



INSTALLATION AND OPERATOR'S MANUAL

READ THIS MANUAL BEFORE INSTALLING OR USING YOUR YOUR LEGACY STOVES BOILER

LEGACY STOVES HAND-FIRED COAL BOILER

Models: SF170 • SF270



IMPORTANT: IN ORDER TO ACHIEVE SAFE AND SATISFACTORY RESULTS FROM YOUR LEGACY STOVES BOILER, READ SAFETY RULES AND INSTRUCTIONS CAREFULLY BEFORE INSTALLING AND OPERATING. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH STATE AND LOCAL CODES. INSTALLATION IS TO BE PERFORMED BY A QUALIFIED INSTALLER. SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE.



Your Legacy Stoves 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 operating temperature is 180° Fahrenheit. Flammable or explosive products must never be stored in the same room or in the vicinity of a boiler.

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Model:
Serial Number:
Date of Purchase:

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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 Legacy Stoves boilers can be supplied with the “H” stamp and National Board number for an additional fee when requested prior to purchase. All Legacy Stoves 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.

PER EPA GUIDELINES, YOU CAN NOT BURN WOOD IN THIS UNIT EXCEPT FOR THE PURPOSE OF STARTING A COAL FIRE.

CAUTION: KEEP CHILDREN AWAY!

CAUTION: DO NOT TOUCH DURING OPERATION!

CAUTION: MAXIMUM DRAFT MARKED ON NAMEPLATE.

ALWAYS WEAR GLOVES WHEN ATTENDING TO THIS HEATER.

WARNING: THIS HEATER IS NOT AN INCINERATOR. DO NOT BURN GARBAGE, PAINTED OR TREATED WOOD, GASOLINE, FUEL OILS OR OTHER FLAMMABLE LIQUIDS OR MATERIALS

DO NOT LEAVE SMALL CHILDREN UNATTENDED WHILE IN THE ROOM WITH THIS HEATER.

DO NOT INSTALL IN A ROOM USED FOR SLEEPING!

DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING.

THIS HEATER IS NOT APPROVED FOR INSTALLATION IN MOBILE HOMES!

DO NOT CONNECT TO A FLUE SERVICING ANOTHER APPLIANCE!

WARNING: NEVER USE GASOLINE, 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 IT IS IN USE.

CAUTION! THIS HEATER IS HOT WHILE IN OPERATION. KEEP COMBUSTIBLES SUCH AS FURNITURE, FUEL, AND DRAPERIES OUTSIDE OF LISTED CLEARANCES.

INSTALLATION IS TO BE PERFORMED BY A QUALIFIED INSTALLER. INSTALLATION WILL COMPLY WITH ALL THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION OVER THE INSTALLATION.

DANGER: RISK OF FIRE OR EXPLOSION - DO NOT BURN GARBAGE, GASOLINE, DRAIN OIL OR OTHER FLAMMABLE LIQUIDS.

WARNING: DO NOT OPERATE WITH FLUE DRAFT EXCEEDING -0.08 IN WATER COLUMN

WARNING: DO NOT OPERATE WITH FUEL LOADING OR ASH REMOVAL DOORS OPEN

WARNING: INSPECT AND CLEAN FLUES AND CHIMNEY REGULARLY.

Installation

To achieve safe and satisfactory results from your Legacy Stoves hand-fired coal boiler, these installation and operation guidelines must be strictly adhered to. You must also check local building codes in your area to ensure compliance.


GENERAL CHIMNEY INTRODUCTION

One of the most important considerations in installing a boiler is the type of chimney that will be used. The condition and construction of the chimney is important to providing sufficient draft. Having sufficient draft is in turn important for safe, efficient operation. The chimney produces the draft, not the appliance. It is very important not to connect to a chimney/flue serving another appliance.

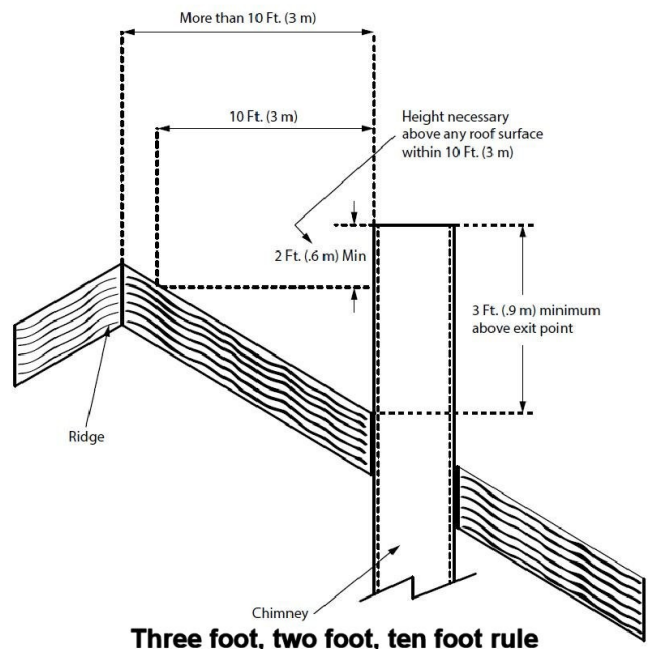
CAUTION: DO NOT TO CONNECT THIS UNIT TO A CHIMNEY/FLUE SERVING ANOTHER APPLIANCE.

Draft

Draft is created by a pressure differential between the bottom and the top of the chimney. Chimney height, air moving across the top of the chimney, and warmer air in the chimney than outside will all result in greater pressure differences and stronger draft. A warm chimney drafts better than a cold one. For this reason a chimney drafts best when kept warm. It is more difficult to maintain sufficient temperature in an exposed chimney. A larger chimney, or one with a lot of thermal mass will also present more problems than a chimney that is protected from outside temperature extremes. A chimney must be kept warm (about 250° F) for proper draft to occur. A chimney's height, expressed as the difference between the top opening and the flue pipe connection on the appliance, contributes to draft because atmospheric pressure is naturally lower at the chimney top than bottom. See Draft Control section in this manual for more information.

⚠ 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 or fly ash 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. Follow code requirements for your area and consult a chimney professional. Keep in mind the 3-2-10 rule, as depicted below. The chimney must be leak-free from the standpoint of air entering through cracks or other chimney defects or through loose stovepipe fittings.

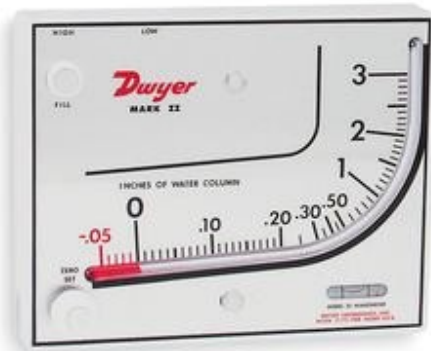


Three foot, two foot, ten foot rule

3-2-10 Rule for Chimneys

Technical Aspects of Chimney Performance

A device called a manometer is used in measuring 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 $-.04$ inches in the tube. For units to be operated on coal, limit maximum draft to $-.08$ inches. Use of a barometric damper may be required.



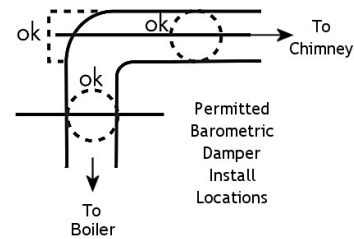
Dwyer Manometer

To measure the draft, drill a hole in the connector pipe and attach a draft meter or manometer. First, check the draft above the barometric damper (if installed). Then check it below the barometric damper and make your damper adjustment to where it opens to prevent the draft from going higher than $-.08$ inches of water column. If the chimney is incapable of supplying the required draft, it will need to be improved. See the section on Common Chimney Problems for more information.

Barometric Damper

A barometric damper is a device that allows room air to enter the chimney, bypassing the air intake on the heater. A heater and chimney combination that drafts well will occasionally produce more draft than is desired. Excessive draft can lead to burning out of control and excessive heat production. It will also lead to reduced efficiency, as more heat will end up going up the chimney. A barometric damper is used

on a coal fired heater to limit maximum draft to $-.08$ column inches. The barometric damper needs to be the same diameter as the stove collar. It is to be installed in the chimney connecting pipe as shown below, utilizing a Tee in the stove pipe.



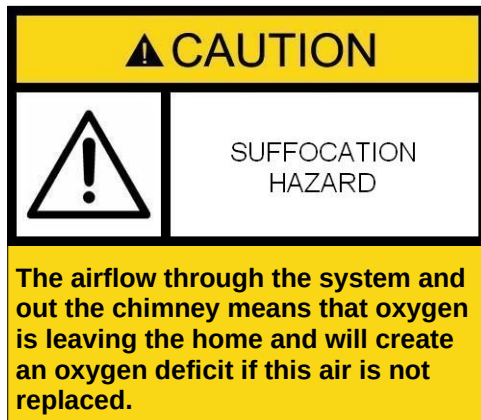
It is important to check the chimney draft when the seasons change to ensure draft settings are correct. Changes may be needed when transitioning from winter heating to summer heating (domestic water heating). The amount of draft will change from one season to the next. It is not uncommon to add a draft inducer in warmer seasons to maintain the recommended $-.04$ to $-.07$ inches of water column.



Barometric Damper

Combustion Air (Make Up Air)

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. Adequate combustion air is critical for the performance of your heater. There is usually sufficient leakage in older homes to provide for this, but in well-insulated homes it may be necessary to provide additional outside air into the home. Combustion air can be provided with a duct to the outside. A louvered vent can also be used.



Masonry Chimneys

If you plan on using a preexisting masonry chimney, have it thoroughly inspected and cleaned. Any faults which make the chimney unsafe and unusable must be repaired prior to use. These can include improper height, structural defects, blockages, inadequate clearance to combustibles, unsealed openings into other rooms of the house, signs of creosote or smoke leakage, a loose or absent clean-out door, or absence of a liner.

When connecting to a masonry chimney, several provisions are standard. First, whether the chimney connector is vented to the chimney through a thimble or a breech pipe, neither must pass beyond the inner surface of the chimney liner, and both must be firmly cemented in place with refractory cement. (A thimble is a masonry pipe which is inserted through the chimney wall, and is frequently the preferred method; a breech pipe is a piece of steel pipe used the same way.) In Canada, a breech pipe has ridges or protrusions to lock it firmly into the refractory cement. In either case, the chimney connector vents to the chimney through the thimble or breech pipe. See wall pass-through information in the section on stove pipe.

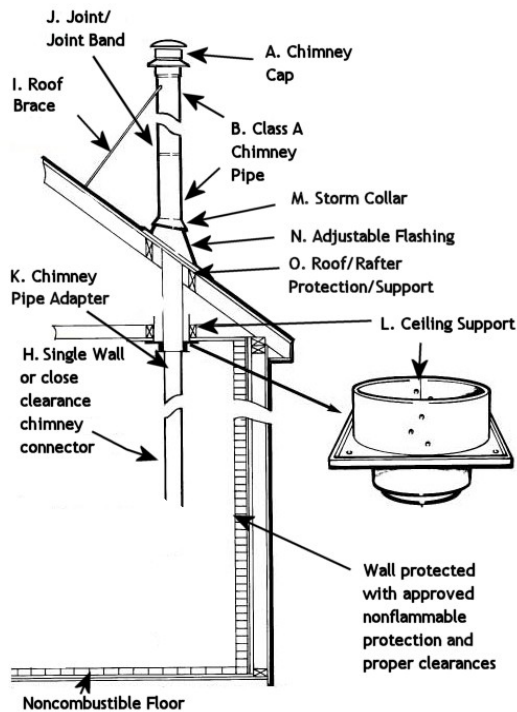
Prefabricated Chimneys

When venting your boiler using a prefabricated chimney, be sure to contact local building code authorities, and to follow the manufacturer's instructions exactly. Use only the manufacturer's parts; do not use makeshift installation techniques. All prefabricated chimneys must be tested to either the U.S. or Canadian high-temperature standards, UL 103 or ULC-629.

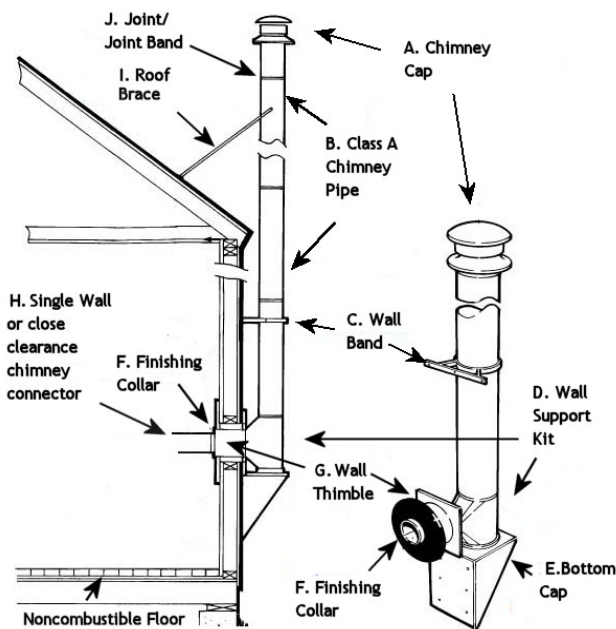
Your manufactured chimney may contain more parts than is shown in the subsequent diagrams. Include all required items in your installation. A chimney cap (A) serves to keep rain and snow from entering the chimney. An approved Class A chimney (B) is required for the SF170 and SF270 boilers. Wall Bands (C) must be deployed for support per manufacturer's recommendations. A manufacturer's Wall Support Kit (D) will contain required items for supporting the chimney. Such kits will cost less than individual items purchased separately. A Bottom Cap (E, location marked, but actual cap not shown) allows for cleaning. A Finishing Collar (F) provides inside wall protection. A Wall Thimble (G) provides for required clearance between the chimney pipe passing through a flammable wall. The Chimney Connector (H) must be approved single wall, or a low clearance pipe, installed with required clearances in place. A Roof Brace (I) is required for chimneys that extend more than a certain distance, as referenced by the manufacturer's instructions, from the roof. Manufactured chimneys may feature a built in "twist lock" at each joint, but a Joint Band (J) is still normally required to secure pipe at the joint. An approved Chimney Pipe Adapter (K) is required. A Ceiling Support (L) will provide structural support for the chimney and is typically part of a kit that includes items that maintain required clearances to flammables. A Storm Collar (M), and Adjustable Flashing (N) prevent water from entering the home by running down the outside of the chimney. Additional items or a kit (O) provide additional mounting support or fire protection to the roof joists or other roof components.

Note: Do not decrease the diameter of chimney pipe to less than that of the flue collar! Chimney connector and flue must be 8 inches in diameter or greater

Inside Chimney



Outside Chimney



COMMON CHIMNEY PROBLEMS

In order to have a properly operating heating system, the chimney needs to be capable of providing sufficient, but not excessive draft. The approach to improving draft in an existing chimney may include one or more of the following: raising chimney height, adding or changing the flue liner, or

selecting a different style of cap to be placed on the top of the chimney. Reasons for insufficient draft include (but are not limited to) the following:

1. Leaking chimney - Air leaking in around a loose fitting cleanout door, joints or seams in connector pipe are not secured properly, cracks or other defects in masonry.
2. Chimney needs to be cleaned.

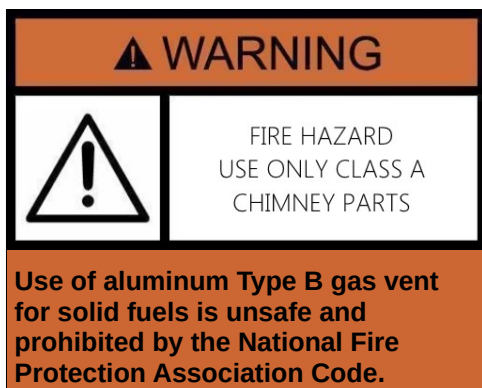
Note: Chimneys need regular maintenance and cleaning. If a chimney is not cleaned on a frequent basis, it will affect draft, as well as be a contributing factor to a potential chimney fire.

