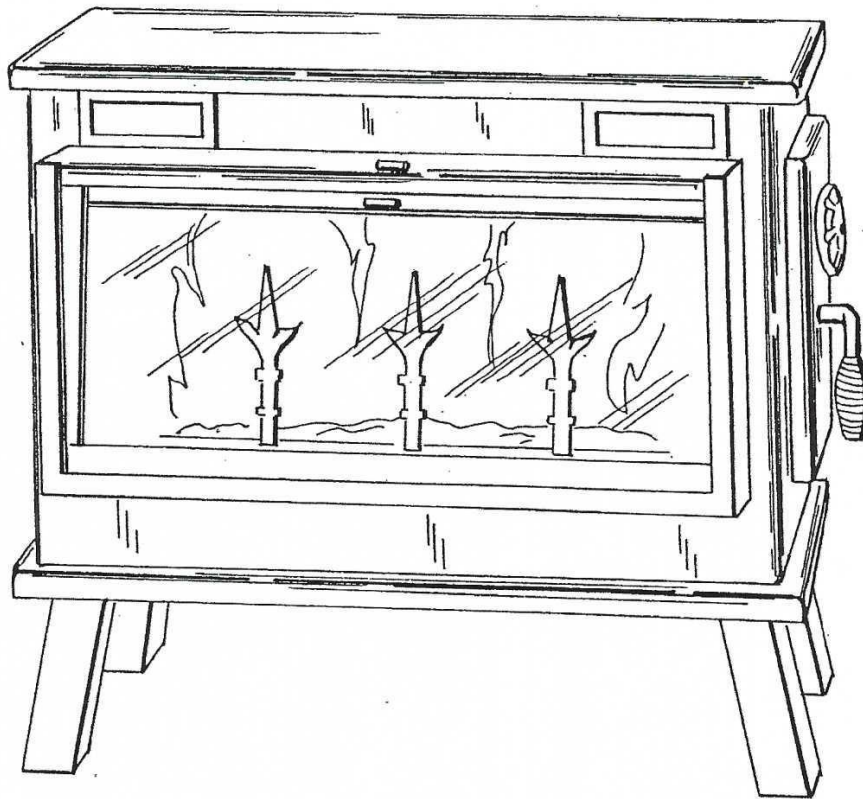


Russo
WOOD STOVE



MODEL 3GVT, GVR, 2GVT, GVR
Horizontal & Vertical Doors

**OWNER'S MANUAL
AND
OPERATING INSTRUCTIONS**

Russo Stoves; *Factory Safety Label* information not valid and not supported by the testing agency, which is no longer in that business.

Please use; National Fire Protection Association Standard 211, information below.

Floor protection; Page 211-36, Section; 12.5.1.2.2

Wall protection; Page 211-38, 211-39, Section; 12.6.1 and 12.6.2.1

Stove pipe connector; Page 211-26, 211-27

For Installation see last 5 pages(2A through 6A) of this manual.

SAFETY CONSIDERATIONS

CAUTION:

"NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR 'FRESHEN UP' A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER WHILE IT IS IN USE."

WARNING! FIRE HAZARD:

DO NOT STORE FUEL, PAINTS, THINNERS OR OTHER FLAMMABLE LIQUIDS IN THE ROOM WITH YOUR STOVE. DO NOT STORE WOOD CLOSER THAN MARKED INSTALLATION CLEARANCES. THE FIRE AND ASH DOORS MUST BE CLOSED DURING OPERATION. DO NOT OPERATE WITH FIRE OR ASH DOORS IN THE OPEN POSITION OR EXCESSIVE TEMPERATURES MAY OCCUR. CLEAN FLUE PIPE AND CHIMNEY REGULARLY.

SAFETY NOTICE: If this wood stove 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 in your area.

CAUTION! Hot Surfaces:

KEEP SMALL CHILDREN AWAY. DO NOT TOUCH. USE HEAT RESISTANT GLOVES TO TEND THE STOVE.

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 non-combustible material, pending final disposal. If the ashes are disposed of by burial in the soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

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 makes an extremely hot fire.

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

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

FOR FURTHER INFORMATION ON USING YOUR HEATER SAFELY, OBTAIN A COPY OF THE NATIONAL FIRE PROTECTION ASSOCIATION PUBLICATION, "USING COAL AND WOOD STOVES SAFELY." NFPA NO. HS-10-1978. THE ADDRESS IS: NFPA, Batterymarch Park, Quincy, MA 02169.

CHIMNEY INFORMATION

The Chimney is one of the most important, yet most neglected and misunderstood portion of any Solid Fuel Burning installation. We do not recommend that the stove be connected to the chimney with other heating devices.

CAUTION!

THE CHIMNEY MUST BE A CLASS "A" CHIMNEY IN GOOD OPERATING CONDITION. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

There are two types of Class "A" Chimneys:

1. Masonry with tile liner suitable for venting residential or building heating appliances. (See NFPA 211.)
2. Class "A" Factory Built Chimney, listed or certified by a nationally recognized testing agency as suitable for venting residential or building heating appliances.

If your masonry chimney has not been used for some time, have it inspected by a qualified person (Building Inspector, Fire Department Personnel, etc.).

If a Listed or Certified Manufactured Chimney is to be used, make certain it is installed in accordance with the Manufacturer's Instructions and all Local and State Codes. See Figure 2-Manufactured Chimney Installation and Figure 3-Masonry Chimney (note roof clearance) in accordance with NFPA 211.

