures. Boiler temperatures and flames in the ignition box area are capable of causing ignition or explosion of explosive or flammable products or explosion of the boiler itself if maximum safe water temperature is exceeded. Maximum safe water temperature is 200<sup>0</sup> Fahrenheit. Flammable or explosive products must never be stored in the same room or in the vicinity of a boiler, and the boiler water temperature must never be allowed to exceed 200<sup>0</sup> Fahrenheit.

**ALTERNATE HEATING SYSTEMS, LLC.**  
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Record Model and Serial Number Below

**Model:**

**Serial:**

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# INTRODUCTION

The purpose of this manual is to assist you in the installation, operation and maintenance of your new boiler in order to achieve the best performance possible. We recommend that the unit be installed by an experienced boiler installation technician who has a thorough knowledge of hydronic heating systems and boilers. Should your installation require a steam boiler, it is even more important that experienced personnel be consulted to ensure that the necessary safety controls are installed and properly wired.

Read the entire instruction manual carefully and understand it thoroughly before installing or operating this unit. Save these instructions and review them periodically to refresh your memory regarding safe operating practices and routine maintenance required.

All Alternate Heating Systems, LLC. (AHS) boilers can be supplied with the “H” stamp and National Board number for an additional fee when requested prior to purchase. All Alternate Heating Systems boilers are built in our own facilities to the most rigid quality control standard so that you can be assured of the highest quality product.

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## INSTALLATION OF ALTERNATE HEATING SYSTEMS COAL-WOOD MULTI-FUEL BOILERS

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To achieve safe and satisfactory results from your Alternate Heating Systems, LLC. Wood & Coal Burning Boiler, these installation and operation guidelines must be strictly adhered to. You must check local building codes in your area to ensure compliance.

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## GENERAL CHIMNEY REQUIREMENTS

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One of the most important considerations in installing a Wood & Coal Burning boiler is the type of chimney that will be used. The condition and construction of the chimney is important to provide sufficient draft. The chimney produces the draft, not the stove.

Natural drafts in a chimney result from two factors. First, draft is created by the aspirating effects of air currents blowing across the top of the chimney. Second, drafts are also produced when the temperature of the flue gases is higher than the atmosphere around the chimney. For this reason a chimney must be kept warm (about 250° F) for proper draft to occur.

It is more difficult to maintain sufficient temperature in an exposed chimney or one that is larger than a chimney that is protected from outside temperature extremes.



### **CAUTION: CREOSOTE BUILDUP PROBLEMS**

**Poor chimneys with cold walls can cause creosote buildup. Sharp bends and horizontal flues should also be avoided. The exhaust must be kept moving through the piping/flue to prevent creosote buildup. If a horizontal section must be used, it must rise slightly to prevent dead air space.**


The chimney must be sufficiently tall (at least 20 feet for masonry chimneys) and should extend several feet above the highest part of the roof to prevent downdrafts. The chimney must be leak-free from the standpoint of air entering through cracks or other chimney defects or through loose stovepipe fittings.

If the chimney must go through a combustible wall, be sure to use a metal thimble specially designed for this purpose. The proper way to install a thimble is to cut an oversize hole in the sheetrock about 6 or 7 inches larger than the thimble. However, be sure to follow the manufacturer's directions that come with the thimble. A metal ring shield is used to cover the hole. This way air can circulate and cool the area around the passageway.

### **Technical Aspects of Chimney Performance**

A device called a manometer is used in describing the technical performance of a chimney. A manometer is an instrument used for measuring the pressure of liquids and gases. An analog manometer consists of a glass tube filled with a liquid and mounted in front of a measuring scale against which the liquid level can be measured. If a manometer were connected to a leak-free chimney with a leak-free connection, then the draft in the chimney should exert enough pressure (or pull) against the water in the manometer to cause it to move at least 0.04 inches in the tube.

**CAUTION:**  
**SUFFOCATION HAZARD**



**The airflow through the system and out the chimney means that oxygen is leaving the home and will create an oxygen deficit if this air is not replaced.**

The airflow through the system and out the chimney means that oxygen is leaving the home and will create an oxygen deficit if this air is not replaced. There is usually sufficient leakage in older homes, but in well-insulated homes it may be necessary to provide additional outside air into the home.

---

## **STOVEPIPE**

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Use only 22-24 gauge single wall stove pipe in open areas no closer than 18 inches from walls or ceiling. If the stovepipe must be closer than 18 inches from the nearest wall or ceiling, or if it must go through walls, closets, or boxed in areas, then U.L. listed insulated stovepipe must be used. Pipe that runs along the outside walls of a building must also be U.L. listed insulated pipe, even if it runs along a non-combustible outside wall. This requirement is in place in order to prevent cooling of the stovepipe which in turn cools the rising smoke and causes creosote to form quickly.

It is not advisable to connect more than one heating appliance to a single chimney but if it is necessary, connect one above the other rather than at the same level. One will rob the other of draft pull and neither will operate properly if installed at the same level.


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## **PROPER CHIMNEY CONNECTION**

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The boiler must be connected to a class "A" chimney with 18 gauge smoke pipe preferably stainless steel.

**WARNING:**  
**CODE COMPLIANCE**



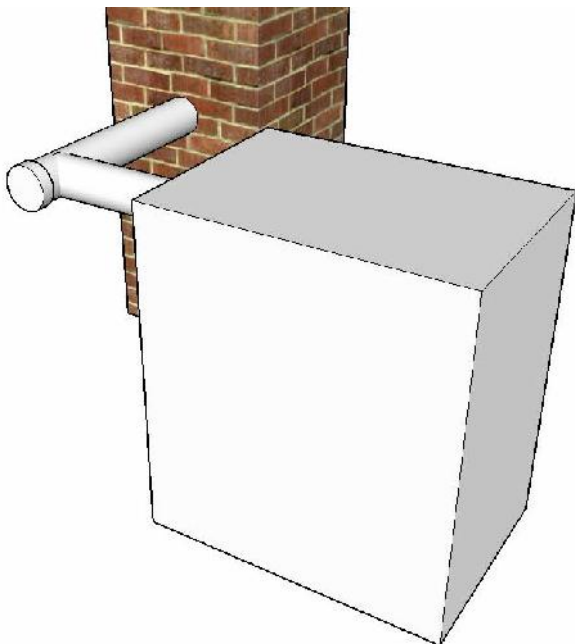
**Use of aluminum Type B gas vent for solid fuels is unsafe and prohibited by the National Fire Protection Association Code.**

Use of aluminum Type B gas vent for solid fuels is unsafe and prohibited by the National Fire Protection Association Code. The recommended method for connecting the boiler to the chimney is to place a T-joint at the top of the vertical section leading from the cyclone. The rear opening must be covered with a cap, which can be removed for cleaning and inspection. If the horizontal run to the chimney is inclined, it will encourage any fly ash, which

drops in the pipe to fall back into the ash separator.