3. Improper chimney height - Chimney does not extend to a sufficient height above the roof line. (Remember the 3 ft.-2 ft.-10 ft. rule)
4. Obstructions in the chimney - Make sure the chimney has been cleaned. Different animals have been known to build nests in chimneys.
5. Trees or other topographical barriers - Trees that are taller than the house can cause the air currents to flow downward over the peak of the roof. This would lead to a down draft effect on the chimney. This can also be caused by adjacent buildings or structures. It could even be from a different peak on the same structure.
6. Improperly sized flue - Too small of a chimney is incapable of moving the volume of air necessary. Too large of a flue could have trouble warming up to create the necessary upward flow.
7. Chimney offsets - Offset chimneys should be avoided if possible. Not only can the offset affect draft, it is also a place for debris to collect over time.
8. Too many elbows - The flue connector has more than two elbows in it. Sometimes, depending on overall chimney performance, one elbow could be too many.
9. Vent sharing - No more than one heating appliance shall vent into a single flue.

If smoke is observed puffing out of the stove or connecting pipe, it is likely that there is an issue with draft. Review the above list for potential

causes. If draft is excessive, review instructions on installing a barometric damper.

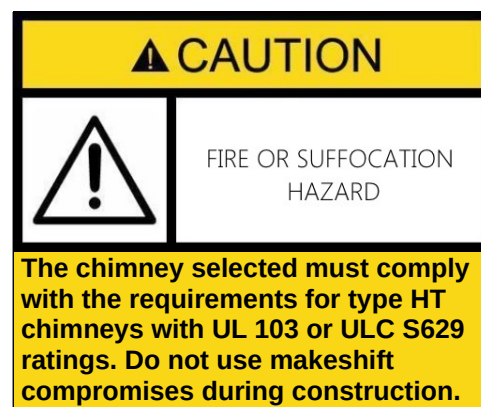
PROPER CHIMNEY CONNECTION



The boiler must be connected to a Class A chimney. Use of aluminum Type B gas vent for solid fuels is unsafe and prohibited by the National Fire Protection Association Code. There are three types of Class A chimneys:

1. Masonry with a tile liner, including brick, block, stone, etc. It must be supported by a ground-level foundation.
2. Insulated "Class A" manufactured chimney, listed and certified by a national test agency (UL 103 or ULC 629).
3. Triple-walled metal "Class A" chimney, listed and certified by a national test agency (UL 103 or ULC 629).

If your masonry chimney has not been used for some time, have it inspected by a qualified person (building inspector, fire department personnel, etc.). If a listed and certified manufactured chimney is to be used, make certain it is installed in accordance with the manufacturer's instructions and all local codes. Use only the manufacturer's parts, and use all parts required in order to follow the manufacturer's guidelines. Do not use makeshift installation techniques. A Multi-Fuel boiler can perform only as well as its venting system allows it to.



IN CASE OF CHIMNEY FIRE

1. Be sure everyone is out of the house.
2. 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.)
3. Shut the boiler down by turning the main power off.
4. If you have a chimney fire, use a chemical flare type fire extinguisher. If you don't have an extinguisher, go to step 4.
5. 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.
6. Contact a chimney professional to inspect your chimney for damages.

IN CASE OF RUNAWAY FIRE


1. Shut the boiler down by disconnecting power.
2. Be sure the draft inducer is off and/or make sure the barometric damper opens. (Excessive draft can cause a runaway fire.)
3. Maintain continued circulation of boiler water to remove heat from the boiler and if boiler is equipped with a domestic coil run hot water.

STOVEPIPE

It is recommended that overall flue connecting pipe length be kept to a minimum. Any horizontal runs must slope upward towards the chimney, with a minimum rise of 1/4 inch per foot. Use a minimum number of elbows, preferably no more than two, to make the 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 that provides a diameter of not less than three times the diameter of the stovepipe. 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.

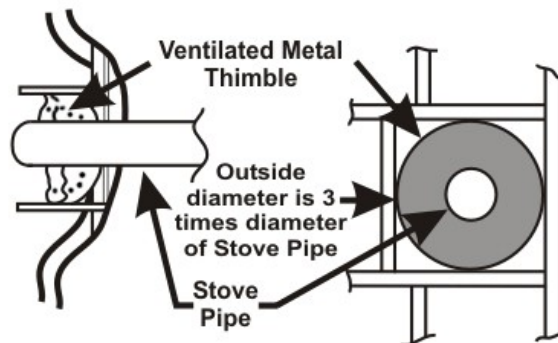
Note: Do not decrease the diameter of chimney pipe to less than that of the flue collar! Chimney connector and flue must be 8 inches in diameter or greater.

⚠ WARNING	
	FIRE & SUFFOCATION HAZARD
Inspect stove pipe at least twice monthly for creosote buildup. Creosote creates a risk of chimney fire, and can obstruct stove pipe. An obstructed stove pipe can result in CO buildup in your boiler room.	

Fires of low intensity, or low smoldering fires are likely to produce creosote buildup. Tars and other organic vapors combine with moisture from the fuel and from combustion byproducts to form creosote. The more time the boiler is fired with wood at low fire, the more opportunity for buildup of creosote inside the stove pipe and chimney. Inspect at least

twice monthly, and remove if buildup occurs. Prevention is your best option, but if creosote is observed, a coal fire will serve to dry up the creosote, after which it can be removed manually from the chimney and stove pipe with the appropriately sized cleaning brushes.

⚠ CAUTION	
	SUFFOCATION HAZARD
Manual Dampers must not be installed in the flue pipe. Improper operation could result in death.	



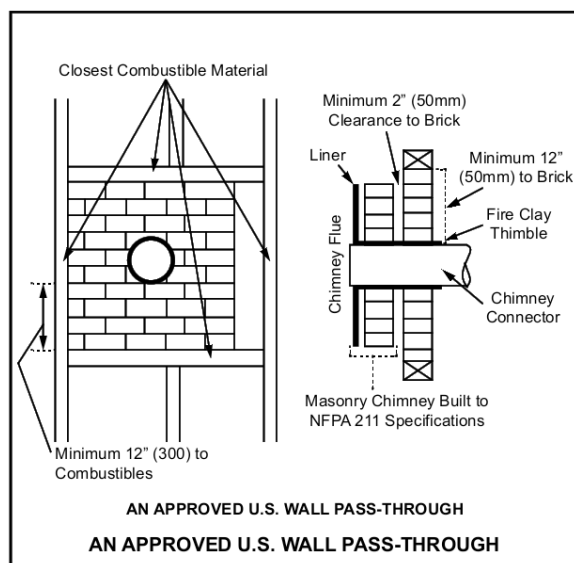
Stove pipe passing through wall

Use 24 gauge or heavier 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 UL listed insulated stovepipe must be used. Pipe that runs along the outside walls of a building must also be UL 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. The diameter of stovepipe must be at least 8 inches.

Wall Pass-Through: United States

In the U.S., the national code is NFPA 211. While many localities adopt this standard, be sure to check with local authorities before beginning your installation. The NFPA (National Fire Protection Association) permits four methods for passing

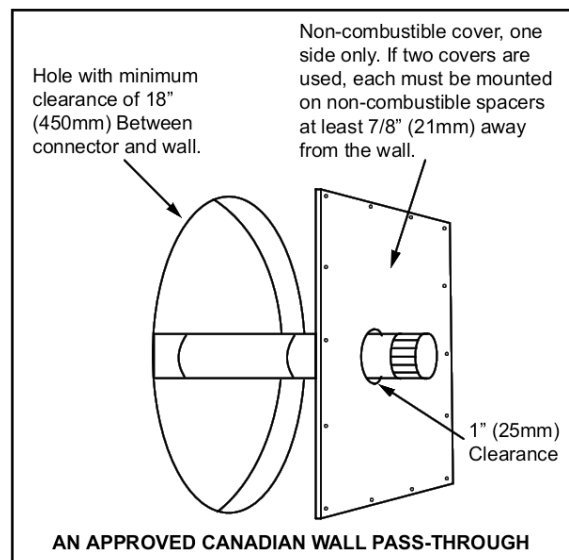
through a combustible wall. A commonly used method to pass through a wall directly to a masonry chimney is to clear a minimum 12"(300 mm) around the entire chimney connector, and fill it with brick masonry which is at least 3.5"(90 mm) thick. A fireclay liner, minimum 3/8" (9 mm) wall thickness must run through the brick wall to the chimney liner (but not beyond the inner surface of the liner). It must be cemented in place with refractory cement. This method is illustrated. For details on the other three options, refer to the most recent edition of the NFPA 211 code.



U.S. Wall Pass-Through

Wall Pass-Through: Canada

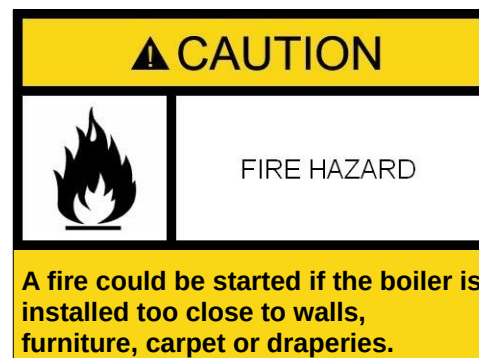
Three methods are approved by the Canadian Standards Association. The diagram following this paragraph shows one method requiring an 18" (450mm) air space between the connector and the wall. It allows use of one or two covers as described in the diagram. The two other methods are described in detail in the current issue of CAN/CSA B365, the national standard.



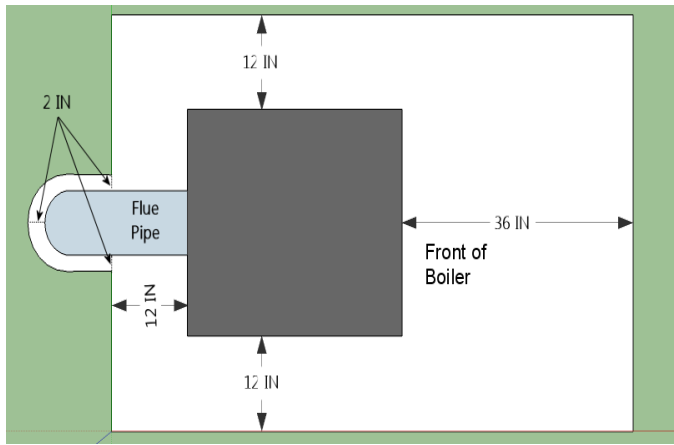
Canadian Wall Pass-Through

BOILER LOCATION

Your SF170/SF270 boiler will radiate a good deal of heat. This heat can be dangerous if the boiler is improperly installed.



The boiler must stand on a noncombustible material such as brick, stone tile or concrete. The floor needs to be flat and must be able to support the boiler's weight, the weight of the fluid in the system, plus the weight of piping and other attachments. NEVER place a boiler directly on a wood floor. If a noncombustible material is used under the boiler to protect a combustible floor, than this material must 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. Floor protection must also extend 2 inches beyond flue connecting pipe also. See the floor protection diagram that follows for installation guidelines.



Floor Protection Diagram

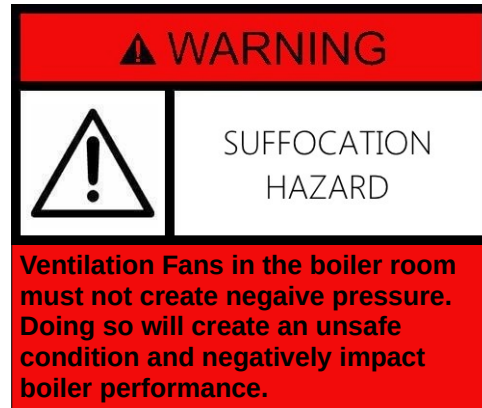
The boiler must be installed in an area dedicated to the boiler and its related equipment. This area must be partitioned or separated from any living area of a residence. The room must have a constant fresh air supply to assure proper combustion of the fuel as well as ventilation of any by-products of combustion.



Boiler Room Requirements

- ✓ The room should be well lighted and should have a source of emergency light.
- ✓ A convenient water supply should be available for boiler flushing and to clean the boiler room floor.
- ✓ Unobstructed floor drains need to be available.
- ✓ 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.



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

RIGGING AND POSITIONING OF BOILER

Do not attempt to move or off-load the boiler without the aid of a crane or dolly. Most Legacy Stoves 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. It is required that a qualified technician experienced in boiler installations install this unit. Wiring on the boiler must be properly grounded.



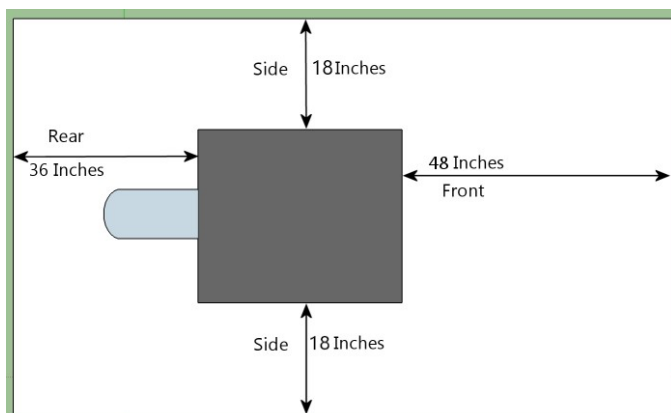
NOTE: This unit is not approved for use in mobile homes.

Clearances

It is important to provide sufficient clearance around the boiler for convenient servicing and cleanout. The required minimums as measured from the boiler vessel are shown below:

SF170/SF270 Clearances

Front:	48 Inches
Right:	18 Inches
Rear:	36 Inches
Left:	18 Inches
Top:	24 Inches

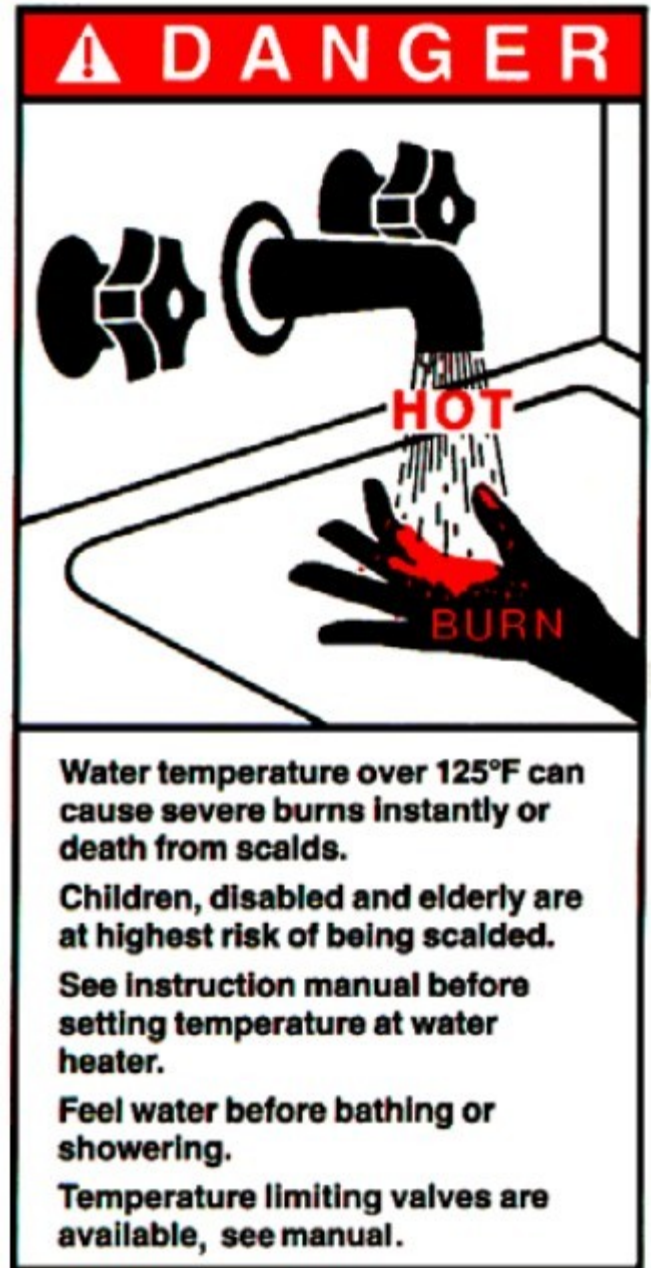


Boiler Clearances Illustrated

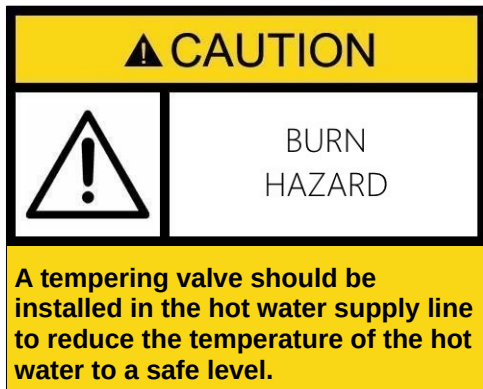
Refer to Appendix B: Specifications for exterior dimensions of the various models. For commercial and residential installations, many boiler codes require a minimum of 3 feet of clearance on all sides. You must follow your local code requirements when

these are more strict than the guidelines in this manual.