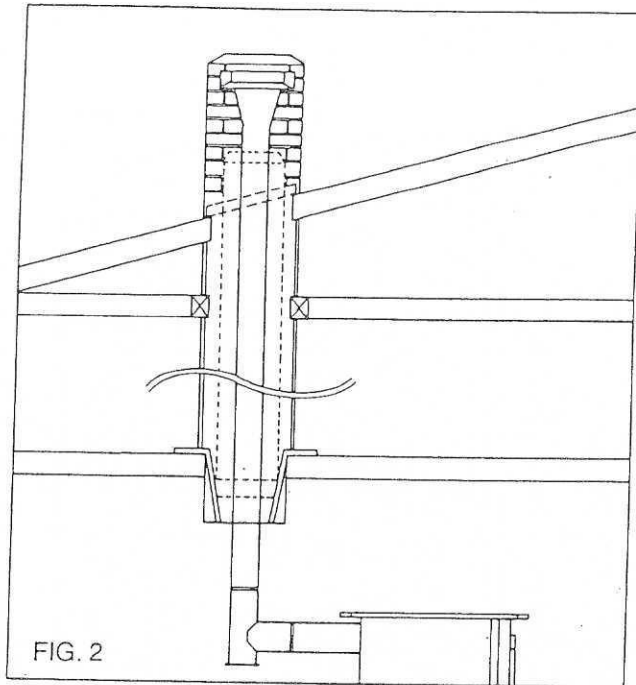


FIG. 2

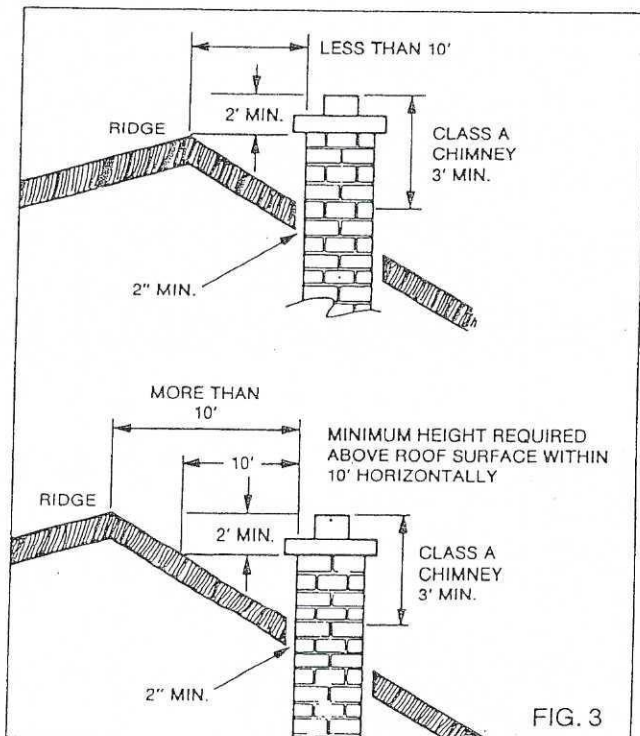


FIG. 3

COMMON CHIMNEY PROBLEMS:

In order to have a proper operating Solid Fuel Heating System, the chimney must be capable of providing the draft required.

REASONS for insufficient DRAFT:

1. Leaky Chimney — Air leaking around a loose fitting cleanout door, flue pipe joints not tight, improper plug openings, or defective masonry.
2. Chimney Improper Height — Chimney does not extend above the roof to a sufficient height to promote sufficient draft or causes a down drafting condition to take place. See NFPA 211.
3. Obstructions — Obstructions in the chimney can be checked prior to using by holding a mirror in chimney cleanout door to give a view of the chimney.
4. Trees or Other Topographical Barriers — Impeding the chimney's operation or causing a down draft condition to exist. This can also be caused by adjacent buildings or the roof of the same structure where the chimney is not high enough (Fig. 4)

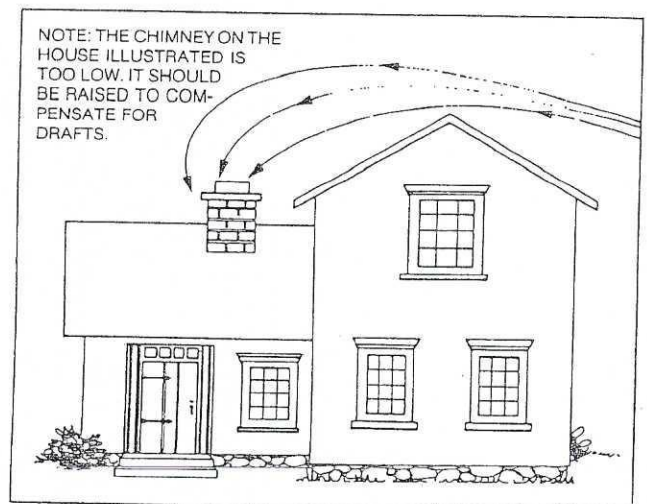


FIG. 4

5. Chimney Size — Chimney is not properly sized to adequately vent the appliance. It is either too small or too large. Minimum chimney height — 14 ft.; minimum diameter — 6 in.
6. Chimney Offsets — Chimneys with offsets should not be used. They cause an obstruction to draft, as well as a place for debris to collect.

7. Elbow Restrictions — The flue pipe is connected to the chimney with too many elbows, reducing the draft the chimney can provide.
8. Multiple Venting — When more than one device vents into the same chimney flue.
9. Cold Air Block — Chimney is located outside of house and will not 'heat up' sufficiently in very cold weather.

The most important thing to remember about chimneys is their need for maintenance and cleaning. If chimneys are not cleaned on a frequent basis, it will affect the draft, as well as contributing to a possible chimney fire.

The draft can be improved by using a chimney cone (Fig. 5) or by extending the height of the chimney and reducing the flue area. A cone or chimney extension can be made by a local sheet metal shop or purchased factory made.

A properly operating chimney will tend to reduce the amount of creosote that is left deposited. Burn a strong fire for 15 minutes each day to help reduce creosote buildup.

BASIC TOOLS AND MATERIALS NEEDED

TOOLS: Screwdrivers — Phillips & Plain
 Small Adjustable Wrench
 1/4" Electric Drill
 6-foot Rule or Tape
 Hammer
 Pliers
 Wire Cutter
 Tin Snips
 Assorted Drills
 5/32", 1/4", etc.
 Level
 Gloves
 Pencil

MATERIALS:

6" Flue Pipe, 6" Tee and Cap; or an elbow; collar; Ceiling Support Box, if required; use 24 gauge blue or black high-quality lock seam type pipe, and fittings. Manual damper for top vent model.

6" minimum inside diameter solid fuel approved Class A Chimney, or existing masonry tile-lined Class A Chimney.

Sheet metal screws — #10-24 x 1/2" (for chimney connector) Furnace Cement.

INSTALLATION CHECK LIST

1. If you plan to install this heater yourself, you must realize that the wrong use of any tool can be dangerous. Unless you are completely familiar with the tools, equipment, and possible hazards involved, we ask that you contact your authorized RUSSO Dealer and arrange for professional installation.
2. Before starting installation, check for proper clearances to combustibles where the stove will be located.
3. If proper clearances, as listed on the Rating Plate, cannot be maintained, refer to the NFPA No. 211 Standard for Chimneys, Fireplaces and Vents, on how to reduce these clearances safely.
4. CHIMNEY — Have chimney inspected for:
 - A. Proper type. Class A only.
 - B. Chimney is in good physical and mechanical condition.
 - C. Chimney is properly installed within the dwelling with proper clearances to combustibles. See NFPA 211.
 - D. If using a manufactured chimney, look for listing mark and install in accordance with manufacturer's installation instructions.
 - E. Do not connect this unit to a chimney serving another appliance.
 - F. Check for proper roof clearances. See NFPA 211.
 - G. Chimney should have a spark guard.
5. Chimney Connector Pipe (Flue System)
 - A. Chimney connector should not be longer than 8 feet.
 - B. No more than 2 — 90-degree Flue elbows should be used.
 - C. The chimney connector must be a minimum of 24 Gauge Steel.
6. This installation must provide adequate combustion air around the unit for safe and proper service.
7. Your stove should be burned outdoors for approximately one hour to cure the paint and evaporate oils used to preserve the steel. If the first burn is inside, provide adequate ventilation for smoke and odor.

ASSEMBLY OF STOVE

Now that you have established the location for your stove and have met the clearance requirements, observe the points listed in the Installation, General, Section. (See Figs. 6A & 6B.)

Before your stove can be installed and operated, it must be unpacked. Remove any and all external poly wrappings. Remove the triangular glass protector from inside the stove. Please note that the glass used in Russo Glass-View® Wood Stoves is Corning Pyrex® glass. It is sealed into a securely gasketed steel frame and slides into its channel at the front of the Glass-View® housing. A pair of steel clips insure a snug fit, minimizing air leakage and insuring long burn times. Before installing the glass, remove any newspaper or cardboard packing from the track and check to see that the folding doors operate smoothly.

