

RITEWAY PRODUCTS: THEIR UNIQUENESS

Riteway was founded nearly 40 years ago with the knowledge that one half the heat value of wood goes up the chimney in smoke. As a result, Riteway engineered a basic design that has revolutionized the use of wood as a fuel.

Riteway products have earned their outstanding reputation for efficiency by burning those combustible gases that escape through the chimney. The advantages are two-fold: it vastly increases the percentage of heat recovered from the same amount of wood, and, secondly, it reduces the troublesome creosote deposits in the chimney. This truly unique "complete"

combustion" design is built into every Riteway heater, furnace and boiler we make. The name "Riteway" automatically tells you the product is engineered for complete combustion.

We want you to make the decision yourself. Many manufacturers incorrectly claim total combustion is achieved in their product. In Riteway you find the sophisticated design and quality construction required for complete combustion to take place. Don't just take our word for it though. Study the facts about what it takes to burn wood. Compare Riteway with other products, and then decide for yourself. We believe that an

educated consumer will invariably select a Riteway.

While extremely important, an efficient design isn't the only thing we offer. Riteway differs from many other manufacturers for the simple reason that we care. Riteways are rigidly inspected by our quality control people prior to shipment. We demand a lot from our dealers, too. You'll find them to be a courteous, knowledgeable and service-oriented group of people. They'll do their best to make you a satisfied customer.

We invite you to explore competitive units on the market. We think you'll come back to Riteway, because you'll find we're the people who care.

BEFORE YOU MAKE AN INVESTMENT

Before you purchase any kind of an appliance, always check to see what's available on the market. It's especially important that you "compare apples with apples" when you are preparing to purchase a woodburning or multi-fuel unit.

Be certain you know what the price includes. Some manufacturers' "accessories" are really quite necessary to make the unit operate! By the time you add on the prices of the so-called "accessories," you're talking about a whole new ball game!

What kind of welding does the manufacturer use on parts subjected to the most wear? Particularly on parts like the body of the unit, you must avoid spot welding! Spot welding is fine for lighter duty parts, but that's all! From whom are you buying your product? If it's a dealer, how much do they seem to know about that particular product; what is their reputation for service? Think about the manufacturer, too. In case any problems develop that your dealer can't handle, would you have access to the factory?

When you are ready to make a purchase, think a little ahead. Many new companies are appearing with the advent of the energy crisis. Someday, you'll need replacement parts no matter whose product you buy. A lot of companies are fading away just as quickly as they spring up. Be sure the manufacturer will still be around when you need them most!

Your purchase will probably involve a substantial amount of

money. Talk with the people who already have that product in use. They'll be able to give you a first hand account, particularly if they've used competitive products in the past and can make actual comparisons. It's a wise way of being more certain about your investment.

Remember that the unit you purchase should have convenience features. Whatever unit you buy, it will require care and maintainance. Be certain to find out whether the unit has an ash pan to make emptying ashes an easy process and whether the unit has a thermostatically controlled damper. A thermostat will control your room temperatures far better and with much less effort than manual damper controls.

RITEWAY: OUR ENERGY COMMITMENT

Part of our world's energy solution is to substitute renewable fuels for fuels that eventually will be depleted. It's just as important, however, that we use our renewable fuels efficiently. If we can't, we're

still guilty of wasting our energy resources.

We at Riteway have a commitment to provide energy efficient products. It means our products cost more than some offered by our competitors, but we have to accept that as part of our commitment. We're not about to cheapen our commitment by making less expensive, less efficient products for the sake of getting a bigger chunk of the market.

We refuse to offer for sale any products we feel are less than best quality or which are not efficient.

HOW DOES WOOD BURN?

You need to understand the basic chemistry of a wood fire before you can determine whether a manufacturer's claims of efficiency are valid.

Wood is composed of several basic elements: carbon, hydrogen, oxygen and small quantities of miscellaneous minerals. These elements combine to form the cellulose, lignin and water which make a tree trunk. It's the cellulose and lignin that are combustible and form the source of energy in wood. The water in wood is undesirable and must be heated and evaporated before wood can burn with any degree of efficiency. This is why you hear people emphasizing the importance of "seasoning" your wood.

The cell walls of wood are comprised of cellulose. Because of its long strands, cellulose forms the grain in wood. Lignin is a plastic-like substance that cements the cells together to give wood its strength. In order for wood to burn properly, the following processes must take place:

- 1. Most of the water must be heated and evaporated.
- 2. Heat must be provided to break down the lignin and cellulose into a gas.
- 3. the gas must be mixed with air (oxygen) in the proper amount for burning.

- 4. The gas/air mixture must be heated to the minimum ignition temperature.
- 5. The gas/air mixture burns, giving off the heat necessary to sustain the fire.

Normally, a wood fire progresses in stages. First, tinder or kindling is ignited to provide initial heat. As soon as enough moisture is given off from the fuel wood, the lignin and cellulose begin to "break down." When the major portion of the volatile materials have been burned off, charcoal is left to slowly burn down into a bed of coals.

Conventional wood heating equipment loses a lot of potential energy through gases only partially burned. For these gases to burn thoroughly, they must pass back through the fire where they can be reheated. With oxygen available at that point, the gases will burn.

Study the diagrams of the different Riteway heating units. You'll see how Riteway has incorporated a design that allows "complete combustion" to take place. In every Riteway unit the gases are forced back through the hot charcoal bed, and oxygen is available for complete combustion.

HOW MUCH WOOD WILL YOU BURN?

People unfamiliar with wood heating often wonder how many cords of wood they may burn in a season. This is completely dependent on the space you are trying to heat, the size and efficiency of the heating unit, weather conditions, geographic location and many other variables.

We have set up several "formulas" that will help to estimate the amount of wood you may need in one season. Please understand that this is an estimate only.

Using the appropriate formula, take the average quantity of fuel you use in a year's time and divide it by the appropriate figure. This will give you the approximate number of cords.

Oil: Divide number of gallons by 175 = Cords of wood
Coal: Divide number of pounds [not tons] by 1600 = Cords of wood
Gas: Divide number of thousand cubic feet [mcf] by 28 = Cords of wood
Electricity: Divide number of kilowatts by 6500 = Cords of wood
Propane gas: Divide number of gallons by 220 = Cords of wood

CHIMNEYS:

JUST HOW IMPORTANT?