DOMESTIC HOT WATER FROM YOUR BOILER: DOMESTIC COIL OPTION

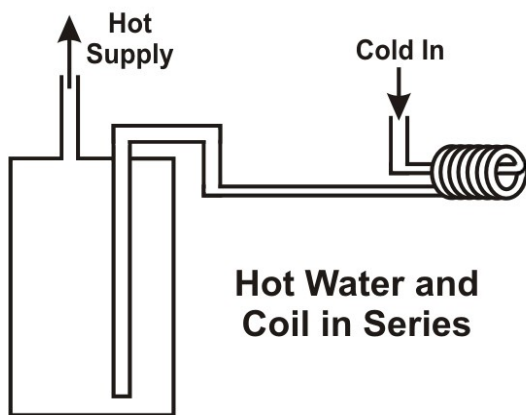


This option is used in the Legacy Stoves coal boiler to supply hot water for domestic home use. With this option in place, your boiler can provide large amounts of hot water heated by low cost solid fuel. These coils operate on the principle of heating water as it passes through fine copper tubing immersed in the boiler water, instead of a separate tank.



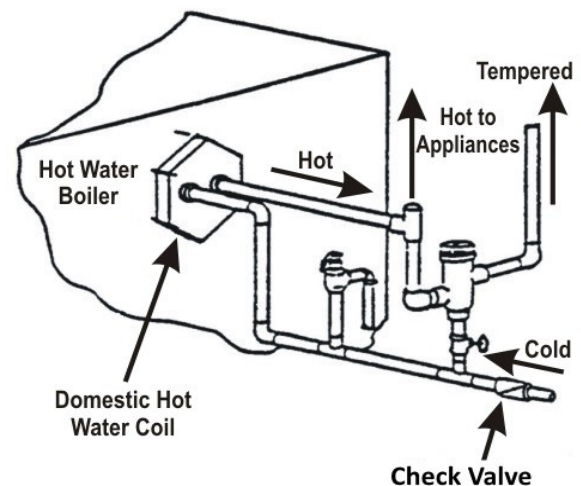
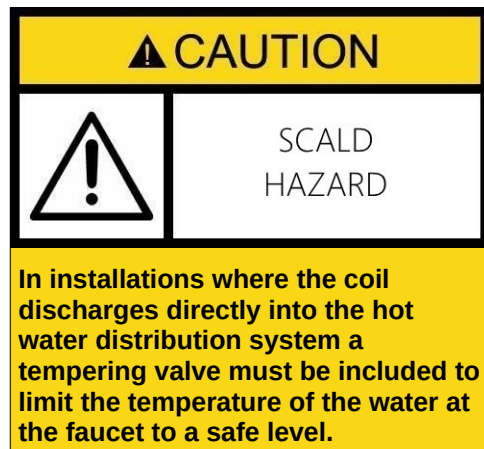
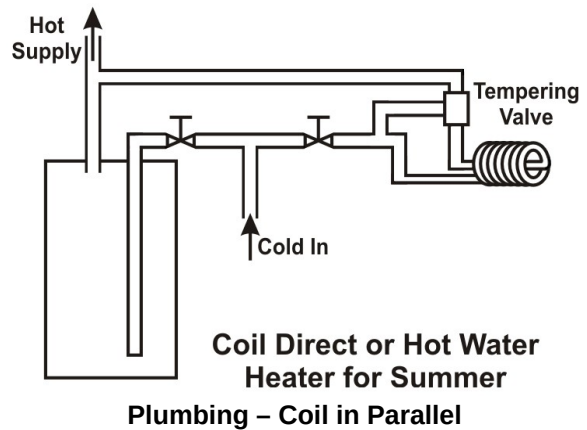
A tempering valve should be installed in the hot water supply line to reduce the temperature of the hot water coming from the domestic coil to a safe level. The tempering valve may be obtained from your Legacy Stoves dealer, local plumber or plumbing supply. This will also ensure a constant water temperature 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.

There are three methods for plumbing the domestic coil. One way is to connect the coil in series with an existing hot water heater.

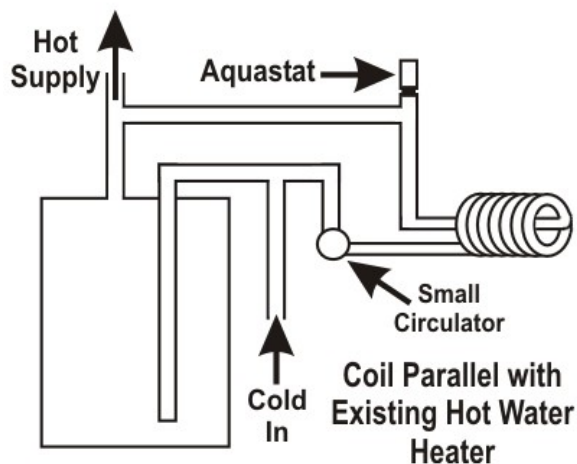


Plumbing – Coil in Series

A second method of plumbing the domestic coil is to connect the coil in parallel with an existing water heater so that the conventional water heater may be used when the Coal Gun™ is not being fired (for example in the summer). The diagram that follows indicates how this can be done.



The third method of plumbing the domestic coil uses a small pump to circulate water continuously between the coil and existing hot water heater. It is also necessary to include a tempering valve or temperature controller on the supply side of the storage tank/water heater to prevent super-heated water from reaching the domestic hot water tank and, ultimately, the faucets.

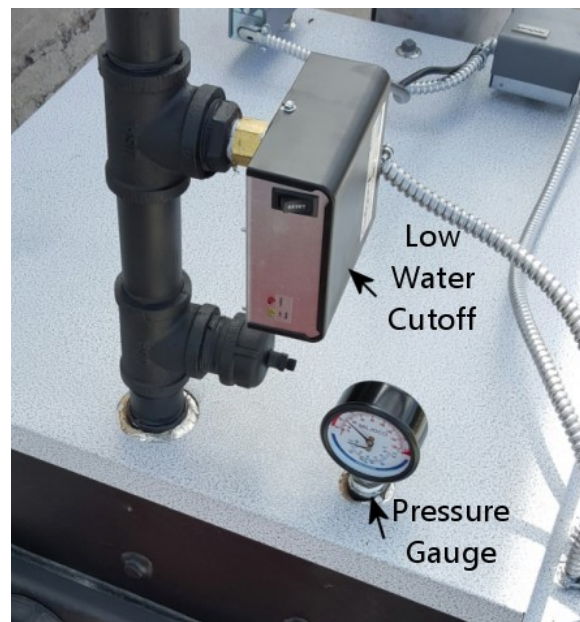


Plumbing – Coil with Circulator

The domestic water must remain separate from the boiler/heating system water. The Domestic coil shall not be connected to any heating system or components previously used with a non-potable water heating appliance. Toxic chemicals, such as, for boiler treatment, shall not be introduced into the domestic water coil.

LOW WATER CUTOFF UTILIZATION

A low water cutoff is required to prevent the boiler from actively firing under a low water condition. If water is lost from the boiler vessel or distribution system, such that heat cannot be distributed from the boiler, the low water cutoff will shut off power to the draft control or forced draft fan, preventing the boiler from actively firing. The low water cutoff is to be installed in a Tee on the supply riser 6 – 12 inches above the boiler, as shown in the following photo of the top of an SF170 boiler.



**Low Water Cutoff
Pressure/Temperature Gauge**

Manufacturer's Documentation

See Appendix D: Parts Listing – Low Water Cutoff

Low Water Cutoff Testing

After installing the unit operate the system. Carefully observe the operation of all components through at least one complete cycle. Be sure to include a check to the operating limit switch operation (shuts down at 180). Make any corrections needed then repeat the checkout. Repeat until system operates properly.

Low Water Cutoff Troubleshooting

If the boiler does not shut down when the water drops below the probe:

1. Remove power immediately and re-check wiring.
2. Remove power and check for adequate clearance from the probe to any surface within the boiler or tee.

IF THE BOILER DOES NOT FIRE

(A) Make sure water is at probe and probe lead wire is properly secured to the terminal.

(B) Check for proper ground between probe and boiler shell. Excessive use of Teflon tape or sealing compound may insulate the probe from the boiler shell.

3. Re-check wiring and test for correct incoming voltage. IF THE RED LED LAMP IS ON The red LED lamp indicates that the control is locked-out. This feature will activate if the boiler experiences a low water condition exceeding 30 seconds in duration. IMPORTANT: Do not reset control until the cause of the low water condition is corrected. CAUTION: Do not add water until boiler is cool.

Low Water Cutoff Offline Testing

If you suspect that a temperature control device is not working properly, the component can be pulled from the system to be checked. Place the capillary in a container of water that can be safely heated to within the temperature range of the device (150-180F). Use a thermometer that has a temperature range well above the temperature you will heat the water to. Make note of the temperature that the device is set to. Heat the water up above the devices set point and listen for an audible click from the device letting you know that the contacts have changed state. If the temperature at which the device changes state is within 10° F of the reading on the thermometer then device is working properly. If the temperature at which the device changes state and the reading on the thermometer is more than 10° F different then the device should be replaced with a new one. It is not advisable to service these devices.

Low Water Cutoff Maintenance

To ensure optimum performance, inspect probe annually. Clean any scale or build-up from the probe using a scouring pad or steel wool. Re-install the probe and test .

THERMOSTAT CONNECTION

SF170/SF270 boilers do not require a connection to a building thermostat for operational purposes. The boiler water temperature is controlled by the operate limit control.

BOILER DUMP ZONE APPLICATIONS

Unlike oil or gas fired boilers, solid fuel boilers will still produce some additional heat after the call for heat has ended. This will cause the boiler temperature to rise if no zones are calling for heat. It is possible to see temperature rise 30° F or more

under a low or no load condition. This will take place until the boiler’s radiation losses match the heat gain. It is recommended that a dump zone be connected to dissipate this excess heat to one or more zones in the system. Setting the operating limit no higher than 180° F allows for the heat rise to occur without exceeding the recommended maximum temperatures.

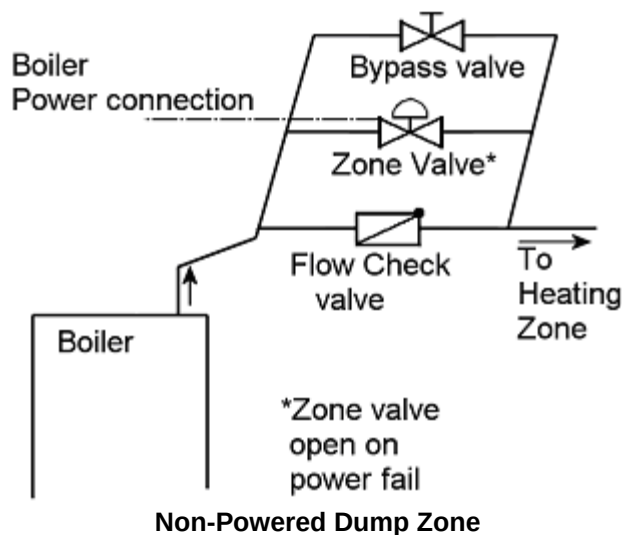
The dump zone control can be used to activate a zone valve or circulator as a dry contact switch. A common setting for dump zone actuation would be 200° F, with the high limit set point adjusted to 10° F lower. When this high limit is exceeded, and if temperature continues to rise until it reaches the dump zone limit, one or more zones will be energized and heat distributed until temperatures fall sufficiently.

If the dump zone is connected to provide heat to a domestic hot water tank or heat exchanger, a mixing valve must be installed on the potable system supply to prevent an unsafe condition of overheating the domestic hot water. The mixing valve outlet should be set no higher than 125° F for potable use (for this type of dump zone, see Appendix H, Example 5).

Non Powered Dump Zone

A non powered dump zone is often required to meet code requirements. This is to provide a way to dump boiler heat in the event that power loss occurs. This hot-water circulation loop shall be able to dissipate at least 10% of the estimated rated heat output of the solid-fuel boiler when circulation is reduced because of an electrical power failure. The loop can only be made inoperative by a deliberate manual action. The design parameters for sizing shall be a pipe size equal to or greater than 3/4 inch (18 mm), room temperature of 65°F (18°C), and mean water temperature of 180°F (82°C).

The loop shall be positioned above the boiler, with features that promote natural thermal circulation of the water. The piping must be such that excessive pressure will not develop in any portion of the boiler or system. Larger diameters may be needed as boiler size increases. The following diagram shows an application example of how this is accomplished.



This arrangement will allow a gravity flow of heat release in the event of a power failure. For other dump zone applications.

INSTALLING THE OPTIONAL FORCED DRAFT BLOWER

The Force Draft Blower option is available for the SF270 only. The option includes a 75 CFM blower and a solenoid that opens a damper, which allows air to the blower, and closes the damper, which seals off air completely when no more heat is needed to be produced. It also includes a potentiometer to control the blower speed and all required electrical parts.

Start the installation by removing the four nuts (use a 7/16 wrench) that hold the Block Off Plate over the forced draft blower hole, located on the rear of the base. Now, make sure the silicone seal remained in tact and re-use the nuts to fasten the blower/solenoid assembly to the rear of the base. The assembly orientation will be so that the solenoid and damper are above the blower. Next mount the 2"x4" junction box on the rear of the boiler flush with the left side and the bottom of the junction box 9" from the ground.

Connect the long conduit to the bottom of the main control box in the open hole. From there the conduit will run straight down and then make a 90 toward the rear of the boiler at 20 inches from the floor. Then will connect to the top of 2"x4" junction box.

The short conduit will connect at the right bottom hole of the 2"x4" junction box. From there

the conduit will run underneath the blower motor and connect to the right side of the motor's junction box.

In the main control box. Connect the white wire to other white wires. Connect green wire with other green wires. Connect the tan wire to the bottom terminal of the mode switch with the ¼" female disconnect terminal.

In the 2"x4" junction box connect the Tan 1 to the white wire coming from the potentiometer. Connect the other white wires together. Connect the green wires together. Connect the two Tan wires and the black wire coming from the potentiometer together.

In the fan motor junction box connect one of the black wires from the fan to the two (2) white wires. Connect the greens together. Connect the other black wire from the fan to Tan 1. Connect the two Tan wires together.

Secure the conduit with the provided straps and self-tapping screws.



TESTING/SERVICING ELECTRICAL COMPONENTS

The electrical components on your SF170/270 boiler are extremely reliable, but any electrical component can fail. Some testing instructions follow. Tests are to be conducted by a qualified technician.



High Limit Control

The high limit control functions as a safety in the event that the operate limit control fails to turn off

Note: See Appendix D for a listing of electrical components. Testing the low water cutoff is covered earlier in the manual in the section dedicated to that component.

draft actuation at the proper temperature. Temperature controls and limits can fail to operate at the correct temperature, due to wandering from their original calibration, or fail outright, by not opening or closing the contained switch at all. Checking the high limit control would involve bypassing the operate limit until temperature rises to the setting on the high limit. If the high limit control fails to open its internal switch, defined by the draft actuator or force draft fan continuing to provide draft, or by persistence of continuity when tested a multi-meter, it should be replaced. The high limit control is installed in one of two fittings on the top of the boiler, near the back.