The loading door must be removed from the inside of the stove and installed. If adjustment is necessary, the latch can be bent in or out with an adjustable wrench until proper tension is obtained. The Handy Tool, screen and slider must be removed. The slider fits atop the Glass-View® housing and is positioned in conjunction with the folding doors. When the folding doors are opened, the slider should also be opened and the safety screen positioned atop the glass. When the folding doors are closed, the screen should be removed and the slider placed into the "closed" position abutting the glass. The Handy Tool should be used to remove or install the screen, position the slider when viewing the fire and regulate the damper. All Russo Wood Stoves have optional blowers which make it possible to circulate the heat that the stove produces.

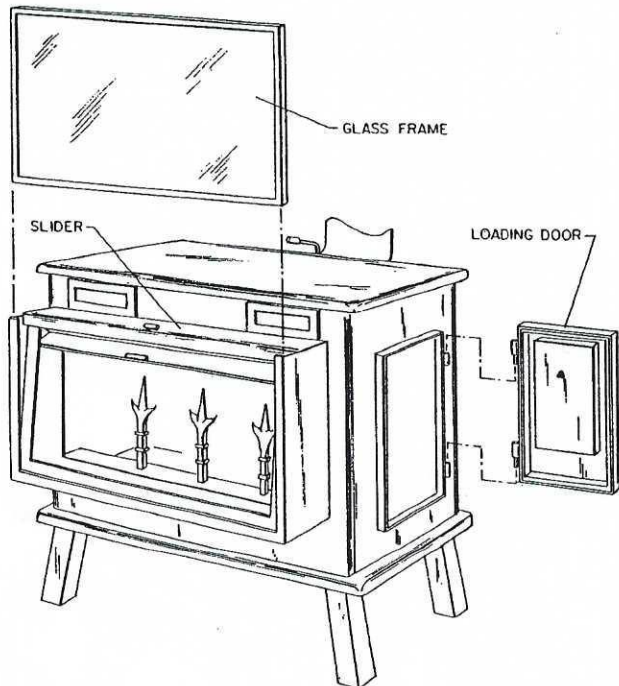
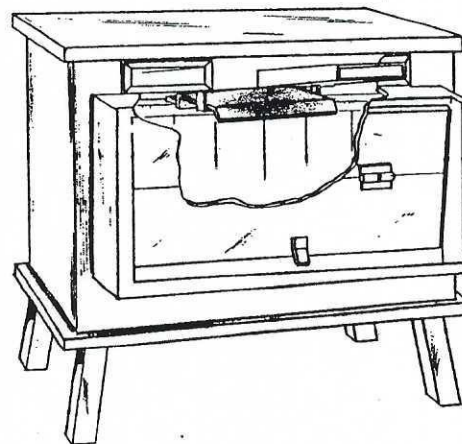


FIG. 7A



BAFFLE INSTALLATION
3GVR, 3GVT

SLIDE BAFFLE IN FROM FRONT OF STOVE OVER THE TWO CLIPS THAT ARE HANGING DOWN. MAKE SURE THAT THE TWO BARS ON REAR OF BAFFLE REST ON BRICK LINTEL. BE CAREFUL WHEN LOADING WOOD INTO STOVE THAT YOU DON'T KNOCK THE BAFFLE OUT OF PLACE.

FIG. 7B

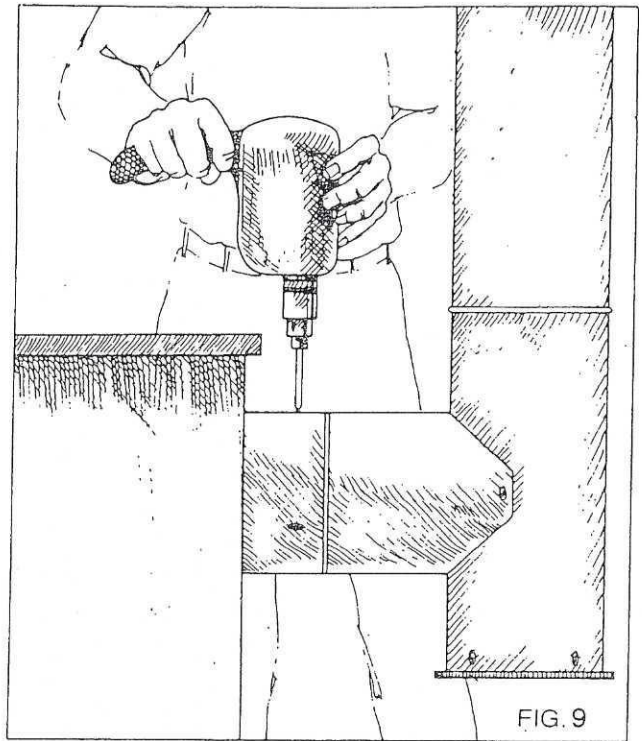
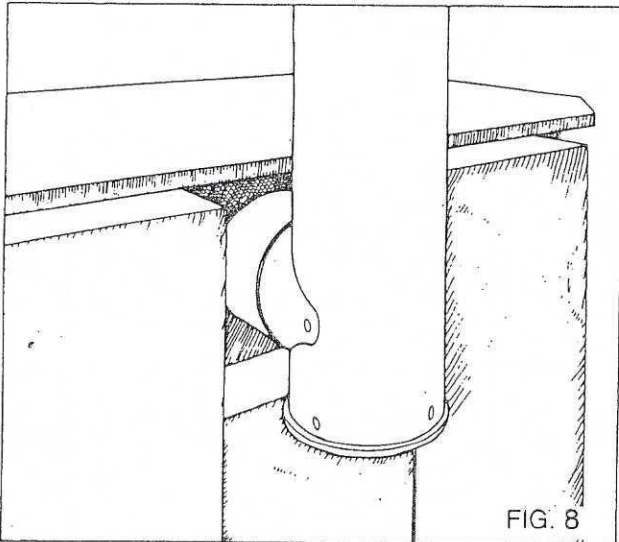
IMPORTANT:

The Chimney Connector must be a minimum of 24 Gauge Steel suitably protected from corrosion.

CHIMNEY CONNECTOR (Flue Pipe)

When connecting the 6" diameter Chimney Flue Connector to the stove, the first section of the pipe or the elbow, (Fig. 8) should be installed inside of the flue collar on the stove.

NOTE: Top Vent Models — A pipe damper should be installed in the first section of pipe, about 18" from stove top.