The chimney is one of the most critical factors in the successful operation of any heating system — whether you're talking about wood, oil, coal or gas-fired units. When using a Riteway or any other heating unit, you should be certain your chimney conforms to generally accepted standards.

The purpose of the chimney is to provide an exit for the gases emitted by the unit. There must be a draft in the chimney to pull the gases from the unit and assist with their escape. Natural draft in a chimney depends on two variables. First, draft is created by the aspirating effect of the air currents blowing across the top of the chimney. Second, when the temperature of the flue gases is higher than the atmosphere around the chimney, natural draft also will result.

A chimney must be kept warm (above 250 degrees Fahrenheit) for proper draft to occur. A chimney should provide a continuous and dependable draft of not less than .04 inches of water and preferably around .06 inches of water. Your local heating equipment dealer should be able to measure the draft for you if you suspect there may be a problem.

Many problems with creosote are due to poor chimneys with cold walls. If you have a masonry chimney, insulating the chimney flue liner will increase the draft as well as make it more consistent. Insulation also will reduce creosote deposits by reducing the amount of moisture condensation from the flue gases.

Chimneys must be kept clean. Because creosote is combustible if it is allowed to accumulate inside a chimney, creosote can ignite in the chimney and will burn vigorously. Chimneys are not designed to withstand such fires, and chimney damage or structural damage can result. Also, the creosote can "block" the chimney by accumulating in the flue liner

 Proper chimney height is required for adequate draft to occur. For masonry chimneys, the minimum distance from the chimney thimble to the top is 20 feet, and it is 24 feet for furnaces and boilers.

 The interior surface of the flue should be as smooth as possible to avoid friction. This also helps to decrease the possibility of a creosote build-up.

Only one appliance should be hooked into each flue.

 Air leakage through cracks where mortar has fallen out or around the clean-out door will mean a cold chimney.

— The stove pipe connecting the heating unit to the chimney should the same diameter or one inch larger where it enters the heating unit. In other words, it should never get

STOVE OR FURNACE

until the inside is completely closed.

Prefabricated insulated stainless steel chimneys are usually satisfactory if installed according to the manufacturer's recommendations. You should take note of some additional points about chimney construction:

> smaller going from the heating unit to the chimney. The stove pipe connecting the unit to the chimney also should have as few bends as possible. The more bends there are, the more draft will be restricted. The stove pipe connector should be kept as short as possible.

The top of the chimney should be at least two feet above the high point of the roof. If an adjoining roof section is higher, the chimney should be at least as high as or higher than the tallest section. If these two conditions are not satisfied, down drafts may result. Down drafts also may be caused by other nearby buildings or trees that are taller than the chimney.

 Flue liners in the chimney must be properly sized! (See table below)

Good chimneys make the difference!

RECOMMENDED SIZING CHIMNEY FLUE LINERS

COLLAR			LINER				
	DIAMETER	AREA (SQ. IN.)	ROUND ID	SQ. OR RECT.	INSIDĒ DIAMETER	AREA (SQ. IN.)	EQUIV. DIA.
	6" 7" 8" 10"	28.3 sq. in. 38.3 sq. in. 50.3 sq. in. 78.5 sq. in.	6"-7" 7"-8" 8"-9" 10"-11"	8" x 8" 8" x 8" 8" x 12" 12" x 12"	63/4" x63/4" 63/4" x63/4" 61/2" x 101/2" 93/4" x 93/4"	42.7 sq. in. 42.7 sq. in. 63.6 sq. in. 83.3 sq. in.	7.4" 7.4" 9" 10.4"

CREOSOTE CAN BE CONTROLLED

Creosote is a tar-like liquid or solid resulting from the distillation of wood during the combustion process. Highly combustible in its solid or semi-liquid state, creosote is present in the gases given off by wood when it burns. The creosote condenses from those gases when the stack temperature drops below 250 degrees Fahrenheit.

One key to eliminating creosote is having an efficient heating system that burns off most of those gases before they even enter the chimney.

Another major factor in creosote prevention is proper chimney construction. Please read our section covering chimneys — you'll be amazed at just how important they are!

GLOSSARY

AIRTIGHT: Stoves which are sealed to the point that the flow of air can be controlled, yielding controlled combustion and heat output.

BOILER: A unit for producing hot water or steam, commonly thought of as a unit for supplying water for central heating.

BTU/HR.: Unit of measure for the flow of energy. One BTU is the energy required to raise the temperature of one pound of water one degree Fahrenheit.

CHIMNEY (AIR COOLED): A chimney constructed to allow air to flow around the flue for cooling. Such chimneys generally do not give satisfactory performance when used with woodburning equipment.

CHIMNEY (AIR INSULATED): Chimneys in which trapped air is utilized as the insulating material around the flue or

inside liner.

COMPLETE COMBUSTION: Complete burning of the combustibles in the fuel. "Complete combustion" units do not totally achieve this, but have provisions for approaching a complete burning of combustibles.

CORD: A measure of firewood equivalent to a stack four feet high, four feet wide and eight feet long.

CREOSOTE: Tars and vapors which have condensed from the smoke given off by burning wood.

DOMESTIC HOT WATER: Potable hot water, generally used for drinking, bathing, washing, etc.

DRAFT: Difference between the air pressure inside a chimney (or heating unit) and pressure outside the chimney.

FLUE: A passage for gases or smoke, commonly thought of as the lengthwise hole extending from the top to the bottom of the chimney. A device with a passage (flue) designed specifically for carrying smoke, generally from within a building.

FURNACE: An enclosed heat-producing unit commonly considered to be used for heating air, with the heated air

distributed through ducts.

HEAT LOSS: The rate at which heat is lost from a structure, caused by infiltration of outside air, conduction through walls, floors, ceilings, etc. and radiation through windows. The heat loss from a building at the lowest expected temperature during the heating season is referred to as the "heat load" of the building.

HYDRONIC HEAT: A heating system which utilizes a circulating fluid, such as water, within a closed system of

pipes for transferring heat.

MULTI-FUEL: Heating units capable of burning more than one fuel, such as a unit that can burn wood and oil.

"R" FACTOR: A measure of the resistance of a material (or a combination of materials) to the flow of heat through the material.

RICK: Sometimes referred to as a "face cord." It is the quantity of wood (any length) piled in a stack four feet high by eight feet long.

SECONDARY COMBUSTION: Burning of combustibles (usually in a secondary zone or chamber) in smoke

generated in the primary combustion zone.