Operating Limit Control

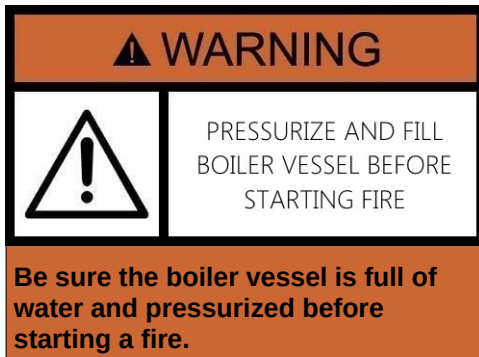
The operate limit control is normally closed, and opens on temperature rise. It will either have a fixed or adjustable differential, to allow for a proper length of cycle for optimum firing. The factory setting will be about 180° F. The boiler will quit firing once the set temperature has been reached. When the temperature falls to the number of degrees below 180° determined by differential, the

boiler will resume active firing mode. Testing is best done with a multi-meter, testing either for continuity/lack of continuity under the expected conditions, or testing for presence or absence of current across the internal switch. If the control does not function at the correct temperature, based on a reference thermometer or the temperature gauge on the boiler, it should be replaced.

Forced Draft Motor/Draft Actuator

Both the forced draft fan motor, and the motor that opens the draft actuator are self contained, thermally protected motors. They are typically replaced, and not repaired when they fail to function. When their function is expected, test for the presence of current in the leads supplying power. If power is not being provided, use the wiring diagram to further troubleshoot why power is absent from the circuit. If power is present, but the forced draft fan motor, or draft actuator, is not functioning replace the affected component.

Operation and Maintenance



Note: Your Legacy Stoves SF170/SF270 boiler is only approved for coal. EPA regulations prohibit the use of these models for wood burning. You must use an EPA approved appliance for burning wood. Wood may be used in preparation for a coal fire only.

FUELS (USA)

Coal

Anthracite coal, pea or nut size, is the primary fuel for which the SF1500, 2500, 3500 are designed. Bituminous coal may also be burned but the results will vary due to the variation in bituminous coal from region to region.

Wood (Used for Coal Fire Startup)

Wood may be burned in the SF1500, 2500, 3500 only in the startup preparation for burning coal. A hot bed of burning coals from wood is the best preparation for starting a coal fire.

PER EPA GUIDELINES, YOU CAN NOT BURN WOOD IN THIS UNIT EXCEPT FOR THE PURPOSE OF STARTING A COAL FIRE.

FUELS (CANADA)

Coal

Anthracite coal, pea or nut size, may also be burned as a primary fuel for the SF1500, 2500, 3500. Bituminous coal may also be burned but the results will vary due to the variation in bituminous coal from region to region.

Legacy Stoves coal boilers are designed for burning coal with maximum efficiency and convenience in hand-fired boilers.

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 draft control mounted on the door and the live coals should be held in the center of the fire to maintain a higher temperature for most efficient combustion. Wood is only to be used for start-up to prepare the boiler for starting a coal fire.

FUEL SHOULD BE STORED IN A DRY PLACE, PREFERABLY INDOORS. KEEP FUEL OUTSIDE THE INSTALLATION CLEARANCE AREA. ALSO, KEEP FUEL AWAY FROM ALL MAINTENANCE ACCESS AREAS.

Adjusting Automatic Draft Controls

In order for your new heater to function, controls must be properly adjusted. The heat output is regulated primarily by the automatic draft control on the bottom door. The electric motor [A] opens and closes the flapper door [B]. Opening and closing the flapper door regulates the airflow to the firebox. The maximum air flow can be adjusted by turning the adjusting bolt [C] counterclockwise for more air, and clockwise for less. Make all such adjustments only when the flapper is in the closed position.

Note: All adjustments of air flow using the air adjustment bolt must be done when the flapper air inlet is closed. Failure to do so could result in motor damage.

The idle adjuster [D] controls the minimum amount of air that enters the firebox when the flapper door

is closed. Adjustment is made by turning the adjuster vertical for zero air, or horizontal for maximum air. It is best to start at a medium setting as shown in the diagram that follows.

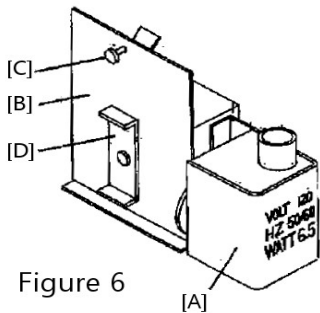
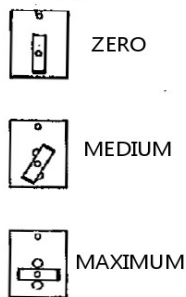


Figure 6



Automatic Draft Controls

Adjusting Optional Forced Draft Blower

Adjusting the forced draft blower which is an upgrade for the SF270 only, is made easy with the potentiometer. Blower adjustment will only need to be performed after install during the first firing. If you have weak draft the forced draft option may over-power the draft created by your chimney which can cause CO to leak out of your boiler. To make sure this does not happen the blower speed can be decreased.

While the boiler has fire, measure the draft to see how the forced draft blower affects the measured draft. Turn the potentiometer dial clockwise to decrease the blower speed until the draft reads - 0.04 to -0.08inWC. It may be helpful to then mark the position with a Sharpie for future reference. Keep in mind that the draft may be fine when the blower is at full RPM's.

Keep pieces of wood or coal out of the draft door opening mechanism, as this could cause the door to stick open.

Note: Oil the ADC hinge at the beginning of the heating season with a light oil.

Firebricks

Firebricks may become cracked during the course of normal operation. A cracked brick that is still in place is still doing its job and need not be replaced immediately. If a brick is broken and has fallen out of place, it should be replaced immediately. The firebrick used in the Legacy Stoves furnaces are inexpensive and easy to replace.

Doors

The door gaskets in both the loading and ash doors need to be checked every month while the stove is in use.

To replace the gaskets you will need to call you Legacy Stoves dealer and order the gaskets using the parts diagram in this manual.

Fuel Capacity

PER EPA GUIDELINES, YOU CAN NOT BURN WOOD IN THIS UNIT EXCEPT FOR THE PURPOSE OF STARTING A COAL FIRE.

When starting a fire with wood, the maximum amount of wood loaded should be the amount of wood needed to efficiently start a coal fire. This will be in compliance with EPA requirements, which dictate that the SF170/SF270 boilers are solid-fuel boilers approved for burning coal. Outside of this requirement, there is no safety related restriction on how much wood may be placed in the boiler, other than its physical capacity. Wood should be loaded length wise, front to back. When opening the load door, always open it just partially for ten seconds, allowing the fire to normalize with the sudden addition of combustion air through the door opening. This will also serve to guard against possible flashover conditions and against burning chunks falling out the load door.

When loading with coal, it is recommended that coal not be piled higher than the firebrick on the sides and back of the firebox. Coal may be loaded as high as possible in the center of the firebox, subject to the limitation that piling it too high will result in it being higher than recommended on the sides. Coal

must never be loaded so deeply that there is a risk of it tumbling out the load door.

Note: Solid-Fuel-Burning appliances need to be cleaned frequently to guard against buildup of soot, creosote and ash. Clean flue connecting pipe at least monthly. Clean the chimney at least twice per year. Clean more often if conditions require it. Slow burning wood fires increase the needed frequency.

Cleaning Requirements

PER EPA GUIDELINES, YOU CAN NOT BURN WOOD IN THIS UNIT EXCEPT FOR THE PURPOSE OF STARTING A COAL FIRE.

Note: Small, intense wood fires are preferred to large smoldering ones, as they reduce creosote formation in flue connecting pipe and the chimney.

Burning wood may result in creosote formation in the chimney and connecting pipe, particularly with long burning, low intensity fires. Switching to coal promptly will prevent creosote formation. Creosote that forms during a wood fire will dry and become flaky during a subsequent coal fire. It can then be easily cleaned from surfaces inside the boiler, chimney and the flue connecting pipe. If wood is being used, check flue pipe daily to become familiar with how quickly creosote forms with your burning practices. Clean as required.

Burning coal will produce fly ash that will be pulled into the flue connecting pipe and chimney. Build up of fly ash and soot can cause performance to deteriorate, and in severe cases create a safety issue due to reversing of draft that occurs from a blocked flue connecting pipe or a blockage in the chimney. Even a partial blockage is dangerous.

When burning bituminous coal, buildup in the flue connecting pipe and chimney may include soot in addition to fly ash. Soot presents a fire hazard, as it is often flammable. Check flue connecting pipe and chimney daily at first, then weekly thereafter to keep ahead of a dangerous build up of soot. Clean as often as needed to keep buildup to less than 1/32 of an inch.

Note: In the event of a chimney fire, or runaway fire, see earlier section dedicated to these topics.

INSPECT FLUE PIPES, JOINTS AND SEALS REGULARLY TO ENSURE THAT SMOKE AND FLUE GASES ARE NOT DRAWING INTO, AND CIRCULATED BY THE AIR-CIRCULATION SYSTEM.

CLEANING OF THE HEAT EXCHANGER/BAFFLE, FLUE PIPE, CHIMNEY IS ESPECIALLY IMPORTANT AT THE END OF THE HEATING SEASON TO MINIMIZE CORROSION DURING THE SUMMER MONTHS CAUSED BY ACCUMULATED ASH.

HAVE A CLEARLY UNDERSTOOD PLAN TO HANDLE A CHIMNEY FIRE.

THE CHIMNEY CONNECTOR AND CHIMNEY SHOULD BE INSPECTED AT LEAST TWICE MONTHLY DURING THE HEATING SEASON TO DETERMINE IF A CREOSOTE BUILDUP HAS OCCURRED.



Fuel Storage – Wood

Wood stored for the purpose of kindling should be stored in a dry location. At the very minimum, if stored outside it needs to be under a roof. Indoor storage is preferred, since the amount of kindling you will need throughout the season is likely to be small. Drier kindling will burn hotter, and ignite coal more quickly. Kindling must be stored outside the listed clearances and away from any ignition sources.

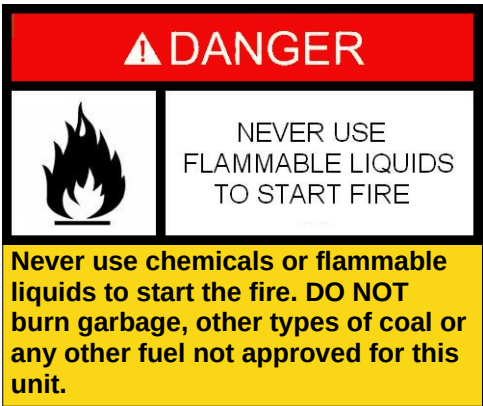
Fuel Storage – Coal

Coal may be stored inside or outside. Keeping coal dry will result in more reliable operation, including less chance of losing the fire when adding coal. In addition, coal stored outside that may become wet is likely to freeze solid. If this occurs,

bring chunks of frozen coal inside to thaw. Enough can be brought into a warmer location to completely thaw and dry before adding to the fire. Keeping the coal dry will make it much easier to work with.

STARTING A FIRE

Note: If you observe a paint curing smell during the first hours of burning, provide increased fresh air into the boiler room during the break in period.



Starting a Wood Fire

Place seven or eight sheets of crumpled newspaper or similarly suitable paper onto the top of the grates. Next, lay in some very dry, small kindling wood (approximately 3/4” or less) on top of the newspaper. Layer the kindling in a cross-cross fashion to allow for maximum air flow through the material. Open the manual draft controls on the load door by turning them counterclockwise. Light the paper nearest the center of the door opening. Once the paper is lit, you may partly close the door, leaving it slightly ajar to provide additional combustion air. Add a few small pieces of firewood when the kindling is burning well.



Manual Draft Controls on Loading Door

Note: Open manual draft controls by turning them counter-clockwise. Close them by turning them clockwise.

The next step will depend on whether you are using the automatic natural draft control, or forced draft option. If you are using the natural draft control, set the control toggle switch to DRAFT and close the ash door and load door, this will allow air to enter from the draft control. It will feed the fire by flowing upward through the grate. A wood fire will burn more vigorously if air also feeds through the manual controls on the load door.

If you use the forced draft option for starting your fire, set the control toggle switch to FORCED DRAFT, and close off other air inlets, such as the manual controls on the load door, or you may push smoke into the boiler room. Additionally, opening both the load door and ash door may overwhelm the available draft and cause smoke to leak into the boiler room. Keep in mind that your eventual goal is establishing a coal fire, which must receive most of its air from underneath. As you prepare to switch to coal, increase the ratio of bottom air-flow to top air-flow.



Starting a Coal Fire

To start a coal fire, first start the fire with wood as previously described. Once the wood fire is well established, and a bed of burning charcoal is forming in the bottom of the firebox, add a layer of coal to the fire. Make sure at this point that the air supplied to the fire is coming from underneath, through the automatic draft control, or forced draft fan or an open ash door. Only add a shallow depth (approximately two inches) of coal at first. Make sure plenty of air is feeding the fire from underneath. As signs of coal ignition appear,

consisting mainly of evidence of flame, an additional layer of coal may be added. Layers can be added until the bed is about 10 inches deep, as long as you do not add too much coal at once.

COAL TYPES

Legacy Stoves coal boilers operate best when a good grade of hard coal is burned since it has a high output of energy combined with 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 air to flow more freely 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 ideal.

Good grades of soft coal can be burned in the Legacy Stoves coal boilers provided the ash and sulfur content is low enough. Soft coals generally produce more ash than do hard coals and also tend to “clinker” (or fuse together) producing lumps of ash residue that can be hard to remove through the grates. In severe cases, when they cannot be broken up to the point that they will drop through the grates, they may need to be removed through the load door. Be sure to wear gloves and use tongs, and to have a suitable container, such as the ash container described later, to put them in. You may choose to let the fire go out, but the clinkers will still take considerable time to cool.

When adding coal to the fire it is important not to smother the fire, preventing a free flow of combustion air through the burning fuel. When adding new coal to the fire, coal with a higher percentage of volatiles (this is especially true of soft coal) will require more top air-flow. This can be accommodated using the manual controls on the load door. Part of the way through a burn cycle, the volatiles will have been burnt off, and the manual draft controls can be adjusted to allow less air across the top of the fire.


Maintaining a Coal Fire

The coal in an operating coal boiler needs to have some depth of unburned coal in order to maintain a fire. If you are new to burning coal, you may underestimate this required depth. In addition, since the fire burns from underneath, instead of on top as

for wood, it can be challenging to estimate the depth of unburned coal that is in the firebox. If the fire has begun to fade and weaken in vigor, do NOT shake the grates. Add only a small amount of coal at first, and provide abundant air from underneath in order to help it recover. To attend to this recovery, you may even want to open the ash door and watch and wait for the fire to gain sufficient vigor. Once the fire recovers, you may then shake the grates and/or add more coal. If you lose the fire, it is likely that the grates were shaken too much too soon, or too much coal was added to a lazy fire.

Note: Once the fire has faded, it is easy to smother it by adding too much coal too fast, or to lose the fire by shaking the grates. Only shake the grates when the fire is well established.

If the fire has gone out, shake the grates to remove most (but not all) of the ash. When you start to see tiny pieces of black coal, stop shaking. You can then build a wood fire right on top of the coal that remains, and start the process over again.

⚠ 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.	

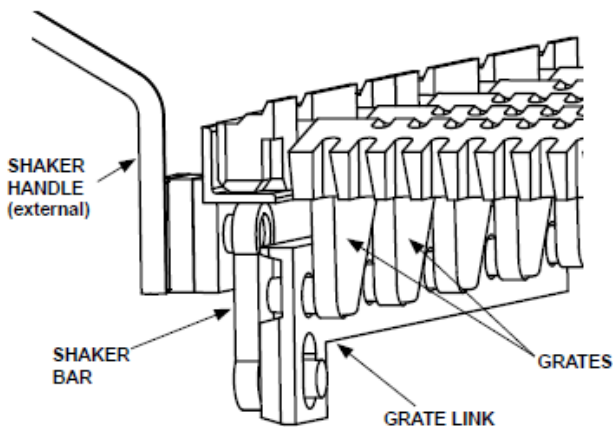
Note: Ashes should be placed in a metal container with a tight-fitting lid. Do not use this container for storing other waste. The closed container of ashes should be placed on a noncombustible floor or on the ground outside the home, well away from all combustible materials, pending final disposal. 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 thoroughly cooled.