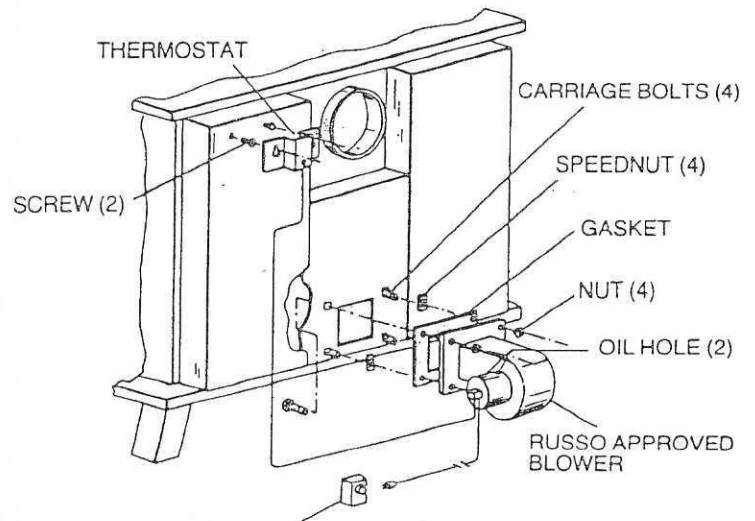


BLOWER INSTALLATION

It should be held in place by drilling three holes (Fig. 9) through the flue collar and the pipe. These holes should be equally spaced. The holes should be of suitable diameter for the sheet metal screws or pop rivets used for fastening.

A straight section of pipe or elbow must now be installed.

Now continue installing the flue pipe until the chimney ceiling support box is reached. When connecting the ceiling support collar, use a 6" connector adapter. Reverse the crimp so it may be properly installed into the ceiling support box. See Fig. 2 for a typical completed assembly.



SUGGESTED RUSSO BLOWER SPEED CONTROL

FIG. 10

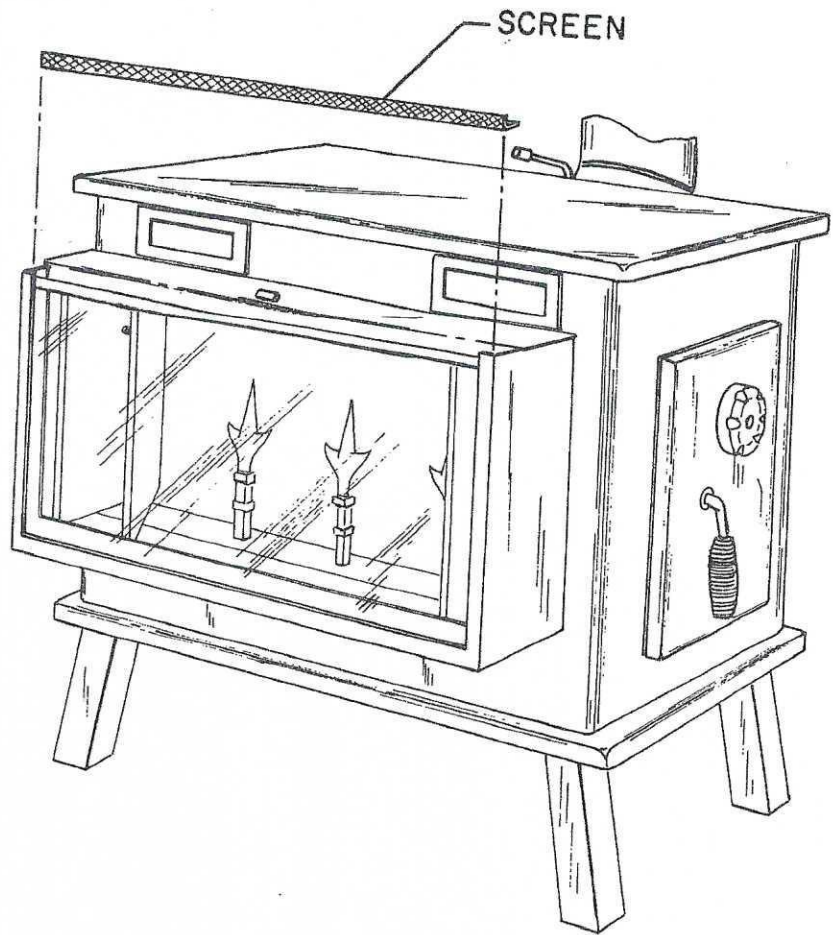
IMPORTANT:

1. All Pipe Joints should be fastened together with three sheet metal screws or pop rivets.
2. All horizontal runs should have 3/4" rise to the foot so that any liquid creosote that may develop will run back into the stove.
3. All joints should be sealed with furnace cement.

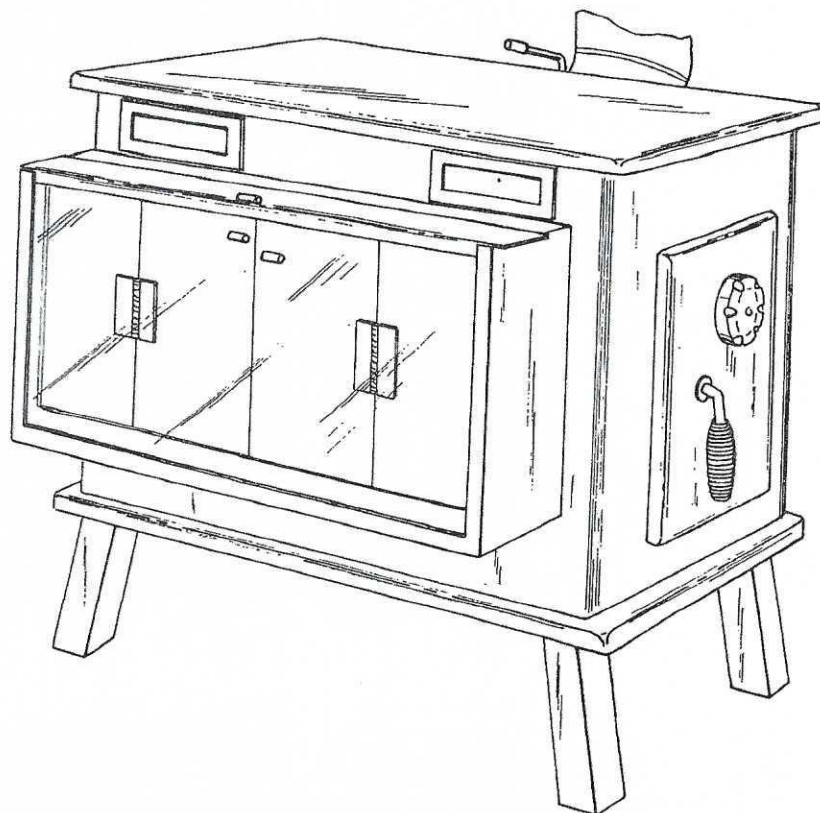
INSTALLATION — Install 10-24 carriage bolts from inside out on the housing. Screw on sheet metal fasteners tightly by hand. Slide gasket over studs. Slide blower over studs in the position as shown. Install 10-24 HEX-NUTS and tighten firmly. Install sheet metal screws for thermostat. Slide assembled thermostat over sheet metal screws and tighten. See Fig. 10.

Vertical Door Operation

VIEWING MODE
Folding doors open
slider open
screen in place



AIR TIGHT MODE
Folding doors closed
screen removed
slider closed



Horizontal Door Operation

This RUSSO GLASS-VIEW STOVE features a steel folding door. The purpose of this door is to keep the glass clean and reduce the air flow into the stove.