"U" FACTOR: Overall coefficient of heat transfer through material. "U" factor can be considered the reciprocal of the combined resistances of materials.

LIMITED WARRANTY

Riteway space heaters are warranted to be free of defects in materials and workmanship for a period of one year from the date of purchase when used in accordance with the recommendations in the installation and operation manual for the product.

Riteway furnaces and boilers are warranted to be free of defects in materials and workmanship for a period of five years from the date of purchase when used in accordance with the recommendations in the installation and operation manual for the product, with the following exceptions: firebrick, one year; cast iron gas combustion flue, one year; electrical and plumbing components, limited to the warranties offered by those respective manufacturers.

Defective parts will be repaired or replaced at the manufacturer's option. Parts must be returned prepaid to Riteway Manufacturing Company, and if found defective on inspection, will be replaced without charge for the replacement part as long as the unit is still under warranty. All replacement parts are shipped FOB Harrisonburg, Virginia (freight collect). This warranty does not cover damage caused by alteration, repairs, abuse, tampering, or improper operation of the unit. It does not cover damage from handling or Acts of God.

The manufacturer expressly limits any implied warranty of

fitness for a particular purpose and any implied warranty of merchantability to one year for Riteway space heaters and five years for Riteway furnaces and boilers, with the following exceptions: Firebrick, one year; cast iron combustion flue, one year; electrical and plumbing components, limited to the duration of the express warranties offered by those respective manufacturers. The manufacturer neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with its products. In addition, the manufacturer shall be held free and harmless from liability from damage to property related to the operation, proper or improper, of the equipment. This warranty applies only to the original purchaser, members of his household, guests in his home, and the purchaser's transferee. THE MANUFAC-TURER SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DE-SCRIPTION ON THE FACE HEREOF.

All claims made by the purchaser under this warranty should be directed through the dealer from whom the unit was purchased. If the dealer cannot be contacted after reasonable effort, claims may be placed with Riteway Manufacturing Company, a Division of Sarco Corporation.

Prices and specifications subject to change without notice.



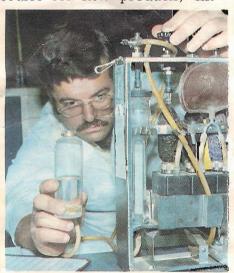
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THE RITEWAY TEAM

PROFESSIONALISM AND TECHNOLOGY

Riteway products are unique in the industry, as you will undoubtedly discover for yourself as you read our literature.

Even more unique, however, is our management style and our way of developing, testing and manufacturing products. Corporate decisions are made by a "core team" comprised of the corporate officers and representatives from Engineering, Manufacturing, Sales, Data Processing, Industrial Relations and Finance. The team sets the course for new products, em-





ployee benefit programs and the myriad of major issues any company faces. The effectiveness of this organizational structure is demonstrated by the high level of innovation, professionalism and technology you find in Riteway products. We've built a 40-year history of real "firsts" in the industry.

Riteway's most important asset is people: our employees. We could have the most sophisticated facilities in the world and still never achieve the high level of performance we now have at



Riteway. It's our people who make the difference. One dealer recently wrote, "I have enjoyed every one of your seminars, but never have I felt as enthused about the coming seasons as I now do. The workmanship, quality and line of products have reached the levels where I can have great pride in selling Riteway equipment. You people at Riteway are the finest people one could find to work with."

We're proud of ourselves for designing and producing what we believe are the most sophisticated products in the industry.



INSTALLING AND OPERATING THE RITEWAY WOOD HEATER MODEL 2000 & MODEL 37

Please read this manual thoroughly before using the heater.

LIMITED WARRANTY

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Riteway furnaces and boilers are warranted to be free of defects in materials and workmanship for a period of five years from the date of purchase when used in accordance with the recommendations in the installation and operation manual for the product, with the following exceptions: firebrick, one year; cast iron gas combustion flue, one year; electrical and plumbing components, limited to the warranties offered by those respective manufacturers.

Defective parts will be repaired or replaced at the manufacturer's option. Parts must be returned prepaid to Riteway Manufacturing Company, and if found defective on inspection, will be replaced without charge for the replacement part as long as the unit is still under warranty. All replacement parts are shipped FOB Harrisonburg, Virginia [freight collect]. This warranty does not cover damage caused by alteration, repairs, abuse, tampering, or improper operation of the unit. It does not cover damage from handling or Acts of God.

The manufacturer expressly limits any implied warranty of fitness for a particular purpose and any implied warranty of merchantability to one year for Riteway space heaters and five years for Riteway furnaces and boilers, with the following exceptions: firebrick, one year; cast iron combustion flue, one year; electrical and plumbing components, limited to the duration of the express warranties offered by those respective manufacturers. The manufacturer neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with its products. In addition, the manufacturer shall be held free and harmless from liability from damage to property related to the operation, proper or improper, of the equipment. This warranty applies only to the original purchaser, members of his household, guests in his home, and the purchaser's transferree. THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. THERE ARE NO WARRANTIES WHICH EX-TEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

All claims made by the purchaser under this warranty should be directed through the dealer from whom the unit was purchased. If the dealer cannot be contacted after reasonable effort, claims may be placed with Riteway Manufacturing Company, a Division of Sarco Corporation.

Prices and specifications are subject to change without notice.

1. INSTALLATION CHECK LIST:

- A. Install the heater on a 3/8 inch asbestos millboard floor protector which extends 18 inches beyond the heater on the fuel door side and 8 inches on all other sides. The floor protector must also cover the area under the chimney connector and 2 inches to either side. (See Fig. 1)
- B. Observe proper clearances as listed in Table 2.
- C. The stove pipe connecting the heater to the chimney must be of 24 ga. (0.0239) or thicker corrosion resistant steel. The stove pipe should be as short as safety will allow (20" minimum distance between pipe and combustible material), and there should be a maximum of 2 (two) 90° elbows. All horizontal runs should be slightly inclined toward the heater. (See Fig. 1) The connector pipe, elbows, and flue collar must be fastened together with sheet metal screws.
- D. A double-walled ventilated metal thimble must be used where the stovepipe goes through the interior wall. (See Fig. 2)

- E. Be sure that the stovepipe does not pass through a floor, closet, concealed space, or enter the chimney in the attic without proper clearance to combustible materials being maintained at all points.
- F. Be sure that only one appliance is connected to a flue.
- G. The chimney and flue liners must be clean and in good repair, and the liner must be properly sized. (See Table 1) A UL listed chimney, residential type and building heating appliance (UL Gas and Oil Equipment Directory) can be used where a masonry chimney is not available or practical. A circulating air-insulated three-walled chimney is not recommended.
- H. A smoke detector and fire extinguisher should be installed in an appropriate location.
- Be sure the installation meets all local codes and fire insurance company requirements.
- J. Be sure the magnetic damper, Riteheat regulator and all necessary shields are installed prior to firing the heater. (See Number 2 of these instructions.)