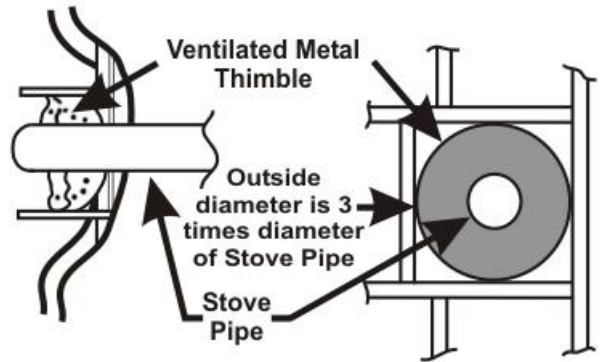
If a second change of direction is required before entering the chimney a cleanout "T" should be placed at this point also as indicated in Figure 1. Each joint should be secured with three sheet metal screws and sealed with high temperature furnace cement or "Troweleze" refractory cement. Any horizontal pipe should be pitched upward toward the chimney at least 1/4" for each foot of horizontal run. Be sure there is at least 18" clearance between horizontal piping and combustible ceiling. Be sure that the chimney connection pipe extends at least 2" into the chimney, but does not extend so far into the chimney that it blocks airflow.

In installations where the chimney draft is too strong, the problem may be eliminated by allowing air to pass up the chimney from an auxiliary valve located at floor level and connected to a "T" in the flue pipe or chimney. The diagram below shows how the boiler should be connected to the chimney if a direct connection into the chimney is not made. A cleanout cover should be placed wherever the stovepipe changes direction.



**Figure 1: Proper chimney connection**

Particular attention should be paid to the point where a flue passes through a wall or ceiling. The pass-thru should always be made with insulated pipe and the proper accessories or use of a thimble which provides a diameter of not less than three times the diameter of the stove pipe. (see illustration below)



**Figure 2: Stove pipe passing through wall**

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### **IN CASE OF CHIMNEY FIRE**

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1. Call the fire department. (In the event the fire is out before they get there, you will want them to inspect the structure and make sure there is no latent damage or hazard.)
2. Shut the boiler down by turning the main power off.
3. If you have a chimney fire, use a chemical flare type fire extinguisher. If you don't have an extinguisher, go to step 4.
4. Using a water hose, wet down the area of the roof surrounding the chimney. Do not wet the chimney itself or try to put water down the flue as it will very likely damage the flue tiles.
5. Contact a chimney professional to inspect your chimney for damages.

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## COMBUSTION AIR SUPPLY

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It is important to make provision for adequate supply of combustion air, either natural infiltration through a door or window or by ducting outside.

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## BOILER LOCATION

---

Wood & Coal Burning Boilers are designed to radiate as much heat as possible, but this heat can be dangerous if the boiler is improperly installed.



**CAUTION:**

**A fire could be started if the boiler is installed too close to walls, furniture, carpet or draperies.**

The boiler must stand on a noncombustible material such as brick, stone tile or concrete. **NEVER** place a boiler directly on a wood floor. The noncombustible material upon which the boiler stands should extend at least 12 inches beyond the base of the boiler in the rear and on the sides and at least 36 inches in front. The boiler must be installed in an area dedicated to the boiler and its related equipment. This area must be partitioned or separated from any living area of a residence. The room must have a constant fresh air supply to assure proper combustion of the fuel as well as ventilation of any by-products of combustion.

### Boiler Room Requirements

1. The room should be well lighted and should have a source of emergency light.
2. A convenient water supply should be available for boiler flushing and to clean the boiler room floor.
3. Unobstructed floor drains.
4. Must have adequate air supply, which must be kept clear at all times. Since the combustion process requires a

supply of air at all times, it is essential that provisions are made to supply adequate air to the boiler room. This air supply is necessary to insure complete combustion and venting of any gases or smoke that would be emitted from this solid fuel burning boiler in case the boiler malfunctions.

5. Electrical disconnect at point of entrance to boiler room.
6. Walls and ceiling must be of fire rated construction. Consult local or state codes for requirements.

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## RIGGING AND POSITIONING OF BOILER

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Do not attempt to move or off-load the boiler without the aid of a crane or dolly. Most Alternate Heating Systems boilers have a lifting lug in the center of the top while on some units two lifting lugs in the front and rear are provided.

Once on the floor level where it will be installed the unit may be rolled on pipe or may be moved by means of a pallet jack. The boiler must be placed on a concrete slab or other rigid pad of non-combustible material with sufficient strength to adequately support the boiler including its contents of water. The boiler should be positioned as closely as possible to the chimney. The smoke pipe must pitch continually upward toward the chimney and be as straight as possible. Level the boiler after it has been positioned.

Before proceeding with installation, inquire with local building officials to ensure that all building, plumbing and electrical codes will be complied with.

A qualified technician experienced in boiler installations is recommended for the installation of this unit. Wiring on the boiler must be properly grounded.





**WARNING:**  
**BUILDING CODE COMPLIANCE**  
The installation of this unit must comply with state and local requirements and must be inspected by the state or local building inspector where required.

**NOTE:** This unit is not approved nor is it recommended for use in mobile homes.

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## **CLEARANCES REQUIRED FOR SAFETY AND OPERATION**

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It is important to provide sufficient clearance around the boiler for convenient servicing and cleanout.

The required minimums when measured from the boiler vessel are 36" to the rear, 18" to the right side (when facing the loading door), 18" on the left, 18" on top and 48" to the front. Refer to Appendix B: Specifications for exterior dimensions of the various models. For commercial and residential installations most boiler codes require a minimum of 3 feet of clearance on all sides.

# OPERATION AND MAINTENANCE OF ALTERNATE HEATING SYSTEMS COAL-WOOD MULTI-FUEL BOILERS

Alternate Heating Systems Coal-Wood Boilers are designed for burning coal with maximum efficiency and convenience but will also burn wood. Each unit is manufactured to burn primarily wood or primarily coal. Units that are manufactured to burn primarily wood have a secondary combustion area where un-combusted gases from the wood have a second chance to be combusted. When burning wood the unit will have to be loaded three to four times per day on average (if the unit is loaded less often, then creosote buildup in the chimney will occur).

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## WOOD VS COAL

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The conditions required for burning the two fuels efficiently are considerably different. With coal the combustion air must be drawn up through the bed of coal, whereas with wood the air should enter through the door and the live coals should be held in the center of the fire to maintain a higher temperature for most efficient combustion. Therefore Alternate Heating Systems, LLC. Coal-Wood Boilers have two different draft systems so that the proper system can be used for each fuel. The grate system is a unique rotary design which allows the air opening size to be increased from a nearly solid bottom to a very large exposed area.

When burning wood, the grates should be rotated so that one side on all the grates are horizontal, and the ashes and coals should also be allowed to build up to a depth of four inches or more. This will have the effect of sealing off the bottom of the firebox, preventing combustion air from entering from below. The grates should only be rotated when it is necessary to remove some ash, being careful to maintain sufficient ashes to insulate the bottom.