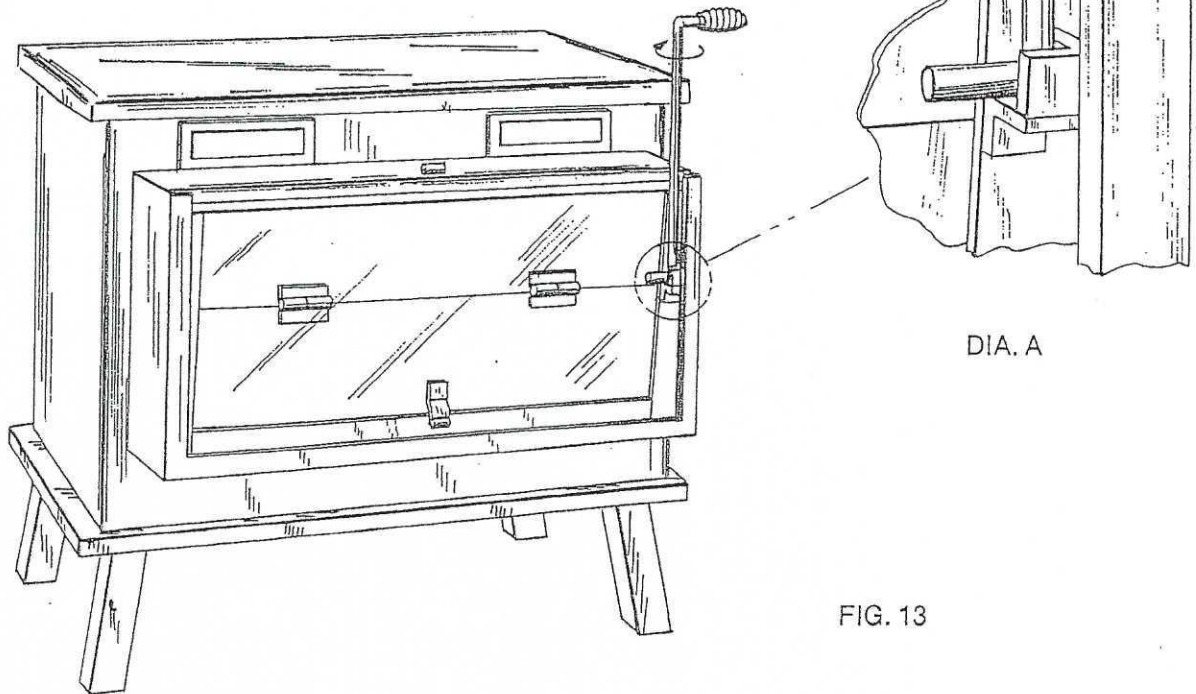
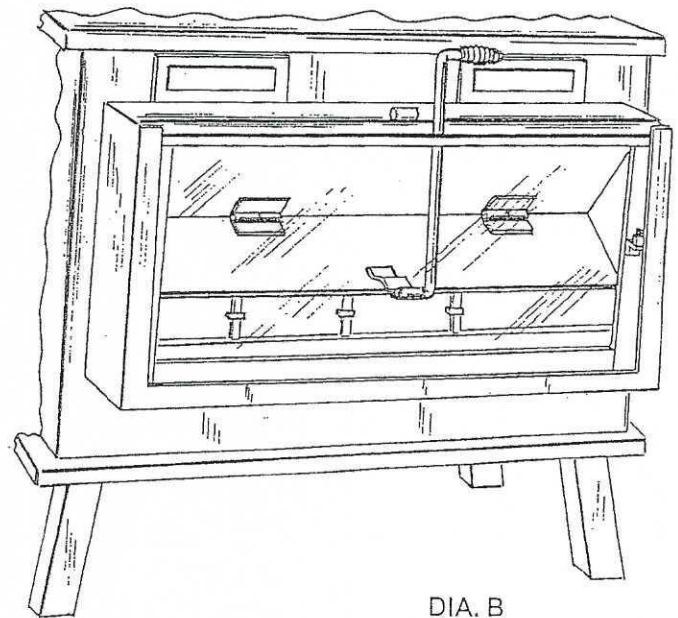


FIG. 13

TO OPEN FOLDING DOORS . . .

- Step 1. Move slider to rear position.
- Step 2. Slide Handy Tool between glass frame and vertical door (See Dia. A)
- Step 3. Place tool in the bracket at the extreme right hand corner of the glass frame, and twist clockwise to break spring back on door. (See Dia. A)
- Step 4. Place small end of tool in bushing in door center and lift door all the way to the top until it stops. (See Dia. B)



DIA. B

TO CLOSE . . .

Insert small end of tool in bushing. Push down door, when it gets close to bottom exert pressure to compress door springs. Close the slider.

Remember, when the folding doors are open, the slider atop the Glass-view® housing must be in the open position and the screen placed in the opening between the framed glass and the front edge of the slider. When the folding doors are closed, the safety screen should be removed and the slider placed into the closed position..

DO'S AND DON'TS FOR YOUR NEW WOOD STOVE

DO cure the new stove slowly.

DO secure each connection of stove pipe with at least 3 sheet metal screws.

DO clean and oil blower (if purchased) every six months with **only** SAE 20 non-detergent oil.

DO remove ashes frequently.

DO NOT clean glass when the stove is hot.

DO NOT replace glass with any type but the replacement glass shown in this manual.

DO NOT use charcoal, resinous woods, green or unseasoned wood, manufactured logs, or manufactured coal bricks in your stove.

DO NOT leave the loading door open when the stove is in operation.

DO NOT use any blower other than the optional accessory blower that has been tested with this stove.

DO NOT use stove pipe for a chimney.

DO NOT use aluminum type B gas vent pipe for solid fuels — it is unsafe and prohibited by the NFPA code.

When the first several fires are started in the stove, some smoking and a slight burning odor may be noticed. This is normal and will quickly disappear. If possible, the stove should be burned outdoors to cure the paint before installation.

NOTE: It is normal for a stove to make popping and cracking noises as it expands during the 'heating up' process. These noises should be minimal once operating temperatures are reached.

OPERATING INSTRUCTIONS

DANGER:

Fire Hazard

DO NOT USE CHEMICALS OR FLUIDS TO START FIRE! SEVERE BODY BURNS OR A FIRE IN YOUR HOME COULD RESULT.