2. INSTALLING THE MAGNETIC DAMPER, RITEHEAT REGULATOR, AND HEAT SHIELDS:

The magnetic damper, Riteheat regulator, and all necessary shields must be installed before firing the heater. (See Figures 4 and 5)

On the Model 2000, the damper and regulator are installed as follows:

- A. Remove the label located over the primary air inlet.
- B. Place the magnetic damper in position and attach with the sheet metal screws provided in the hardware package.
- C. Remove the label where the Riteheat regulator will be installed.
- D. Place the Riteheat regulator in position and attach with the sheet metal screws provided.
- E. With the Riteheat regulator at the lowest setting and the magnetic damper lid closed, connect the two bead chains together so there is very little slack.
- F. Adjust the magnetic damper as follows: The damper lid should snap shut when it comes within 1/4" of the damper box. When the lid pops open, it should open approximately 1/2" above the damper box. To make any necessary adjustments, loosen the two screws holding the magnet to the damper box. (See Fig. 3) On the Model 37 there are two access holes in the combustion flue shield for this purpose. Sliding the magnet downward will decrease the pull of the magnet on the damper lid, and sliding the magnet upward will increase the pull. After making any adjustments, be certain the magnet is not in direct contact with the damper lid.

On the Model 37 the magnetic damper and Riteheat regulator are factory mounted in the combustion flue shield. Installation of this shield is as follows:

- A. Adjust the magnetic damper according to paragraph (F) above.
- B. Remove the label located over the primary air inlet.
- C. Place the combustion flue shield in position and attach using the sheet metal screws provided.

The Model 37 also requires a heat shield on the left side (facing the door) of the heater. Remove the shield from the right side of the heater where it is attached for shipping. Place the shield in position on the left side and attach, using the sheet metal screws provided.

3. STARTING THE FIRE:

It is extremely important to place 2" of dry earth or ash over the grate before starting the fire. This will protect the grate from burning out prematurely. Adjust the Riteheat regulator so the magnetic damper is open. You may also want to open the ash door to allow extra air to enter when starting the fire. Pull out the operating rod to open the direct draft damper. Place a quantity of crumpled paper in the heater, adding kindling and other small pieces of wood. Place larger wood on top. Light the paper and as soon as the fire is burning briskly close the ash door and direct draft damper.

IMPORTANT: The direct draft damper should be opened only when starting a fire or adding fuel. The ash door should be opened only when starting a fire or removing the ash pan, and the stove should never be left unattended with the ash door open. Never block the magnetic damper open or fire the unit with the ash door open (except as noted previously), as this will result in overfiring.

CAUTION: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this heater. Keep all such liquids well away from the heater while it is in use.

4. ADJUSTING THE RITEHEAT REGULATOR:

After the fire has been started and the room temperature has reached the desired level, adjust the dial on the Riteheat regulator so the magnetic damper just closes. The heater should maintain uniform temperature without further attention as long as fuel is in the combustion chamber. Sudden changes in the outside temperature may require that the regulator be adjusted slightly.

5. ADDING FUEL:

Add fuel only when the previous load has been converted to charcoal. After the charcoal has built up, use the poker to rake back and forth through the charcoal bed in the Model 2000. In the Model 37 shake the grate bars lightly. This will allow the finer ash to slip through the grate and into the ash pan. There should always be a minimum of 2" of ash on the grate to protect the grate from extreme heat produced by the charcoal bed. When raking the ash, live coals should be pushed toward the gas combustion flue. The charcoal bed should be at least 2" below the bottom of the gas combustion flue so that the draft is not obstructed. During mild weather when one charge of wood may last days, fuel should be replenished twice daily. Add only enough fuel to last 12 hours. The smaller amount of wood will have to burn harder in order to supply the necessary heat, and as a result, there will be less creosote.

6. DISPOSAL OF ASHES:

It is not usually necessary to empty the ash pan more than once every week or 10 days. When emptying ashes while the fire is burning, do not leave the ash door open for an extended period of time.

Ashes should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal. 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.

7. SELECTING & SEASONING WOOD:

Your choice of wood and how you season it is a significant factor in the successful operation of a Riteway or any wood-burning unit. A chart is included outlining the relative heat values of different wood varieties, as well as some of their other important characteristics. Seasoning wood is important since dry wood has a greater heating value than green wood, and it is more convenient and safer to use. Green and resinous wood should not be used because of the high creosote formation and the tendency to cause popping and sparks. Most popular hardwood varieties require 9 to 12 months for proper seasoning, although the moisture content of the wood should be reduced roughly 35 per cent in three months, depending on the season of the year. Fully seasoned wood has a moisture content of about 20 per cent.

Firewood generally seasons more rapidly in the late spring and summer and more slowly in late winter. To speed seasoning, the pile should be placed so that air may circulate easily through it. The ideal place is an open shed which would provide protection from the rain and dew, yet make air circulation possible.

Information published by the U.S. Forest Service indicates that a cord of wood cut into shorter lengths yields more cubic feet of wood than a cord cut into longer lengths. Averages taken by the Forest Service show that one cord cut into four-foot lengths yields 78.8 cubic feet, where a cord cut into two-foot lengths yields 97.5 cubic feet of solid wood. The conclusion drawn is that the shorter the cut lengths are, the less air space there is and therefore more wood!

8. CONTROLLING CREOSOTE:

All types and makes of woodburning heating equipment will give trouble with creosote deposits under certain conditions. When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

Creosote condenses from the flue gases when the stack temperature drops below 250 degrees F. The amount of creosote deposited in the pipe and chimney is dependent on the amount of moisture in the flue gases, the temperature of the stack, the rate at which the wood is burned and how completely the combustible elements in the flue gases have been burned in the combustion chamber. Most problems with creosote are due to poor chimneys with low draft and cold walls and to a low rate of burning when little heat is needed during the spring and fall months.