When burning coal the draft control linkage on the loading door must be disconnected and replaced with the chain linkage that is provided. When burning coal it may be necessary to rotate the grates slightly to increase airflow through the fire.

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## COAL TYPES

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Alternate Heating Systems, LLC. Coal-Wood Boilers operate best when a good grade of hard coal is burned since it has a high output of energy and low ash and sulfur content. Either “stove” or “nut” size should be used. The larger size of these two produces the hottest fire because it allows freer movement of air through the burning mass. However “nut” size hard coal will burn longer at a more even rate and a mixture of the two sizes may prove to be the most ideal.

Good grades of soft coal can be burned in the Alternate Heating Systems, LLC. Coal-Wood Boilers provided the ash and sulfur content is low enough. Soft coals generally produce considerably more ash than do hard coals and also tend to “clinker” (or fuse together) producing lumps of ash residue. When adding soft coal to the fire it is important not to smother the fire, preventing a free flow of combustion air through the burning fuel.



**WARNING:  
EXPLOSION HAZARD**

**After adding soft coal, always stir the fire to be certain the flames are visible. This will prevent the possibility of explosive gases being generated.**

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## AQUASTAT OPTION

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An option on all Alternate Heating Systems Coal-Wood Boilers is a high-limit aquastat installed in the water wall and wired to the water circulator. The aquastat is a safety feature that will prevent the possibility of the boiler overheating. In a situation where the *thermostat* does not call for heat for an extended period of time and the temperature in the boiler rises to the temperature to which the aquastat is set, the aquastat will activate the circulator to pump excess heat away from the boiler and into the area being heated.

**WARNING:  
EXPLOSION HAZARD**



The temperature of the aquastat should be set no higher than 200° for the aquastat to work effectively. Setting the temperature higher than this can allow the water to boil before the circulator has time to move the hot water away from the boiler.

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## DOMESTIC HOT WATER FROM YOUR BOILER: DOMESTIC COIL OPTION

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An option on all Alternate Heating Systems, LLC. Coal-Wood Boilers is a tank-less domestic coil to supply hot water for domestic home use. These coils operate on the principle of heating water as it passes through fine copper tubing immersed in the boiler water. The AHS coil is rated to produce 5 gallons per minute when the temperature of the water in the boiler is at 200° Fahrenheit.

**WARNING: BURN HAZARD**



A tempering valve should be installed in the hot water supply line to reduce the temperature of the hot water to a safe level.

A tempering valve should be installed in the hot water supply line to reduce the temperature of the hot water coming from the domestic coil to a safe level. The tempering valve may be obtained from your Alternate Heating Systems or local plumber. This will also ensure a constant water temperature at the tap. If hot water is supplied to an automatic dishwasher, a line can be run directly to this appliance ahead of the tempering valve. Be sure to check maximum water temperature capability of the dishwasher before installing water-feed lines to a dishwasher in this manner.

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## OTHER GENERAL OPERATING GUIDELINES

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Be sure children are advised of the danger of boilers, and keep them away from the boiler. Always keep clothing like boots, shoes, mittens, hats and coats at least 3 feet away from the stove. Never let unsupervised children operate a boiler.

Keep kindling wood and logs at least 3 feet away from the boiler.

**NEVER** use any liquid fire starter or highly flammable substance to light your boiler. **ALWAYS** instruct small children to stay away from the boiler while you are lighting it.

**ALWAYS** check for combustible materials around your stove before leaving the house or going to bed at night and remove immediately.

**DO NOT BURN GREEN WOOD** in your boiler. You will be wasting fuel and increasing the danger of chimney fire due to large amounts of creosote produced by green wood. You can get as much as 40% more heat from a log simply by letting it dry out. Season the wood at least six months or longer before burning.

The best type of fuel for your Alternate Heating Systems, LLC. Wood & Coal Boiler is seasoned hardwood such as oak or hickory. It takes nearly twice as much pine wood to equal the amount of heat produced by oak or hickory, and softwood such as pine will produce considerably more creosote.

It is a good idea to burn your stove hot for at least ½ to ¾ of an hour each day to help limit the buildup of creosote in the stovepipe.

If you have a metal chimney, tap it from time to time and listen for a loose rattling. If audible, this sound indicates that creosote is building up. Adding a handful of rock salt to a hot fire will help to discourage the formation of creosote

The boiler door should be opened slowly at first to prevent a large volume of air from rushing into the stove. This will prevent back-puffing of smoke into the room.

Inspect the chimney from time to time and clean it when necessary.

**BAFFLE:** A ceramic board is attached to the baffle to create a high-temperature zone. This is a wearable item that you need to be careful not to scrape wood against causing it to score, which would lessen efficiency and promote warping of the baffle. The baffle can be slid back and forth from the outside to make a more direct route for the smoke to travel out of the firebox when you open the door to load the boiler. Our baffles are not welded into place, so they can be easily replaced if necessary.

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### C055 WITH OIL AUTO SWITCHOVER

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**WOOD** - This position will keep the boiler in wood mode operation only. The oil Burner will never run in this setting.

**AUTO** - If the boiler operating temperature is achieved in wood mode, turn mode switch to **AUTO**, and then turn MAIN switch off and back on to set this operation. The boiler will remain in **WOOD** operation until the water temperature falls to the switchover set point (usually 160°). At this point, the boiler will switch to **OIL** mode automatically and remain in **OIL** mode until the switch is turned back to **WOOD**.

#### Operating Sequence for Auto Mode

- ❑ In wood mode – bring boiler to operating temp 180°– 190°

- ❑ Turn MODE switch to **AUTO**
- ❑ Turn MAIN switch off then on
- ❑ Boiler is set for Auto switchover

**OIL** - This position is for oil burner operation only.

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### CONDITIONING OF BOILER WATER

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Proper treatment of make up water and boiler water are necessary to prevent scale or other deposits and corrosion within the boiler. The absence of adequate external and internal treatments can lead to operation upsets or total boiler failure. Where a choice is available, pretreatment of the water externally to the boiler is always preferred and more reliable than treatment within the boiler.

Instructions for feed water treatment as prepared by a competent feed water chemist should be followed. Do not experiment with homemade treatment methods or compounds.

Representative samples of feed water and boiler water need to be analyzed frequently to ensure that they are in specification. The following terms and guidelines are to be used in conjunction with the advice of a water treatment specialist.

#### *Ph*

The Ph value of your boiler water is a number between zero and fourteen. Values below seven are acidic while values above seven are basic.

The Ph factor is the most important factor influencing scale forming or the corrosive tendencies of boiler water. It should be adjusted to between a minimum of 10.5 and a maximum of 11.0 to prevent acidic corrosion of boiler tubes and plates and to provide for the precipitation of scale forming salts.

Below a Ph of 5.0 the water is acidic enough to dissolve the steel boiler plates. Under these conditions the steel gradually becomes thinner and thinner until it is destroyed. At a Ph between 5 and 9.4 pitting of steel plates will occur at a rate dependant upon the amount of dissolved oxygen in the boiler.