1. Here's a safe way to start your fire. Take six double sheets of newspaper. Open them up and spread them on the floor — one on top of the other. Start at a diagonal corner and roll them into a tight tube or roll. Knot the roll by twisting it into a single knot. Make up three or four of these knotted rolls. Lay them into the firebox and place dry kindling on top of them.
2. Before starting your stove, be sure that the flue damper is open and the air wheel on the load door is fully open. The stove must be started in the airtight setting, with the folding doors shut and the slider in the closed position. Do not attempt to start the Russo Glass-View® Stove with the folding doors opened. A thermal shock situation may develop which could break the glass.
3. Light the paper and kindling and close the load door tightly.
4. Before fully opening the load door to check the fire or add a charge of fuel, **ALWAYS OPEN THE DOOR SLIGHTLY** about half an inch or so and wait a minute. This will allow the pressure inside the controlled combustion chamber to equalize with the room pressure and will reduce the possibility of smoke spilling into the room. The flue damper **MUST** be in the open position, the slider **MUST** be fully closed, and the blower **MUST** be shut off when opening the load door.
5. Do not leave the slider closed for more than a minute while the folding doors are open. Excessive soot and creosote will accumulate on the glass. Also, the glass could overheat and break because of the lack of air wash.
6. When the stove is in the viewing mode, do not pile wood any higher than the top of the log guards. Do not allow wood to burn in the glass partition. All burning should be confined to the firebox.
7. **NEVER OPERATE YOUR STOVE WITH THE LOAD DOOR OPEN.**

8. Once the stove is burning well, the flue damper could be partially closed and the air inlet wheel on the load door closed to about 1½ turns. The optimal setting on the air wheel and flue damper will be dictated by the strength of the chimney draft and the type of wood being burned. They will vary from one installation to another. After the stove and glass have been allowed to warm up for 20-30 minutes, the folding doors can be opened and the slider repositioned. The glass could be broken if insufficient warm-up time is allowed.
9. Place your charge of wood handy (but at a safe distance) to the stove, so you can load the charge quickly and shut the load door.
10. **DANGER!** Never burn large amounts of corrugated boxes, wood shavings, Christmas wrappings, paper scraps, or a dried Christmas tree. A CHIMNEY FIRE COULD RESULT BECAUSE THE CHIMNEY COULD BECOME QUICKLY OVERHEATED AND IGNITE ANY COMBUSTIBLE DEPOSITS IN THE CHIMNEY FLUE.
11. Avoid overfiring and overheating your stove.

FLUE DAMPER OPERATION

Your stove is equipped with a manual flue damper (rear vent models only), located in the flue collar of your stove. The damper is used to control the draft of your stove and to achieve longer burn times.

The actual need of the damper is dependent on the draft of your flue, and how it works best for your installation must be determined by you. Generally, the following will apply: 1) Overnight burns are achieved by closing the damper half way; 2) With strong drafting flues, a fully-closed damper is needed for an overnight burn; 3) In very cold weather, draft increases and full closure of the damper is needed for long burn times.

NOTE: Make sure flue damper is opened prior to opening load door.

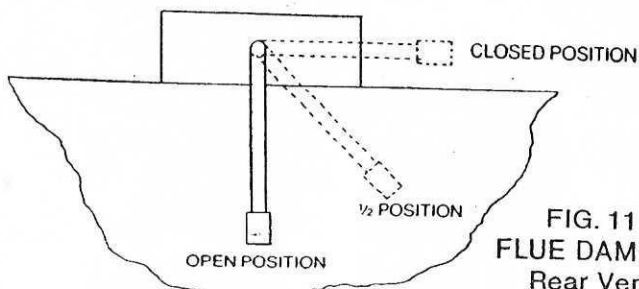


FIG. 11
FLUE DAMPER
Rear Vent

PRIMARY/SECONDARY AIR ADJUSTMENT

Located on the load door of your RUSSO Side-Loading Wood Stove is an air wheel which controls the primary and secondary air flow. When starting your stove, this wheel should be in the full-open position.

As the fire is established, the air flow should be reduced to lower the heat output and lengthen the burn time. The air wheel will become hot enough to give a severe burn, and should be adjusted only when wearing fire-proof gloves, or by using your Handi-tool.

The exact adjustments needed to this air wheel for starting a fire, reloading, and long burn times, will vary with each installation. Over an operating period of three to six months, you will find the best operating methods for your installation.

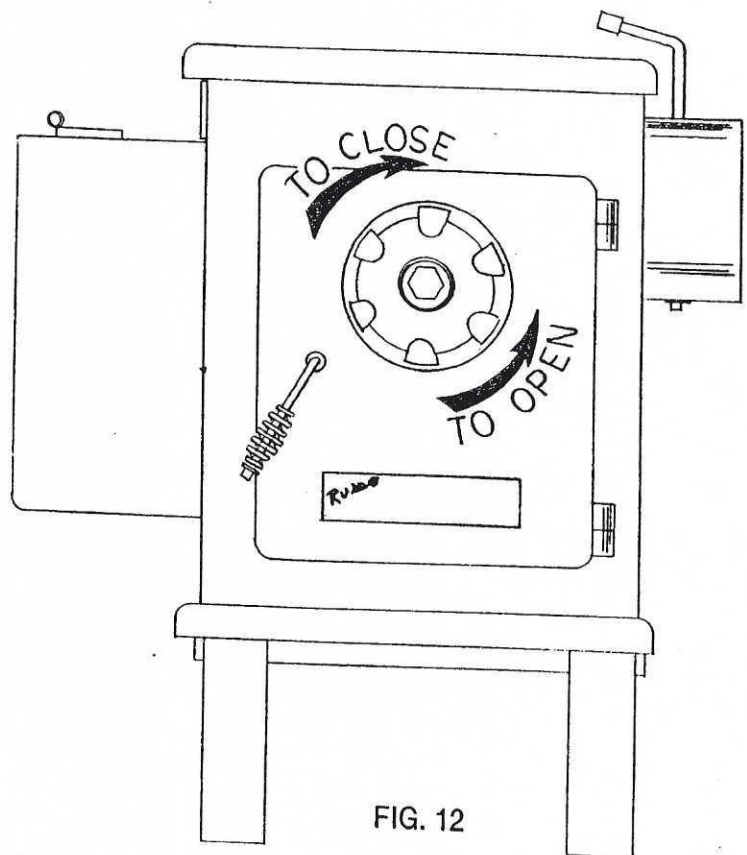


FIG. 12

MAINTENANCE

STOVE MAINTENANCE

At the end of a heating season, remove all ashes from your stove. Any scale on the steel or cast iron parts should be removed with a wire brush. The inside of the stove can be sprayed with aerosol oil to prevent rusting. The exterior of the stove can be touched up with high temperature stove paint.

DOOR LATCH ADJUSTMENTS

The load door latch has been adjusted at the factory for proper tightness. If door is too loose because of worn gaskets or too tight because of new gaskets, bend the latch in or out to adjust.

VIEWING GLASS MAINTENANCE

The viewing window is Corning Pyrex® glass. If broken, it should be replaced only with Pyrex glass, available through Russo dealers. The glass is not guaranteed. Glass should be cleaned periodically.

The glass should be cleaned when **cool** with glass cleaner. All residues of cleaning agents must be removed with water to prevent etching or fogging of the glass.

NOTE: Use only soft cloths or paper towels to clean glass. **DO NOT** use scrapers, metallic objects or abrasives. Scratching or chipping could cause breakage.

BLOWER MAINTENANCE

The blower should be removed and cleaned periodically. Dust will accumulate on the inlet screen and impeller wheel of the blower. These parts should be thoroughly cleaned to insure adequate flow of air and minimize strain on the motor. The motor should be lubricated every 6 months with oil provided or *only* with SAE 20 Non-Detergent Oil.

NOTE: On some models the oil holes are on the bottom.