A low firing rate during spring and fall months can be circumvented. Instead of loading the combustion chamber with a full charge of wood, load only enough wood to last a 12-hour period. The reduced load will have to burn harder to provide the same heat as a full load. You will get better fuel efficiency doing this and avoid the creosote that develops with low firing.

Moisture in the flue gases may be controlled by using the driest wood possible, mixing small pieces (preferably slab wood) with every full load, and never using only large wood during mild weather when combustion is relatively slow.

Draft can be increased by having as few bends as possible between the heater and the chimney, insuring adequate chimney height and diameter, preventing air leaks in the chimney, eliminating external obstructions near the chimney outlet, and having a separate flue for each appliance.

The chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if a creosote buildup has occurred.

If creosote has accumulated, it should be removed to reduce the risk of a chimney fire.

When a pipe and chimney are badly plugged because of operating under improper conditions or warm weather, the only practical way of cleaning is to disassemble the stovepipe and clean both the pipe and the chimney by scraping.

In a Riteway, you can open the direct draft damper 20 to 30 minutes before adding fuel to increase the stack temperature and allow any creosote in the pipe to dry. In the process of drying, the creosote shrinks and the scale falls from the walls of the pipe. Once a week, open the direct draft damper and place several sheets of crumpled newspaper in the unit. Open the ash door slightly to permit plenty of draft. This will allow the flame to be carried out into the smoke pipe and ignite any creosote present. If this is done on a regular basis, there will not be enough creosote in the pipe to cause a dangerously high temperature when it burns, REMEMBER: Never leave the stove unattended while the ash door is open.

PLEASE NOTE: When people have complained about creosote formation while using Riteway equipment, in almost every case the cause has been either a poor chimney or the unit has not been operated according to Riteway's instructions. It is VERY

IMPORTANT that instructions be read and followed. It is also very important that Riteway owners are aware of the difficulties that poor chimneys can produce. Many people think that just because they have a *new* masonry chimney it must be a good chimney! This is not necessarily the case!

9. CHIMNEYS

It is always better to locate the chimney on the inside of the building to help keep the chimney warm. The second best position would be on the inside of an exterior wall. If possible, placement of a chimney on the outside of an exterior wall should be avoided.

The chimney outlet should be at least two feet higher than any portion of the building within 10 feet and at least 3 feet above the point where the chimney passes through the roof. If these two conditions are not satisfied, downdrafts may result. Downdrafts may also be caused by other nearby buildings or trees that are taller than the chimney.

Many people, unless they are building a new residence, cannot afford the expense of a new chimney. If it is desirable to hook a Riteway appliance into an existing chimney, there are several things that require your attention. The first rule to follow is that the unit should have a separate flue with a flue liner to reduce the possibility of draft interference. A separate flue is not only required for Riteway equipment but it is recommended by many heating equipment manufacturers and the National Fire Protection Association.

An existing masonry chimney with a tile flue usually is adequate as long as no other appliances are attached to the flue. A masonry chimney without a tile flue is NOT SUITABLE! If this is a problem, the least expensive remedy is to fit the chimney with a metal flue liner. Using a 24 gauge or heavier stainless steel pipe, brace and seal the bottom, fill the space between chimney and pipe with vermiculite, then brace and carefully seal top of the chimney. The following should be checked for any existing lined chimneys:

- A. The chimney preferably should be straight and have no offsets. Offsets provide a place for creosote to accumulate. This not only is potentially dangerous but it will affect the draft. The best solution is to open a hole in the chimney and plaster the offset corners so there is a smooth surface.
- B. The liner must be properly sized for the unit.
- C. Generally, a chimney should not have an arch as this will impede the draft unless the wind is coming from the right direction.
- D. All cracks in the chimney must be sealed or cold air will enter the chimney.

Perhaps your present home does not provide a chimney for your stove installation. You can choose either to build a masonry chimney according to specifications already discussed or use a pre-fab chimney. A metal pre-fab chimney is efficient, normally cheaper, and more easily installed than a new masonry chimney. Riteway recommends a stainless steel double-walled insulated chimney, but does not recommend the three-walled (uninsulated) air cooled pre-fab chimney which has been found to cool the flue gases resulting in creosote accumulation on the inner surface of the flue. The pre-fab chimney must be a UL listed chimney, residential type and building heating appliance.

If it is desired to connect a Riteway heater to a fireplace flue in a chimney, the fireplace cannot be used as long as the heater is installed there. A heater can be installed by running a metal flue liner (6" for the Model 2000 or 7" for the Model 37) from the stove all the way up the chimney, installed as instructed above for a metal chimney liner. PLEASE NOTE: Riteway does not recommend installing a heater in a fireplace opening. Be warned that problems may develop even if the precautions outlined above are followed.

Whether building a new chimney or planning to use an existing chimney, a homeowner should avoid or correct these common errors. The following briefly summarizes some of the important points about chimney construction:

- A. A minimum height of 20 feet is required for adequate draft.
- B. The chimney should be as straight as possible. Offsets should be plastered as described earlier.
- C. The interior surface of the flue should be as smooth as possible.
- D. Only one appliance should be hooked into each flue.
- E. The connecting stovepipe should be the same diameter or larger where it enters the chimney as where it enters the heating unit.
- F. The smallest cross sectional area should be considered the effective area of the **chimn**ey. If an 8" x 8" chimney is restricted to an 8" x 6" at some point, it is only as effective as an 8" x 6" chimney.
- G. Air leakage through cracks results in a cold chimney, and a chimney must be warm for proper draft to occur.

The length of the stovepipe connecting the heater to the chimney should be kept as short as safety will allow (see National Fire Protection Association standard 89M) to minimize cooling of the flue gases in the pipe. When installing stovepipe, the crimped end should fit inside the heater's collar. Any horizontal runs should have an elevated pitch or rise of 1/4" per running foot so that any liquid creosote will flow back into the combustion chamber and burn.

10. DRAFT:

Proper draft is extremely important with all wood and coal burning appliances. A good chimney should provide a continuous and dependable draft of not less than .04 inches of water and preferably around .06 inches of water.

Most of the customer inquiries Riteway receives are problems caused by a poor or in some cases excessive draft. A result of a poor draft could be: creosote, smokey firebox when loading, or backpuffing. Indications of excessive draft are burning too much fuel, low heat output, and high stack temperatures.

