OWNER'S MANUAL

Installation, Operation and Maintenance Instructions

CATALYTIC RADIANT WOODBURNING HEATER

MODEL K31

SAFETY TESTED TO UL 1482 AND LISTED BY WARNOCK HERSEY INTERNATIONAL, INCORPORATED: The design and manufacture of this heater and the contents of this manual comply with the Warnock Hersey International safety standards for woodburning heaters.

EPA-CERTIFIED TO PHASE II EMISSION STANDARDS: This heater meets the U.S. Enviornmental Protection Agency's emission limits for wood heaters built on or after July 1, 1990.

Under specific test conditions this heater has been shown to deliver heat at rates ranging from 10,300 to 34,600 Btu's per hour.

IMPORTANT GENERAL INFORMATION

- READ ALL INSTRUCTIONS BEFORE STARTING THE INSTALLATION.
- FAILURE TO FOLLOW SAFETY INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR EVEN DEATH.
- SAVE THIS MANUAL FOR FUTURE REFERENCE.

TAMPER WARNING

This heater contains catalytic combustors which need periodic inspection and replacement for proper operation. It is against the law to operate this heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is activated or removed.

SAFETY NOTICE

If this heater is not properly installed, a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation inspection requirements in your area.

This heater must be connected to a Listed High Temperature Type HT Factory-Built Residential Type and Building Heating Appliance Chimney or an approved masonry chimney with a flue liner.

INTRODUCTION

Many home fires result from not following installation, operation and maintenance instructions supplied by manufacturers of heating appliances. For your safety please read and follow our instructions before installation and use of the heater.

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SECTION 1

SUMMARY OF RULES FOR SAFE INSTALLATION, USE AND CARE

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL AND USE YOUR NEW HEATER, FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

SAFE INSTALLATION

1. **Qualified Installer/Codes.** Your heater should be installed only by an experienced wood heater installer in strict accordance with this manual. Even though the work is done by a qualified installer, you should be familiar with your installation and be sure the work is done in accordance with this manual. Contact local building or fire officials about restrictions and installation inspection in your area. Make sure the installation meets all local codes and that all needed permits are obtained. Many home fires are caused by too little clearance or improper installation of the venting system. This manual gives necessary information to safely install your heater.
2. **Dangerous Uses/Locations.** Due to fire risk, do not install this heater in a mobile home, modular home or trailer. Do not install it in a garage or area where any flammable liquids are stored. An explosion or fire could result. Due to risk of persons being injured by contacting the hot surfaces of the heater, locate the heater away from traffic areas such as halls.
3. **Chimney and Chimney Connector.** This heater must be connected to a separate chimney connector and chimney system vented to the outside. The chimney may be either an approved Class "A" Masonry Chimney or a 6" diameter Listed High Temperature Type HT Factory-Built Residential Type and Building Heating Appliance Chimney. These two chimney types will be described in detail in this manual. The heater must be connected to the chimney using chimney connector pipe that is at least 24 gauge black or blued steel. Do not use a Class "B" aluminum gas vent pipe for either the chimney connector pipe or the chimney. This is unsafe, is a fire risk, and is prohibited by the National Fire Protection Association. To avoid the risk of fire, masonry chimneys must be at least 4" thick (12" if built of rubble stone) and must have a 5/8" fireclay or stainless steel lining.

   Review the methods of venting shown by Figures 5 through 9. Follow the method that best suits your home. Failure to vent the heater in accordance with the instructions can result in fire or smoke damage and bodily injury including death.

DANGER: THE CHIMNEY CONNECTOR GETS SO HOT IT CAN CATCH YOUR WALL OR CEILING ON FIRE IF NOT PROPERLY INSTALLED. THEREFORE, YOU MUST USE AN APPROPRIATE METHOD TO PASS THROUGH A COMBUSTIBLE WALL TO A CHIMNEY (SEE FIGURES 5, 7, AND 8) OR A CHIMNEY SUPPORT OR FINISH SUPPORT PACKAGE TO PASS THROUGH A CEILING, (SEE FIGURES 6 AND 9). OTHERWISE, THE WALL OR CEILING WILL CATCH FIRE FROM THE HOT CHIMNEY CONNECTOR.

DANGER: DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE. THERE IS A SERIOUS SAFETY RISK IF TWO APPLIANCES OR HEATERS ARE CONNECTED TO THE SAME FLUE.

4. **Floor Protector.** The heater must be placed on a listed floor protector if the floor is wood or other combustible flooring. If carpet is present, it must be removed. Place the heater on a listed floor protector or a floor protector made of a noncombustible, inorganic material equal to 3/8 inch thick millboard having a thermal conductivity of "K" factor number equal to or less than .084 BTU-INCH/(HR.)(°F)(FT.²) to prevent the floor from catching fire from sparks or glowing embers that might escape the heater or drop from the joints of the chimney connector pipe. The floor protector must protect the floor beneath and around the heater and chimney connector (also known as flue pipe) as shown by Figure 10.
5. **Safe Clearances.** Minimum clearances to unprotected combustible walls and ceilings as noted by Figures 5, 6, 7, 8 and 9 must be maintained. Drapes, curtains, furniture and other combustible materials should be kept much further away from the heater to avoid a fire. If you choose to, you may install the heater and chimney connector closer to combustible surfaces than indicated by Figures 5, 6, 7, 8 and 9 if a clearance reduction system is also installed to protect combustible ceiling and walls near the heater. See "Minimum Clearances To Combustible Walls and Ceilings" later in this manual for details.
6. **Hot Surfaces.** Keep children away from the heater. Do not touch the heater until it is cool to avoid burns.
7. **Smoke Detector.** Install a smoke detector on each floor of your home. In case of accidental fire it can provide time to escape.
8. **Inspection After Installation, But Before Use.** Have the entire installation inspected by the local fire department, building code inspector or fire marshal to be sure your installation is safe. Have this manual on hand for a reference if needed. Keep the manual in a safe place where it can be found when needed.

SAFE USE

Dangerous Fuels. This heater is designed to burn only natural wood. (See the "Wood Facts" section of this manual for additional information about wood.) This heater is not designed to burn artificial logs, processed fuels, coal, charcoal, plywood, trash, garbage, wrapping paper, preformed wood, or treated wood. These prohibited fuels may cause the heater and chimney to dangerously overheat or release poisonous gases into the dwelling. These prohibited fuels also contain elements such as lead, zinc and sulfur that will "poison" or deactivate the catalytic combustors. A poisoned catalytic combustor will not operate effectively and must be replaced.

Never use gasoline, gasoline type lantern fuels, kerosene, charcoal lighter fluid, or any similar liquids to start or freshen up a fire in this heater. The use or presence of these type fuels in or around the heater can cause an explosion and house fire resulting in personal injuries and property damage.

2. **Dangerous Overfiring.** DO NOT OVERFIRE THIS HEATER. Overfiring can damage the catalytic combustors or cause a chimney fire or a house fire. A catalytic combustor that has been damaged by excessive temperatures caused by overfiring will not operate effectively and must be replaced. Overfiring can also greatly shorten the life of the heater. The following conditions will cause your heater to overfire:
   -Leaving the heater's fuel feed door open during heater operation.
   -Leaving the heater's ash removal door open during heater operation.
   -Excessive draft. (See Section 5)
   -Burning improper fuel. (See Dangerous Fuels above)

   If any part of the chimney connector or heater (other than the combustors) glows red hot, the heater is overfired. Immediately move the heater's inlet air control lever to its most closed position (See Figure 12), and keep the heater's doors closed until the heater cools.
3. **AVOID CHIMNEY FIRES.** A chimney fire is usually indicated by a roaring noise within the chimney and/or a pinging noise within the chimney connector and the emission of sparks and ash from the top of the chimney. Chimney fires can be dangerous.

TO REDUCE THE RISK OF A CHIMNEY FIRE:
-BURN ONLY WELL SEASONED WOOD.
-DO NOT OVERFIRE THE HEATER.
-KEEP THE CHIMNEY'S FLUE LINING CLEAN OF CREOSOTE AS NOTED BY THE FOLLOWING SAFE CARE SECTION OF THIS MANUAL.

For what to do in case of a chimney fire, see "VENTING SYSTEM CARE" in Section 4 of this manual.
For additional information on safe use of this heater, see Section 3 of this manual.

SAFE CARE

1. **Creosote Formation and Need For Removal.** 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 in the chimney called a chimney fire. Even though reduction of creosote is one of the primary advantages of a heater employing catalytic combustors, some creosote residue will still accumulate on the flue lining. Also, in the event the catalytic combustor ceases to function, creosote can be expected to accumulate on the flue lining at an increased rate. So, the chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if creosote buildup has occurred. If creosote has accumulated, it should be removed to reduce the risk of a chimney fire.
2. **Disposal of Ashes.** Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.
3. **Annual Inspection.** Have a qualified person inspect your complete system before cold weather each year. Make sure creosote is removed. Replace all damaged or worn parts before using.

For additional information on safe care of this heater, see Section 4 of this manual.

SECTION 2

LOCATING AND INSTALLING THE HEATER

SELECTING A LOCATION FOR THE HEATER

1. When locating your heater, consider safety, convenience, traffic flow, and the fact that the heater will need a chimney and chimney connector.
2. Your heater should be located away from doors and hallways or other areas where drafts could blow smoke, fire or ashes out of the heater during fire tending.
3. The heater should be located in an open area to allow for necessary clearances as specified within this manual.
4. Keep furniture, drapes, curtains, wood, paper, and other combustibles far away from the heater.

5. Never install the heater in locations where gasoline, kerosene, charcoal lighter, or any other flammable liquids are used or stored.
6. DO NOT INSTALL THIS HEATER IN A MOBILE HOME, MODULAR HOME OR TRAILER.

TOOLS AND SUPPLIES NEEDED FOR INSTALLATION

Pencil	Electric drill	Rag or several paper towels
Ruler or tape	Drill bits	No. 8 sheet metal screws
	Screwdriver	(3 each for each joint of
	Furnace cement	connector pipe)

INSTALLATION EQUIPMENT NEEDED FOR YOUR SAFETY

1. Chimney Connector (Also known as flue pipe): The chimney connector joins the heater to the chimney. The chimney connector should be 6-inch diameter black or blued steel, 24 gauge minimum.
2. Wall Thimble: A manufactured or site-constructed device installed in combustible walls through which the chimney connector passes to the chimney. It is intended to keep walls from igniting. A wall thimble is needed only if chimney connector must pass through a combustible wall between the heater and the chimney, (see figure 5 for thimble options).
3. Chimney: A Masonry Chimney (constructed to the National Fire Protection Association and local code standards) with at least 5/8" fireclay lining joined with refractory cement or other listed lining system suitable for use with wood burning heaters. See the "MASONRY CHIMNEY REQUIREMENTS" portion of this manual for masonry chimney requirements.

OR

A Listed High Temperature Type HT Factory-Built Residential and Building Heating Appliance Chimney. Associated components required for installation such as the chimney support base, firestop (as appropriate), attic insulation shield, insulated tee, etc., are necessary to assure a safe chimney installation. Use only components manufactured for the chimney. See the "METAL PREFABRICATED CHIMNEY REQUIREMENTS" portion of this manual for Listed High Temperature Type HT Factory-Built Residential and Building Heating Appliance Chimney requirements.

AVOID FIRE: Maintain the designated clearance distance to combustibles. Insulation must NOT touch the chimney. There must be the designated air space clearance around the chimney. This air space around a chimney is necessary to allow natural heat removal from the area. Insulation in this space will cause a heat buildup which may ignite wood framing.

4. Floor Protector: To prevent floor from catching fire, a listed floor protector or a floor protector made of a noncombustible inorganic material equal to 3/8-inch thick millboard having a thermal conductivity of "K" factor number equal to or less than .084 BTU-INCH/(HR)(°F)(FT^2) must be used. Depending on the type of heater installation you use, the floor protector must protect the floor beneath and beyond the heater and chimney connector pipe (also known as flue pipe) as shown by Figure 10.

IMPORTANT INFORMATION ABOUT THE VENTING SYSTEM

1. The venting system consists of the chimney connector (also known as flue pipe) and a chimney. The entire venting system gets extremely hot during use. Temperatures inside the chimney may exceed 2000 degrees in the event of a creosote fire. To protect against the possibility of a home fire, the chimney connector and the chimney must be properly installed and maintained. A wall thimble must be used when a connection is made through a combustible wall to a chimney, (see figure 5 for thimble options). DO NOT PASS A CHIMNEY CONNECTOR THROUGH A FLOOR OR CEILING OF ANY KIND. Only Listed Factory-Built Residential Type and Building Heating Appliance Chimneys or masonry chimneys constructed to N.F.P.A. Standards should pass through a floor or ceiling.
2. The chimney connector (also known as flue pipe) must be 6-inch diameter, 24 gauge minimum blued or black steel. DO NOT use aluminum or galvanized steel. They cannot properly withstand the extreme temperatures of a wood fire. DO NOT use chimney connector pipe as a chimney. You MUST connect this heater to a chimney comparable to those illustrated in this manual.
3. The joints of the chimney connector must be assembled so the crimped end is toward the heater and each joint must be sealed with furnace cement and fastened with a minimum of three sheet metal screws.
4. The heater must be connected to a prefabricated Listed High Temperature Type HT Factory-Build Residential Type and Building Heating Appliance chimney or an approved Class "A" masonry chimney with a flue liner.
5. NEVER connect this heater to an aluminum type "B" gas vent. It is not safe, is a fire hazard and is prohibited by National Fire Protection Association code (N.F.P.A. 211).
6. Do not connect this heater to a chimney flue serving another appliance. There is a serious safety risk if two appliances or heaters are connected to the same flue.
7. A copy of the N.F.P.A. 211 codes (Chimney, Fireplace, Vents and Solid Fuel Burning Appliances) may be obtained from N.F.P.A., Inc. Batterymarch Park, Quincy, MA 02269.

MASONRY CHIMNEY REQUIREMENTS

If the heater is to be attached to a masonry chimney, the heater should not be installed until it is determined that the chimney is safe for use. Before installing the heater, have the chimney inspected by a building inspector, fire department, or qualified heating engineer. To prevent risk of walls, roof, or other combustibles catching fire from the extremely hot fire, smoke, and flue gases, and to obtain a proper draw, a chimney must meet the minimum standards for masonry chimneys established by the National Fire Protection Association (NFPA). Make certain the inspection agency is familiar with NFPA No. 211 and all local codes. Some of those minimum standards are listed here for your convenience.