### ***DISSOLVED OXYGEN***

Aeration of city water supply is frequently used to remove other noxious gasses, however, efficient aeration results in saturation of the water with oxygen. The majority of corrosion problems are directly related to the quantity of dissolved oxygen in the boiler water.

Elimination of the corrosive effect of dissolved oxygen can be accomplished either directly or chemically.

Direct or mechanical removal of dissolved oxygen is done through the use of a de-aerator. Chemical de-aeration is done through the introduction of specific chemicals in the boiler to react with the oxygen. The dissolved oxygen content should be maintained at a minimum but at no time should it exceed 0.007 mg/l.

### ***SULFITES***

Sodium sulfite is generally used for the chemical removal of dissolved oxygen within the boiler water. To assure the rapid and complete removal of the oxygen entering the boiler feed water system the concentration of sulfite in the boiler must be maintained at a minimum of 120 ppm. (parts per million).

### ***SOLIDS***

Solids can be broken up into two categories of both suspended and dissolved. Suspended solids are those that can be removed by filtration while dissolved solids are in solution with the water.

The best test for the determination of the solids content of the boiler water is through a conductance test. The conductance value of boiler water varies by the various ionized salts present. The conductance can be used to measure the total dissolved solids in the boiler water and to serve as an accurate means for the control of solids through the use of blow down.

Another test that is sometimes used as a measure of solids is to measure the chloride present in the boiler water. The ratio of chlorides in the boiler water to that of the feed water can be used as a means to determine the amount of blow down required. The chloride test is unsuitable for feed water with low

incoming concentrations, and the concentrations in the feed water must be averaged over time for accuracy.

High boiler solids will lead to foaming, priming, surging, and carry over. These conditions may only be overcome by proper daily blow down of the boiler.

### ***ALKALINITY***

The alkalinity of boiler water should be sufficiently high enough to protect shell and plates against acidic corrosion, but not so high as to produce carryover. A minimum value for alkalinity for adequate protection is 200 ppm.

High boiler alkalinity (in excess of 700 ppm) should be avoided. Values higher than this can cause the steel to become brittle.

### ***PHOSPHATES***

Phosphates are used to react with calcium hardness in the boiler water. In order for this reaction to take place it is important to maintain a Ph at a minimum value of 9.50. It is desirable to keep the concentration of phosphates in the water to 30-50 ppm to enable the complete reaction of the phosphates with the calcium hardness entering the boiler through the feed water.

### ***HARDNESS***

The hardness of water is caused by calcium and magnesium ions. Water hardness will vary greatly throughout the country depending on the source of the water.

In boilers hard water can cause the formation of scale and sludge or mud. The hardness must be removed in the makeup water to the return system. Total hardness should not exceed 50 ppm.

### ***OILS***

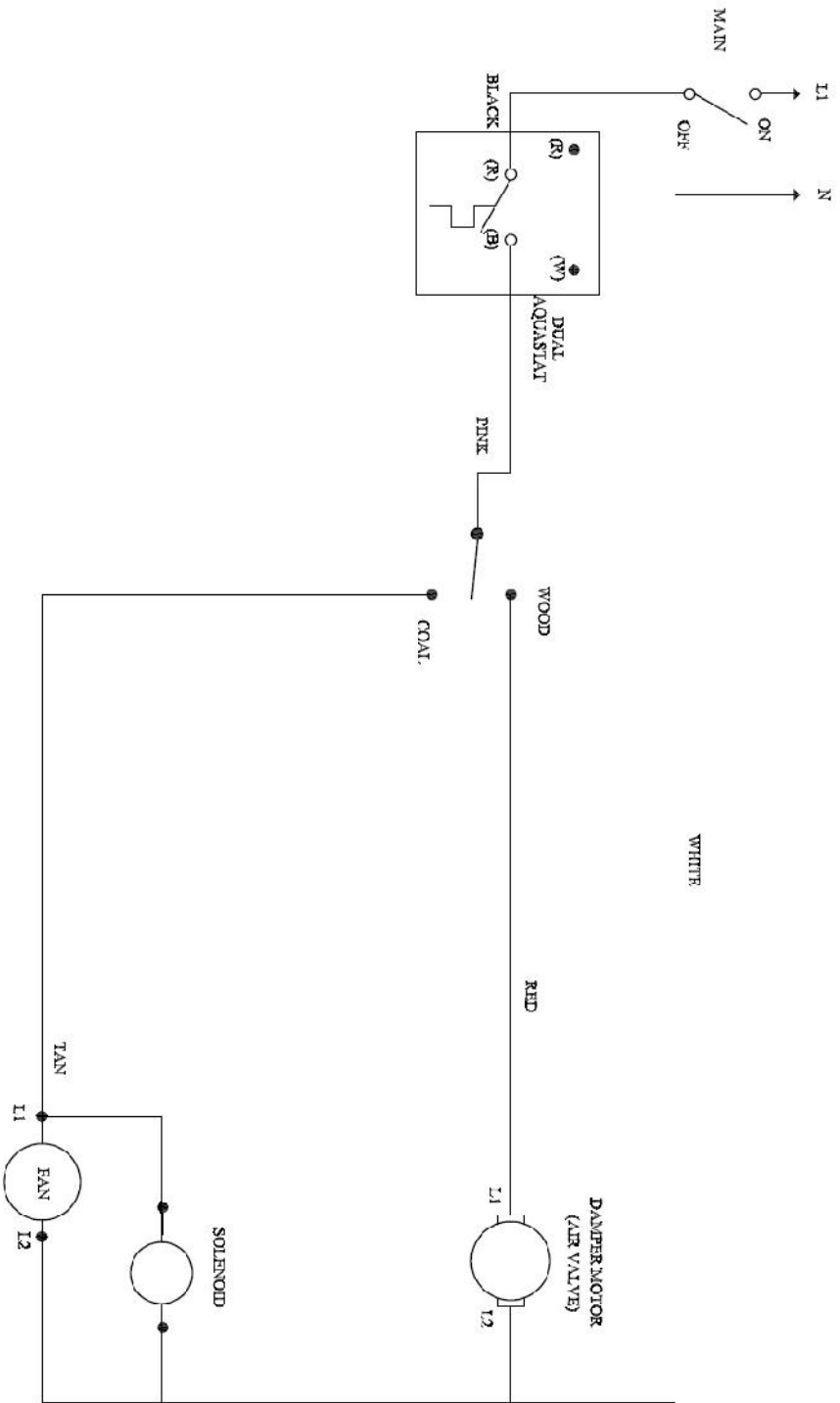
Every effort should be made to prevent oils from getting into the boiler water. Oil causes foaming or combines with suspended solids to form a sludge, which can cause the overheating of boiler plates. If oil does get into the boiler, the boiler should immediately be taken out of service and thoroughly cleaned.