WOOD BURNING FACTS

BE AWARE OF CREOSOTE "BUILD-UP" WHEN BURNING WOOD

Woodburning stoves will create creosote deposits under certain conditions, unless you are aware of these conditions and avoid them.

Creosote is a tarry liquid or solid resulting from the distilling of wood during the combustion process.

It consists of a number of compounds which condense and bake in the chimney flue.

Creosote may build up on the interior surface of the chimney and flue pipes, considerably reducing their diameter.

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

WARNING!

A SERIOUS CHIMNEY FIRE MAY BE IGNITED IF A SUFFICIENT CREOSOTE "BUILD-UP" IS PERMITTED OVER AN EXTENDED PERIOD OF TIME!

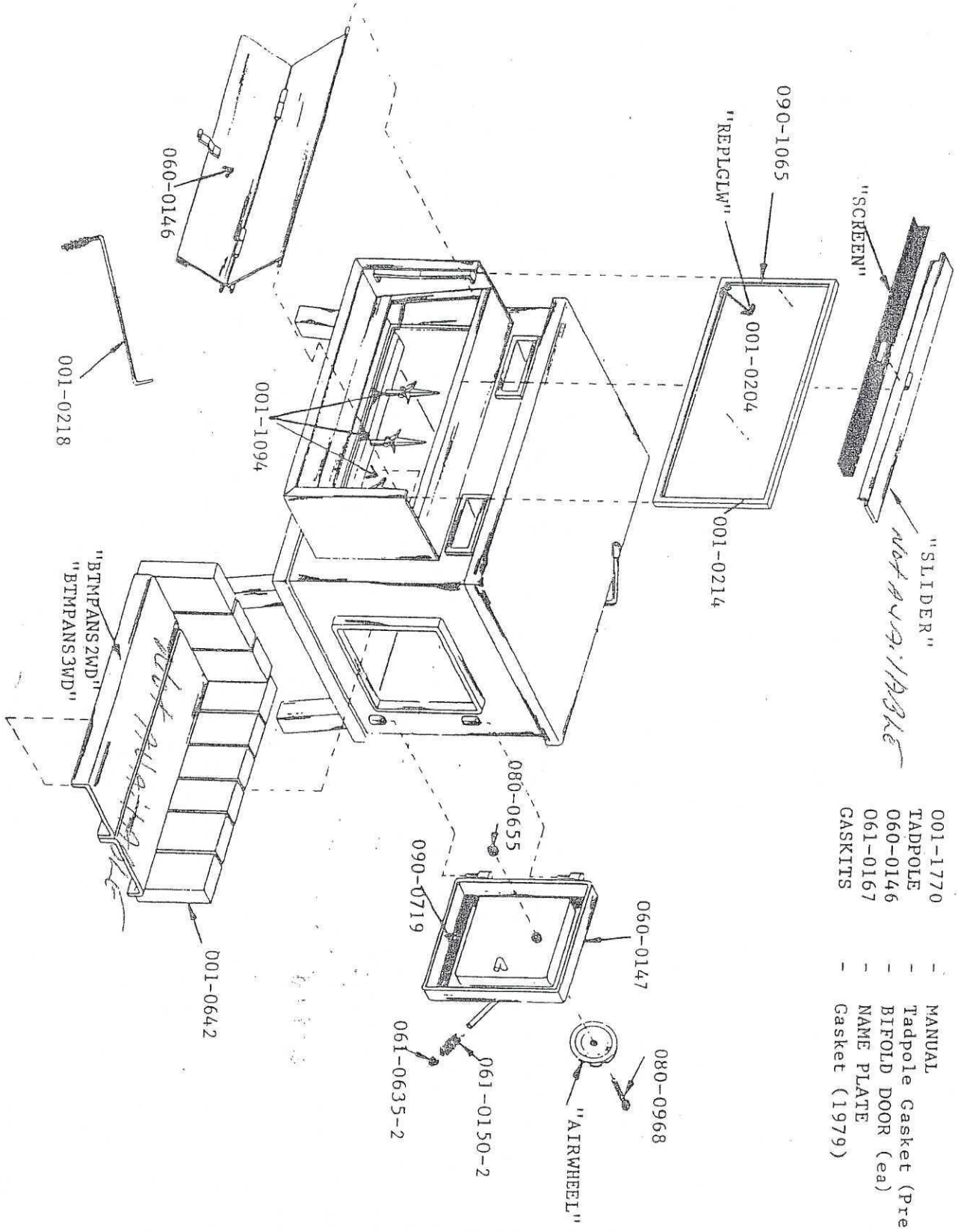
Moisture in the flue gases may be controlled by using the driest wood possible, mixing small pieces with every full load, and not using only large wood during mild weather when combustion is relatively slow.

CAUTION!

You must check your chimney flue pipe connector frequently when first starting to burn wood to determine the amount of chimney maintenance (cleaning) that will be required. This is dependent on wood type, moisture, and in general, how the stove is used.

Repair Parts Drawing

2GV, 3GV & 2SR, 3SR



001-1770	MANUAL
060-0146	Tadpole Gasket (Pre '79)
061-0167	BIFOLD DOOR (ea)
GASKITS	NAME PLATE
-	Gasket (1979)

12.5.1.1.1 Residential-type solid fuel-burning appliances that are tested and listed by a recognized testing laboratory for installation on floors constructed of combustible materials shall be placed on floors in accordance with the requirements of the listing and the conditions of approval.

12.5.1.1.2 Appliances that are not listed by a recognized testing laboratory shall be provided with floor protection in accordance with the provisions of 12.5.1.2 or 12.5.1.3.

12.5.1.1.3 Residential-type solid fuel-burning appliances shall be permitted to be placed without floor protection in any of the following manners:

- (1) On concrete bases adequately supported on compacted soil, crushed rock, or gravel
- (2) On concrete slabs or masonry arches that do not have combustible materials attached to the underside
- (3) On approved assemblies constructed of only noncombustible materials and having a fire resistance rating of not less than 2 hours, with floors constructed of noncombustible material
- (4) On properly stabilized ground that can support the load of the appliance

12.5.1.1.4 Any floor assembly, slab, or arch shall extend not less than 18 in. (457 mm) beyond the appliance on all sides.

12.5.1.1.5 In lieu of the requirements for floor protection specified herein, a floor protector listed by a recognized testing laboratory and installed in accordance with the installation instructions shall be permitted to be employed.

12.5.1.1.6 Concrete bases, concrete slabs, masonry arches, and floor-ceiling assemblies and their supports shall be designed and constructed to support the appliances.

12.5.1.2 Room Heaters, Fireplace Stoves, Room Heater/Fireplace Stove Combinations, and Ranges.

12.5.1.2.1 Room heaters, fireplace stoves, room heater/fireplace stove combinations, or ranges that are set on legs or pedestals that provide not less than 6 in. (152 mm) of ventilated open space beneath the fire chamber or base of the appliance shall be permitted to be placed on floors of combustible construction, provided the following conditions exist:

- (1) The floor under the appliance is protected with closely spaced solid masonry units not less than 2 in. (51 mm) in thickness.
- (2) The top surface of the masonry is covered with sheet metal not less than 24 gauge [0.024 in. (0.61 mm)].
- (3) The floor protection extends not less than 18 in. (457 mm) beyond the appliance on all sides.