1. The top of the chimney must not be obstructed so as to interfere with the venting of the smoke and flue gases. If a chimney cap, protector or spark arrestor is installed, have it checked by your local building official before using. An unapproved chimney cap, protector or spark arrestor can become clogged with creosote, leaves or other matter. This blocks the chimney and causes smoke and the dangerous carbon monoxide in smoke to spill back into your home where it can kill you.
2. Your masonry chimney must be supported on an adequate foundation and must have either a 5/8" thick fireclay or stainless steel lining. There must be at least 1/2-inch air space between the flue liner and the chimney wall. (See Figure 1).
3. A chimney inside the house must have at least 2 inches of clearance to the combustible structure. A chimney outside the house must have at least 1 inch clearance to the combustible structure. Fire stops must be installed at the spaces where the chimney passes thru floors and/or ceiling (see Figure 2). Insulation should be at least 2 inches from the chimney to leave an air space around the chimney. (See Figure 3)
4. The flue lining of the masonry chimney must be smooth and have no leaks. The inside of the chimney flue liner should be no smaller than 8 inches square or 6 inches round; a smaller chimney flue liner will be too restrictive to the flow of smoke and gases. A 6" diameter round liner is preferred because round flues draw better than square flues.
5. Since an oversized chimney flue contributes to the accumulation of creosote, the size of the chimney flue liner must be checked to determine that it is not too large for the heater. For this heater, the inside cross-sectional area of the chimney flue liner should be no more than 85 square inches to assure proper venting.
6. The top of the chimney must be at least 3 feet above the point where it comes through the roof, and at least two feet higher than any obstruction within a 10 foot radius. (See Figure 4)
7. If the chimney has insufficient draft, the draft may be improved by extending the height of the chimney or reducing the number of elbows in the venting system. See section 5 of this manual for important draft information.
8. Make certain the chimney is kept clean and is not blocked. Check for overhanging limbs over the top of the chimney periodically.

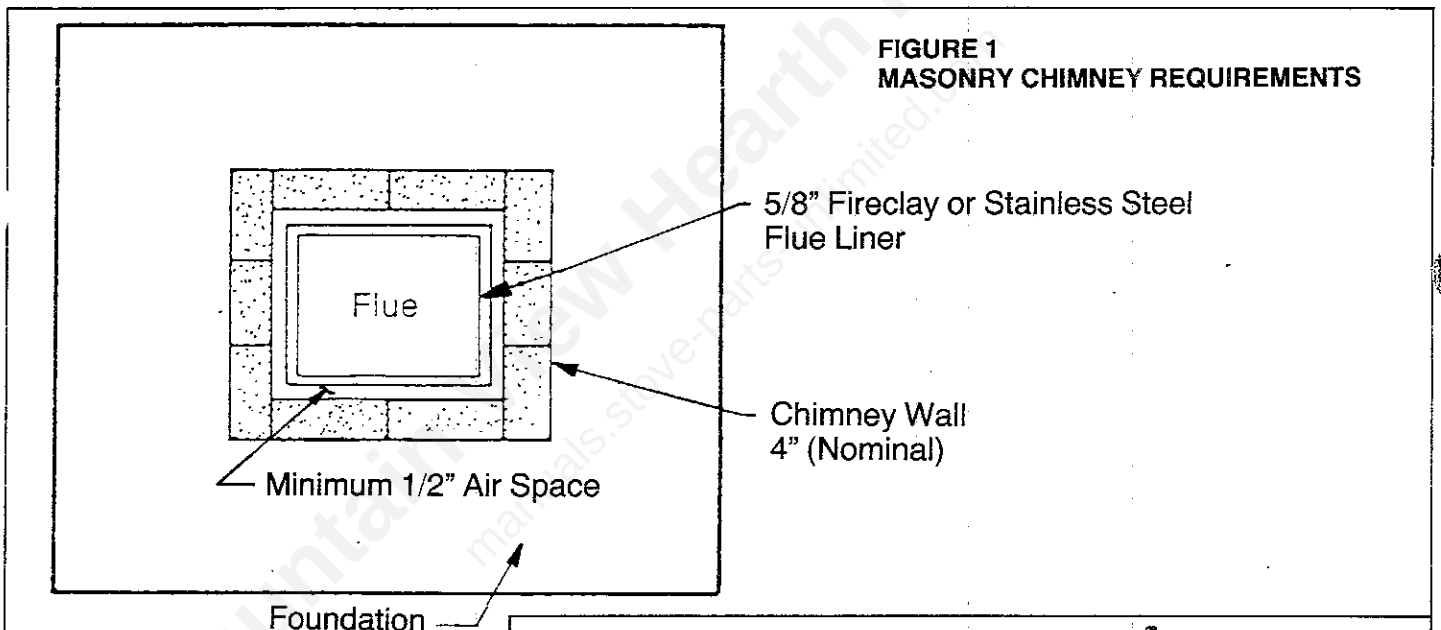


FIGURE 1
MASONRY CHIMNEY REQUIREMENTS

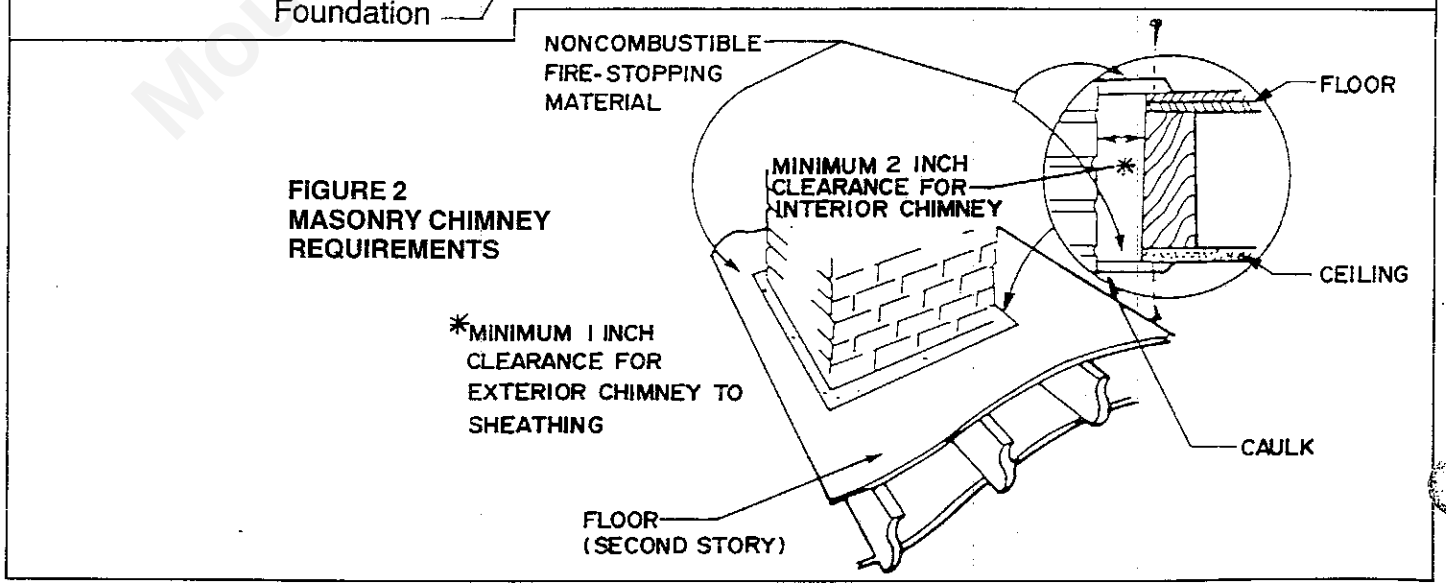


FIGURE 2
MASONRY CHIMNEY REQUIREMENTS

FIGURE 3-MASONRY CHIMNEY REQUIREMENTS

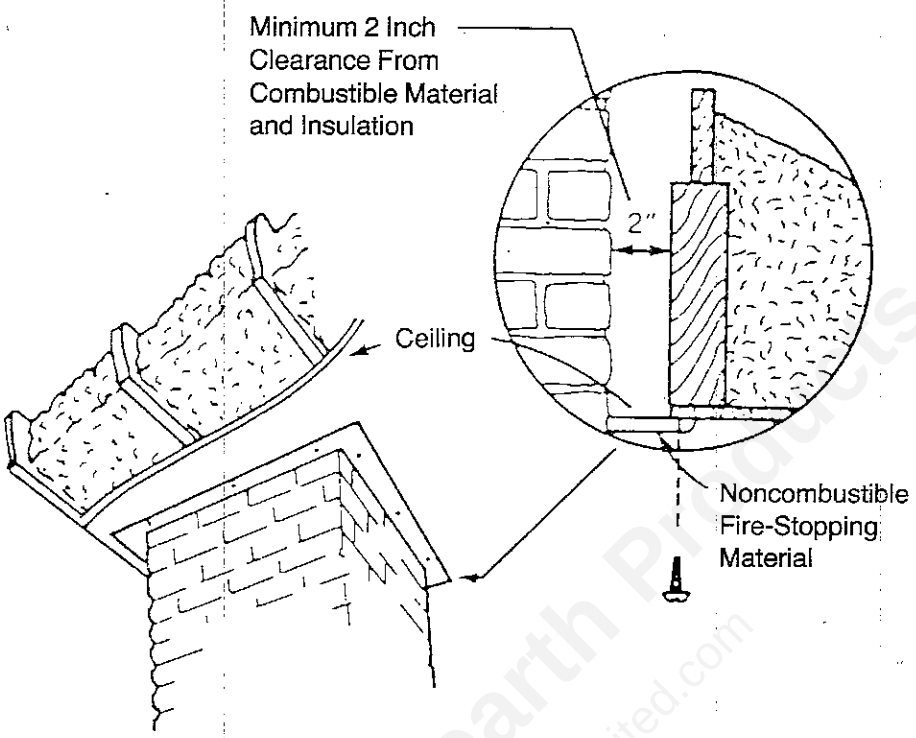
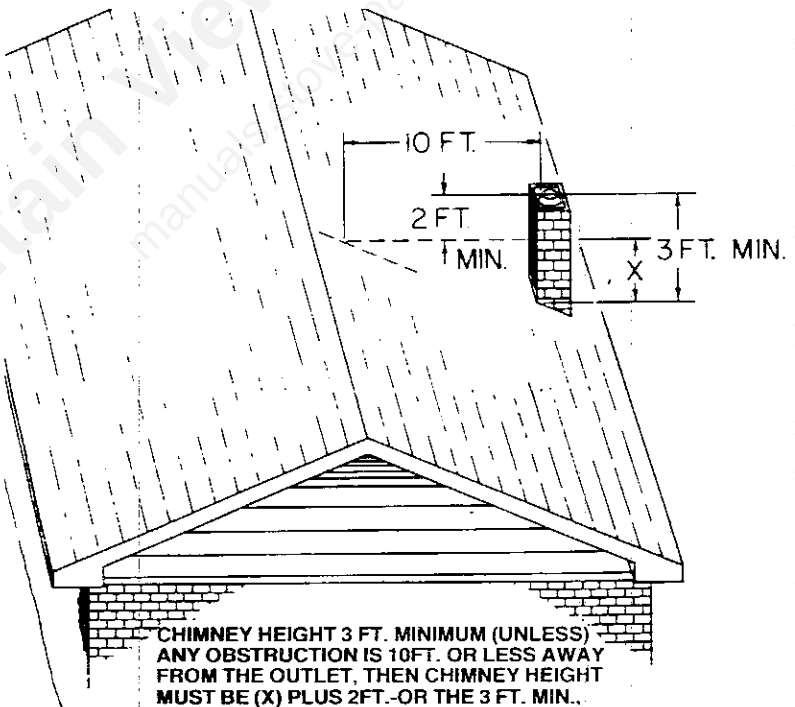


FIGURE 4- CHIMNEY HEIGHT REQUIREMENTS



CHIMNEY HEIGHT 3 FT. MINIMUM (UNLESS) ANY OBSTRUCTION IS 10FT. OR LESS AWAY FROM THE OUTLET, THEN CHIMNEY HEIGHT MUST BE (X) PLUS 2FT.-OR THE 3 FT. MIN., WHICHEVER DIMENSION IS GREATEST.
X EQUALS HEIGHT OF OBSTRUCTION
MASONRY CHIMNEY SHOWN DIMENSIONS ARE SAME FOR METAL PREFABRICATED CHIMNEY.

CONNECTION OF CHIMNEY CONNECTOR TO A MASONRY CHIMNEY THROUGH A COMBUSTIBLE WALL

Figure 5 shows how to connect the chimney connector of a heater to a masonry chimney through a combustible wall. There are five allowable ways that a chimney connector can be connected to a masonry chimney by passing through a combustible wall. NFPA Standard 211 allows the following wall pass-through systems:

FIGURE 5 - CONNECTION OF CHIMNEY CONNECTOR TO MASONRY CHIMNEY THROUGH A COMBUSTIBLE WALL (ALSO SEE FIGURE 8)

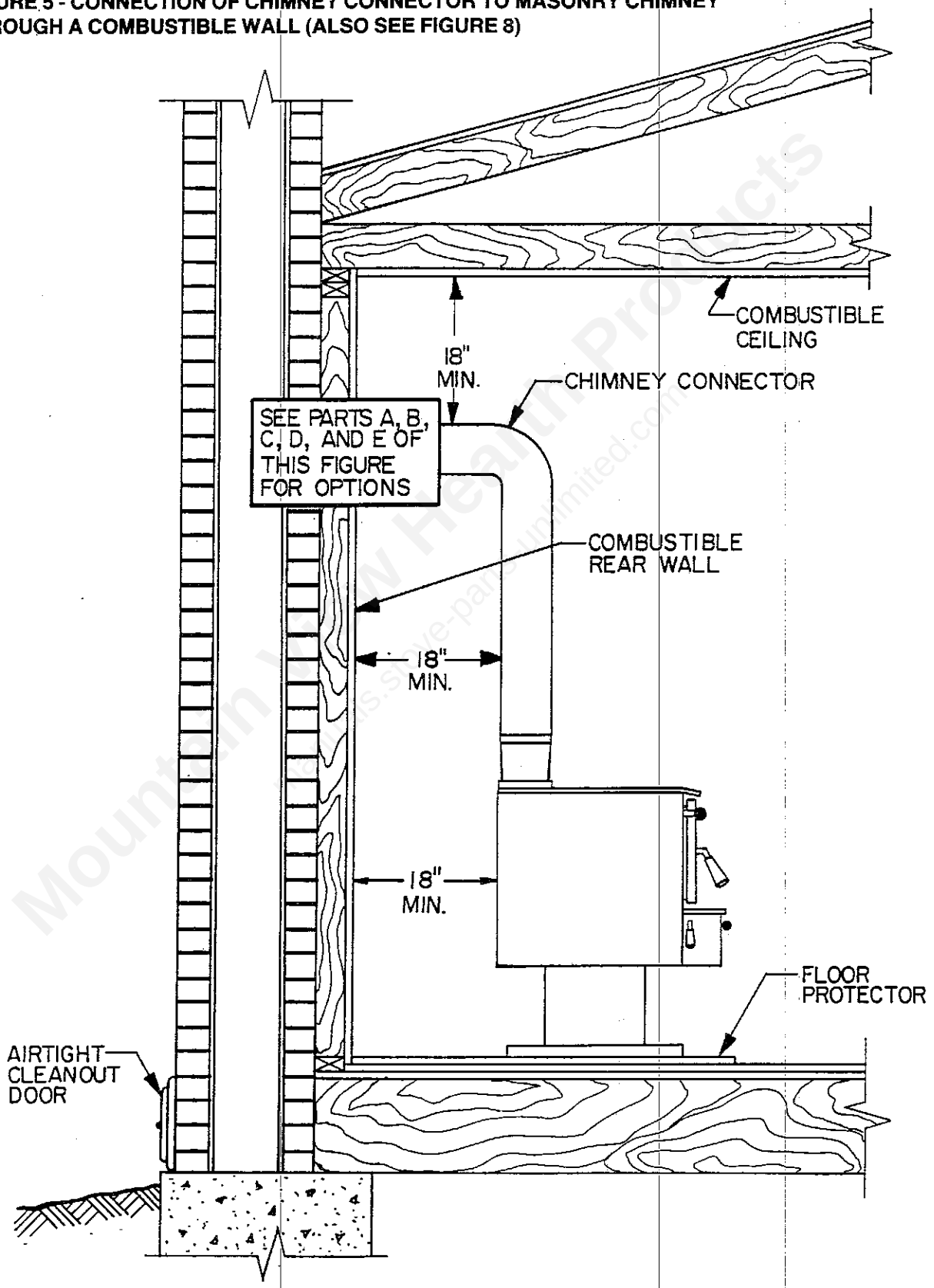
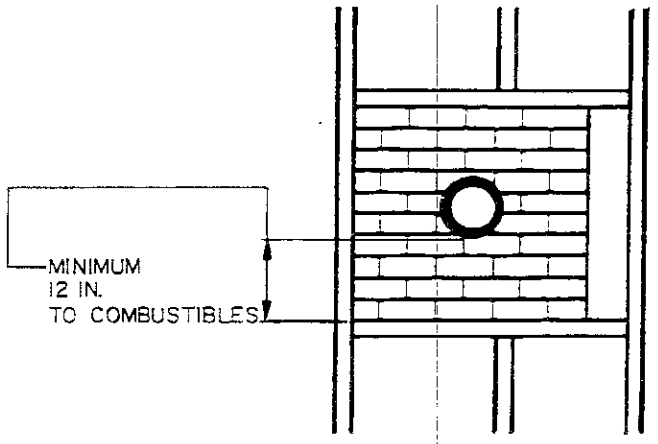
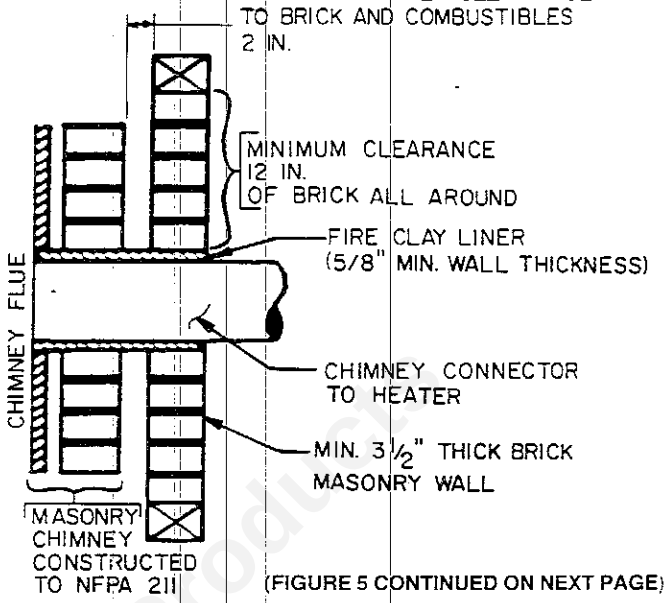