## **APPENDIX A: WIRING DIAGRAM**

# MULTI-FUEL BOILERS WITH DAMPER MOTOR AND FAN ELECTRICAL SCHEMATIC

115 VOLTS - 15 AMP



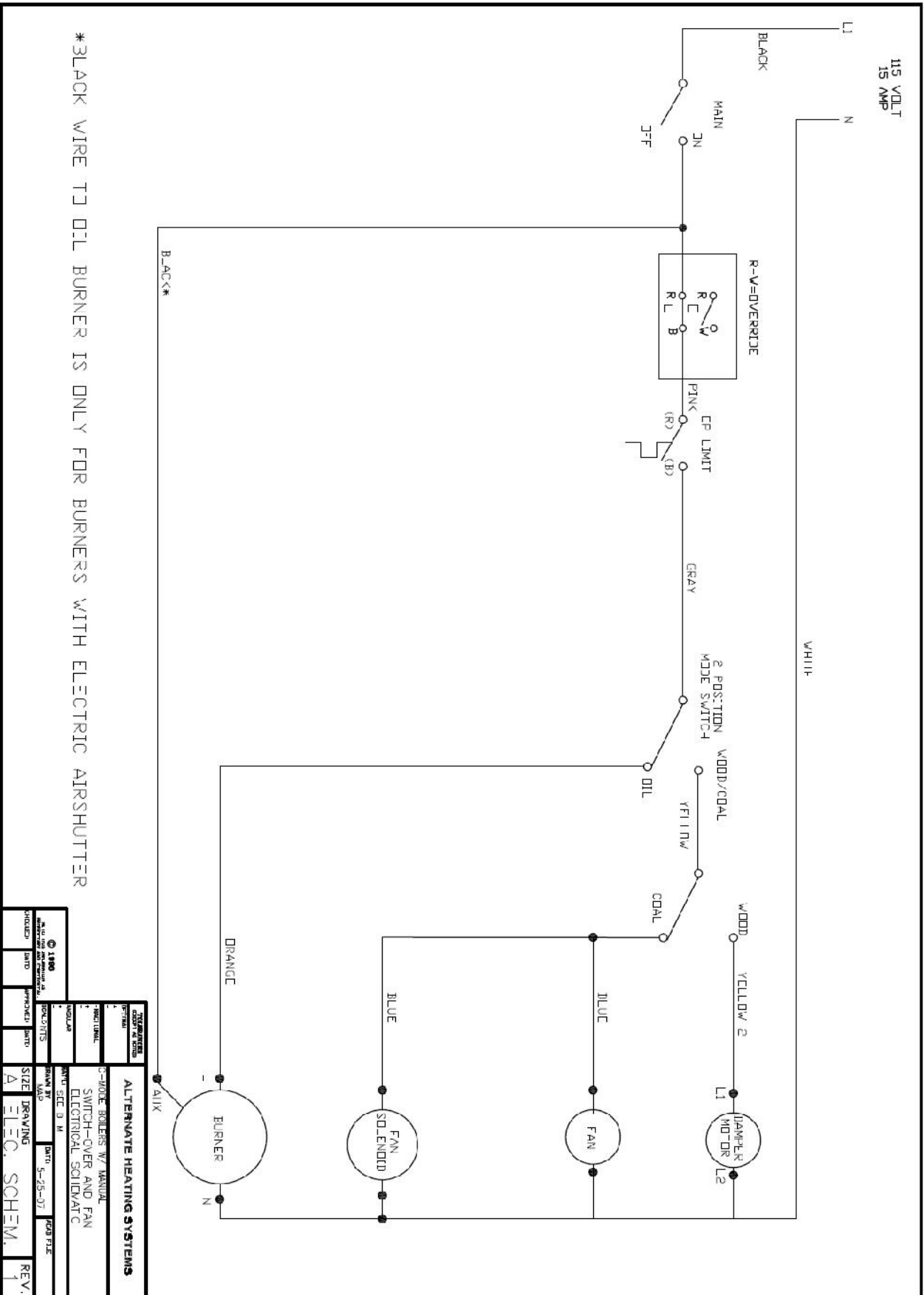
CONTROLS FOR C40, C55, C70 C100 W DAMPER MOTOR AND FAN

Alternate Heating Systems, LLC  
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 Specifications subject to change without notice.