DUMP ZONE CONTROL



A dump zone control is standard equipment on all Legacy Stoves coal boilers. It is installed in the water wall and can be wired to a water circulator or other approved provision for heat dumps. The control 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 control is set, it will activate the dump zone to pump excess heat away from the boiler and into the area being heated.

GRATES



Close-up view of grate system components

The Grates are made of heavy-duty cast iron. The function of the grate system is to support the coal while allowing air flow through the fire. The grate system also allows removal of the ashes by shaking

them through the grates. The grates are removable without the use of tools. It is first necessary to remove the fire bricks. Once they are removed, the grates simply lift out. Lift the right end higher to disengage from the shaking link. Tore-install the grates, lower them, one at a time, left end first, be sure the grate hooks into the grate link as you drop it into place.

Note: Warped grates are not covered under warranty. This type of failure is due to leaving ash build up underneath the grates.

Your grates will last forever, as long as you keep your ashes cleaned out of the stove. When ashes are left to pile up against the underside of the grates, the air-flow is blocked. With no air flow through the grates, they will begin to sag from the intense heat. The grates are designed to accommodate three different sizes of anthracite coal. Pea is defined as being able to fit through a round screen hole of 9/16" to 7/8". Nut or Chestnut is defined as being able to fit through a round screen hole of 7/8" to 1½". Finally, Stove coal which is 1½" to 2½" in size. Pea or Nut you'll find work the best for starting a fire, while all three sizes burn just as well. The external shaker handle allows for greater safety from burns, and the convenience of needing no extra tools.

OTHER GENERAL OPERATING GUIDELINES

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 a 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. Dry wood is more effective for starting coal fires.

The best type of fuel for your Legacy Stoves boiler is anthracite coal in the nut size. Larger coal may result in more air flow than is desired and difficulty in controlling the fire. Continuous operation on coal will limit the buildup of creosote in the stovepipe. Exhaust produced by burning Anthracite coal will chemically react with creosote and loosen it from the chimney liner and flue connecting pipe. You can then easily remove this material from the pipe and the chimney cleanout.

If you have a metal chimney, tap it from time to time and listen for a loose rattling. If audible, this sound indicates that fly ash or creosote is building up. Cleaning the chimney and/or connecting pipe is required.

Operation During a Power Failure

If means of dissipating heat exists and the fire were to go out shake all ash out of firebox and simply restart the fire.

A non-powered dump zone or other gravity loop provision is recommended for dissipating heat during a power outage. Of chief concern is lack of water circulation that can occur when there is no power for circulator pumps and zone valves.

Alternately, backup power may be used to both power the controls and circulators. This is the best option for providing continued heating during an extended outage.

Whatever means are used, it is important that the system works even when unattended to guard against overheating. Backup power must be provided in a way that satisfies local code requirements and prevents back-feeding of electricity into the power grid.

Note: If backup power is provided by a generator, always operate the generator well outside the home to avoid carbon monoxide in the home.

CONDITIONING OF BOILER WATER

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, pre-treatment 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 periodically 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 the scale forming or 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 dependent 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 deaerator.

Chemical deaeration is done through the introduction of specific chemicals in the boiler to react with the oxygen. The dissolved oxygen content should be maintained at as low a level as possible. 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 (Steam Boilers)

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 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

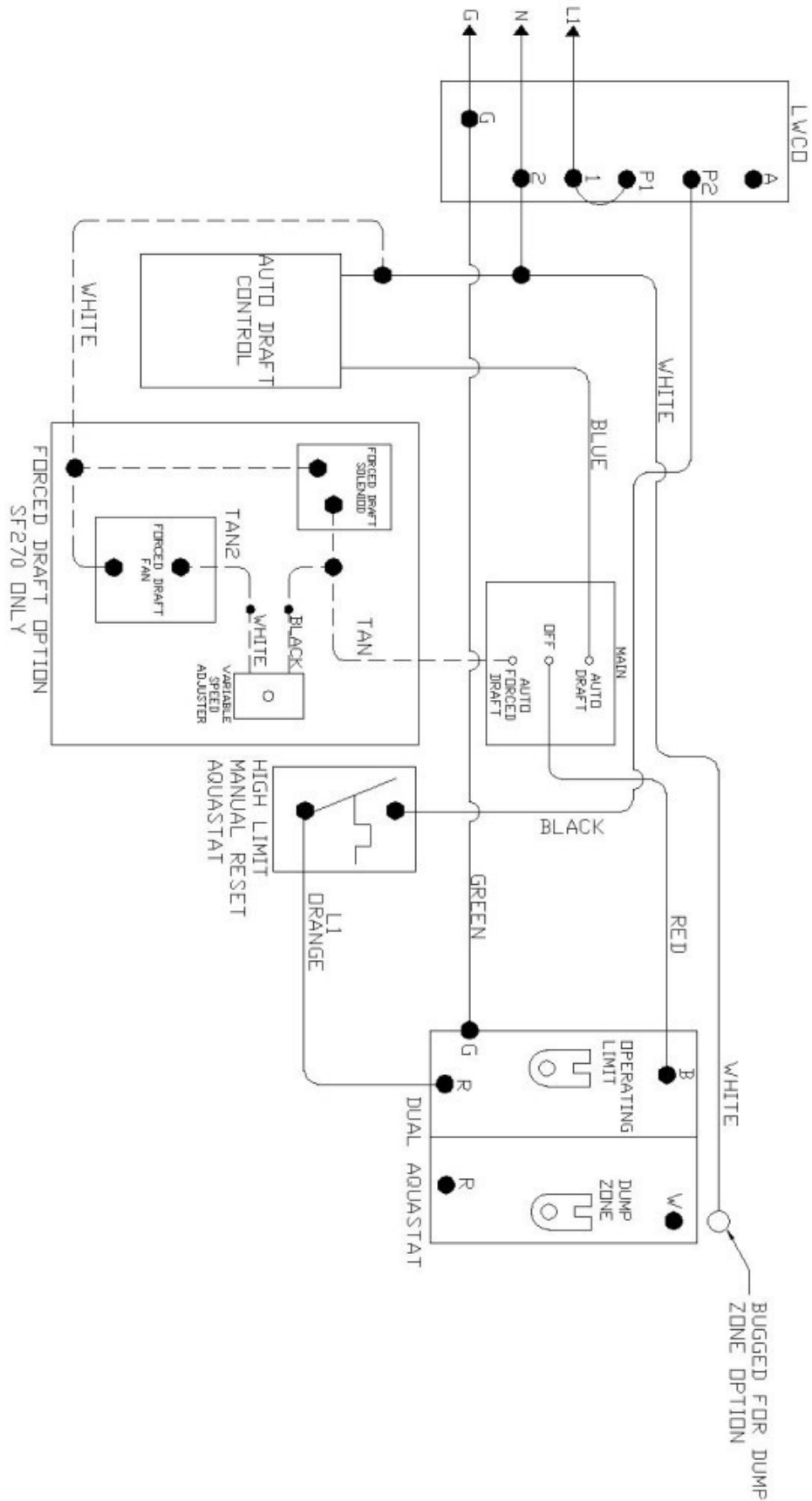
The hardness of water is caused by calcium and magnesium ions. Water hardness will vary greatly throughout the country depending on the source of the water.

Hard water in boilers and hydronic heaters 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.

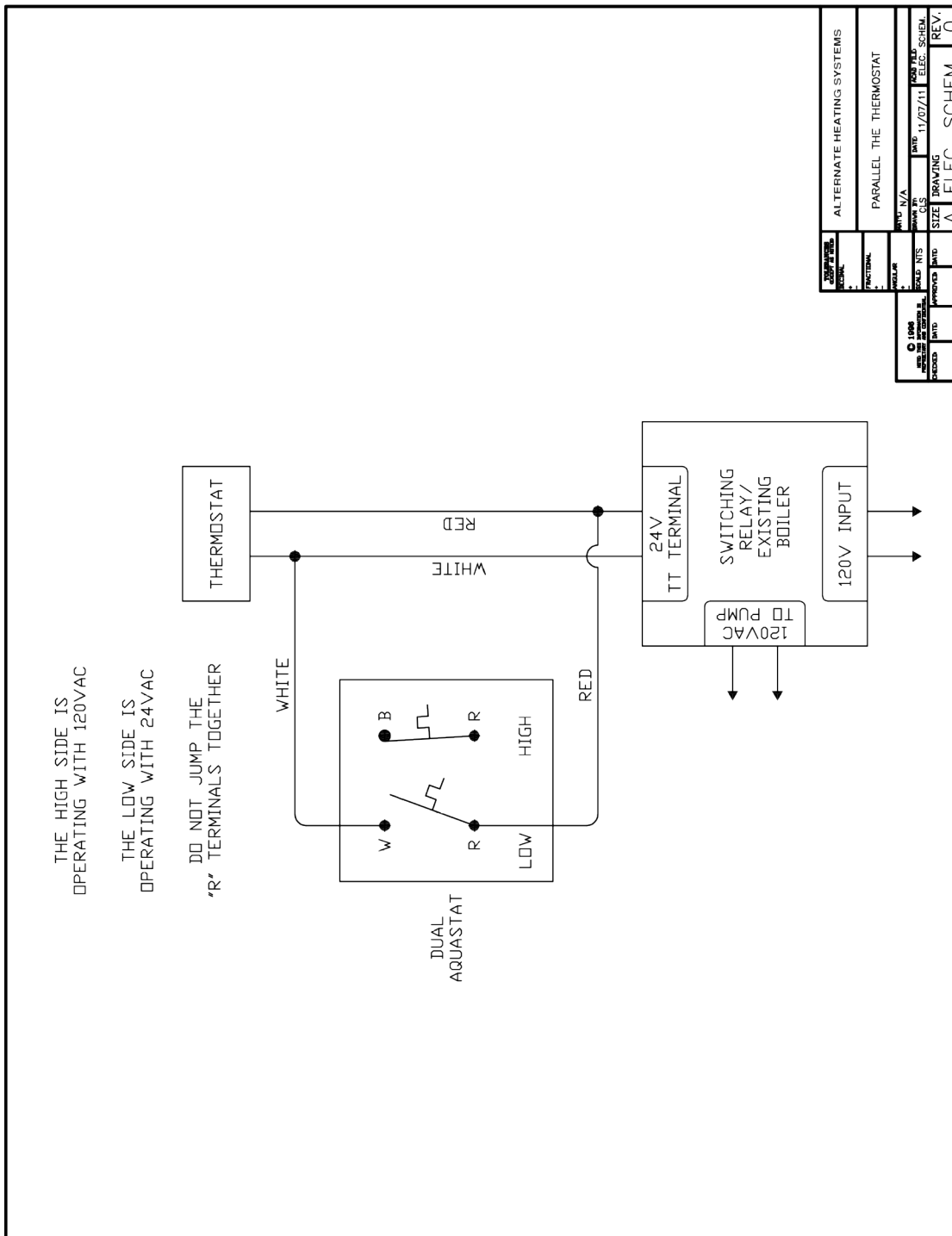
Oils

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.

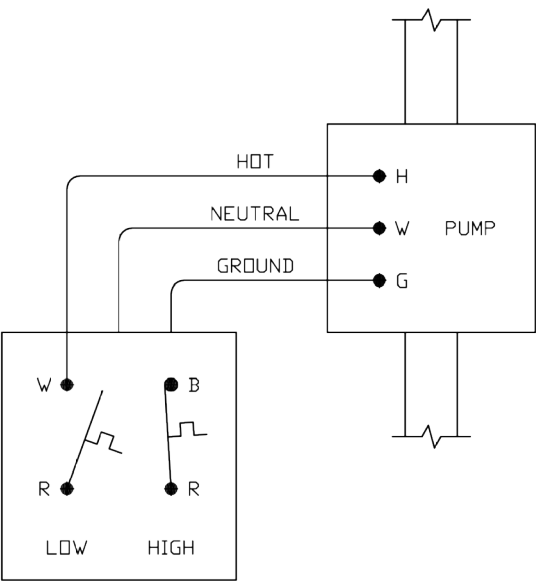
Appendix A: Wiring Diagrams



Dump Zone – Parallel to Thermostat



Dump Zone – Using Pump or Zone Valve



JUMP THE "R"
TERMINALS TOGETHER

NEUTRAL AND GROUND
WIRES PROVIDED IN
THE DUAL AQUASTAT

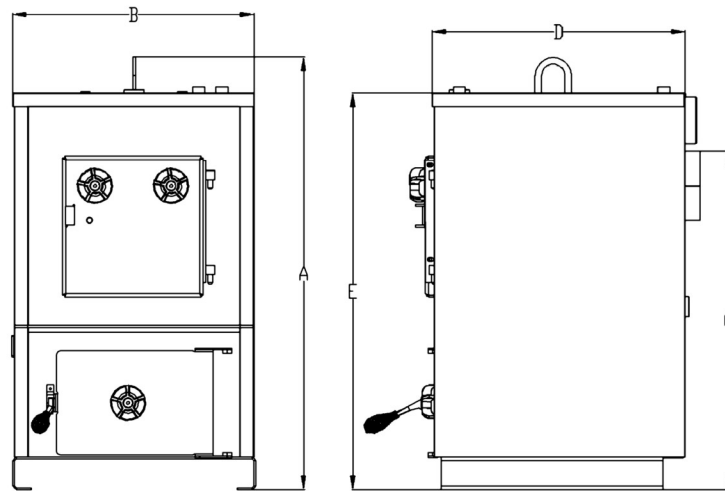
120VAC PUMP SHALL BE
NO MORE THAN 3 AMPS

IT IS ADVISABLE TO USE
SAME CIRCUIT AS BOILER
TO POWER PUMP

<div>© 1998 ALL RIGHTS RESERVED BY THE COMPANY</div>	DESIGNATION	ALTERNATE HEATING SYSTEMS
		ELECTRICAL
		FUNCTIONAL
		DETAILS
SCALE: NTS	DATE: 11/07/11	ACW FILED
DRAWN BY: C/S	ELEC. SCHEM.	REV.:
SIZE: A	ELEC. SCHEM.	0

Appendix B: Specifications

Description	SF170	SF270
A. Height (top of lifting lug)	46.75	52.25
B. Width	26.14	28.04
C. Height (top of flue collar)	36.56	42.5
D. Depth, front to back	27.37	33.3
E. Height (top of boiler)	42.84	48.6
Weight (lbs)	1,100	1,250
BTU Input	90,000	120,000
Heating Capacity	3,200	4,200
Flue Collar Size	8	8
Fuel	Pea, Nut, Stove Coal	Pea, Nut, Stove Coal
Number of Grates	4	5
Firebox Dimensions	22 x 15.5 x 19	27.5 x 20.5 x 21
Firebox Dimensions, Cu Ft	3.6	6.5
Clearances (Sides)	24	24
Clearance (Front)	48	48
Clearance (Rear)	30	30
Clearance (Top)	24	24



*All dimensions in inches, unless otherwise indicated.
Specifications and design subject to change without notice.
All specifications shown are approximate.