FIGURE 5 CONTINUED ON NEXT PAGE

PART A (Figure 5)





(FIGURE 5 CONTINUED ON NEXT PAGE)

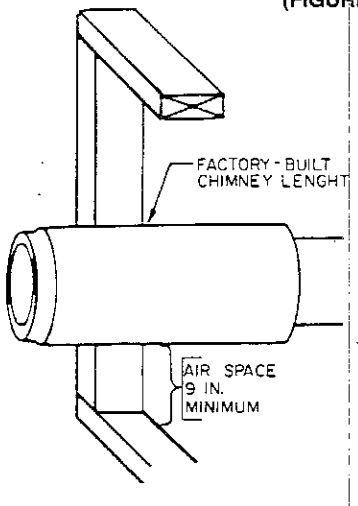
1. Use a minimum 3 1/2" thick brick masonry wall framed into the combustible wall. A fireclay liner (ASTM C315 or equivalent) having a 5/8" minimum wall thickness must be used and it must be at least 12" away from any material that could catch fire. The inside diameter of the fireclay liner shall be sized for the proper snug fit of a 6" diameter chimney connector pipe. The fireclay liner shall run from the outer surface of the brick wall to, but not beyond, the inner surface of the chimney flue and shall be firmly cemented in place. See Part A of Figure 5.
2. Use a solid insulated listed factory-built chimney length having an inside diameter of 6" and having 1" or more of solid insulation. There must be at least a 9" air space between the outer wall of the chimney length and any combustible materials. The inner end of the chimney length shall be flush with the inside of the masonry chimney flue and shall be sealed to the flue and to the brick masonry penetration with nonwater-soluble refractory cement. Sheet steel supports which are at least 24 gauge (0.024") in thickness shall be securely fastened to wall surfaces on all sides. Fasteners between supports and the chimney length shall not penetrate the chimney liner. See Part B of Figure 5.
3. Use a 10" diameter ventilated thimble made of at least 24 gauge (0.024") steel having two 1" air channels. The ventilated thimble must be separated from combustible materials by a minimum of 6" glass fiber insulation. The opening in the combustible wall shall be covered and the thimble supported with sheet steel supports which are at least 24 gauge (0.024") in thickness. The sheet steel supports shall be securely fastened to wall surfaces on all sides and shall be sized to fit and hold the chimney section. Fasteners used to secure chimney sections shall not penetrate chimney flue liner. See Part C of Figure 5.
4. Use an 8" inside diameter solid insulated listed factory-built chimney length which has 1" or more of solid insulation. The minimum length of this chimney section shall be 12" and will serve as a pass-through for the 6" diameter chimney connector. There must be at least a 2" air space between the outer wall of the chimney section and any combustible materials. The chimney section shall be concentric with and spaced 1" away from the chimney connector by means of sheet steel support plates on both ends of the chimney section. The opening in the combustible wall shall be covered and the chimney section supported on both sides with sheet steel supports which are at least 24 gauge (0.024") in thickness. The sheet steel supports shall be securely fastened to wall surfaces on all sides and shall be sized to fit and hold the chimney section. Fasteners used to secure chimney sections shall not penetrate chimney flue liner. See Part D of Figure 5.
5. A listed factory-built wall pass-through system may be purchased and installed according to the instructions packaged with it to provide a safe method of passing the chimney connector through a combustible wall for connection to a masonry chimney.

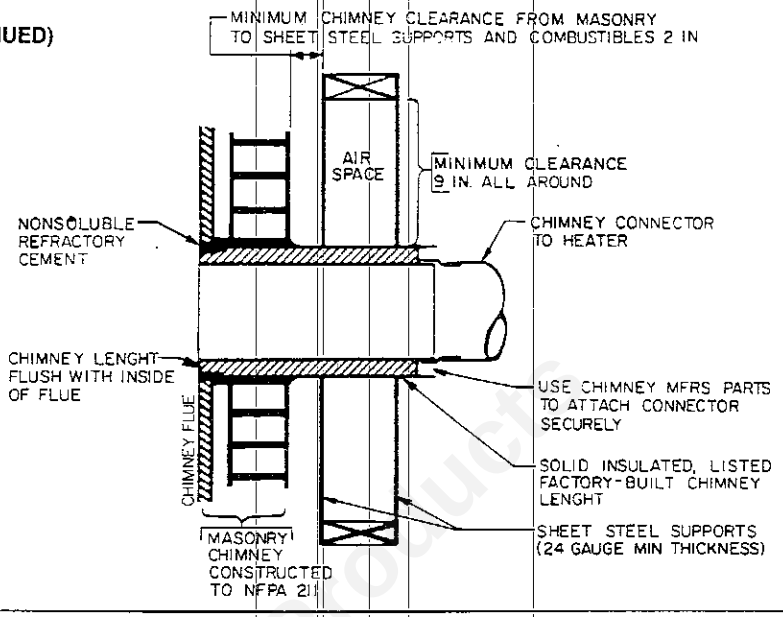
Additional requirements pertaining to Figure 5 and the above wall pass-through systems:

1. Insulation material used as part of wall pass-through system shall be of noncombustible material and shall have a thermal conductivity of 1.0 Btu•in./ft^2•°F (4.88 kg•cal/hr•m^2•°C) or less.
2. All clearances and thicknesses are minimums: larger clearances and thickness are acceptable.
3. A chimney thimble, as shown for "3" and "4" above (Parts C and D respectively of Figure 5) shall be used for types "3" and "4" connections to facilitate removal of the chimney connector for cleaning. The chimney thimble shall be of ASTM C315 fireclay with 5/8" minimum wall thickness, or material of equivalent durability. The inside diameter of the thimble shall be sized for the proper snug fit of a 6" diameter chimney connector pipe. The thimble shall be installed without damage to the chimney flue. The thimble shall extend through the chimney wall to, but not beyond, the inner surface of the chimney flue and shall be permanently cemented in place with high-temperature cement.
4. A chimney connector to a masonry chimney, except for "2" above (Part B of Figure 5), shall extend through the wall pass-through system to the inner face of the chimney flue, but not beyond. It does not have to be fastened in place so long as it cannot accidentally be pulled out of the chimney or shoved into the chimney flue. If fasteners are used to secure the chimney connector to a masonry chimney, the fasteners shall not penetrate the chimney flue liner.
5. Any material used to close up an opening for the connector shall be of noncombustible material.

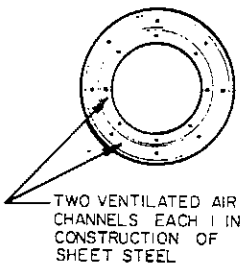
PART B (Figure 5)

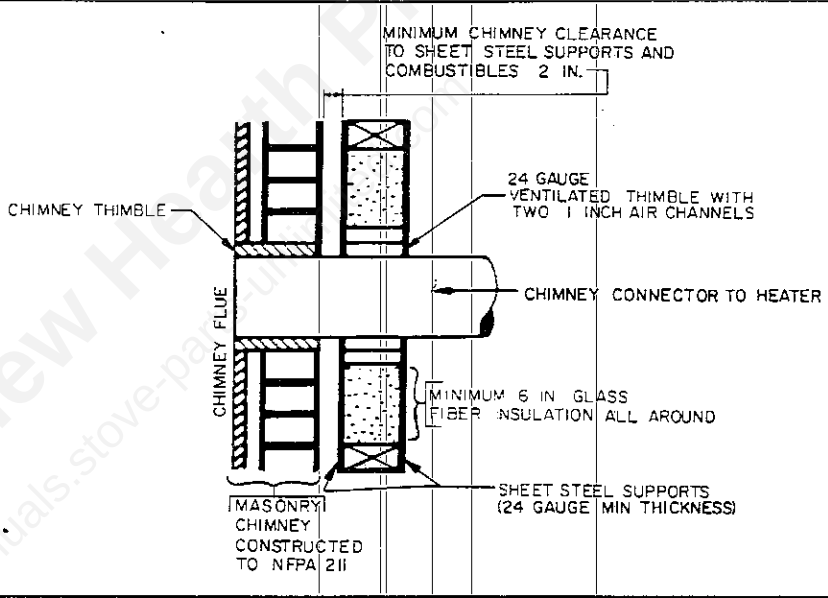
(FIGURE 5 CONTINUED)



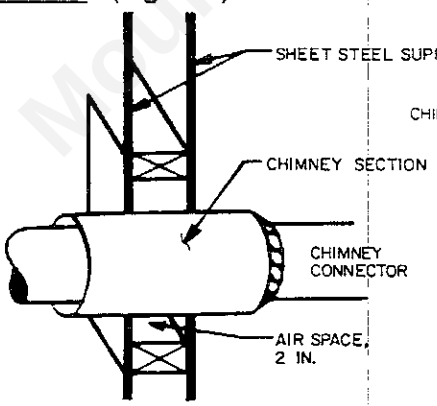


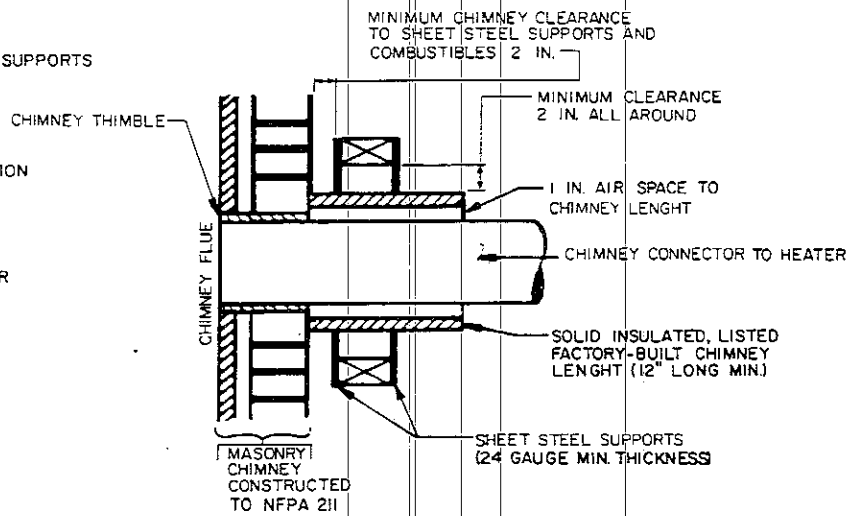
PART C (Figure 5)





PART D (Figure 5)





PART E (Figure 5)

NOTE: In addition to the methods shown by A, B, C and D of Figure 5, a listed factory-built wall pass-through system may be purchased and installed according to the instructions packaged with it to provide a safe method of passing the chimney connector through a combustible wall for connection to a masonry chimney.

CONNECTION OF CHIMNEY CONNECTOR TO A MASONRY CHIMNEY WHEN CHIMNEY CONNECTOR DOES NOT PASS THROUGH A COMBUSTIBLE WALL

If the chimney connector does not have to pass through a combustible wall to get to a masonry chimney, simply connect the chimney connector directly to the masonry chimney's chimney thimble as described and shown by parts C and D of figure 5. Remember, the chimney connector should extend into the chimney thimble to the innerface of the chimney flue, but not beyond; if the chimney connector is extended through the chimney thimble into the chimney flue, resistance to the flow of smoke and gases up the chimney will occur; that flow resistance will have an adverse affect on the operation and performance of the heater and venting system.

METAL PREFABRICATED CHIMNEY REQUIREMENTS

Any metal prefabricated chimney that this heater is connected to must be a Listed High Temperature Type HT Factory-Built Residential Type and Building Heating Appliance Chimney. It's interior size should be no smaller than 6 inches in diameter or no larger than 9 inches in diameter. An undersized chimney (less than 6 inches interior diameter) will result in poor draft and inefficient operation whereas an oversized chimney larger than 9 inches interior diameter) will result in poor drft and more creosote accumulation.

When a metal prefabricated chimney is used, the manufacturer's installation instructions must be followed precisely. You must also purchase (from the same manufacturer) and install the ceiling support package or wall pass through and "T" section package, firestops (when needed), insulation shield, roof flashing, chimney cap, etc. Maintain the proper clearance to the structure as recommended by the manufacturer. This clearance is usually a minimum of 2 inches, although it may vary by manufacturer or for certain components.

A Listed chimney cap should be installed to prevent entrance of rain and help eliminate down drafts. An unapproved chimney cap, protector or spark arrestor can become clogged with creosote, leaves or other matter. This blocks the chimney and causes smoke, and the dangerous carbon monoxide in smoke, to spill back into your home where it can kill you.

If the chimney has insufficient draft, the draft may be improved by extending the height of the chimney, making certain the chimney is clean and not blocked, checking for overhanging limbs, and reducing the number of elbows in the chimney connector connecting the heater to the chimney. See Section 5 of this manual for important draft information.