Date Revised: 03/20/12



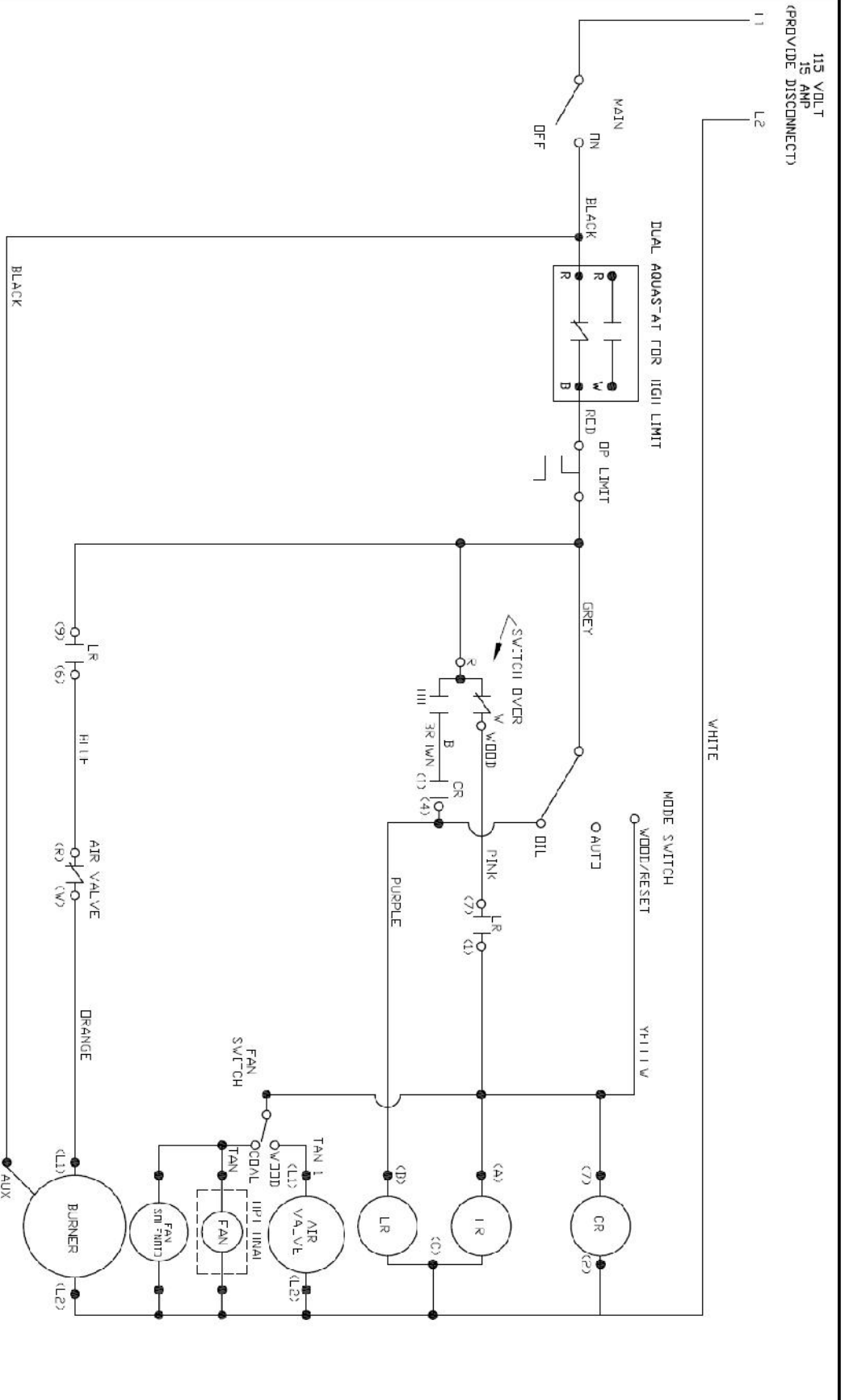
# C-MODEL BOILERS W/ MANUAL SWITCHOVER AND FAN ELECTRICAL SCHEMATIC



\*BLACK WIRE TO OIL BURNER IS ONLY FOR BURNERS WITH ELECTRIC AIRSHUTTER

<b>115V</b> ALL WIRING SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES.		<b>DATE:</b> 5-25-07		<b>REV:</b> 1	
<b>DESIGNED BY:</b> [ ]	<b>CHECKED BY:</b> [ ]	<b>DATE:</b> 5-25-07	<b>REV:</b> 1	<b>PROJECT:</b>	<b>REV:</b> 1
<b>ALTERNATE HEATING SYSTEMS</b>			<b>115V</b>		
<b>C-MODEL BOILERS W/ MANUAL SWITCH-OVER AND FAN ELECTRICAL SCHEMATIC</b>			<b>DATE:</b> 5-25-07		
<b>SIZE:</b> DRAWING			<b>PROJECT:</b>		
<b>A</b>			<b>REV:</b> 1		

# C MODEL BOILERS W/ OIL AUTO SWITCH/EVER ELECTRICAL SCHEMATIC



<b>115 VOLT 15 AMP (PROVIDE DISCONNECT)</b>	
<b>DUAL AQUAS-AT FOR HIGH LIMIT</b>	
<b>DP LIMIT</b>	
<b>MODE SWITCH WOOD/RESET</b>	
<b>SWITCH DIVER</b>	
<b>FAN SWITCH</b>	
<b>AIR VALVE</b>	
<b>DRANGE</b>	
<b>BURNER</b>	
<b>AUX</b>	
<b>ALTERNATE HEATING SYSTEMS</b>	
<b>C-MODE BOILERS W/ OIL AUTO SWITCH-OVER ELECTRIC CAL SOLIDMATIC</b>	
<b>DATE:</b>	<b>REV:</b>
<b>10-7-05</b>	<b>1</b>
<b>W.P.</b>	<b>A</b>
<b>10-7-05</b>	<b>ELEC. SCHEM.</b>
<b>10-7-05</b>	<b>1</b>

## APPENDIX B: SPECIFICATIONS

Model:	WO55	WOC55	WOC70	WOC100
BTU/hr Wood	180,000	180,000	220,000	350,000
Coal	N/A	225,000	265,000	400,000
Oil (MAX)*	225,000	225,000	250,000	400,000
Heating Surface	32 Ft <sup>2</sup>	32 Ft <sup>2</sup>	33 Ft <sup>2</sup>	56 Ft <sup>2</sup>
Water Capacity	59 Gal.	59 Gal.	70 Gal.	100 Gal.
Firebox Capacity	10 Ft <sup>3</sup>	10Ft <sup>3</sup>	14 Ft <sup>3</sup>	22 Ft <sup>3</sup>
Coal Capacity	N/A	200 lbs	250 lbs	400 lbs
Max. Log Length	24"	24"	36"	38"
Door Opening	14"x14"	14"x14"	14"x14"	16"x16"
Height	47"	54"	59"	64"
Width	28"	28"	28"	34"
Depth	48"	48"	40"	62"
Flue Height (to ctr)	36 ¾"	45"	45"	50"
Flue Size	8"	8"	8"	8"
Weight (lbs)	1,165	1,400	1,450	2,130

Model:	W40	W55	WC40	WC55	WC70	WC100
BTU/hr Wood	120,000	180,000	120,000	180,000	220,000	350,000
Coal	N/A	N/A	150,000	225,000	265,000	400,000
Heating Surface	20 Ft <sup>2</sup>	27 Ft <sup>2</sup>	20 Ft <sup>2</sup>	27 Ft <sup>2</sup>	33 Ft <sup>2</sup>	50 Ft <sup>2</sup>
Water Capacity	40 Gal.	55 Gal.	40 Gal.	55 Gal.	70 Gal.	95 Gal.
Firebox Capacity	7.5 Ft <sup>3</sup>	10 ft <sup>3</sup>	7.5 Ft <sup>3</sup>	10 Ft <sup>3</sup>	14 Ft <sup>3</sup>	22 Ft <sup>3</sup>
Coal Capacity	N/A	N/A	125 lbs.	200 lbs.	250 lbs	400 lbs.
Max. Log Length	24"	24"	24"	24"	36"	38"
Door Opening	14" x14"	14" x14"	14" x14"	14" x14"	14"x14"	16" x16"
Height	37"	47"	44"	54"	59"	64"
Width	28"	28"	28"	28"	28"	34"
Depth	36"	36"	36"	36"	40"	50"
Flue Height (to ctr)	26 ¾"	36 ¾"	35"	45"	45"	50"
Flue Size	8"	8"	8"	8"	8"	8"
Weight (lbs)	815	985	1,050	1,220	1,450	1,950

\*Specifications and design subject to change without notice.  
All specifications shown are approximate.

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## **ADDITIONAL SPECIFICATIONS**

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### **Pressure Drop**

Pressure Drop (Line Loss) within the boiler is less than the pipe rating of the pipe within the boiler, so there is no appreciable pressure drop.