ADDITIONAL SPECIFICATIONS

Pressure Drop

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

Explanation of GPM Flow

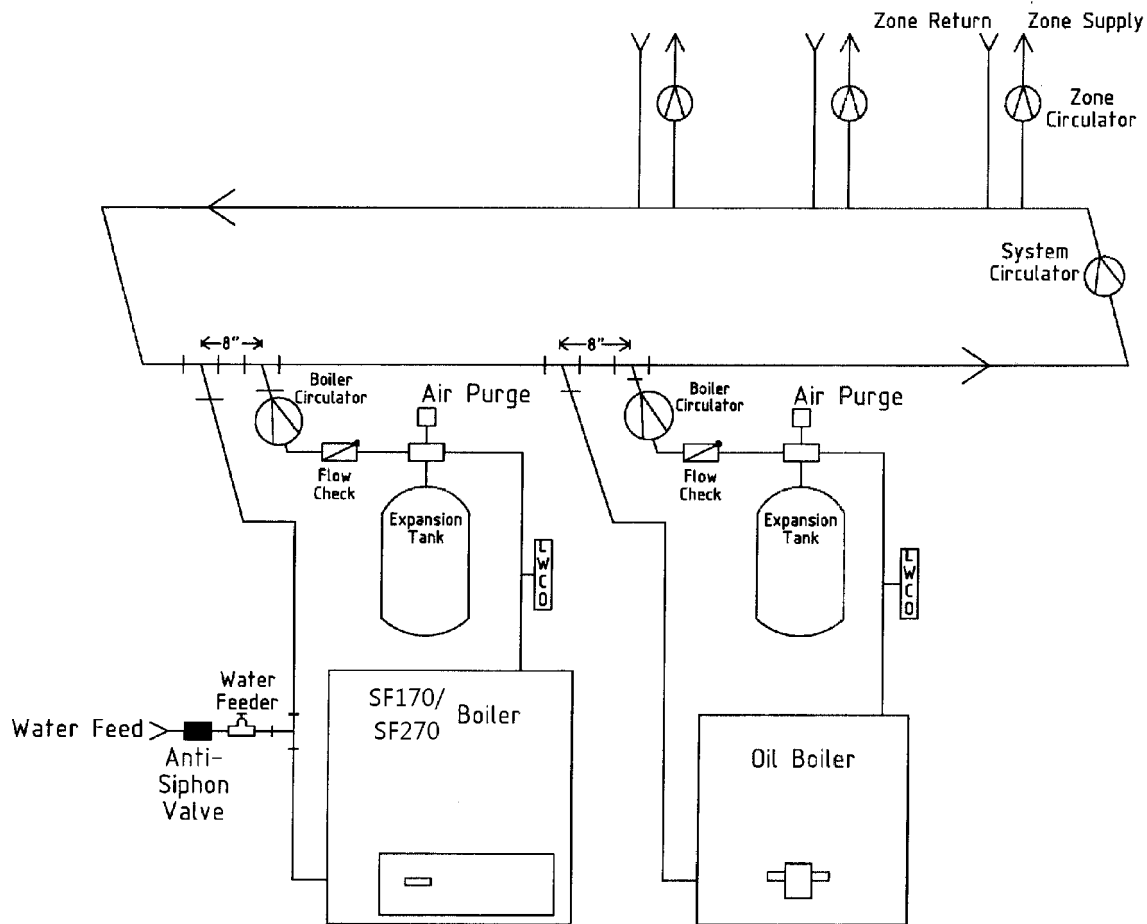
The following are given as examples of gallons per minute water flow required to deliver hot water in order to provide heating of a given number of degrees and at a certain BTU level:

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

As you can see from the above, with a 20° F temperature differential, 10 gallons per minute of flow is required for each 100,000 BTU / Hour transferred.

Appendix C Boiler Piping Diagrams

Boiler Piping Diagram – Primary/Secondary System Option 1

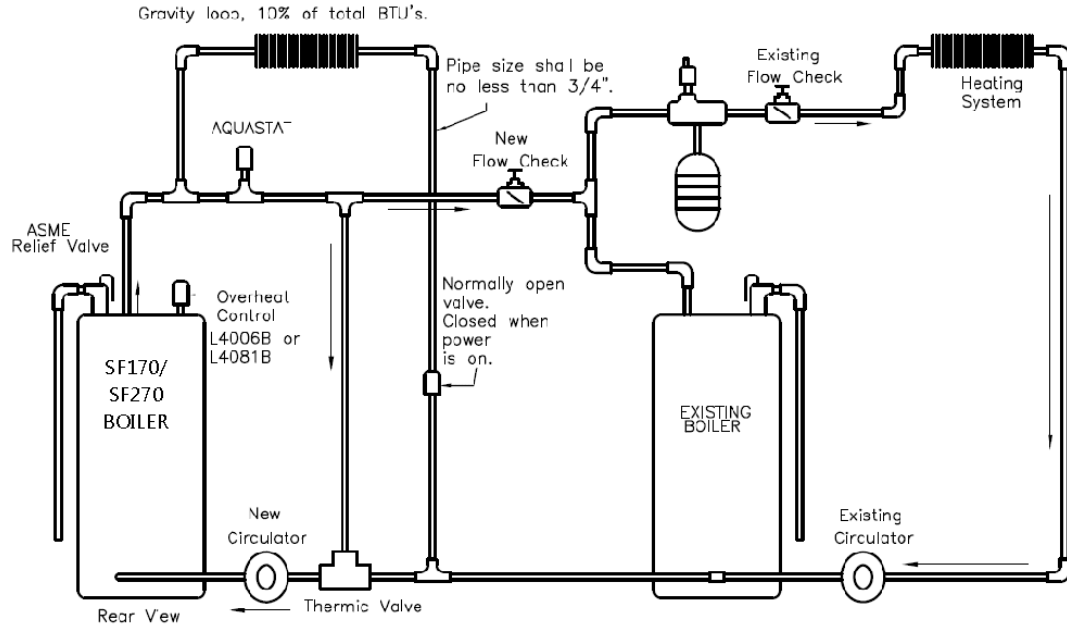


Note:

1. A call for heat from any zone activates Boiler Circulators, System Circulator and Zone Circulator.
2. Each Boiler Circulator is also controlled by a low limit to prevent operation when the Boiler is cold.
3. Dump zone operation will activate one or more zones, System Circulator and Boiler Circulator.
4. Do not bypass temperature supply control system on radiant heat system. In radiant heat applications, permit activation of a call for heat but allow system controls to regulate water temperature.

Not all system components, valves and devices are shown in this drawing. Actual conditions and application requirements will vary. Please consult a heating expert or your Legacy Stoves dealer for additional information.

Boiler Piping Diagram – Primary/Secondary Option 2



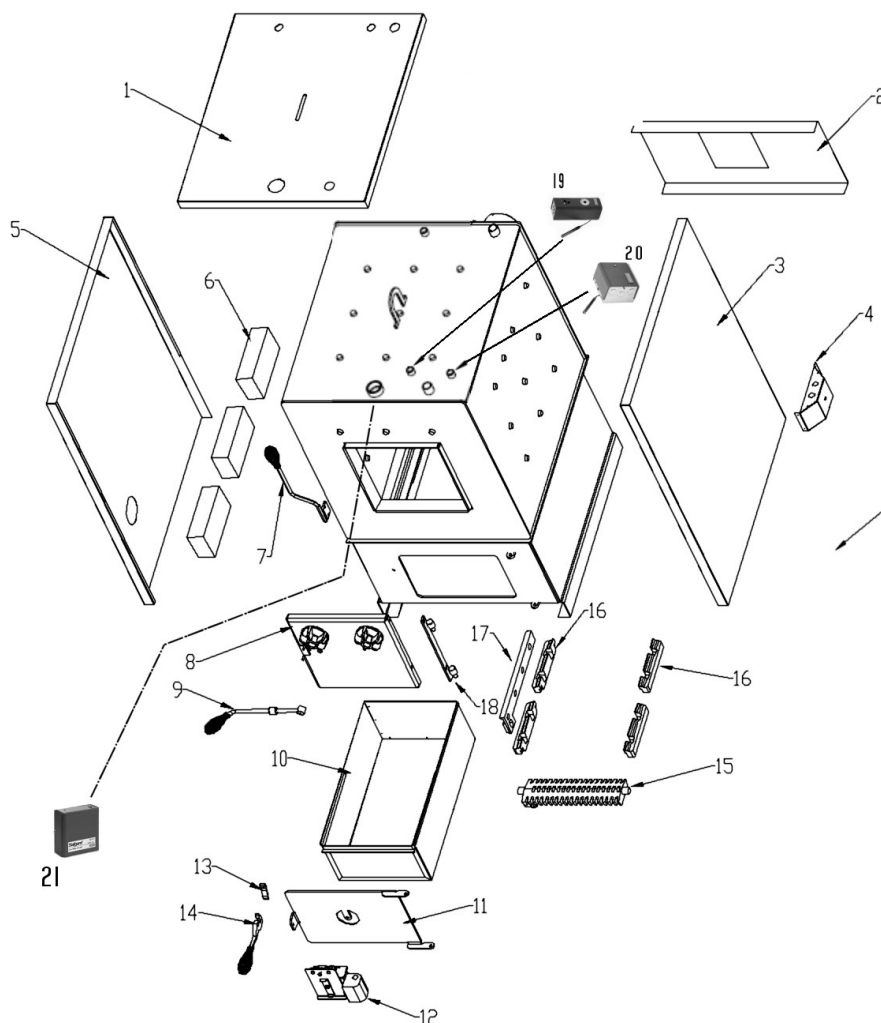
Note: The above illustrates one possible method of connecting the SF170/SF270 boilers with an existing boiler. This connection is as follows: using a small circulator (and with the backup boiler piped into the return tapping) run another pipe from the supply tapping T, of the Legacy Stoves boiler to 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 model SF170. Use 1 1/4" pipe to make this connection on the SF270. 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 Legacy Stoves boiler. When power to the Legacy Stoves boiler is on, the circulator should be running. 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.

Appendix D: Parts Listing

Electrical Parts

	Model		SF170		SF270
Electrical Components					
Combustion Air Actuator					
	Part Number		4-00-00109		4-00-00109
	Brand		Schnieder Electric		Schnieder Electric
	Ratings (Amp/Vol/HP)		6.5 WA/120v		6.5 WA/120v
	UL File Number		C RU US E9429		C RU US E9429
Combustion Air Solenoid (If Present)					
	Part Number		na		200-237
	Brand		na		Dormeyer
	Ratings (Amp/Vol/HP)		na		120v 60hz
	UL File Number		na		E83929 E68194
Combustion Air Blower (If Present)					
	Part Number		na		3-21-07500
	Brand		na		FASCO
	Ratings (Amp/Vol/HP)		na		120v
	UL File Number		na		
Blower Controller (If Present)					
	Part Number		na		3-20-02223
	Brand		na		Palmetto
	Ratings (Amp/Vol/HP)		na		120v
	UL File Number		na		E51028
High Temp Limit					
	Part Number		200-407		200-407
	Brand		HONEYWELL		HONEYWELL
	Ratings (Amp/Vol/HP)		120v 8a		120v 8a
	UL File Number		MP466		MP466
Operate Temp Limit					
	Part number		200-401		200-401
	Brand		HONEYWELL		HONEYWELL
	Ratings (Amp/Vol/HP)		120v 8a		120v 8a

Service Parts SF170



IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer. Legacy Stoves does not sell directly to consumers, unless dealers are more than 25 miles away. Provide model number and serial number when requesting service parts from your dealer.

ITEM	DESCRIPTION	COMMENT	PART NUMBER
1	TOP SHEET METAL		2-00-04315
2	REAR SHEET METAL		2-00-04317
3	RIGHT SIDE SHEET METAL		2-00-04314
4	CONTROL BOX		2-00-00809
5	LEFT SIDE SHEET METAL		2-00-04316
6	BRICK		
	FULL	6 PCS	3-40-900450250
	FULL & CUT	2 PCS	3-40-100450250
	SPLIT	6 PCS	3-40-900450125

Continued

7	SHAKER HANDLE ASSEMBLY		1-10-01005
8	LOAD DOOR ASSEMBLY		1-10-00830
	LOAD DOOR GASKET KIT		200-8011
9	LOAD DOOR HANDLE		413-006
	LOAD DOOR LATCH		413-002-SF
10	ASH PAN ASSEMBLY		1-10-04330
11	ASH DOOR		2-00-00804
	ASH DOOR GASKET KIT	60 INCHES	3-44-88100
12	ADC ASSEMBLY		1-10-03375
13	ASH DOOR LATCH		2-00-00036
14	ASH DOOR HANDLE		4-00-00042
15	GRATE 13" CAST		3-00-00207
16	2 GRATE HOLDER	QTY 4	3-00-00193
17	4 GRATE LINKAGE		4-00-00205-4
18	LOAD DOOR HINGE		413-028
19	HIGH LIMIT CONTROL		200-407
20	DUAL (OPERATE/DUMP) CONTROL		200-401
21	LOW WATER CUTOFF MANUAL RESET		200-411.2

Beginning Manufacturing Date: Mar 2015

Ending Manufacturing Date: Active

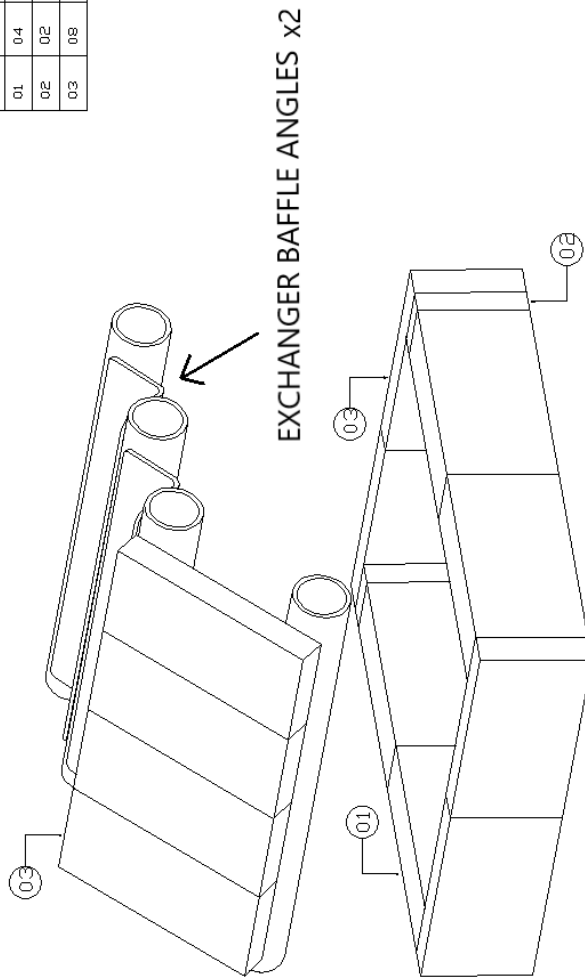
SF170 Bottom Brick Layout

Installed brick are shown at right. Diagrams below illustrate brick locations and type. Bottom brick and water tube brick are shown on the following page in full complement.