The top of the chimney should be at least three feet above the point it comes through the roof and at least two feet higher than any part of the roof or house within a ten foot radius. See Figure 4.

A straight up chimney is best because it will draw better. A 15 degree offset, if necessary, is better than a 30 degree offset.

METAL PREFABRICATED CHIMNEY INSTALLATION

There are basically two methods of metal prefabricated chimney installation. One method is to install the chimney inside the residence through the ceiling and the roof. The other method is to install an exterior chimney that runs up the outside of the residence.

Figure 6 shows how to connect the chimney connector of a heater to a metal prefabricated chimney installed inside the residence through the ceiling and the roof.

Figure 7 shows how to connect the chimney connector of a heater to an exteriorly installed metal prefabricated chimney that runs up the outside of the residence.

The components illustrated by Figures 6 and 7 may not look exactly like the system you purchased, but they demonstrate the basic components you will need for a proper and safe installation.

REMEMBER: Follow the chimney manufacturer's installation instructions and maintain the manufacturer's specified clearance distances.

FIGURE 6

CONNECTING THE CHIMNEY CONNECTOR OF A HEATER TO A LISTED HIGH TEMPERATURE TYPE HT FACTORY-BUILT RESIDENTIAL TYPE AND BUILDING HEATING APPLIANCE CHIMNEY INSTALLED INSIDE THE RESIDENCE THROUGH THE CEILING AND THE ROOF. (ALSO SEE FIGURE 9)

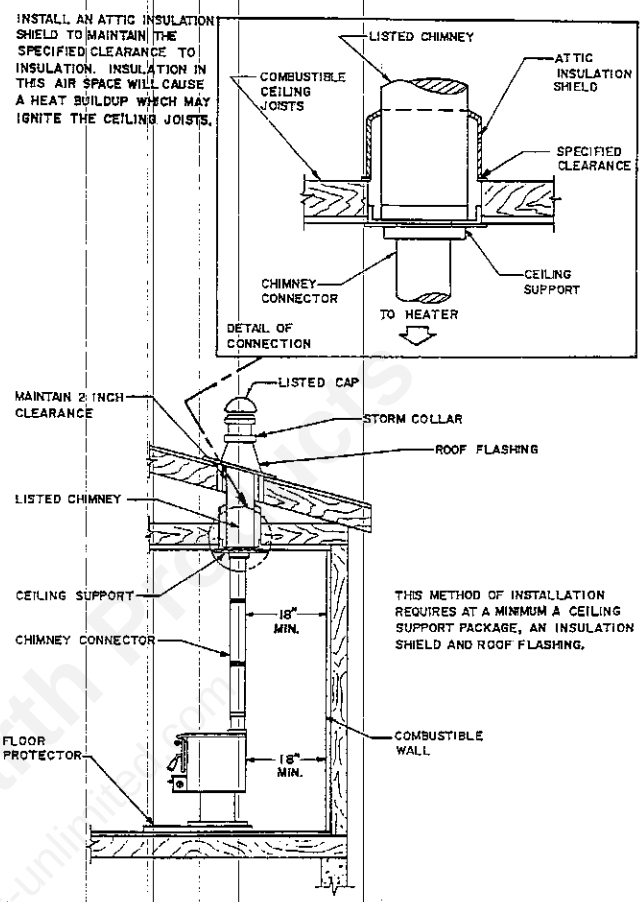
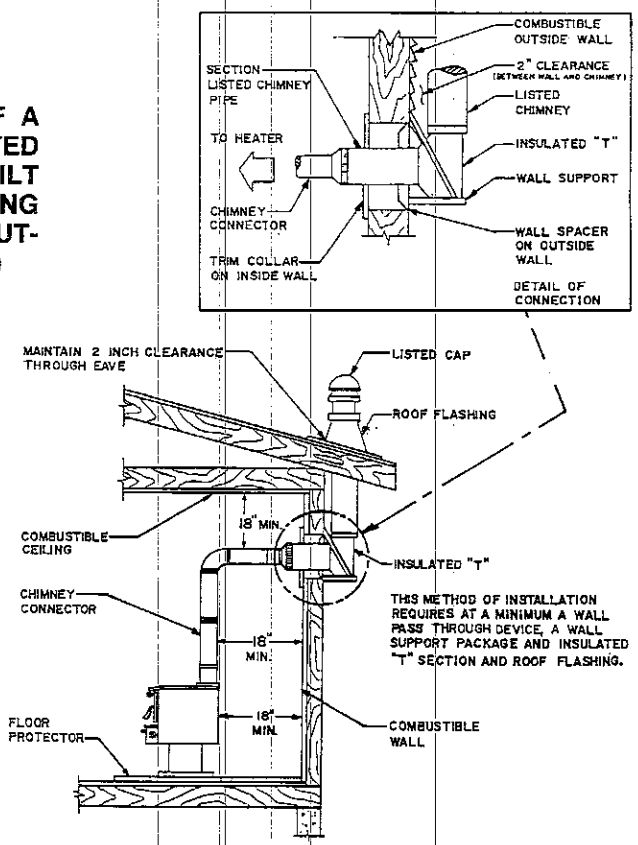


FIGURE 7

CONNECTING THE CHIMNEY CONNECTOR OF A HEATER TO AN EXTERIORLY INSTALLED LISTED HIGH TEMPERATURE TYPE HT FACTORY-BUILT RESIDENTIAL TYPE AND BUILDING HEATING APPLIANCE CHIMNEY THAT RUNS UP THE OUTSIDE OF THE RESIDENCE. (ALSO SEE FIGURE 8)



HEATER INSPECTION

Before installing the heater, inspect the heater for external damage or missing parts. Check the gaskets around the doors to assure that they are still in place. Check the inside of the heater. If any parts are found to be damaged or missing, report these to your dealer and make sure all problems are resolved before installing the heater. See the heater's repair parts pamphlet for illustrations of heater parts.

HEATER INSTALLATION

CAUTION: IF THIS HEATER IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT. FOR YOUR SAFETY, FOLLOW THE INSTALLATION DIRECTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.

CAUTION: DO NOT CONNECT THIS HEATER TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE. THERE IS A SERIOUS SAFETY RISK IF TWO APPLIANCES OR HEATERS ARE CONNECTED TO THE SAME FLUE.

CAUTION: THE HEATER MUST BE PLACED ON A LISTED FLOOR PROTECTOR AS NOTED IN THIS MANUAL IF THE FLOOR IS WOOD OR OTHER COMBUSTIBLE FLOORING. IF CARPET IS PRESENT, IT MUST BE REMOVED. THE FLOOR PROTECTOR MUST NOT BE PLACED ON CARPET. SEE FIGURE 10.

CAUTION: MOST WALLS AND CEILINGS CONTAIN WOOD EVEN THOUGH THEY ARE MADE OF SHEETROCK OR PLASTER ON THE OUTSIDE. THESE WALLS AND CEILINGS CAN CATCH FIRE FROM THE HOT HEATER OR CHIMNEY CONNECTOR IF HEATER AND CHIMNEY CONNECTOR ARE NOT PROPERLY INSTALLED.

MINIMUM CLEARANCE TO COMBUSTIBLE WALLS AND CEILINGS

Minimum clearances to unprotected combustible walls and ceilings as noted by Figures 5 through 9 must be maintained. Drapes, curtains furniture and other combustible materials should be kept much further away from the heater to avoid a fire.

If you choose to, you may install the heater and chimney connector closer to combustible surfaces than indicated by Figures 5 through 9 if a clearance reduction system is also installed to protect combustible ceiling and walls near the heater. However, there are limits as to how close the heater can be installed to combustible surfaces protected by a clearance reductions system.

A correctly installed clearance reduction system protects the combustible surfaces well beyond the sides and above the top of the heater and beyond the sides and top of the chimney connector pipe.

Two common types of clearance reduction systems use sheet metal with a minimum thickness of 28 gauge (galvanized steel, aluminum, copper) or a 3-1/2 inch (4 inch nominal) thick masonry wall. Either of these materials must be spaced out 1 inch from the combustible surfaces. With sheet metal, non-combustible spacers are used to maintain the 1 inch air space. With a masonry wall, metal wall ties and furring strips, if needed, are used to anchor the brick to the wall. To avoid excessive heat transmission, the spacers or wall ties should not be placed directly behind the heater or chimney connector. The 1 inch air space provides free air circulation. It is essential that there be openings at the top and bottom of these clearance reducers so cool air can enter at the bottom and warm air exit at the top. It is the "chimney effect" whereby when the air in the space is heated, it rises exiting from the top and being replaced by cooler air at the bottom, that makes these shields effective.

Masonry, or other non-combustible products, attached directly to a combustible surface without an air space offer very little protection and cannot be considered a clearance reduction system unless specific materials have been tested and listed for direct attachment to a combustible surface. The same applies to thin veneer brick and stone coverings. These materials provide adequate protection only when mounted on sheet metal with a 1 inch minimum spacing to the wall.

FIGURE 8

PLAN VIEW SHOWING MINIMUM CLEARANCES TO COMBUSTIBLES. FOR CLARITY, THE FLOOR PROTECTOR IS NOT SHOWN BY THIS PLAN VIEW. SEE FIGURES 5 AND 7 FOR SIDE VIEW OF INSTALLATIONS.

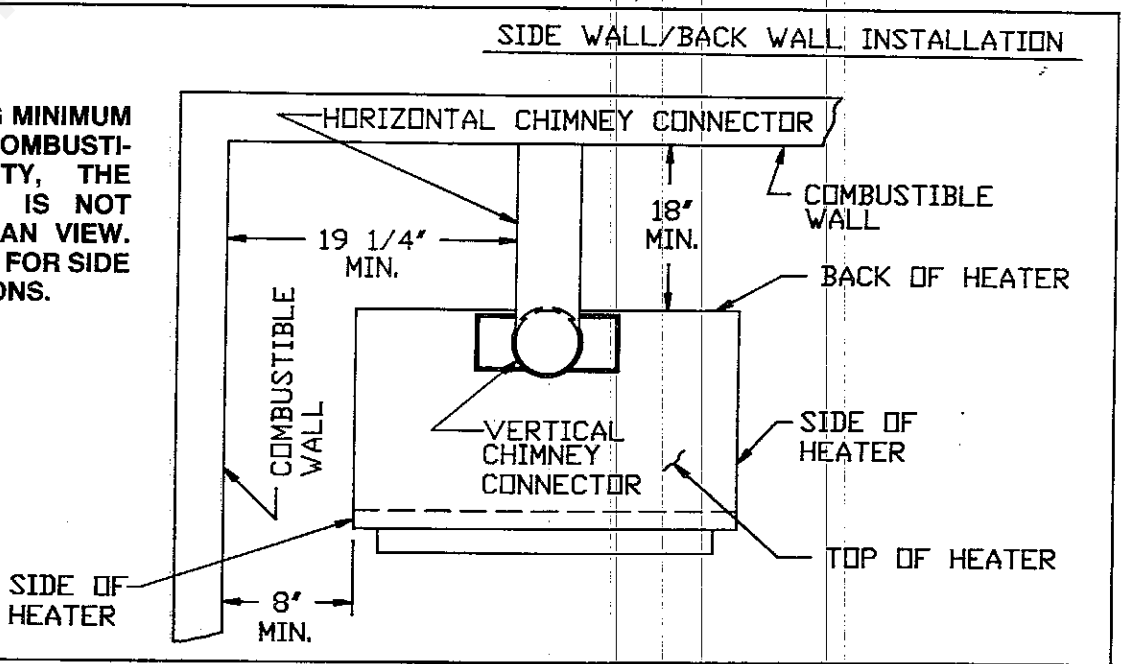
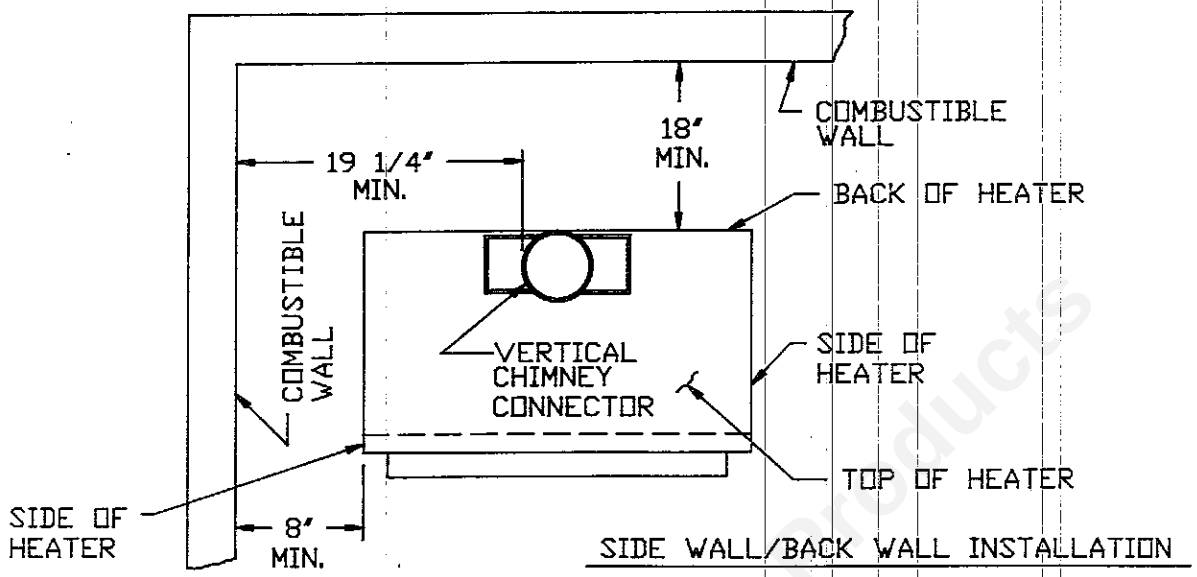


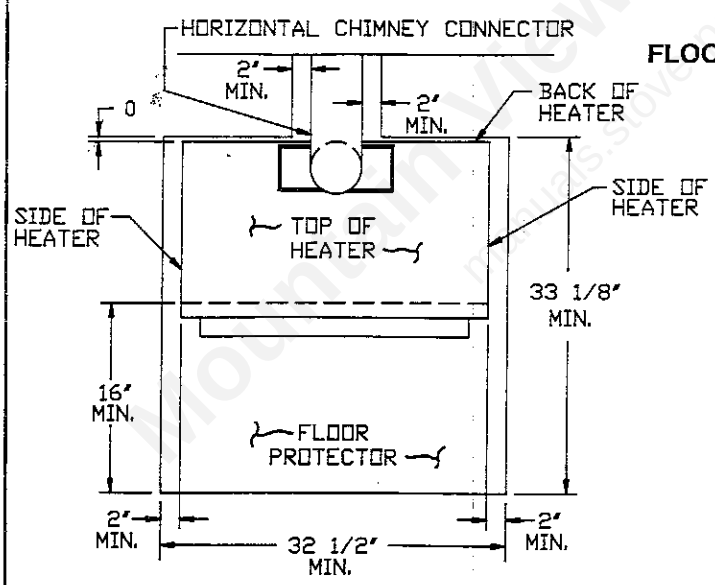
FIGURE 9 **PLAN VIEWS SHOWING MINIMUM CLEARANCES TO COMBUSTIBLES. FOR CLARITY, THE FLOOR PROTECTORS ARE NOT SHOWN BY THESE PLAN VIEWS. SEE FIGURE 6 FOR SIDE VIEW OF INSTALLATIONS.**



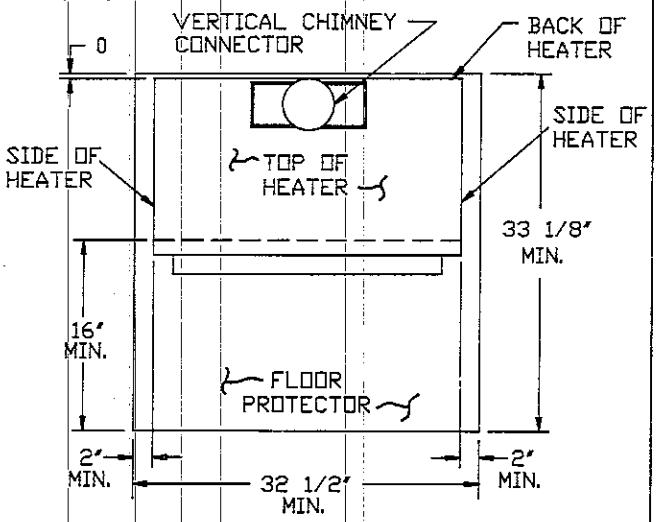
A variety of prefabricated clearance reduction systems which have been safety tested and listed are available through heater dealers. Always look for a safety listing label on the product when selecting a clearance reduction system through a heater dealer and make sure it is designed for use with solid fuel appliances. The manufacturers of these tested and listed systems provide specific installation instructions that must be followed exactly for a safe installation.