### **Explanation of GPM Flow**

The following are given as examples of gallons per minute water flow required to deliver hot water in order to provide heating of a given number of degrees and at a certain BTU level:

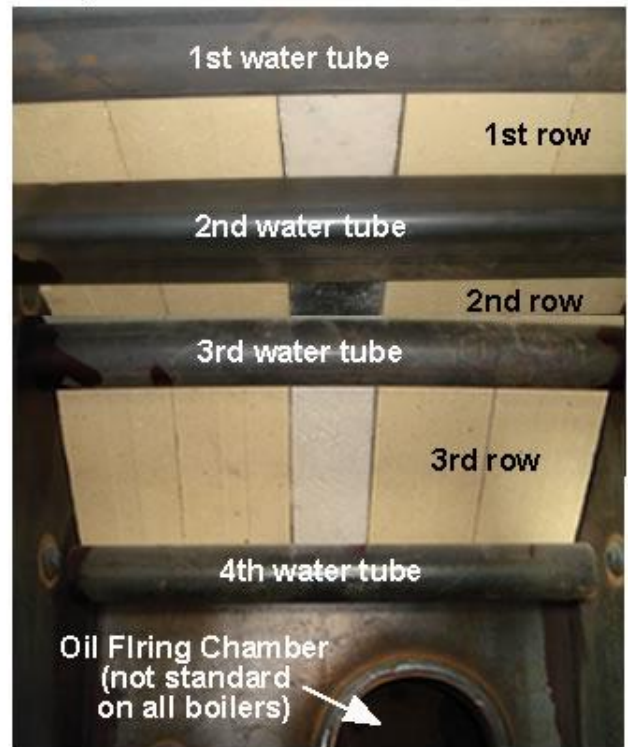
- 500K BTU's at 20 degrees temperature differential requires 50 gallons per minute.
- 250K BTU's at 20 degrees temperature differential requires 25 gallons per minute
- 1M BTU's at 20 degrees temperature differential requires 100 gallons per minute

# APPENDIX C: BRICK LAYOUT: C MODEL WITH WATER TUBE OPTION

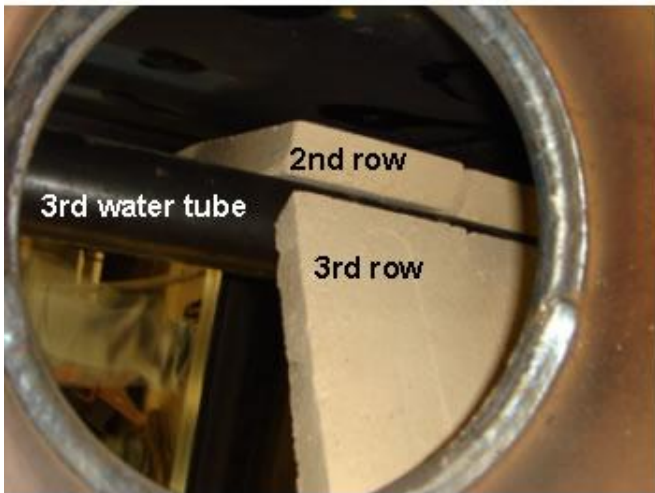
## FLAT BRICK LAYOUT



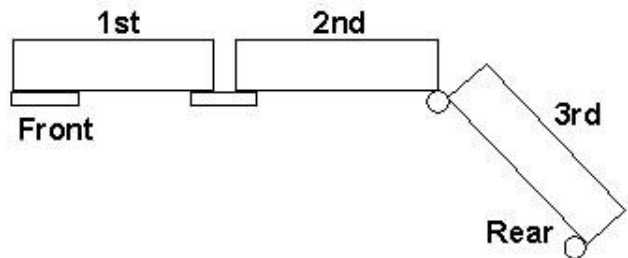
The photo below shows how the bricks are to be placed on the water tubes



The photo below shows the bricks looking through the 8" exhaust flu (located on the rear of the boiler)



## Side View Schematic



**Step 1:** Begin by opening the boiler door and removing the flat bricks that are placed in the bottom of the boiler. Leave the wedge shaped bricks in the boiler for time being

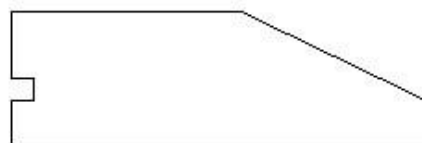
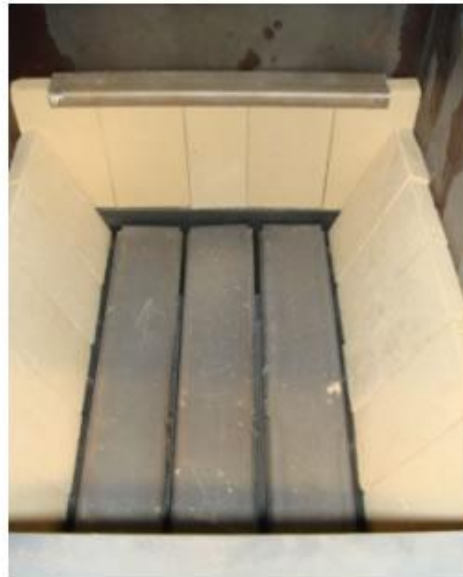
**Step 2:** Notice there are 12 wide bricks and 3 narrow bricks.

**Step 3:** The 1<sup>st</sup> row of bricks is placed on the first 2 flat water tubes (going from the front of boiler to the back of boiler). You may have to twist bricks around a little to get them up in the boiler. Make sure the wider bricks are towards the outside of the row and the narrow brick is in the center. The 1<sup>st</sup> row of bricks should be placed forward enough so that they become flush with the front water tube. Depending on chimney draw or excessive smoke coming out through the load door, the first row of bricks may need to be removed.

**Step 4:** The 2<sup>nd</sup> row is placed directly behind the 1<sup>st</sup> row in the same order and is placed on top of the second and third water tubes.

**Step 5:** The 3<sup>rd</sup> row of bricks is placed in the same order as the first 2 rows of bricks and is placed through the 8" exhaust flu in the rear of the boiler. They will rest on the third and fourth water tubes as shown in the pictures above.