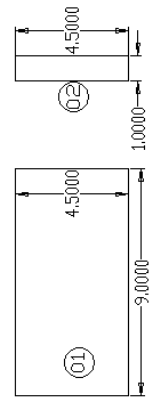
SF170 Bottom Brick and Heat Exchanger Brick

ITEM	QTY	Part No.	Part Name
01	04	3-40-900450250	STANDARD BRICK
02	02	3-40-100450250	LEFT AND RIGHT
03	08	3-40-900450125	STANDARD BRICK



SF 170 BRICK

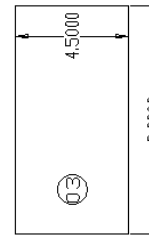
FULL BRICK (2.5" WIDTH)



QTY-4

QTY-2

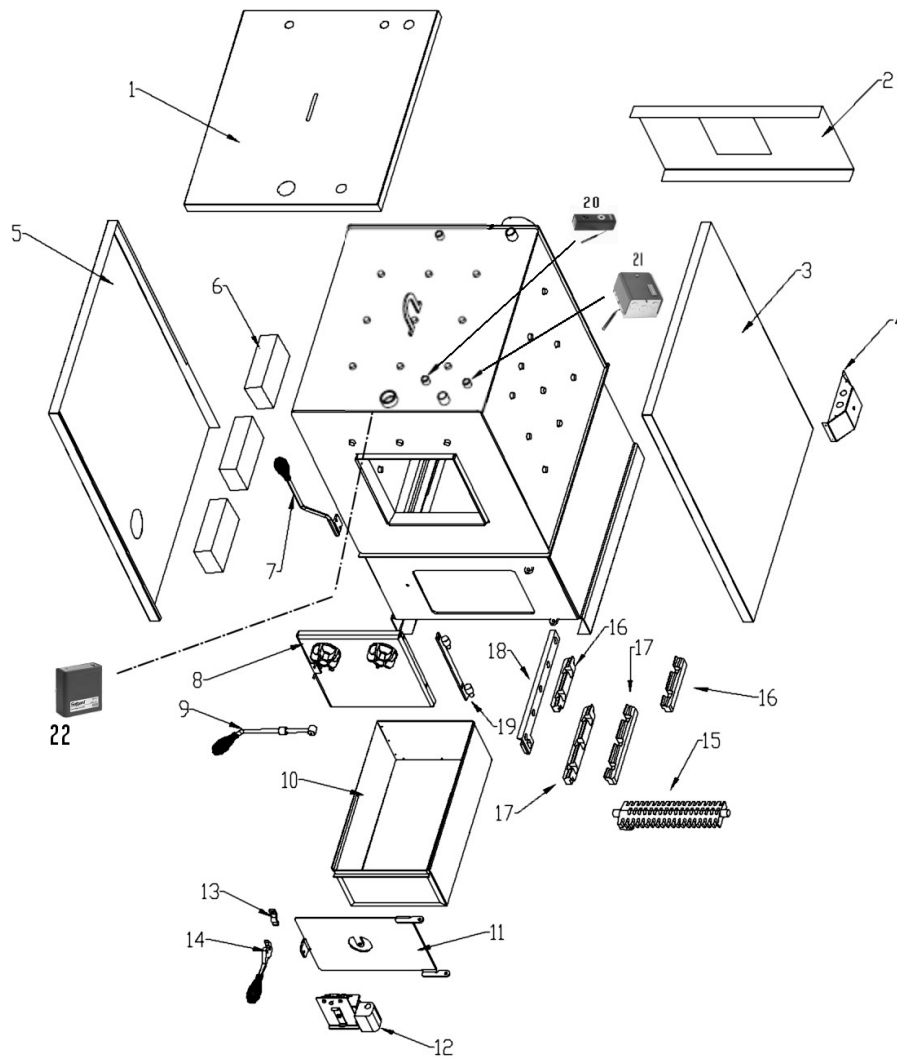
SPLIT BRICK



QTY-8

MATERIAL		BRICK		EMPTY 48 HOURS FRACTION DECIMAL 4/752 0.0054 XX XXXX XXXX 0.0006	
MIL. PH.		---			
WEIGHT OF LENGTH		---			
FINISH		---			
USED ON		---		ANGLEULAR FINISH 1/10"	
BY		---		SMO. SLIPS, EDGES 0.05 IN MAX	
DATE		---		DO NOT SCALE DRAWING	
DRAWN BY		NATHANIEL G			
PART NUMBER		100-01700		DWS NUMBER 01700	
TITLE		SF170 BRICK LAYOUT			
		B			

Service Parts SF270



IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer. Legacy Stoves does not sell directly to consumers, unless dealers are more than 25 miles away. Provide model number and serial number when requesting service parts from your dealer.

ITEM	DESCRIPTION	COMMENT	PART NUMBER
1	TOP SHEET METAL		2-00-00806
2	REAR SHEET METAL		2-00-00807
3	RIGHT SIDE SHEET METAL		2-00-00805-2
4	CONTROL BOX		2-00-00809
5	LEFT SIDE SHEET METAL		2-00-00805-1
6	BRICK		
	FULL	6 PCS	3-40-900450250
	SPLIT	4 PCS	3-40-900450125
	SPLIT & CUT	2 PCS	3-40-250450125
7	SHAKER HANDLE ASSEMBLY		1-10-01005

<i>Continued</i>				
8	LOAD DOOR ASSEMBLY			1-10-00830
	LOAD DOOR GASKET KIT			200-8011
9	LOAD DOOR HANDLE			413-006
	LOAD DOOR LATCH			413-002-SF
10	ASH PAN ASSEMBLY			1-10-00820
11	ASH DOOR			2-00-00804
	ASH DOOR GASKET KIT	60 INCHES		3-44-88100
12	ADC ASSEMBLY			1-10-03375
13	ASH DOOR LATCH			2-00-00036
14	ASH DOOR HANDLE			4-00-00042
15	LONG GRATE 15" CAST			3-00-00208
16	2 GRATE HOLDER			3-00-00193
17	3 GRATE HOLDER			3-00-00194
18	5 GRATE LINKAGE			4-00-00205
19	LOAD DOOR HINGE			413-028
20	HIGH LIMIT CONTROL			200-407
21	DUAL (OPERATE/DUMP) CONTROL			200-401
22	LOW WATER CUTOFF MANUAL RESET			200-411.2

Beginning Manufacturing Date: Mar 2015

Ending Manufacturing Date: Active

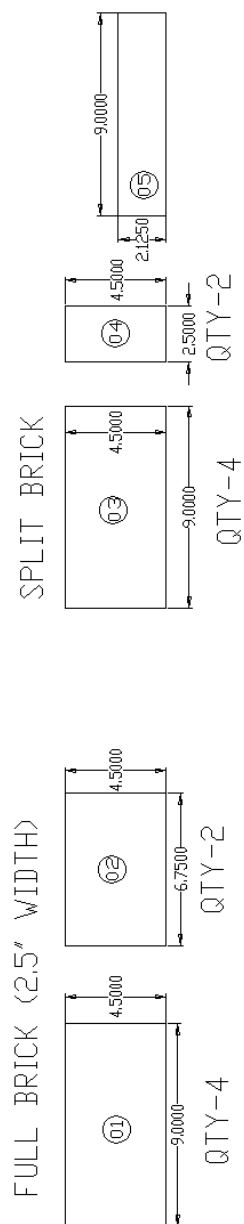
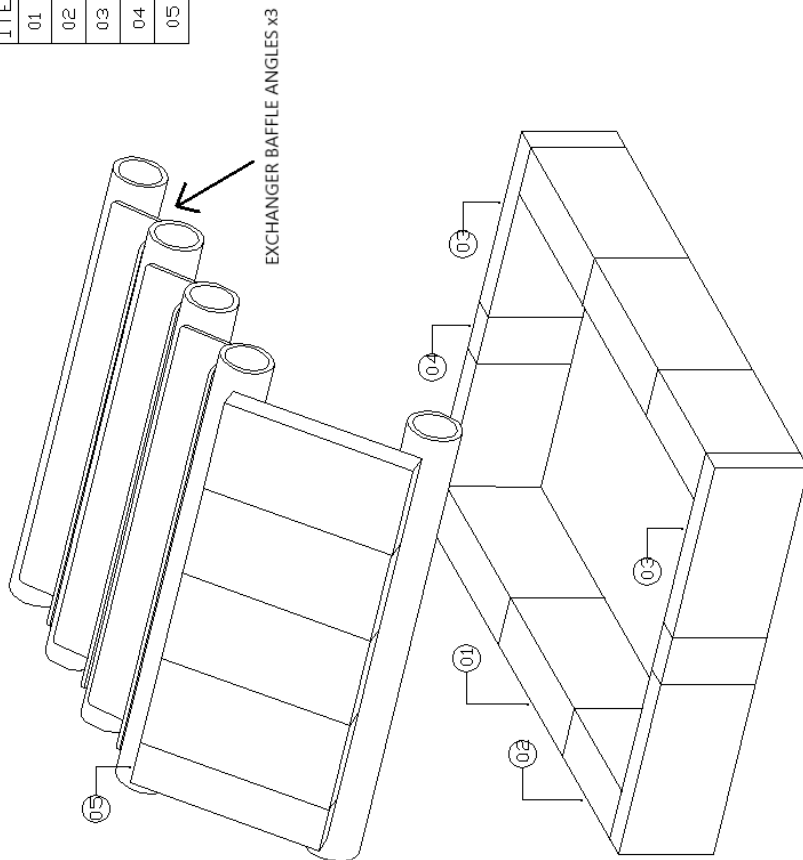
SF270 Base Brick Layout

Installed brick are shown at right. Diagrams on the following page show brick locations and type for both base brick and heat exchanger brick.



SF270 Bottom Brick and Heat Exchanger Brick

ITEM	QTY	Part No.	Part Name
01	04	3-40-900450250	STANDARD BRICK
02	02	3-40-675450250	LEFT AND RIGHT
03	08	3-40-900450125	STANDARD BRICK
04	02	3-40-250450125	FRONT AND REAR
05	01	3-40-900213125	TOP EXCHANGER BRICK

[illegible]





Service Parts – Low Water Cutoff

Safgard

Low Water Cut-Offs

550/650/750 Series

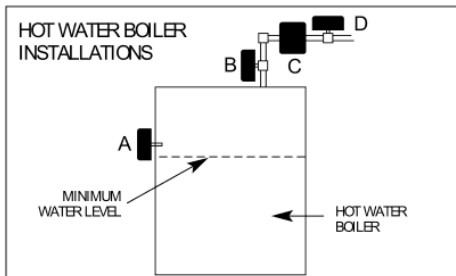
120 VAC Operating Voltage

-  Automatically shuts off burner in a low water condition to prevent boiler damage.
-  Low maintenance. No moving parts to wear stick or hang up, as in float devices.
-  Test button (550 & 650 Series) allows the burner circuit and control to be tested without lowering the water level.
-  Manual reset feature (550 & 750 Series) will not lock out in power failures.

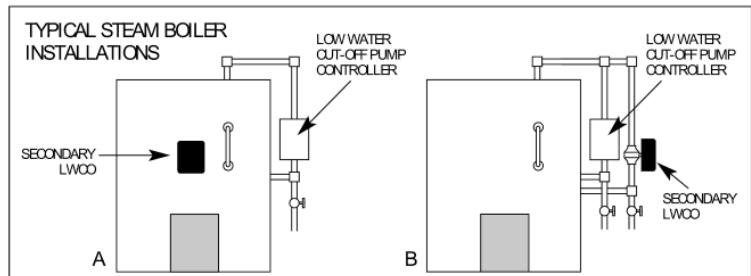


WARNING: To prevent electrical shock or equipment damage, power must be off during installation or servicing of the control. To prevent serious burns, the boiler should be thoroughly cooled before installing or servicing control. Only qualified personnel may install or service the control in accordance with local codes and ordinances. Read instructions completely before proceeding.

1. Where To Install



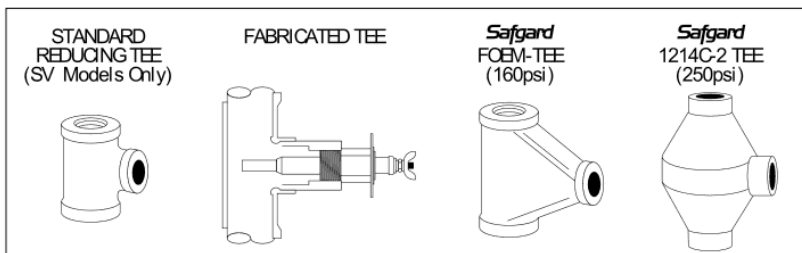
HOT WATER BOILERS: Probe must be installed at or above the minimum safe water level established by the boiler manufacturer. The probe may be installed directly in the boiler (A) if a suitable tapping is available, in the riser (B), in the header horizontally (C), or in the header vertically (D). **IMPORTANT:** To assure proper drainage, pipe diameter should be no less than 1" on installations in vertical piping and no less than 1/4" on installations in horizontal piping.



STEAM BOILERS (Secondary): Control must be installed in a suitable tapping provided in the boiler (A), or in an equalizing line (B). The control should be located below the level of the primary low water cut-off but above the lowest permissible water line as specified by the boiler manufacturer.

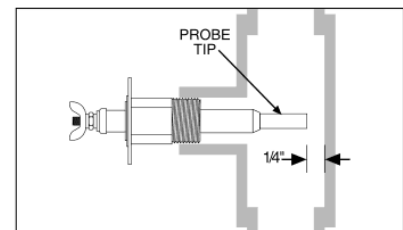
Note: For installations in equalizing lines, Hydrolevel recommends the use of Safgard Tees (see step 2).

2. Tee Options



TEE MOUNTING: If a field fabricated tee is used, make sure that the tee drains thoroughly when the water level falls below it, and that it conforms to the spacing requirements described in Step 3. Models equipped with the shorter EL1214-SV probe can be installed in most standard reducing tees. Safgard cast iron tees are also available to accommodate all probe models (See page 4).

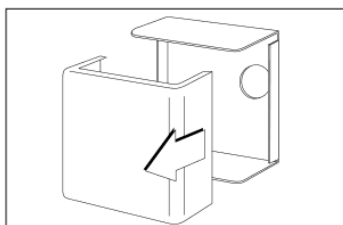
3. Probe Installation



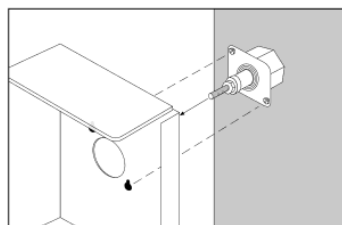
Check to insure 1/4" clearance from probe to any surface within the boiler or tee. When installed in a tee, the probe tip should extend fully into the pipe run. Apply pipe sealing compound to threads.

Note: Use of Teflon tape is not recommended.

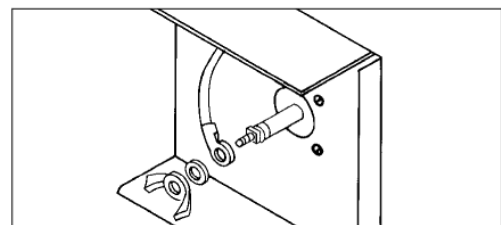
4. Control Mounting



Loosen the two control box cover binding head screws and remove the cover.

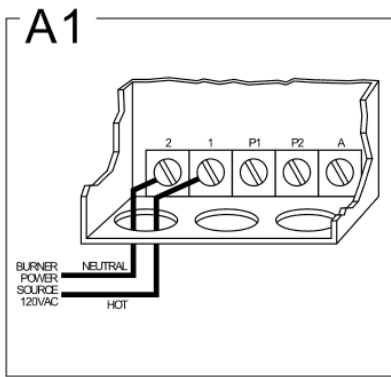


Slide keyhole slots over probe mounting screws and tighten screws (with either a 1/4" hex head driver or flat screwdriver).



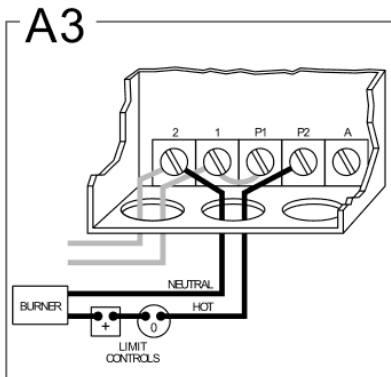
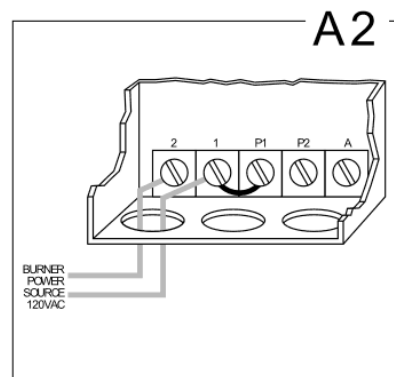
Connect the ring terminal wire lead to the probe terminal stud and secure with the lock washer and wing nut provided. *With the power removed*, proceed with installation and wiring according to Method A or B described on next page.

WIRING METHOD A: SAME POWER SOURCE FOR CONTROL AND BURNER CIRCUIT.



□ **A1** Connect the hot lead of the input voltage (120 VAC, 60 HZ) to terminal 1. Connect the neutral lead to terminal 2. 120 VAC, 60 HZ must be supplied to terminals 1 and 2 for internal operation of the control.