Should you choose to make your own clearance reduction system, contact your local fire department, fire marshal or building code inspector for specific requirements regarding home-constructed clearance reduction systems and safe installation clearances to protect combustible surfaces.

FIGURE 10
FLOOR PROTECTION



PLAN VIEW OF INSTALLATION WITH HORIZONTAL CHIMNEY CONNECTOR SHOWING OUTLINE OF MINIMUM SIZE FOR NON-COMBUSTIBLE FLOOR COVERING OR A LISTED FLOOR PROTECTOR.

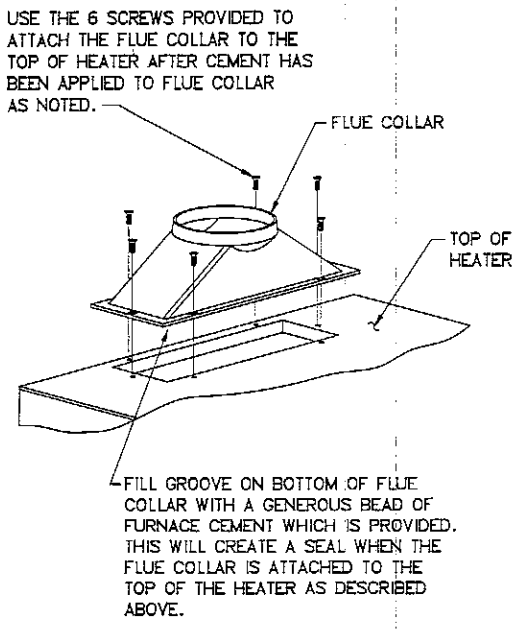


PLAN VIEW OF INSTALLATION WITH VERTICAL CHIMNEY CONNECTOR SHOWING OUTLINE OF MINIMUM SIZE FOR NON-COMBUSTIBLE FLOOR COVERING OR A LISTED FLOOR PROTECTOR.

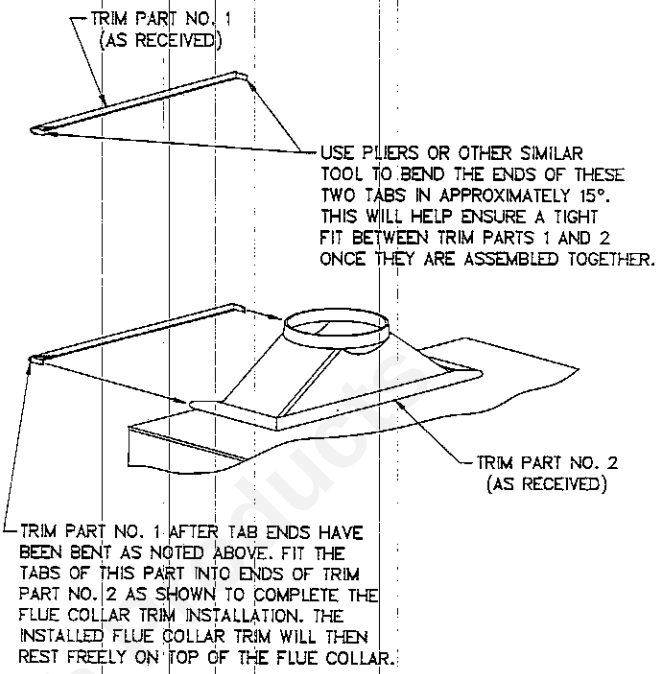
TO SAFELY AND PROPERLY INSTALL THIS HEATER:

1. Install a Listed High Temperature Type HT Factory-Built Residential Type and Building Heating Appliance Chimney, build an approved masonry chimney with flue liner, or adapt an existing masonry chimney with flue liner to vent this heater. (See Figures 1 through 7.)
2. Purchase the 6-inch diameter chimney connector pipes that are required. The pipe should be black or blued steel, 24 gauge minimum. Do not use more than two elbows or the chimney draft will be restricted. Number 8 sheet metal screws and furnace cement will also be needed to assemble the chimney connector pipes.

FIGURE 11 - INSTALLATION OF FLUE COLLAR AND ITS TRIM



INSTALLATION OF FLUE COLLAR.



INSTALLATION OF FLUE COLLAR TRIM

3. If the heater is to be installed on a combustible floor, purchase a listed noncombustible floor protector as described in this manual and install it in the proper location. The floor protector MUST protect the floor beneath and around the heater and chimney connector as shown by Figure 10.

4. Use the furnished fasteners and cement to install the heater's flue collar as shown by figure 11, then install the trim around the flue collar as shown by figure 11.

5. Assemble the chimney connector pipe sections to determine if the chimney connector pipe will correctly extend from the heater flue collar to the chimney. Any horizontal section of chimney connector pipe must slope upward at least 1/2" rise to the horizontal foot to maintain adequate draft, (see Figure 12). Always install the chimney connector pipe with the crimped end toward the heater to prevent creosote from leaking out of the joints, (see Figure 12). Always use the least number of chimney connector pipe sections possible. Minimum clearance to combustible walls and ceilings as noted throughout this manual MUST always be maintained if a clearance reduction system is not installed.

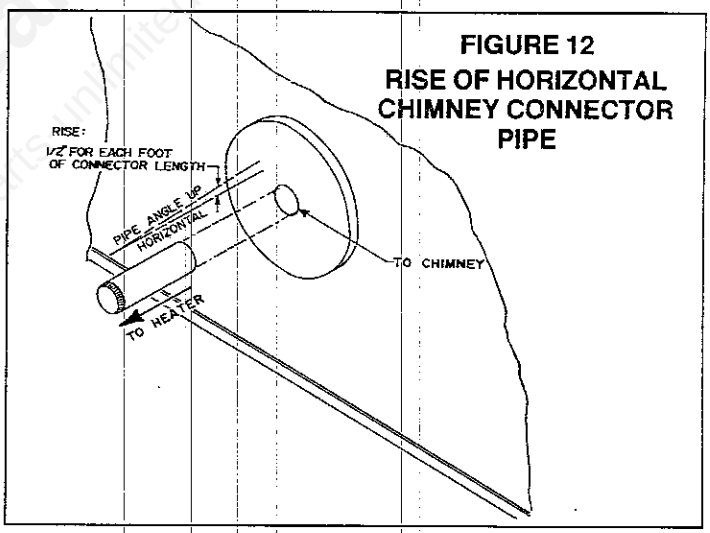


FIGURE 12
RISE OF HORIZONTAL CHIMNEY CONNECTOR PIPE

6. After it is determined that the assembled chimney connector will properly connect the heater to the chimney, disassemble all sections of the chimney connector in preparation for the final assembly procedures.
7. Place the crimped end of the first chimney connector pipe or elbow into the heater's flue collar and mark it through each of the holes in the heater's flue collar.
8. Remove the pipe or elbow from the flue collar and drill 1/8-inch diameter holes at the points marked by step 6.
9. Apply furnace cement to the inside surface of the heater's flue collar, reinstall the first pipe or elbow and fasten in place with No. 8 sheet metal screws. Apply additional furnace cement to the outside of the chimney connector flue collar joint if an airtight seal was not achieved when the pipe or elbow was installed.
10. Assemble the remaining chimney connector pipes by applying furnace cement to the joints, drilling 1/8-inch diameter holes for and attaching each joint with three No. 8 sheet metal screws.
11. Connect the chimney connector to the chimney as shown by Figure 5, 6, or 7.
12. Remove all excess cement with a rag or paper towels. Allow the applied cement to dry before building the first fire in the heater.
13. Install the factory-furnished thermometer probe as shown by Figure 13:
    First-Insert the stainless steel ferrule into the factory-drilled hole located in the heater's top.
    Second-Insert the thermometer probe into the stainless steel ferrule. The head of the thermometer probe should rest freely on the heater's top.

14. Route the heater's blower power supply cord away from the heater to avoid damage to the power supply cord from heat or dropped objects. Do not route the power supply cord under the heater's floor protector or rugs of any type. Always keep the power supply cord away from hot surfaces. Plug the power supply cord into a 120 volt, 60Hz, 15 amp properly fused and grounded receptacle.

DANGER: IF ANY CLEARANCE TO UNPROTECTED COMBUSTIBLE WALL OR CEILING IS LESS THAN THOSE SPECIFIED BY FIGURES 5 THROUGH 9 AFTER HEATER INSTALLATION IS COMPLETED, A CLEARANCE REDUCTION SYSTEM MUST BE INSTALLED BEFORE THE FIRST FIRE IS BUILT IN THE HEATER; OTHERWISE, THE UNPROTECTED WALL OR CEILING COULD CATCH FIRE. REMEMBER, THERE ARE ALSO LIMITS AS TO HOW CLOSE THE HEATER CAN BE INSTALLED TO A COMBUSTIBLE SURFACE PROTECTED BY A CLEARANCE REDUCTION SYSTEM. REREAD "MINIMUM CLEARANCES TO COMBUSTIBLE WALLS AND CEILINGS" PRESENTED EARLIER IN THIS MANUAL.

CAUTION: FOR YOUR SAFETY, CONTACT YOUR LOCAL FIRE DEPARTMENT, FIRE MARSHAL, OR BUILDING CODE INSPECTOR FOR INSPECTION PRIOR TO AND FOLLOWING CLEARANCE REDUCTION SYSTEM AND/OR HEATER INSTALLATION.

SECTION 3

HOW TO USE THE HEATER, SAFE OPERATION

IMPORTANT: DO NOT USE THE HEATER UNTIL A PROFESSIONAL INSPECTION HAS BEEN MADE OF THE ENTIRE INSTALLATION BY YOUR LOCAL FIRE DEPARTMENT, FIRE MARSHAL OR BUILDING CODE INSPECTOR. INSTALL A SMOKE DETECTOR ON EACH FLOOR OF YOUR HOME. IN CASE OF ACCIDENTAL FIRE FROM ANY CAUSE IT CAN PROVIDE TIME FOR ESCAPE.

SAFETY REMINDERS

- A correctly installed heater can still pose a fire hazard if it is not used properly.
- Only after the heater is installed properly. attached to an approved chimney in good condition and has been inspected by a qualified person, it is ready for operation.
- Remember not to place any combustibles near the heater. In addition to furniture. rugs and clothing. this includes paper which you might use to start the fire. A hot coal could fall from the heater and cause a fire.
- Never use flammable liquids to start or freshen a fire. Gasoline, kerosene. lantern fuel and other such liquids can explode.
- Don't touch a heater to see if it's hot. Use insulated and fireproof gloves when tending the heater.
- When the heater is operating. children must be closely supervised. Unaware of the potential danger of a hot heater. children may accidentally bump into or touch the heater and be burned.
- Make sure you do not wear loose or flowing garments when tending the heater. Clothing like this could ignite. Be careful that hot coals don't fall on your clothing.
- Open a window to allow fresh air into the room when you use the heater for long periods of time to prevent asphyxiation.
- Do not use this heater as a trash disposal. This can cause dangerous overheating.
- Do not overfire this heater. Overfiring can cause a chimney fire or house fire. Overfiring can also shorten the life of the heater.
- Burn natural wood only in this heater. See the "WOOD FACTS" section of this manual for detailed information. Burning anything other than natural wood in this heater may damage the catalytic combustors.
- The small amounts of wood used for daily fire tending should be kept in a non-combustible container at least 36 inches away from the heater.
- Use only metal containers with tight fitting lids to remove ashes.

HEATER OPERATION

HOW THIS HEATER OPERATES (See Figure 13)

The chimney draft draws combustion air (oxygen) into the heater's firebox through an adjustable inlet air damper. The amount of combustion air allowed to be drawn into the heater is manually controlled by the inlet air control lever located at the lower front of the heater. The gases (smoke) produced by the burning wood are either (1) consumed by the fire and burned, if there is sufficient heat and combustion air present, or (2) drawn through the heater's catalytic combustion system and burned there on its way to the heater's venting system, or (3) drawn out of the heater into the venting system through a bypass damper which bypasses the heater's catalytic combustor system. As the surface of the heater becomes hot, it radiates heat to the objects around it and heats air flowing by it. Any attempt to alter this flow of air by connecting this heater to a duct system can lead to improper and possibly hazardous operation of this heater.

The heater is equipped with a variable speed manual blower. Use the blower control knob located on the heater's lower right-hand corner (see figure 13) to turn the blower on and set the blower speed as desired, or turn the blower off. To begin, we recommend setting the blower speed proportional to the air inlet setting, later the blower can be set as experience dicatates. Figure 14 shows the schematic wiring diagram of the blower.

INLET AIR DAMPER EXPLAINED

The inlet air damper on this heater is an adjustable opening whose opening size is manually set by the heater operator who adjusts the inlet air control lever as shown by Figure 13. The inlet air damper's adjusted opening size determines the amount of combustible air (oxygen) allowed to be drawn into the heater's firebox by the chimney draft.

CATALYTIC COMBUSTORS EXPLAINED

Under normal conditions, hydrocarbons and other potentially flammable products in wood smoke have a wide range of ignition temperatures. Many won't burn below about 1200°F or even higher. In most woodburning heaters, the average temperature in the firebox is only 700°F to 800°F during a burn cycle. Thus, much of the wood smoke passes through the heater unburned, wasting a good bit of the potential heat in the wood. Worst, some of the unburned smoke products condense and accumulate as dangerous creosote in the heater's venting system while other smoke products are expelled out the chimney to pollute our environmental air. However, when wood is correctly burned in a heater properly equipped with a catalytic combustor system, the majority of the smoke generated by the burning wood is disposed of (burned) so well that the heater's combustion efficiency is improved, there is less dangerous creosote to accumulate in the heater's venting system, and there is less harmful air pollutants to polute our environmental air.