The most common cause of poor draft is an improperly sized flue liner. Riteway recommends that the chimney liner's inside dimensions be at least as large as the appliance's collar size and have no larger cross sectional area than an 8" x 8" square flue liner for the Model 2000 or 8" x 10" square flue liner for the Model 37, or a cross sectional area no larger than 125% of the collar for a round flue. For instance, a 6" heater collar is 28 square inches increased by 25% would be 35 square inches or approximately a 7" round flue. In general, for round liners Riteway recommends that they not be increased more than 1" from that of the Riteway's collar size (see Table 1). The reason for the above is that Riteway appliances are designed to produce the maximum amount of heat per amount of fuel burned. As a result, the flue gas temperature is lower than for some similar equipment.

Natural draft in the chimney depends on two variables. First, draft is created by the aspirating effect of the air currents blowing across the top of the chimney. Second, the temperature of the flue gases is higher than the ambient temperature which makes the flue gases lighter than the surrounding air. As a result, the flue gases will rise.

If the firing rate of any Riteway equipment cannot be controlled, the draft should be checked to determine if excessive draft is the problem. If flue draft is in excess of the recommended range of 0.04 to 0.08 inches water column, look for air leaks around fuel and ash doors, magnetic damper regulator, and the heater's base.

BURNING COAL (MODEL 37 ONLY):

For best results a good quality hard coal (anthracite) is recommended. Pea or nut size coal is recommended; however, the coal must be large enough so that it does not fall through the grate openings. If the chimney provides a poor draft, larger size coal should be used to improve the unit's performance. Adjust the Riteheat regulator so that the magnetic damper is open. You may also want to open the ash door to allow extra air to enter when starting the fire; however, it is important to remember that you should never leave the stove unattended with the ash door open! Open the direct draft damper, place a small amount of crumpled paper on top of the grates, and cover this with kindling.

Light the paper and as soon as the kindling is burning freely, add one or two shovels of coal. You may want to shake a few of the ashes into the ash pan as you add coal. This will allow draft air to enter through the grates. When the fire is burning well, more coal can be added. The coal should not come above the top of the fire brick. When adding fuel, push the live coals toward the flue baffle (point where the flue gases leave the combustion chamber) and add a fresh charge of coal in front.

It may be necessary to shake the grates morning and evening when burning coal. Shake until live coals begin to fall. If the fire does not respond promptly when the magnetic damper opens, it may be necessary to shake the grates once again to allow a few more ashes to slip through. Be certain that the grate bars are in a level position. Failure to do this may cause the grate bars to warp! Do not allow the ashes to pile up high in the ash pan as there must be a few inches of air space between the ash pan and the grate bars to allow draft and prevent the grate bars from warping. When burning coal, the ash pan should be emptied more often. It may be helpful in burning coal to fill the firebox only to the top of the firebrick, being careful to cover the two draft louvers, one to the front and one to the back, thus forcing combustion air through the grates. Be very careful to leave the combustion flue to the right open.

12. MAINTENANCE OPERATIONS:

Check gaskets on ash and fuel doors. Close the doors on a thin piece of paper. If the paper does not pull out freely, the door may be considered properly sealed. If it does pull out easily, air can leak in at that point. Do this at close intervals to determine if the doors are correctly sealed all the way around.

Visually inspect the direct draft damper to see that it closes tightly, is not warped, and operates without binding. Repair or replace if necessary.

13. SYMPTOMS AND SOLUTIONS:

Smoke leaking around the stove top: Caused by improper seal between the stove top and the stove body. To remedy, loosen the bolts around the stove top and remove the top. Install a new top sealing gasket around the top edge of the heater body. Replace No effort was spared in making your Riteway heater an excellent the top using the bolts previously removed.

rod: Caused by inadequate draft in chimney. Without proper the heater.

draft, smoke tends to accumulate in the top of the combustion chamber. To remedy, check for obstruction (birds' nests, creosote, etc.) in the chimney or stovepipe. Check the ash level on the grates and be certain it is not too high and blocking draft near the combustion flue. Make certain you are burning well-seasoned wood. If these conditions appear satisfactory and the problem still persists, you or your dealer should check the chimney draft with a draft gauge. If the draft is less than .04 inches/water, follow our recommendations on chimney construction and correction.

Backpuffing: Caused by downdrafts in the chimney. To remedy, follow our recommendations on chimney construction and correction. Note: Occasionally, in modern and well-insulated homes, pressure differences can produce "backpuffing". To remedy, simply open a window or exterior door slightly.

Firing Rate uncontrolled: Caused by unwanted air leakage. To remedy, check ash door and fuel door gaskets as described earlier. Check seal between stove top and body and remedy if

Paint discolors: Riteway uses a specially developed heat-resistant paint. Depending on the firing rate of the heater, the pigments may begin to oxidize at some points. Though discolored, the paint still adequately protects the body of the heater. If the appearance is objectionable, your dealer will supply you with touch-up paint or you may use "barbecue black", which is available at hardware stores.

14. JUST A REMINDER:

For further information on using your heater safely, obtain a copy of the National Fire Protection Association publication "Using Coal and Wood Stoves Safely" NFPA No. HS-8-1974. The address of the NFPA is 470 Atlantic Ave., Boston, MA. 02210. NFPA has been used as a reference throughout this literature.

A Riteway heater is no different than any scientifically designed appliance. Riteway units are built for years of satisfactory service if operated according to the instructions. Periodic maintenance checks will add to the life of the unit and will assure you of satisfactory performance.

product from the standpoints of engineering, workmanship, and Smoke leaking through heater body at the direct draft damper materials. Contact your dealer if you have any questions about

RITEWAY MFG. CO. P.O. BOX 153 HARRISONBURG, VA 22801 (703) 434-7090

TABLE 1 RECOMMENDED SIZING CHIMNEY FLUE LINERS

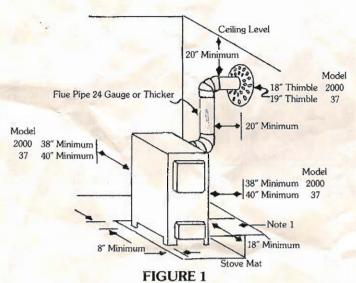
RITEWAY HEATER	COLLAR SIZE	CHIMNEY LINER INSIDE AREA (SQ. INCHES)	ROUND LINER (ID)	STANDARD LINER (OD)	
2000	6"	28-38	6"-7"	8" x 8"	
37	7"	38-50	7"-8"	8" x 10"	

TABLE 2 INSTALLATION CLEARANCES (IN INCHES)

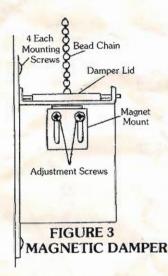
RITEWAY HEATER (SEE NOTES 1 and 2)	MINIMUM DISTANCE TO WALLS		
2000	38"		
37	40"		

Heater legs must provide at least 4" of open space between the heat shield and floor.