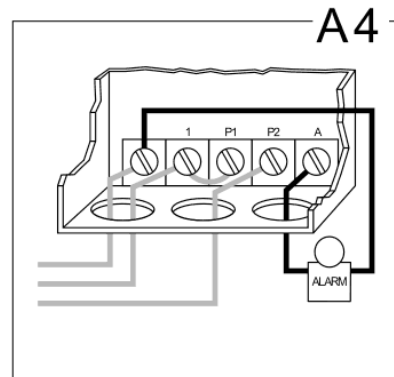
Install a jumper between terminal **A2** □
1 and terminal P1. Power from terminal P1 is supplied to terminal P2 through the control relay when water is at the probe.



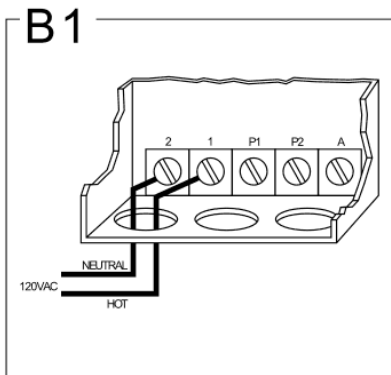
□ **A3** Connect terminal 2 to burner circuit neutral. Connect terminal P2 to burner circuit in series with other limit controls. Consult boiler manufacturer instructions for proper terminal connections. Control should be wired in series with and before other circuits.

Optional alarm connection. **A4** □
Connect alarm common to terminal 2.
Connect alarm hot to terminal A.

Upon completion of wiring, replace control box cover.

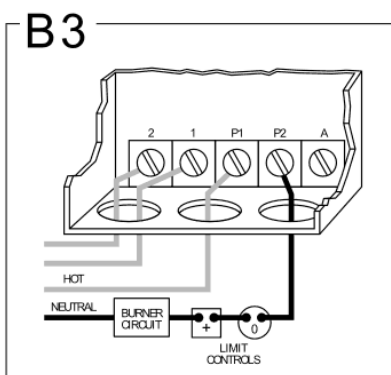
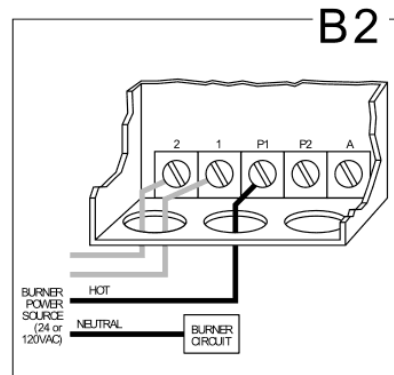


WIRING METHOD B: SEPARATE POWER SOURCE FOR CONTROL AND BURNER CIRCUIT.



□ **B1** Connect the hot lead of the input voltage (120 VAC, 60 HZ) to terminal 1. Connect the neutral lead to terminal 2. 120 VAC, 60 HZ must be supplied to terminals 1 and 2 for internal operation of the control.

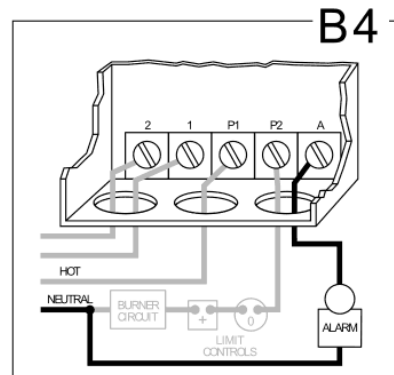
Connect hot lead from the 24 VAC or 120 VAC burner power source to terminal P1. This terminal supplies power to terminal P2 in normal operating conditions when water is at the probe. Connect neutral to burner circuit. Note: consult boiler manufacturer instructions for proper terminal connections.



□ **B3** Connect terminal P2 to burner circuit in series with and before other limit controls.

Optional alarm connection. **B4** □
Connect alarm hot to terminal A. Connect alarm common to neutral of the burner power source.

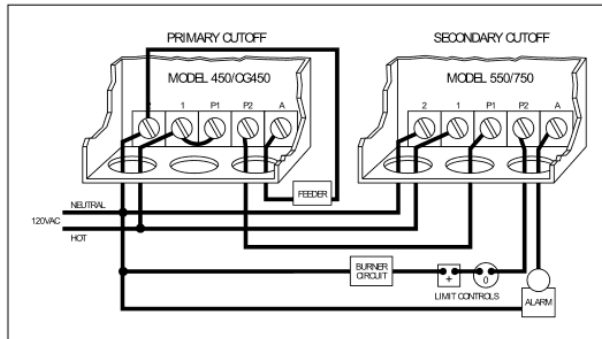
Upon completion of wiring, replace control box cover.



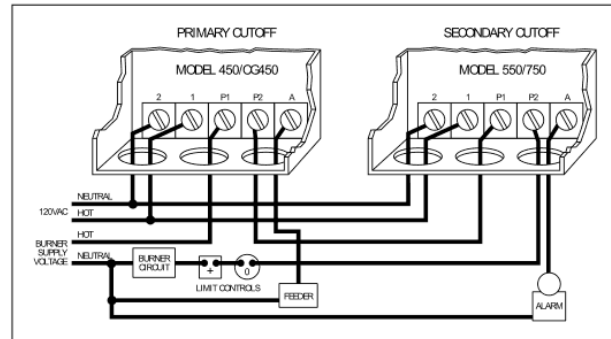
WIRING METHOD C: SECONDARY CUT-OFF

When a Safgard 550/750 is used as a secondary low water cut-off on a steam boiler, the following wiring instructions should be used. The diagram below depicts the 550/750 as a secondary control wired in series with a Safgard Model 450/CG450. Consult boiler manufacturer's instructions for the location of a tapping recommended for a secondary low water cut-off. **CAUTION** – Model 550/750 should not be used as a primary cut-off on a steam boiler.

SAME POWER SOURCE FOR CONTROL AND BURNER CIRCUIT

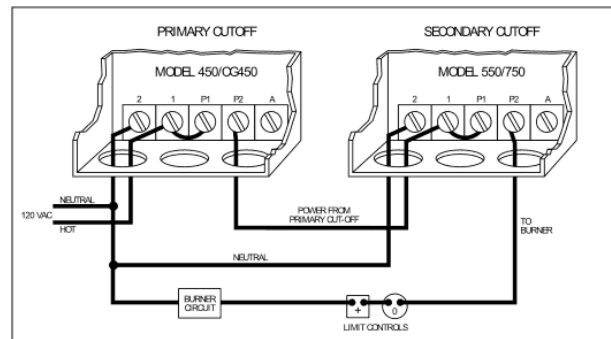


SEPARATE POWER SOURCE FOR CONTROL AND BURNER CIRCUIT



ALTERNATE WIRING: SECONDARY CUT-OFF WITH CRITICAL DIFFERENTIAL

On some installations it may be necessary to mount the secondary cut-off at a level in close proximity to the primary cut-off level. In these situations, when the primary low water cut-off shuts down the boiler, the water line can settle below the secondary cut-off causing nuisance lockouts. The wiring diagram at the right is designed to prevent these lockouts. **NOTE:** This wiring method can only be used if the power supply from the primary cut-off is 120 VAC.



OPERATING INSTRUCTIONS

750 Series: Manual Reset

1. With the water level above the probe, turn on the power and set the thermostat to call for heat. The burner will fire immediately. The LED lamps should be off.
2. Slowly lower the water level below the probe. The amber light will come on and the burner will shut down within two seconds.
3. Wait 30 seconds. The red LED lamp will come on indicating that the control is locked-out.
4. Raise the water above the probe. The red LED lamp will remain lit and the burner will not fire.
5. Push the RESET button to reset the control and restore burner operation.

650 Series: Automatic Reset & Test Button

1. With the water level above the probe, turn on the power and set the thermostat to call for heat. The burner will fire immediately. The LED lamp should be off.
2. Push the test button on the top of the control to simulate a low water condition. The LED lamp will light and the burner will shut down within two seconds.

550 Series: Manual Reset & Test Button

Follow the operating instructions for the 750 & 650 Series above.

Note: To test the manual reset feature on the 550 Series without lowering the water level:

1. Push and hold down the TEST button. The red LED lamp will come on in approximately 30 seconds indicating that the control is locked-out.
2. Once the red LED is lit, release the TEST button. The burner will not fire.
3. Push the RESET button to reset the control and restore burner operation.

TROUBLE SHOOTING

IF THE BURNER DOES NOT SHUT DOWN

If the burner does not shut down when the water drops below the probe:

1. Remove power immediately and re-check wiring.
2. Remove power and check for adequate clearance from the probe to any surface within the boiler or tee.

IF THE BURNER DOES NOT FIRE

1. Make sure water is at probe and probe lead wire is properly secured to the terminal.
2. Check for proper ground between probe and boiler shell. Excessive use of Teflon tape or sealing compound may insulate the probe from the boiler shell.
3. Re-check wiring and test for correct incoming voltage.

IF THE RED LED LAMP IS ON

The red LED lamp indicates that the control is locked-out. This feature will activate if the boiler experiences a low water condition exceeding 30 seconds in duration.

IMPORTANT: Do not reset control until the cause of the low water condition is corrected. **CAUTION:** Do not add water until boiler is cool.

MAINTENANCE

To ensure optimum performance, inspect probe annually. Clean any scale or build-up from the probe using a scouring pad or steel wool. Re-install the probe and test control in accordance with the Operating Instructions.

FITTINGS

Controls equipped with the EL1214-SV Probe can be mounted in standard reducing tees (supplied by others). Safgard manifolds, listed below, can be used with all probe models.



FOEM MANIFOLD

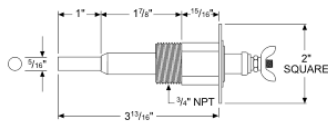


1214C-2 TEE

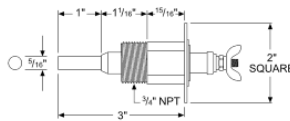
MODEL	PSI	SIZE
FOEM-1	160	1 1/2" x 1 1/2" x 3/4"NPT
FOEM-2	160	1" x 1" x 3/4"NPT
FOEM-3	160	1 1/4" x 1 1/4" x 3/4"NPT
1214C-2 TEE	250	1" x 1" x 3/4"NPT

PROBE DATA

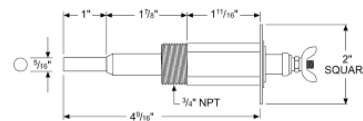
Test Pressure: 1000 PSI, All Models



EL1214 - STANDARD MODEL - 3/4" NPT
For 1/2", order Model EL1220

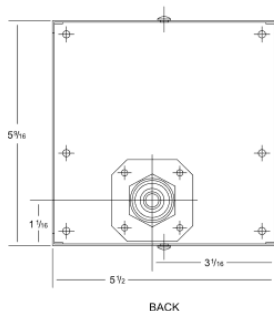


EL1214-SV - 3/4" NPT
For 1/2", order No. EL1220-SV

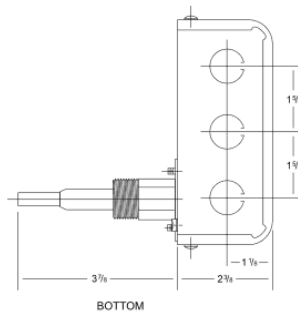


EL1214-P - 3/4" NPT

DIMENSIONS



BACK



BOTTOM

SPECIFICATIONS

MAXIMUM PRESSURE: 250 PSI
INPUT VOLTAGE: 120 VAC, 60 HZ
SWITCH RATINGS: 5.8 FLA, 34.8 LRA
SWITCH CONTACTS: SPDT
ALARM CIRCUIT: 125 VA @ 120 VAC
Pilot Duty



LIMITED MANUFACTURER'S WARRANTY

We warrant products manufactured by Hydrolevel Company to be free from defects in material and workmanship for a period of two years from the date of manufacture or one year from the date of installation, whichever occurs first. In the event of any claim under this warranty or otherwise with respect to our products which is made within such period, we will, at our option, repair or replace such products or refund the purchase price paid to us by you for such products. In no event shall Hydrolevel Company

be liable for any other loss or damage, whether direct, indirect, incidental or consequential. This warranty is your EXCLUSIVE remedy and shall be IN PLACE OF any other warranty or guarantee, express or implied, including, without limitation, any warranty of MERCHANTABILITY or fitness for a particular purpose. This warranty may not be assigned or transferred and any unauthorized transfer or assignment thereof shall be void and of no force or effect.

HYDROLEVEL COMPANY

P.O. Box 1847
New Haven, CT 06508
Phone: (203) 776-0473
FAX: (203) 773-1019



Warranty Information (2 Pages)

Alternate Heating Systems

LIFETIME LIMITED WARRANTY

Alternate Heating Systems, on behalf of its hearth brands ("AHS"), extends the following warranty for Legacy Stoves™ wood and/or coal hearth appliances that are purchased from an AHS Legacy Stoves authorized dealer.

WARRANTY COVERAGE:

AHS warrants to the original owner of the AHS Legacy Stoves appliance at the site of installation, and to any transferee taking ownership of the appliance at the site of installation within two years following the date of original purchase, that the AHS Legacy Stoves appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components manufactured by AHS are found to be defective in materials or workmanship during the applicable warranty period, AHS will, at its option, repair or replace the covered components. AHS, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

WARRANTY PERIOD:

Warranty coverage begins on the date of original purchase. In the case of new home construction, warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the product by an independent, authorized AHS Legacy Stoves dealer/ distributor, whichever occurs earlier. The warranty shall commence no later than 24 months following the date of product shipment from AHS Legacy Stoves, regardless of the installation or occupancy date. The warranty period for parts and labor for covered components is produced in the following table. The term "Limited Lifetime" in the table below is defined as: 10 years from the beginning date of warranty coverage for wood/coal and coal appliances. These time periods reflect the minimum expected useful lives of the designated components under normal operating conditions.

Warranty Period		AHS Manufactured Appliances and Venting			Components Covered
Parts	Labor	Coal and Wood	Coal	Venting	
1 Year		x	x	x	All parts and material except as covered by Conditions, Exclusions, and Limitations listed
2 years		x	x		Igniters, electronic components, and glass Factory-installed blowers
Limited Lifetime	3 years	x	x		Firebox and heat exchanger
90 Days		x	x	x	All replacement parts beyond warranty period

See conditions, exclusions, and limitations on next page

WARRANTY CONDITIONS:

This warranty only covers AHS appliances that are purchased through an AHS Legacy Stoves authorized dealer or distributor. A list of AHS Legacy Stoves authorized dealers is available on the AHS Legacy Stoves branded websites.

This warranty is only valid while the AHS appliance remains at the site of original installation.

This warranty is only valid in the country in which the AHS Legacy Stoves authorized dealer or distributor that sold the appliance resides.

Contact your installing dealer for warranty service. If the installing dealer is unable to provide necessary parts, contact the nearest AHS Legacy Stoves authorized dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.

Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.

WARRANTY EXCLUSIONS:

This warranty does not cover the following:

Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under warranty.

Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.

Repair or replacement of parts that are subject to normal wear and tear during the warranty period. These parts include: paint, wood, pellet and coal gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.

Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this warranty.

Damages resulting from: (1) failure to install, operate, or maintain the appliance in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/ incorrectly performed repairs; (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operating instructions; (7) installation or use of components not supplied with the appliance or any other components not expressly authorized and approved by AHS Legacy Stoves; (8) modification of the appliance not expressly authorized and approved by AHS in writing; and/or (9) interruptions or fluctuations of electrical power supply to the appliance.

Non-AHS venting components, hearth components or other accessories used in conjunction with the appliance.

Any part of a pre-existing fireplace system in which an insert is installed.

AHS's obligation under this warranty does not extend to the appliance's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

This warranty is void if:

The appliance has been over-fired or operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.

The appliance is subjected to prolonged periods of dampness or condensation. There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

LIMITATIONS OF LIABILITY:

The owner's exclusive remedy and AHS's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will AHS be liable for any incidental or consequential damages caused by defects in the appliance. Some states do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from state to state. EXCEPT TO THE EXTENT PROVIDED BY LAW, AHS MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

Service and Maintenance Log

[illegible]



**Advanced Design
Old Fashioned Value**

(Signature of Boxer)

A simple, empty rectangular box with a thin black border, intended for a signature.

Your premium quality hearth product designed and assembled
by the experienced and skilled members at Alternate Heating
Systems in Harrisonville, PA, USA.