A catalytic combustor is a ceramic honeycomb-type structure (the combustor) which is chemically coated with a compound known as noble metal (the catalyst). The catalyst, metals like platinum and palladium, have chemical properties that, when heated to as little as 500°F, enable the combustor to "light-off" (ignite) and burn (oxidize) the majority of the hydrocarbons and other flammable products present in the unburned smoke of a wood fire as the smoke passes through the combustor on its way to the heater's venting system. In other words, a catalyst is an element which will cause something to happen under conditions by which they would not normally happen, without being consumed or used up by that reaction. In a wood heater equipped with catalytic combustors, this simply means that the catalyst is allowing the hydrocarbons and other flammable products in wood smoke to be burned at temperatures as low as 500°F rather than at the 1100°F to 1500°F temperatures normally required to burn the same smoke products.

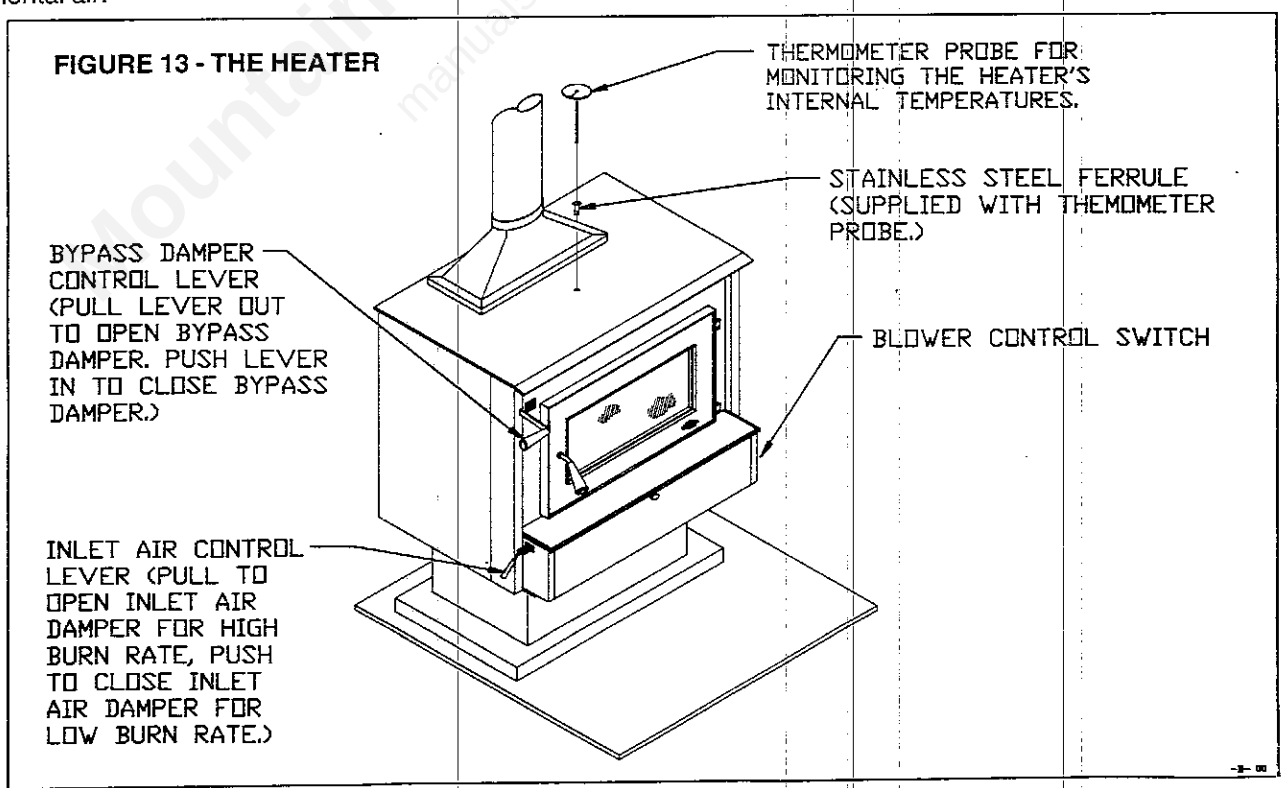
This heater is equipped with a thermometer probe for monitoring catalytic combustor temperatures. The thermometer probe protrudes into the heater through the heater's firebox top.

It is normal for combustors to become extremely hot during catalytic burning, but temperatures above 1800°F should be avoided because those extreme temperatures can damage a combustor's catalyst. Combustor temperatures between 1400°F to 1600°F are common, but operating temperatures between 700°F to 1400°F are recommended. If combustor temperatures above 1800°F are observed, open the bypass damper to prevent damage to the catalyst and reduce the inlet air supply to rapidly lower the temperature. As inlet air damper settings become more familiar, undesirable settings can be avoided. See Figure 13.

NOTE: It is normal for catalytic combustors to glow cherry red when their temperature is above 1000°F. However, do not equate nonglowing combustors with nonfunctioning combustors because most catalytic burning occurs below 1000°F. As combustors age, less glowing will occur, but as long as combustor temperatures above 700°F are reached, the combustors are functioning.

Proper usage of this heater's catalytic combustors will improve the heater's combustion efficiency, and there will be less dangerous creosote to accumulate in the heater's venting system, and there will be less air pollutants released into our environmental air.

FIGURE 13 - THE HEATER



BYPASS DAMPER EXPLAINED

The smoke generated by the fire in the heater's firebox must bypass the heater's catalytic combustor system during certain phases of heater operation. To accomplish this, the heater is equipped with a bypass damper.

As a general rule, the bypass damper must be either in the closed position or the open position during the heater's operation. In the closed position, the smoke generated by the fire in the heater's firebox is drawn through the catalytic combustor system as it flows its way to the venting system; when the bypass damper is in the open position, the smoke bypasses the catalytic combustor system and goes directly into the venting system.

The bypass damper should be in the open position any time the heater's fuel feed door is opened for loading, firetending or inspection of fire. Because the catalytic combustor system offers some resistance to the flow of smoke, opening the fuel feed door of an operating heater with its bypass damper in the closed position would allow smoke and possibly flames to spill from the heater; the open bypass damper offers a path of least resistance to the smoke. ALWAYS OPEN THE BYPASS DAMPER BEFORE OPENING THE HEATER'S FUEL FEED DOOR AND KEEP IT OPEN WHILE LOADING, FIRETENDING OR INSPECTING THE FIRE.

The bypass damper should be opened anytime the heater's thermometer probe indicates that the catalytic combustor temperature is less than 500°F.

WOOD FACTS

As previously mentioned, only natural wood should be burned in this heater. Of course, enough newspaper to start the wood fire is acceptable.

The small amount of wood used in daily fire tending should be kept in a noncombustible container at least 36 inches away from the heater.

The amount of heat you receive from the heater, the degree of control you have over its heat output, how safely you operate the heater, and how often you have to clean its catalytic combustor system and venting are all somewhat dependent on how much you know a about wood and burning wood.

Freshly cut natural wood contains a lot of water, as much as 50 percent water by weight; therefor, freshly cut wood is likely to produce a smoldering, smoky fire and chimney temperatures that are cool enough to cause a more rapid accumulation of a substance known as creosote. (NOTE: The hazards of creosote are described elsewhere in this manual.) To prepare freshly cut natural wood for the most economical and troublefree burning, it should be cut, split, and stacked out of the rain with its ends exposed for at least 6 months before it is burned. Wood that has been seasoned or air-dried in this fashion will normally dry naturally until it is approximately 20 percent water by weight.

There are two types of natural wood: (1) Hardwoods, which generally come from deciduous, broad-leaved trees, are dense and slow to catch fire but will burn evenly for a long time once they do start burning. (2) Softwoods, which generally come from evergreen trees, are less dense than hardwoods and are easier to ignite because they are resinous. Softwoods burn fast, so a fire built entirely of soft wood will burn out quicker than one built entirely of hardwood.

By mixing softwoods and hardwoods, an easily ignited and long-lasting fire can be achieved.

To get an idea of how wood is described and sold, you should first know that the most common measure is the cord. A cord is a tightly stacked pile of logs 8 feet long, 4 feet high, and 4 feet deep. The logs are usually cut 2 feet long, but you can have them cut into shorter lengths. A partial cord, called a face cord or a rick, is the same length and height as a cord, but its depth can be anywhere from 1 to 3 feet.

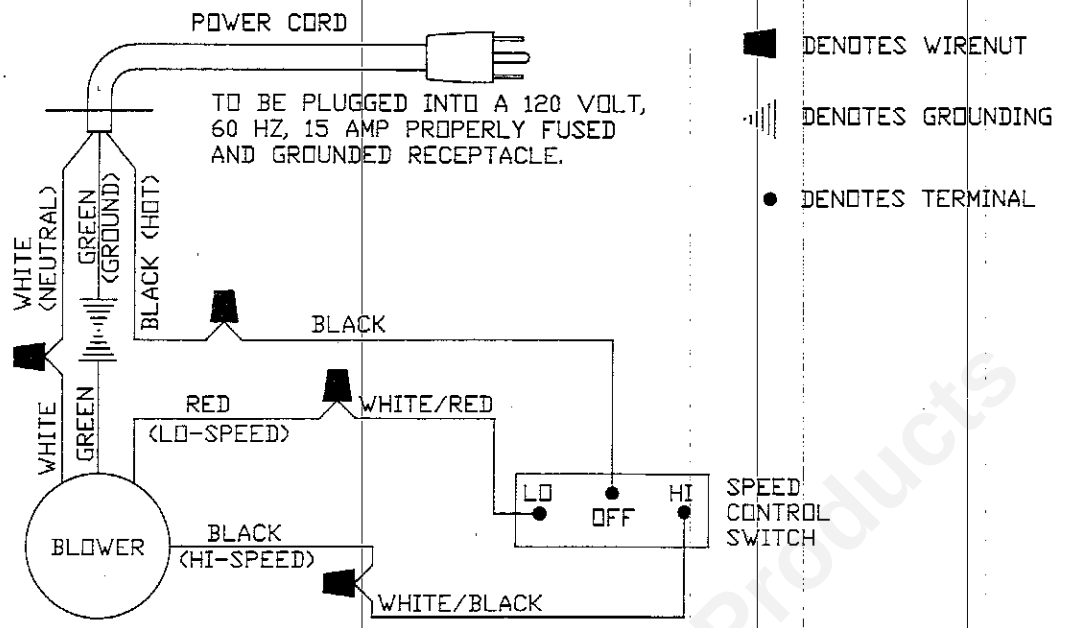
Wood is also sold by the ton. A ton of air-dried, dense hardwood (oak, hickory, maple, etc.) is equal to approximately one-half cord.

If you buy wood by weight, look for seasoned (air-dried) wood. Don't pay for extra water. NOTE: Seasoned wood will look withered and have cracked ends. The wood should be generally sound, but don't be concerned about small pockets of rot you may find.

The following chart shows the heat values (per cord) of some various species of natural woods after they have been seasoned:

Order of Most Heat Per Cord	Species	Type	Average Weight Per Cord	Btu Heat Value of Seasoned Cord
1st	Hickory	Hardwood	3,595 lbs.	30,600,000
2nd	Maple	Hardwood	3,075 lbs.	29,000,000
3rd	Beech	Hardwood	3,240 lbs.	27,800,000
4th	Oak (White)	Hardwood	3,750 lbs.	27,700,000
5th	Oak (Red)	Hardwood	3,240 lbs.	26,300,000
6th	Birch (Yellow)	Hardwood	3,000 lbs.	26,200,000
7th	Elm	Hardwood	2,750 lbs.	24,500,000
8th	Tamarach	Softwood	2,500 lbs.	24,010,000
9th	Cherry	Hardwood	2,550 lbs.	23,500,000
10th	Ash	Hardwood	2,950 lbs.	22,600,000
11th	Spruce	Softwood	2,100 lbs.	18,100,000
12th	Hemlock	Softwood	2,100 lbs.	17,910,000
13th	Pine (White)	Softwood	1,800 lbs.	17,900,000
14th	Aspen	Hardwood	1,900 lbs.	17,700,000
15th	Basswood	Hardwood	1,900 lbs.	17,001,000

FIGURE 14 - WIRING DIAGRAM OF BLOWER



TO BUILD A FIRE

WARNING: THE PAINT ON THE EXTERIOR OF THE HEATER WILL GO THROUGH A CURING PROCESS DURING THE FIRST FIRING OF THE HEATER AND WILL EMIT SOME SMOKE AND ODOR. BE PREPARED FOR THIS BY RAISING A WINDOW OR OPENING A HOUSE DOOR TO PROVIDE VENTILATION.

The first time the heater is fired, the fire should be regulated so as to increase in intensity gradually to allow the paint to cure slowly and to allow the other heater components to adjust to their expanded size.

1. Fully open the heater's inlet air damper as shown by Figure 13.
2. Fully open the heater's by-pass damper. See Figure 13.
3. Open the heater's fuel feed door and place several wadded grapefruit-size newspaper balls on the heater's grate beneath the bypass damper. Be sure the heater's ash removal door is securely closed.
   CAUTION: DO NOT OPERATE THE HEATER WITH ITS GRATES REMOVED. THE GRATES HOLD THE FUEL IN THE PROPER POSITION FOR BEST BURNING.
4. Cover the newspaper balls with dry kindling sticks. Place the kindling sticks close enough to one another so the flames can move easily from one stick to the other. If the kindling is packed too tightly, the fire will suffocate, smoke and then die out.
   NOTE: Softwoods make better kindling than hardwoods.
   NOTE: If the heater tends to smoke when first lit, a draft may be induced by holding a torch of rolled-up newspaper at the opening of the by-pass damper. Occasionally, this must be done two or three times to establish an updraft. It may also help to open a house door or window slightly.
5. Light the wadded balls of paper in the heater. Leave the fuel feed door slightly ajar (approximately 1 to 2 inches) to allow plenty of oxygen to reach the fire, but DO NOT LEAVE THE HEATER UNATTENDED.
   WARNING: NEVER LIGHT OR REKINDLE A HEATER FIRE WITH KEROSENE, GASOLINE, OR CHARCOAL LIGHTER FLUID: RESULTS CAN BE FATAL.
6. Once the original kindling is well lit, add more kindling and 2 or 3 logs about three inches in diameter. Be careful not to smother the fire. Stack the new wood pieces carefully near enough to keep each other hot, but far enough away to allow adequate air flow between them. NEVER LEAVE THE HEATER UNATTENDED WHILE ANY OF ITS DOORS ARE NOT SECURELY CLOSED.
7. Once the logs begin to burn, securely close the fuel feed door.
   CAUTION: OPERATING THE HEATER WITH THE FUEL FEED DOOR OR THE ASH REMOVAL DOOR OPEN CREATES AN ABNORMAL FIRING CONDITION WHICH CAN OVERHEAT THE HEATER, CHIMNEY AND ADJACENT COMBUSTIBLE MATERIALS. THIS CAN DRASTICALLY SHORTEN THE HEATER'S LIFE, THE CATALYTIC COMBUSTOR'S LIFE, AND VOID THE FACTORY WARRANTIES OF THE HEATER AND ITS COMPONENTS.
8. When all the wood in the firebox is burning well, finish loading the heater in the following sequence:
   First - Open the heater's fuel feed door.
   Second - Load the heater's firebox with the desired amount of wood.
   NOTE: Probably the least understood requirement in maintaining a good fire is that of establishing a good base of coals. Many new heater users hesitate to load enough wood to sustain a fire. A good bed of hot coals will maintain a more even temperature as well as get a new load of wood started burning easily.
   Third - Securely close the heater's fuel feed door.