2. 3/4" asbestos millboard entirely covering the floor under the heater and extending out at least 18" beyond the heater on the loading side and 8" on all other sides. The floor protector must also cover the area under the chimney connector and 2 inches to either side. (see Fig. 1)

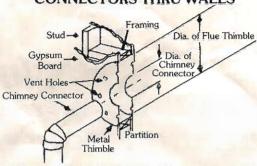


NOTE 1: The floor protector must cover the area under the chimney connector and two (2) inches to either side.



Firewood Ratings					
Wood Variety	Relative Heat	Easy to Burn	Easily Split	Smoke	Sparks
Ash, Red Oak, Beech, White Oak, Birch, Hickory, Hard Maple, Pecan, Dogwood	High	Yes	Yes	No	No
Soft Maple, Cherry Walnut	Medium	Yes	Yes	No	No
Elm, Sycamore, Gum	Medium	Medium	No	Medium	No
Aspen, Basswood Cottonwood	Low	Yes	Yes	Medium	No
Chestnut, Poplar	Low	Yes	Yes	Medium	Yes
Southern Yellow Pine, Douglas Fir	High	Yes	Yes	Yes	No
Cypress, Redwood	Medium	Medium	Yes	Medium	No
White Cedar, Western Red Cedar, Eastern Red Cedar	Medium	Yes	Yes	Medium	Yes
White Pine, True Firs, Ponderosa Pine, Sugar Pine	Low	Medium	Yes	Medium	No
Tamarack, Larch	Medium	Yes	Yes	Medium	No
Spruce	Low	Yes	Yes	Medium	Yes

FIGURE 2 CONNECTORS THRU WALLS



NFPA No. 211 does not permit a chimney connector to pass through any floor or ceiling or through any firewall or fire partition. However, where necessary, a connector may pass through a partition other than a fire partition under any of the following conditions:

(1) Where a ventilated type metal thimble, as shown in figure 2 is used. Such a thimble must be at least 12 inches larger in diameter than the chimney connector.

(2) Where a metal or burned fire-clay thimble is used and the thimble is surrounded on all sides by not less than 8 inches of brick work or equivalent fireproofing material.

(3) Where a combustible material is cut out of the partition wall for a sufficient distance to provide not less than 18 inches clearance on all sides of the connector. Any material used to close this opening must be non-combustible insulating material.

Extract from National Fire Protection Association Pamphlet "Using Coal and Wood Stoves Safely!" NSPA HS-8, 1974, page 5 & 6.