### Wedge Brick Layout



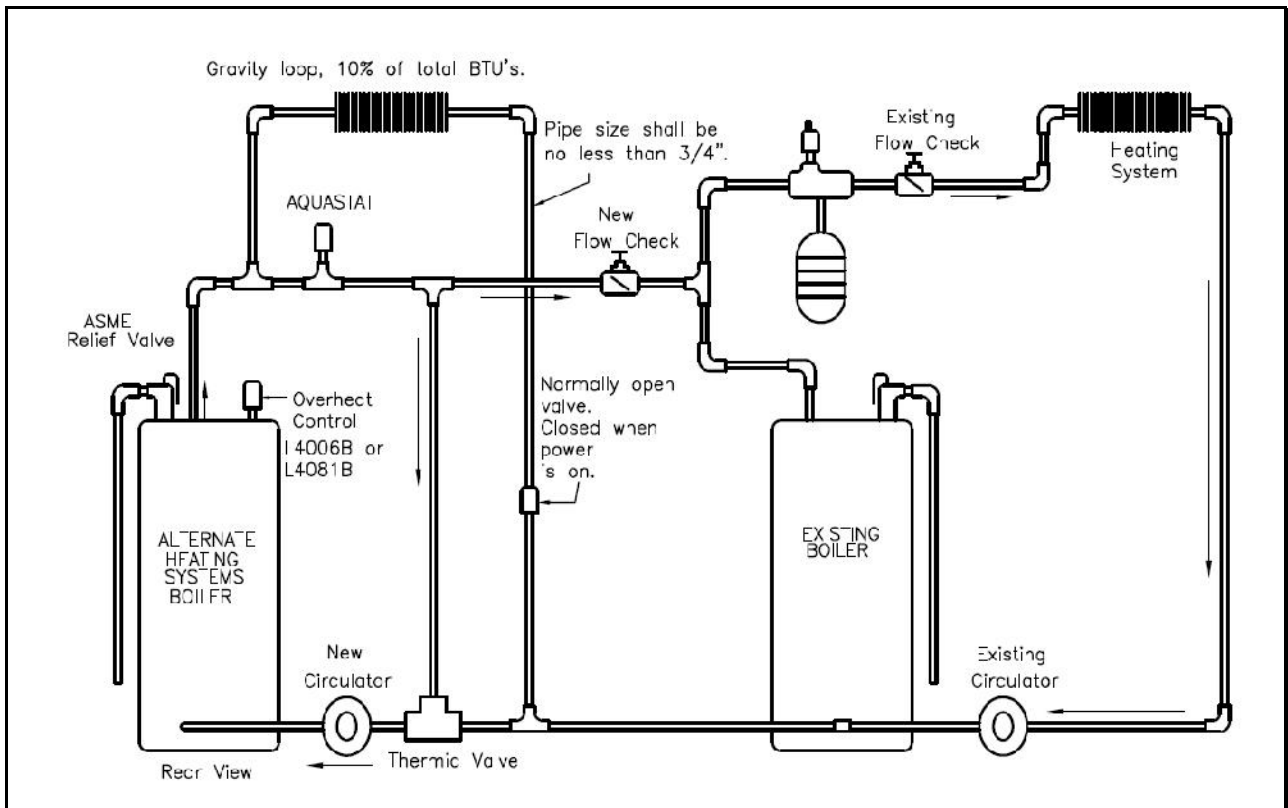
The wedge shaped bricks are placed with the notch towards the bottom of the boiler. The brick sits on the angle bar with the angled part of the brick towards the wall of the boiler and the flat part of the brick facing inwards. If narrow wedge shaped bricks are included, they are placed first in the front of the boiler.





## APPENDIX D: TABLE OF FIGURES

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Note: The above illustrates one possible method of connecting the Multi boiler with an existing boiler. This connection is as follows: using a small circulator (and with the backup boiler piped into the return tapping) run another pipe from the supply tapping T, of the AHS to the supply line, of the existing boiler on the lower side of the flow control valve. A minimum of 1" diameter pipe should be used for this connection on the AHS boiler. The pipe size must be determined by taking into account the distance involved and flow required. The new circulator should be wired to the power for the AHS boiler. When power to the AHS is on, the circulator should be running. An alternate option is to attach a strap on aquastat on the AHS boiler supply line that closes on temperature rise. This will automatically activate the pump at a given temperature. The add-on boiler shall be installed without interfering with the normal delivery of heated water from the original boiler. The add-on boiler shall be installed without affecting the operation of the electrical and mechanical safety controls of the original boiler.

# LIMITED WARRANTY

## Coal/Wood Multi-fuel Boilers

WC 40 WOC 40 WC 55 WOC 55 WC 70 WOC 70 WC 100 WOC 100

The manufacturer, ALTERNATE HEATING SYSTEMS, warrants to the original owner, for the periods specified below, that the boiler to which this warranty applies is free from defects in materials and workmanship when installed, operated, and maintained in accordance with the printed instructions supplied with the unit.

- A. WHAT IS COVERED AND FOR HOW LONG (all from date of original installation)
- 1) Boiler Vessel, Five (5) years. This does not cover any corrosion or deterioration in boiler vessel due to improper PH levels in water.
  - 2) Doors (excluding gasketing, knobs, and ceramic insulation board), draft regulation mechanisms, draft fan assembly (excluding ceramic heat shield), firebox refractory pieces – One (1) year.
  - 3) All electrical and plumbing components and controls such as temperature/pressure gauge, safety relief valve, aquastat controllers, electric motor, domestic hot water coil, oil burner, fan shaft bearings, timer, draft motor, etc. purchased by Alternate Heating Systems from other manufacturers are limited to warranties offered by those manufacturers, typically One (1) year.
  - 4) V-belt, pulleys, ceramic board door and fan heat shields, fasteners, sight glass, smoke flap, door gasket and silicone rubber seal, door handle knobs, paint, wiring, and wiring devices -Thirty (30) days.
- B. WHAT WE WILL DO AND NOT DO
- 1) Alternate Heating Systems will repair and replace, at our option, units or component parts found defective after inspection by Alternate Heating Systems or our authorized representative during the periods outlined above.
  - 2) Alternate Heating Systems SHALL NOT BE LIABLE UNDER THIS WARRANTY IF:
    - a) The unit or any of its component parts have been subject to misuse, alteration, unauthorized repair, neglect, accident, or damage from handling.
    - b) The unit is not installed, operated and maintained in accordance with the printed instructions supplied with the unit and in accordance with local plumbing and/or building codes.
    - c) The unit is operated above its rated output which is shown on the nameplate attached to the unit and listed in Alternate Heating System's printed literature.
    - d) The unit is fired with fuels other than those recommended by Alternate Heating Systems. This includes fuels recommended by dealers and distributors selling Alternate Heating Systems products if these are not fuels recommended by Alternate Heating Systems.
- C. WHAT THE CUSTOMER MUST DO
- 1) Contact the dealer who sold you the unit.
  - 2) If said dealer cannot be located, contact any other Alternate Heating Systems dealers in your area.
  - 3) If you are unable to locate a dealer, submit your warranty claim directly to Alternate Heating Systems at the address listed below.
  - 4) When you make an inquiry or warranty request, be sure to include the following information:
    - a) Unit model number
    - b) Serial number
    - c) Date of installation
    - d) Dealer's name
    - e) Type of fuel burned
  - 5) The OWNER and not Alternate Heating Systems or its dealers will be liable for the following costs involved in repair or replacement of the defective unit or component part
    - a) All necessary costs in returning the defective unit or component part to the factory or other location designated by Alternate Heating Systems.
    - b) All freight and delivery costs of shipping a new or required unit or replacement component part to the owner.
    - c) All labor and other costs incurred in the removal of the defective unit or part and installation of a new or required unit or part.
    - d) Any material required to complete installation of new or required unit or replacement part.
- D. LIMITATIONS AND STATE LAW RIGHTS
- 1) Alternate Heating Systems neither assumes nor authorizes any representative or other person to assume for it any other obligation or liability in connection with its products other than expressly written here.
  - 2) Implied warranties of merchantability and fitness for a particular purpose are limited to the duration of this LIMITED WARRANTY.
  - 3) Alternate Heating Systems shall not be liable for any incidental or consequential damages such as water, smoke or heat damage to property arising directly or indirectly from any defect in its products or their use.
  - 4) Some states do not allow limitation on how long an implied warranty lasts and the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.
  - 5) This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.
  - 6) The remedies set forth herein shall be the exclusive remedies available to the owner.

## ALTERNATE HEATING SYSTEMS, LLC.

1086 Wayne Avenue  
Chambersburg, PA 17201  
(717)-261-0922

**IMPORTANT: READ AND KEEP IN YOUR POSSESSION!**



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