9. During the start-up of a cold heater, a medium to high firing rate must be maintained with the bypass damper and the inlet air damper open for about 20 minutes or until the heater, catalyst, and wood are all stabilized at proper operating temperatures. Even though it is posssible to have the heater's internal temperature reach 600°F within two to three minutes after a fire is started, if the bypass damper is closed and the inlet air damper adjusted too soon, the heater's fire may go out or the catalytic combustors may not maintain "light-off." Therefore, wait until the heater, catalyst, and wood are stabilized at proper operating temperatures before closing the bypass damper and adjusting the inlet air damper in the following sequence:

   First - Close the bypass damper.

   Second - After closing the bypass damper, adjust the heater's inlet air damper for the desired heat and burn rate. The inlet air damper is adjusted by setting the heater's inlet air control lever to a point midway between "HI" and "LO." If the house or heating situation requires a higher or lower setting to obtain the desired amount of heat, adjust the heater's inlet air control lever setting appropriately.

NOTE: The gauge on the thermometer probe should indicate a rapid temperature rise shortly after the heater's bypass damper is closed. This rapid rise in temperature indicates that catalytic burning is taking place. If there is no rapid temperature rise, catalytic burning is not taking place and it will be necessary to repeat step 9 so that catalytic burning is maintained at the end of step 9 before proceeding to the following step 10.

10. Let each load of wood burn down to a good coal bed.

How long a load of wood burns will vary considerably with the variables such as type of wood, how well the wood is seasoned, the heater's inlet air control lever setting, the position of the heater in the house and how well the house is insulated.

FIRE TENDING

Fire tending is the occasional poking or stirring of the burning fuel bed to ensure airflow through the fire and adding new wood as needed. With experience, you should determine how often firetending is required to maintain the desired heat output of the heater. To ensure safe and satisfactory performance of the heater, the following rules should be observed:

1. KEEP THE FUEL FEED DOOR AND ASH DOOR CLOSED EXCEPT WHEN TENDING THE FIRE OR REMOVING ASHES. Operating the heater with a door open can cause the heater to overheat and will increase the possibility of smoke, ash or sparks escaping the heater and damaging the dwelling or its contents.
2. The following sequence should always be followed when opening the heater's fuel feed door to prevent smoke and possibly fire from spilling out of the heater:
   a. Fully open the inlet air damper by setting the heater's inlet air control lever to the "HI" position.
   b. Fully open the bypass damper.
   c. Wait about one minute, then open the fuel feed door.
3. Never load the heater in any manner which might block or hinder the bypass damper in any way. A blocked or hindered bypass damper could have a detrimental affect on the heater's performance and operation.
4. ADD ONLY SMALL AMOUNTS OF FRESH WOOD TO THE HEATER AT EACH REFUELING. Adding large amounts of fresh wood can cause an accumulation of gases above the fire that can cause backpuffing. Backpuffing can occur whenever concentrated gases accumulate over the firebed and then catch fire quickly. This may cause smoke and flame to be expelled from the heater during firetending, but under rare conditions, backpuffing can be severe enough to break apart poorly connected chimney connector pipes. If backpuffing is experienced, see section 5 of this manual for possible cause and solution to stop the backpuffing. This is an abnormal condition and a potential hazard. Determine and correct the cause.

   Adding large amounts of wood to the fire causes a rapid cooling of the chimney and the release of excessive amounts of water vapor up the chimney. This can cause excessive creosote accumulation in the chimney.
5. DO NOT OVERFIRE THE HEATER. If any part of the chimney connector or heater (other than the combustors) glows red hot, move the heater's inlet air control lever to "LO" and keep the heater's doors closed until the heater cools.
6. NEVER LEAVE THE HEATER UNATTENDED FOR LONG PERIODS OF TIME AFTER ADDING FRESH WOOD. Before the heater is left unattended, the fire should be well established and the inlet air control lever set at medium or less.
7. After refueling a hot heater that has a catalytic combustor temperature below 500°F, the heater should be operated at a medium to high firing rate with the bypass damper open for about 10 minutes, or until the gauge on the heater's thermometer probe indicates a stabilized catalytic combustor temperature of between 500°F to 700°F This helps to ensure that the heater's catalytic combustor reach the proper operating temperature to maintain "light-off". When the catalytic combustor temperature is stabilized at between 500°F and 700°F, close the bypass damper and set the heater's inlet air control lever to the desired setting.
8. After refueling a hot heater that has a catalytic combustor temperature above 500°F, the heater's bypass damper may be closed and the heater's inlet air control lever set to the desired setting because catalytic combustor temperatures above 500°F will be hot enough to support catalytic burning.
9. IF YOU DO NOT WISH TO BURN THE HEATER CATALYTICALLY, LEAVE THE HEATER'S INLET AIR CONTROL LEVER SET AT "HI" FOR 15 MINUTES AFTER ADDING FRESH WOOD TO A FIRE. This allows the gases to be driven off and shortens the length of time the dense smoke is likely to deposit creosote in the heater's chimney connector and chimney. (NOTE: As previously noted, the bypass damper should remain in the open position during non-catalytic burning.)

A REVIEW OF CATALYTIC COMBUSTION OPERATING TEMPERATURES

Achieving Catalytic Light-Off: At least once during each burning cycle, the temperature within the heater should be raised high enough to cause the catalyst to become active. The most convenient time to do this is during fuel loading. With new catalytic combustors, catalytic combustor temperatures of 500°F to 600°F will initiate catalytic burning. But as a combustor ages, its catalytic activity decreases, so older combustors need more heat during start-up to sustain catalytic action. During the catalytic combustor's normal range of life, catalytic combustor temperatures between 500°F and 700°F will be sufficient for light-off.

NOTE: As previously noted, a thermometer probe is provided for monitoring the catalytic combustor temperatures.

Maintaining Catalytic Burning Conditions: During the start-up of a cold heater, a medium to high firing rate must be maintained with the bypass damper and the inlet air damper open for about 20 minutes or until the heater, catalytic combustors, and wood are all stabilized at proper operating temperatures. Even though it is possible to have internal firebox temperatures reach 600°F within two to three minutes after a fire is started, if the bypass damper is closed and the inlet air damper adjusted too soon, the heater's fire may go out or the catalytic combustors may not maintain "light-off."

After the refueling of a hot heater that has a catalytic combustor temperature below 500°F, the heater should be operated at a medium to high firing rate with its bypass damper open for about 10 minutes (or until the gauge on the heater's thermometer probe indicates a stabilized catalytic temperature of between 500°F to 700°F) to help ensure the heater's catalytic combustors reach the proper operating temperature to maintain "light-off." At the end of a burn cycle, it's possible that the amount of the burning charcoal might not provide sufficient temperature or fuel for the catalyst system; therefore, firing a new load of wood with the heater's bypass damper and inlet air damper open until the heater, catalytic combustors, and wood are all stabilized at proper operating temperatures helps to ensure proper catalytic burning during a burn cycle.

When refueling a hot heater that has a catalytic combustor temperature above 500°F, the bypass damper maybe closed and the heater's inlet air control lever set to the desired setting which will provide the desired heat output.

If difficulty is encountered in achieving catalytic light-off or maintaining catalytic burning conditions refer to Section 5 of this manual for appropriate remedies.

SECTION 4

HOW TO TAKE CARE OF YOUR HEATER AND VENTING SYSTEM (ROUTINE MAINTENANCE)

VENTING SYSTEM CARE

As previously noted, the venting system consists of the heater's chimney connector (the pipe which connects the heater to the chimney) and the chimney itself.

CREOSOTE - FORMATION AND NEED FOR REMOVAL

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 and extremely hot fire.

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

NOTE: EVEN THOUGH REDUCTION OF CREOSOTE IS ONE OF THE PRIMARY ADVANTAGES OF A CATALYST EQUIPPED HEATER, CREOSOTE WILL STILL ACCUMULATE IN THE HEATER'S VENTING SYSTEM. CATALYTIC COMBUSTORS DO NOT ELIMINATE THE NEED FOR CREOSOTE INSPECTION AT LEAST TWICE MONTHLY DURING THE HEATING SEASON.

If creosote has accumulated, it should be removed to reduce the risk of a chimney fire. NOTE: When removing creosote from the chimney connector and chimney, the heater should be disconnected from the chimney connector to prevent the dislodge creosote from entering the heater where it could jam the heater's bypass mechanism or plug the catalytic combustors.

A chimney fire is usually indicated by a roaring noise within the chimney and/or a pinging noise within the chimney connector, and the emission of sparks and ash from the top of the chimney.

If a chimney fire should occur, do the following:

1. Immediately close any heater door that might be open.
2. Set the heater's inlet air control lever to the "LO" position as shown by Figure 13.
3. Alert all people in the house. Either have them leave, or be ready to leave.
4. Call the fire department.
5. As an added precaution, the roof of your home and other outside combustibles may be protected by wetting with a garden hose or buckets of water.

A chimney fire may cause structural damage to the chimney. After the chimney fire is over, thoroughly inspect the chimney, chimney connector and surrounding materials for damage and make any necessary repairs before using the heater again. Most fire departments make free chimney inspections and can provide assistance in locating chimney cleaning or repair services.

THE VENTING SYSTEM SHOULD ALWAYS BE CLEANED AND INSPECTED BEFORE EACH HEATING SEASON.

CHIMNEY CONNECTOR PIPE-CORROSION INSPECTION

Chimney connector pipes do not last forever. Corrosion is particularly a problem if the inside of the pipe tends to get damp from condensation of flue gases or from rain or snow getting into the chimney.

Chimney connector pipe replacement may be necessary more than once a season, but once every few years is more typical. Every time the chimney and chimney connector are checked for creosote buildup, the strength and integrity of the chimney connector pipes should also be checked. Tap each chimney connector pipe with a small hammer or poke with a screwdriver to reveal where the metal is getting thin due to corrosion on the inside. Elbows usually give out first. Replace as necessary.

HEATER CARE

ASHES-REMOVAL AND DISPOSAL

Ashes should not be allowed to accumulate to the point that they obstruct the airflow through the burning wood. If ashes obstruct the airflow, poor burning of the wood is likely and the appliance's grate will be damaged from overheating.

When removing ashes from the heater, wear gloves to protect your hands from glowing embers and hot surfaces. ASHES SHOULD BE PLACED IN A METAL CONTAINER WITH A TIGHT-FITTING LID. THE CLOSED CONTAINER OF ASHES SHOULD BE PLACED ON A NONCOMBUSTIBLE FLOOR OR ON THE GROUND, WELL AWAY FROM ALL COMBUSTIBLE MATERIALS, PENDING FINAL DISPOSAL. IF THE ASHES ARE DISPOSED OF BY BURIAL IN SOIL OR OTHERWISE LOCALLY DISPERSED, THEY SHOULD BE RETAINED IN THE CLOSED CONTANER UNTIL ALL CINDERS HAVE THOROUGHLY COOLED.

Ashes should never be placed in wooden or plastic containers, or in paper or plastic bags, no matter how long the fire has been out. Coals have been known to stay hot for several days when enbedded in ashes.

HEATER MAINTENANCE

The painted surfaces of the heater may be wiped free of dust with a soft cloth. The use of any other cleaning method may damage or remove the paint.

The brass finished trim components on the heater are coated with a clear baked-on enamel to prevent tarnishing. DO NOT polish the brass finished trim components. When cleaning is necessary, use mild soap suds and a soft cloth. After washing, dry the trim surfaces with a clean, dry, soft cloth.

This heater is equipped with a high temperature resistant glass panel. An oven cleaner or steel scouring wood and water may be used to clean the glass when the glass is cool. Take care to avoid chipping or scratching the glass. Chipped or scratched glass can break suddenly when heated. Do not use the heater with a broken glass panel.

This heater is equipped with a high temperature resistant glass panel. An oven cleaner or steel scouring wool and water may be used to clean the glass when the glass is cool. Take care to avoid chipping or scrathing the glass. Chipped or scratched glass can break suddenly when heated. Do not use the heater with a broken glass panel.

At the end of each heating season, the heater should be throughly cleaned of all ashes. Ashes remaining in the heater in combination with moisture in the air can cause severe corrosion of the heater. All rust spots on the heater should be wire brushed and covered with a coat of high temperature paint. If the heater is to be stored until the next heating season, be sure the storage area is dry.

The heater should never be used with damaged or missing parts.

Have a qualified heater installer inspect the complete system before each heating season. Replace all damaged or missing parts.

Check the following items regularly during the heating season to ensure proper heater operation:

1. Condition and operation of fuel feed door and ash removal door sealing gaskets - repair or replace if air leakage is observed and replace if excessive wear is observed. The door sealing gaskets are attached to the doors by standard furnace cement which may be purchased from your heater dealer. See the heater's repair parts pamphlet for ordering information, gasket replacement illustrations, and part numbers.
2. Condition and operation of glass panel gasket-repair or replace if air leakage is observed and replace if excessive wear is observed. The glass panel gasket is attached to the glass panel by adhesive backing applied to the gasket at the factory.
3. Condition and operation of fuel feed door and ash removal door latching pawls and handles - ensure that operation will securely close the door(s). Adjsust as necessary and replace if necessary. See the heater's repair parts pamphlet for ordering information, replacement illustrations, and part numbers.
4. Condition and operation of bypass damper: As necessary, brush or vacuum the bypass damper free of ashes to eliminate bypass damper jamming or misalignment caused by a buildup of ashes in the bypass damper mechanism.
5. Condition and operation of catalytic combustors: It is important to periodically monitor the operation of the catalytic combustors to ensure that they are functioning properly and to determine when they need to be replaced. Non-functioning combustors will result in a loss of heating efficiency, and an increase in creosote and emissions. There are two simple ways to determine if the heater's catalytic combustor system is functioning properly. They are:
   a. Take note of the smoke exiting the chimney with a well established fire burning in the appliance and the bypass damper open. Then close the bypass damper to achieve catalytic light-off. Wait a few minutes, then observe the smoke exiting the chimney. If the catalytic combustor system is functioning properly, there should be a significent decrease in the amount of smoke exiting the chimney after the bypass damper is closed. Be careful not to confuse smoke with steam.

b. With a well established fire burning in the appliance and the bypass damper open, take note of the temperature registered by the thermometer probe's gauge. Then close the bypass damper to achieve catalytic light-off. The thermometer probe's gauge should indicate a rapid temperature rise if the catalytic combustor system is functioning properly.

The catalytic combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustors is not recommended unless more detailed inspection or cleaning is warranted because of decreased performance which cannot be remedied by one of the following procedures, or as outlined by Section 5 of this manual.

- If fly ash accumulation is evident on the combustors, brush the fly ash off the front faces of the combustors when the appliance does not have a fire in it and is not hot. Use a soft bristle brush - a clean, dry paint brush will do fine.
- If creosote is evident on the combustors, operate the appliance at a high fire rate with the bypass damper partly open. Reinspect the combustors after the fire in the appliance has burned out and the appliance is not hot. If some creosote still remains, repeat the firing procedure. CAUTION: CARE SHOULD BE TAKEN NOT TO OVERFIRE THE APPLIANCE.
- At least once per heating season, remove the catalytic combustors from the heater and clean the rear faces of the combustors with plain water is also good - after soaking the combustors in warm or hot (NOT BOILING) water for about 20 minutes, allow the combustors to cool at room temperature and then rinse them under medium water faucet pressure, then allow the combustor to dry thoroughly. For information on how to remove and reinstall the combustors, see the "WHEN AND HOW TO REPLACE THE CATALYTIC COMBUSTOR(S)" section of this manual.