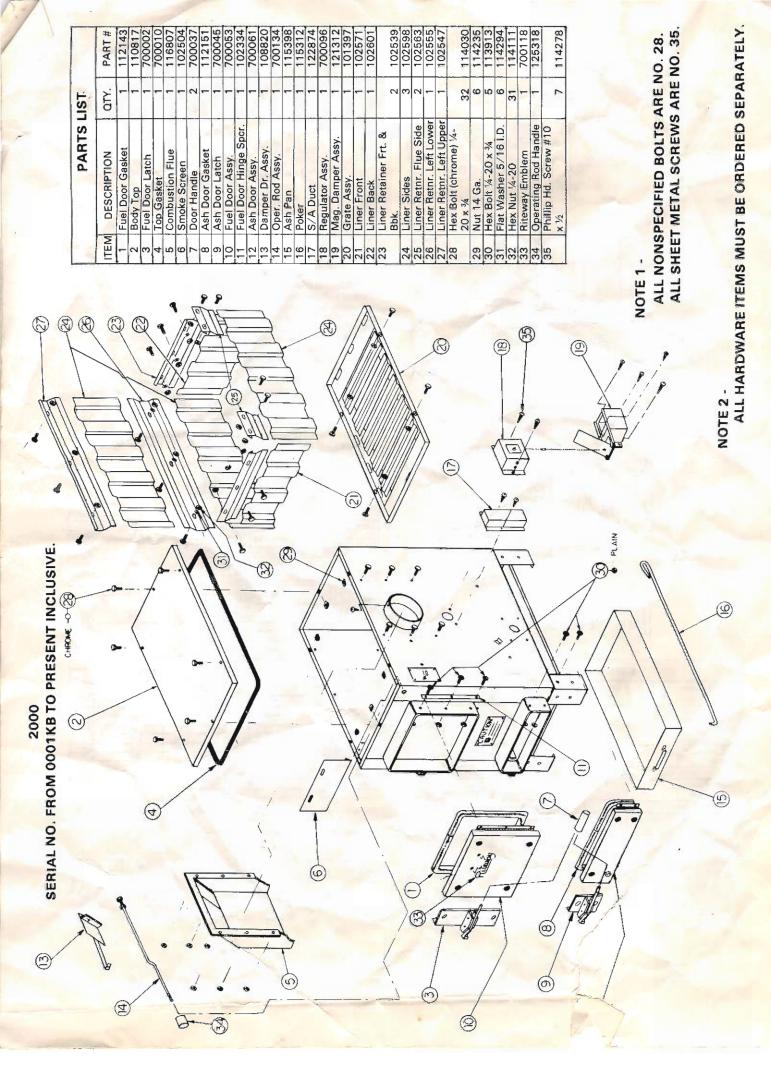
Heat Equivalents

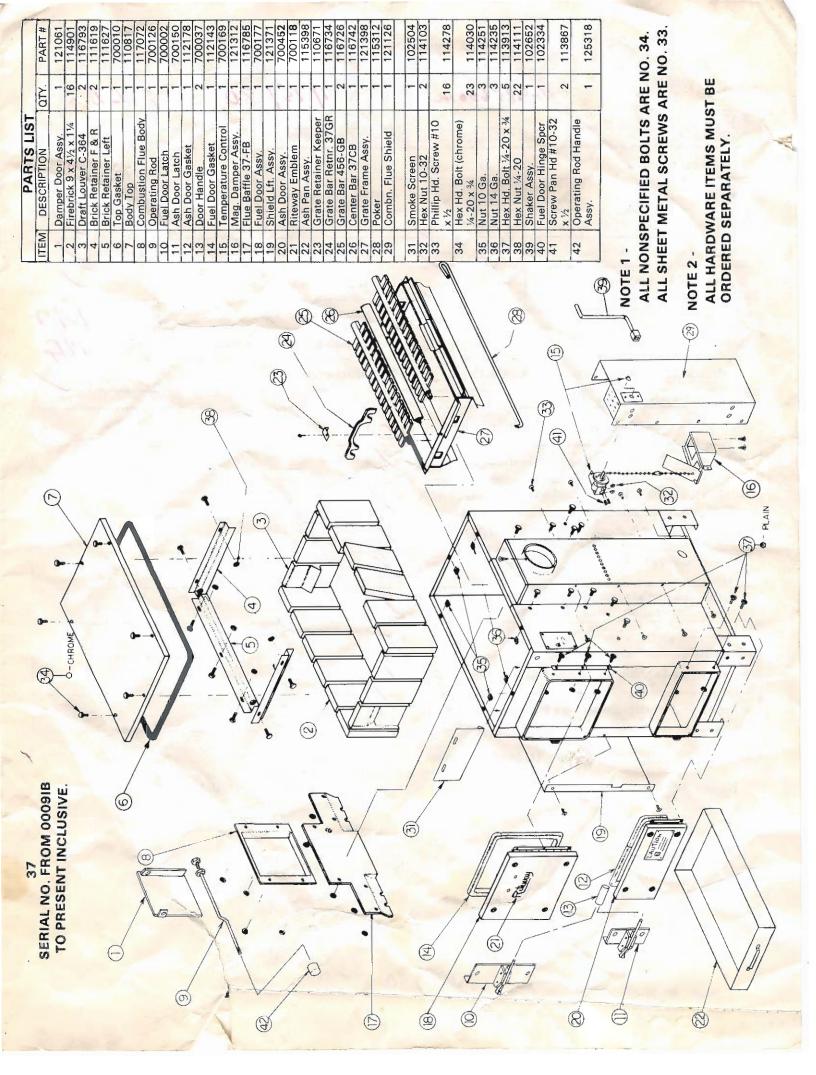
Species	Wt. Per Cord (lbs.)	Coal (tons)	Fuel Oil (gals.)	Natural Gas (therms)
Apple	3790	1.22	171	271
Ash, White	3300	1.06	149	236
Beech	3500	1.12	158	250
Birch, Paper	3040	.97	137	217
Birch, Sweet	3740	1.20	168	267
Birch, Yellow	3420	1.10	154	244
Cherry, Black	2900	.93	130	207
Dogwood, Flowering	4010	1.28	180	286
Dogwood, Pacific	3620	1.16	163	258
Elm, Rock	3540	1.13	159	252
Elm, Soft	2940	.94	132	210
Hickories	4030	1.29	182	288
Hickory, Water	3660	1.17	165	261
Holly	3140	1.01	141	224
Juniper, Alligator	2940	.94	132	210
Larch, Western	3100	1.00	140	222
Locust, Black	4010	1.28	180	286
Maple, Hard	3370	1.08	152	240
Maple, Soft	2850	.91	128	203
Mountain Laurel	3820	1.23	173	275
Oak, Red	3500	1.12	158	250
Oak, White	3700	1.18	166	264
Persimmon	3990	1.28	180	285
Pine, Loblolly	2890	.92	130	206
Pine, Long Leaf	3310	1.06	149	236
Pine, Shortleaf	2840	:91	129	203
Sugarberry	2920	.93	141	208
Tamarack	3020	.97	136	216
Walnut, Black	3130	1.00	141	223

The following figures assume the wood has a 20% moisture content (5780 BTU lb..);

1.56 lbs. of wood = 1 lb. coal 22.2 lbs. of wood = 1 gal. fuel oil 14.0 lbs. of wood = 1 therm natural gas (1 therm = 100,000 BTU = 100 cubic feet)

Electricity	Wood	Coal	Natural Gas	Fuel Oil
37.63 kwh	22.2 lbs.	14.23 lbs.	1.58 therms	1 gal.
23.73 kwh	14.0 lbs.	8.97 lbs.	1 therm	.63 gal.
5288.15 kwh	3120 lbs.	1 ton	222 therms	140 gal.
6290 kwh	1 cord	1.19 ton	264 therms	166 gal.
100 kwh	59 lbs.	38 lbs.	3.41 therms	3 gal.





QUALIT	Y CON	ITRO	L CHECK: HEAT	ΓER				
2000			HECKED 1/15/80_CH		10			
PARTS INCLUDED:								
DESCRIPTION	NOTE/S	CHK'D	DESCRIPTION	NOTE/S	CHK'D			
smoke screen	(5)	1	shield, left assembly	(1), (6)	N			
poker	(1), (4) (2), (3)	/	grate bar retainer	(1), (5)	1			
shaker	(4)	1	grate bar retainer keeper	(1), (5)				
ash pan	(5)	/	cardboard firebrick support	(1), (5)	/			
serial plate	(5)		hardware package	(4)	/			
wooden knob	(5)	/	regulator assembly	(2), (4)	MA			
Riteway emblem	(5)	/	magnetic damper assembly	(2), (4)	MA			
combustion flue shield ass'y	(1), (3)	1	instruction manual	(4)				
FUNCTION AND QUALITY CHE	CK	CH	K'D REMARKS					
ash door latch: seal and ease of op	peration	Ė						
fuel door latch: seal and ease of o	peration		7		- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			
Riteheat regulator: knob should be ease	e tight and tur	n with	3					
magnetic damper: proper adjustment and operation								
grates: shaker fits grate bar and tu (1)	rns grates wit	h ease						
combustion flue assembly: proper ease of operation	seating of par	rts and	7					
heater top: seal								
paint: chipped or bare spots, inconsistencies in coating								
damper door secured with wire fo	or shipping (1)	E	1	Sealth The Way				

- NOTE: (1) Model 37 only
 - (2) Model 2000 only
 - (3) Packed in firebox
- (4) Packed in ash pan
- (5) Installed or in place
- (6) Mounted for shipping (right side)

RITEWAY MANUFACTURING CO. Division of Sarco Corp. P.O. Box 153 Harrisonburg, Va. 22801 703-434-7090