CAUTIONS:

- Never try to clean the cells of catalytic combustor by inserting an instrument of any type. This may dislodge the catalyst coating from the combustor, rendering the combustor useless.
- The use of compressed air to clean combustor cells is not recommended. Experience has shown that the catalyst coating can be blasted off the combustor if high-pressure compressed air is used to clean the combustor cells.
- It is normal for small amounts of the ceramic to break off the the combustor face during the life of the combustor. This loss of material has little effect on the performance of the catalytic combustor. Only when large pieces - golf ball size or larger - are missing should replacement be considered because of ceramic material loss.

WHEN AND HOW TO REPLACE THE CATALYTIC COMBUSTOR(S)

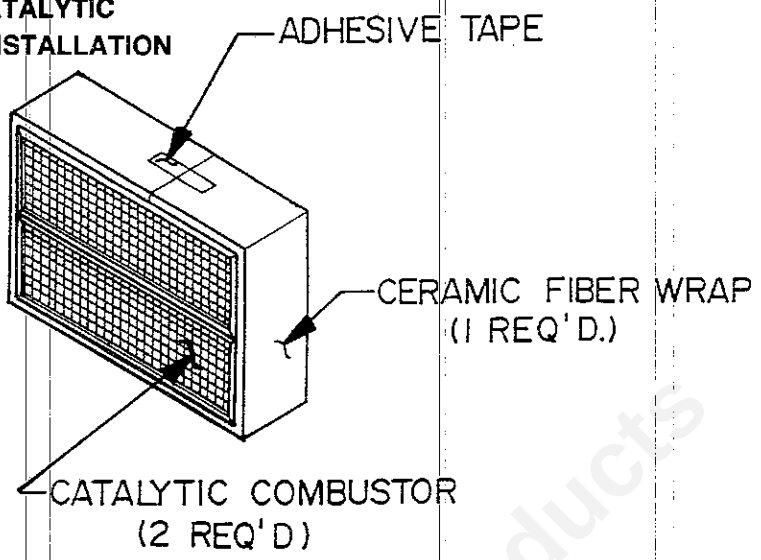
Tests conducted by a leading catalytic combustor manufacturer indicate that the average expected operational life of a catalytic combustors should be about 6,000 operating hours. Remember, this is an averge test figure; actual operational life of your heater's combustors may be more or less, depending on operation procedures and normal care.

Whenever a catalytic combustor is no longer functional, it should be replaced as soon as possible. The TROUBLESHOOTING section of this manual outlines possible problems which might cause a catalytic combustors to stop functioning. Follow the solutions offered by the TROUBLESHOOTING section for the most trouble-free and efficient operation of this heater.

When you do have to replace one or both of the catalytic combustors or just remove them for cleaning, here's how it is done:

1. Allow any fire in the heater to burn out and the heater to cool.
2. Open the heater's fuel feed door, look inside the heater and locate the two catalytic combustors; they are located in the combustor housing which is located in the upper portion of the firebox just in front of the bypass damper. A flame impingement shield, which protects the combustors from direct fire contact, is mounted directly below the catalytic combustors.
3. To gain access to the catalytic combustors, reach through the fuel feed door opening and remove the flame impingement shield from its support rods.
4. Now pull both catalytic combustors out of the combustor housing. Removal is best accomplished by first pushing up slightly on one of the catalytic combustors in order to get hold of the other catalytic combustor. Care should be taken not to drop a combustor because they are made of ceramic material which can break. The combustors are tightly wrapped with insulating material which should also be removed from the combustor housing.
5. Once the combustors and insulating material are out of the combustor housing, inspect for residue inside the combustor housing. Wipe this area clean with a dry cloth; DO NOT USE DETERGENTS, STEEL OR METALLIC BRUSHES, OR SOLVENTS.
6. Clean the front and rear faces of the combustors by brushing them with a soft bristled brush, or by vacuuming them lightly, or by soaking them in plain water as described earlier or, if necessary, obtain new replacement combustors. The catalytic combustors. The catalytic combustor warranty furnished with each new heater gives specific details regarding the purchase of new catalytic combustors.
7. Prepare the combustors for installation by tightly wrapping them with NEW insulating material as shown by Figure 15. The combustors MUST be wrapped with NEW insulating material EVERYTIME they are installed in the combustor housing. The new insulating material may be purchased from your heater dealer.
8. Install the wrapped combustors in the clean combustor housing just like the combustors were installed prior to removal. The combustor housing is sized to create a snug fit between the wrapped combustors and combustor housing; after installtion, the insulating material which the combustors are wrapped will expand and form an even tighter seal when heated by the next fire built in the heater.
9. Reinstall the flame impingement sheild.

FIGURE 15 - PREPARATION OF CATALYTIC COMBUSTORS FOR INSTALLATION



SECTION 5

TROUBLESHOOTING

Problems can arise during the operation of any heating appliance. However, correct installation and good operating practices, including routine appliance and venting system maintenance, along with a good, sound chimney, will eliminate most of the problems mentioned by this section of the manual. Heating appliance operators should make themselves aware of the nature, cause and solution to possible problems so as to help themselves obtain the best possible service from their heating appliance.

TROUBLESHOOTING GUIDELINES

THE VENTING SYSTEM - KEY TO GOOD HEATER PERFORMANCE

A majority of performance problems with wood burning heaters can be traced to some factor in the venting system that is adversely affecting the heater. Air will flow into the heater and smoke will flow up the chimney only if there is sufficient difference between the air pressure in the room where the heater is located and the air pressure inside the chimney. As hot gases and smoke flow up a chimney, the pressure in the chimney is lowered, creating a difference in pressure inside and outside the chimney. When this pressure difference, often referred to as "draft pressure" or simply as "draft", is sufficient, air will be forced into the inlet air dampers of the heater. This air supplies the oxygen necessary for the wood to burn. If the draft is not sufficient, insufficient oxygen will reach the burning wood and it will burn poorly; this condition can also cause smoke and dangerous gases to spill or backpuff from the heater into the room. Backpuffing occurs when the air flow through the heater is insufficient to burn all the gases being released by the wood causing them to build up until they ignite as a minor explosion. This causes smoke to puff out of every opening in the heater and venting system. Too much draft may cause excessive temperatures in the heater and may damage the catalytic combustors. An uncontrollable burn or a glowing red heater part or chimney connector is an indication of excessive draft. The amount of draft in the chimney depends on the length of the chimney, local geography, nearby obstructions (even a tree that has grown tall can affect the draft of a chimney that was previously trouble-free), and other factors described below.

The common unit used to measure draft is "INCHES OF WATER". To determine the draft of your chimney, a draft pressure reading should be taken with a DRAFT METER or a WATER MANOMETER. This requires someone with the proper equipment and the knowledge of how to use it. Your heater dealer should be able to perform this task for you or recommend someone who can.

For this heater, installations with a draft of .03 inches of water or less are considered marginal and will not burn reliably as noted above. In this catalytic combustor-equipped heater, it is not recommended that the draft exceed .08 inches of water or overfiring can occur as noted above. The recommended operating range for this heater is .04 to .07 inches of water.

REMEMBER - THE HEATER CANNOT CREATE DRAFT. ONLY A PROPER LEAK FREE CHIMNEY CAN CREATE THE NECESSARY DRAFT.

WHAT TO DO IF YOUR HEATER SMOKES OR BURNS POORLY OR EXCESSIVE CREOSOTE ACCUMLATES IN THE CHIMNEY

1. Open a window slightly to see if the conditions improve. If opening a window improved the performance of the heater or stops the spillage of smoke into the room, the problem is caused by a slight vacuum in the room. The vacuum can be the result of the room being so tightly constructed that the air removed from the room by the heater is not replaced by normal infiltration of air from outside the room.

The vacuum can also be caused by the loss of air from the room through kitchen or bathroom ventilating fans, other chimneys or vents, ect. The only solution to this type problem is to reduce the air lost from the room or provide a source for air to enter the room.

2. Check the pipes connecting the heater to the chimney for loose or unsealed joints that may allow air to leak into the chimney system.
3. Examine your method of building and tending the fire in the heater. If you close the bypass damper too soon when building a fire, fail to open it before opening the fuel feed door, add too much fresh wood at each refueling, or attempt to operate the heater at too low a combustion rate for the amount of wood present in the firebox, your failure to follow proper practices may be causing the problem. Also check for ash buildup in the ash pan. Ashes can restrict air flow thru the burning wood.
4. Check the catalytic combustors for damage or functional failure.
5. Check the height of the chimney. A chimney that is too short will not develop sufficient draft or will allow wind to interfere with the draft. (See Figure 4 for correct chimney height.)
6. Check the chimney for cracks or holes that might allow air to leak into the chimney. If the chimney is equipped with an ash clean out, be sure the door is closed and fits tightly. The door may have to be temporarily sealed with tar or furnace cement to be as air tight as required. An excellent way to check an exterior chimney for leaks is to perform a smoke test by building a small wood fire in the heater, adding a small amount of wood to the fire to make it smoke heavily, momentarily blocking the top of the chimney, and watching for smoke to leak out of any opening or cracks.
7. Check the entire venting system for obstructions that could be causing resistance to the flow of smoke and gases up the chimney.
8. Check the inside diameter of the chimney. If the inside diameter is too small, it will be too restrictive to the flow of smoke and gases. If the inside diameter is too large, it will result in excess capacity, which means less draft and more cresote. Refer to the "MASONRY CHIMNEY REQUIREMENTS" and the "METAL PREFABRICATED CHIMNEY REQUIREMENTS" sections of this manual for chimney diameter requirements.

WHAT TO DO IF YOUR HEATER BURNS TOO RAPIDLY OR OVERHEATS

1. If the room in which the heater is located becomes uncomfortably warm on moderately cool days, it may be because you are placing too much wood in the heater for the amount of heat required to heat your home. Although the adjustable inlet air damper on the heater is intended to control the burning rate of the wood, a certain amount of air must enter the heater at all times to assure the fire does not go out and the wood burns as cleanly as possible. Thus you should adjust the amount of wood you put in the heater to the outdoor temperature. Placing excessive wood in the heater will cause excessive creosote formation in the chimney, waste wood, can plug up the catalytic combustion causing the heater to smoke or backpuff into the room, as well as make the room uncomfortably warm.
2. If the heater burns too rapidly or overheats, it may be because air is leaking around a loose door gasket or a fuel feed door or ash door latching pawl and handle may need adjusting. Check thoroughly for leaks where air may be entering the heater's firebox.
3. If the heater burns too rapidly or overheats due to excessive draft as described earlier, you may wish to consider purchasing a barometric damper to be installed in the heater's chimney connector. The barometric damper should be set to regulate a .07 draft through the heater. Check with your heater dealer.

TROUBLESHOOTING CATALYTIC COMBUSTORS

PROBLEM	POSSIBLE CAUSE/SOLUTION
1. Combustor Plugging (Also see Catalyst Masking)	(1) Burning materials that produce a lot of char and fly ash can plug combustor cells and cause a smoke spillage problem and prevent catalytic burning/Do not burn materials such as garbage, gift wrap or cardboard. Burn dry, seasoned wood. (2) Burning wet, pithy woods or burning large loads of small-diameter wood with the bypass damper closed without light-off taking place can plug combustor cells with creosote and cause smoke spillage problems and prevent catalytic burning/Don't close the heater's bypass damper until temperature is high enough and stabilized to maintain catalytic burning. Follow proper firing procedure described by owner's manual. It may be possible to burn the accumulated creosote off combustor by putting the bypass damper in a partially open-partially closed position after a "hot" fire has been started. (3) Not maintaining light-off/Same solution as (2) above. (4) Combustor not functioning. If proper burning procedures have been followed to no avail, the combustor is not functioning/Replace combustor or combustors.

2.	Catalyst Masking (Also see Combustor Plugging)	(1) Closing the heater's bypass damper before temperature is high enough or stabilized enough to maintain catalytic burning can cause the catalyst to become masked or coated with a layer of fly ash which will prevent catalytic burning/Brush cooled combustors with a soft bristled brush or vacuum lightly or clean with plain water. NOTE: The difference between masking and plugging is that plugging actually plugs up the combustor cells whereas masking does not. Masking is more likely than plugging, but both are easily preventable by proper heater operation and maintenance.
3.	Catalyst Deactivation	(1) Burning trash, pressure-treated lumber or painted wood will deactivate the catalyst to the point that combustors are no longer functional/Burn quality woods available in your area. If the catalyst has been deactivated, replace the combustors. (2) The catalyst can also be deactivated when it is coated with excessive creosote on fly ash. This buildup reduces the amount of catalyst available to react with the smoke./See "COMBUSTOR PLUGGING" and "CATALYST MASKING" above for solutions.
4.	Catalytic Peeling	(1) Extreme temperatures (above 1800°F) at combustor surface may cause the catalyst to peel. Over firing and flame impingement are primary causes. Minor peeling is normal and will not affect function of catalyst. Severe peeling will close all openings and cause a plugging problem./If peeling is severe, remove and replace combustor or combustors. Avoid extreme temperatures and flame impingement. (NOTE: Flame contact with combustors is known as flame impingement.)
5.	Thermal Cracking of Combustor	(1) The cyclical heating and cooling of the combustors and the varying conditions of wood burning create temperature differentials within a combustor's ceramic material. These temperature differences cause the material to expand and contract at differing rates, resulting in internal stresses that can crack the ceramic material. /This is normal. As long as the combustor remains intact, no burning problems should result. If cracking causes large pieces of the ceramic material to fall out, replace the combustor.
6.	Mechanical Cracking of Combustor	(1) An older combustor is susceptible to handling damage. Stress-relief cracks may develop in service, but will not affect the performance of the combustor if it is not mishandled or abused. However, mishandling or abusing a combustor which has stress-relief cracks could result in the combustor completely breaking apart or loss of some of the catalyst coating./Do not mishandle or abuse. Replace combustor if breakage affects catalytic operation.
7.	Combustor Crumbling	(1) Extreme thermal shock due to flame impingement caused by high-fire mode may cause the face of a combustor to crumble./Bypass combustors when heater is operated in high-fire mode. If combustor crumbling occurs, replace combustor if the crumbling affects catalytic operation.
8.	Catalyst Abrasion	(1) High draft can cause fly ash to grit-blast the surface of a combustor./If more than 1/2" of catalyst (as measured along length of cell) is abraded, replace the combustor. To control catalyst abrasion, keep chimney draft at .04 to .07 inches of water.
9.	Combustor Color Variation	(1) Variation in color from combustor to combustor or within a combustor can occur./These color variations are normal and do not affect combustor performance.

TROUBLESHOOTING THE HEATER'S BLOWER

If the heater's blower fails to operate or it it operates poorly, refer to figure 14 of this manual and check for the following:

1. Power cord unplugged.
2. Blown fuse or open circuit breaker.
3. Defective power cord.
4. Excessive buildup of lint, dust, or ashes on blower motor.
5. Defective blower motor.
6. Defective speed control.
7. Short in wiring.

If you experience other service or operational problems, contact your heater dealer for assistance.

SECTION 6

WARRANTY INFORMATION AND REPAIR PARTS

WARRANTY CLAIM INFORMATION

A catalytic combustor warranty and a heater are packed with this manual. For warranty claims, follow the instructions provided by each warranty.

REPAIR PARTS

A repair parts pamphlet is packed with this manual. If repair parts are ever needed for this heater, refer to the repair parts pamphlet for ordering information.