12.5.1.2.2 Room heaters, fireplace stoves, room heater/fireplace stove combinations, or ranges that are set on legs or pedestals providing 2 in. to 6 in. (51 mm to 152 mm) of ventilated open space beneath the fire chamber or base of the appliance shall be permitted to be placed on floors of combustible construction, provided the following conditions exist:

- (1) The floor under the appliance is protected with one course of hollow masonry units not less than 4 in. (102 mm) in nominal thickness.
- (2) The masonry units are laid with ends unsealed and joints matched in such a way as to provide free circulation of air through the core spaces of the masonry.
- (3) The top surface of the masonry is covered with sheet metal not less than 24 gauge [0.024 in. (0.61 mm)].

- (4) The floor protection extends not less than 18 in. (457 mm) beyond the appliance on all sides.

12.5.1.2.3 Room heaters, fireplace stoves, room heater/fireplace stove combinations, or ranges with legs or pedestals that provide less than 2 in. (51 mm) of ventilated open space beneath the fire chamber or base of the appliance shall not be placed on floors of combustible construction.

12.5.1.3 Furnaces and Boilers.

12.5.1.3.1 Furnaces or boilers with legs or pedestals that provide not less than 6 in. (152 mm) of ventilated open space beneath the fire chamber or base of the appliance shall be permitted to be placed on floors of combustible construction, provided the floor under the appliance has the following characteristics:

- (1) It is protected with one course of hollow masonry units not less than 4 in. (102 mm) in thickness.
- (2) The masonry units are laid with ends unsealed and joints matched in such a way as to provide free circulation of air through the core spaces of the masonry.
- (3) The top surface of the masonry is covered with a steel plate not less than $\frac{3}{16}$ in. (4.8 mm) in thickness.
- (4) The floor protection extends not less than 18 in. (457 mm) beyond the appliance on all sides.

12.5.1.3.2 Furnaces or boilers that are set on legs or pedestals that provide 2 in. to 6 in. (51 mm to 152 mm) of ventilated open space beneath the fire chamber or base of the appliance shall be permitted to be placed on floors of combustible construction, provided the floor under the appliance has the following characteristics:

- (1) It is protected with two courses of hollow masonry units, each not less than 4 in. (102 mm) in thickness.
- (2) The masonry units are laid with ends unsealed and joints matched in such a way as to provide free circulation of air through the core spaces of the masonry.
- (3) The top surface of the masonry is covered with a steel plate not less than $\frac{3}{16}$ in. (4.8 mm) in thickness.
- (4) The floor protection extends not less than 18 in. (457 mm) beyond the appliance on all sides.

12.5.1.3.3 Furnaces or boilers with legs or pedestals that provide less than 2 in. (51 mm) of ventilated open space beneath the fire chamber or base of the appliance shall not be placed on floors of combustible construction.

12.5.2 Mounting for Low-Heat Nonresidential Appliances.

12.5.2.1 Low-heat nonresidential solid fuel-burning appliances that have been tested and listed by a recognized testing laboratory for placement on floors constructed with a combustible material shall be placed on floors in accordance with the requirements of the listing and conditions of approval.

12.5.2.1.1 Appliances that are not listed by a recognized testing laboratory shall be provided with floor protection in accordance with the provisions of 12.5.2.3 or 12.5.2.4.

12.5.2.1.2 Low-heat nonresidential solid fuel-burning appliances shall be permitted to be placed without floor protection in any of the following manners:

- (1) On floors constructed of noncombustible materials and having a fire resistance rating of not less than 2 hours that extend not less than 18 in. (457 mm) beyond the appliance on all sides

12.6 Clearances from Solid Fuel-Burning Appliances.

12.6.1 The clearance shall be not less than specified in Table 12.6.1.

12.6.1.1 Appliances listed for installation with clearances less than specified in Table 12.6.1 shall be permitted to be installed in accordance with the terms of their listing and the manufacturer's instructions.

12.6.1.2 Heating furnaces and boilers and water heaters specifically listed for installation in spaces such as alcoves shall be permitted to be so installed in accordance with the terms of their listing, provided the specified clearance is maintained regardless of whether the enclosure is of combustible or noncombustible material.

12.6.1.3 These clearances shall apply to appliances installed in rooms that are large in comparison with the size of the appliances.

12.6.2 Clearance Reduction.

12.6.2.1 Clearances from listed and unlisted solid fuel-burning appliances to combustible material shall be permitted to be reduced if the combustible material is protected as described in Table 12.6.2.1 and in Figure 12.6.2.1(a) through Figure 12.6.2.1(f).

12.6.2.1.1 Where the required clearance with no protection is 36 in. (914 mm), the clearances in Table 12.6.2.1 shall be the minimum allowable clearances. For other required clearances with no protection, minimum allowable clearance shall be calculated from maximum allowable reduction.

12.6.2.1.2 Unless the appliance is specifically listed for lesser clearance, the clearance after reduction shall be not less than the following:

- (1) 12 in. (305 mm) to combustible walls
- (2) 18 in. (457 mm) to combustible ceilings

12.6.2.1.3 Spacers and ties shall be of noncombustible material. No spacers or ties shall be used directly behind appliance or conductor.

12.6.2.1.4 With all clearance reduction systems using a ventilated air space, adequate air circulation shall be provided as described in 12.6.2.4. There shall be at least 1 in. (25.4 mm) between the clearance reduction system and combustible walls and ceilings for clearance reduction systems using a ventilated air space.

12.6.2.1.5 Mineral wool batts (blanket or board) shall have a minimum density of 8 lb/ft³ (128.7 kg/m³) and have a minimum melting point of 1500°F (816°C).

12.6.2.1.6 Insulation material used as part of clearance reduction system shall have a thermal conductivity of 1.0 (Btu-in.)/(ft²-hr-°F) or less. Insulation board shall be formed of noncombustible material.

12.6.2.1.7 If a single-wall connector passes through a masonry wall used as a wall shield, there shall be at least ½ in. (13 mm) of open, ventilated air space between the connector and the masonry.

12.6.2.1.8 There shall be at least 1 in. (25.4 mm) between the appliance and the protector. In no case shall the clearance between the appliance and the wall surface be reduced below that allowed in this table.

Table 12.6.1 Standard Clearances for Solid Fuel-Burning Appliances

Type of Appliance	Above Top of Casing or Appliance; Above Top and Sides of Furnace Plenum or Bonnet		From Front		From Back ^c		From Sides ^c	
	in.	mm	in.	mm	in.	mm	in.	mm
<i>Residential Appliances</i>	6	152	48	1219	6 ^b	152 ^b	6 ^b	152 ^b
Steam boilers — 15 psi (103 kPa)								
Water boilers — 250°F (121°C) max.								
Water boilers — 200°F (93°C) max.								
All water walled or jacketed								
<i>Furnaces</i>								
Gravity and forced air ^d	18	457	48	1219	18	457	18	457
<i>Room Heaters, Fireplace Stoves, Fireplace Inserts, Combinations</i>	36	914	36	914	36	914	36	914
<i>Ranges</i>								
Lined fire chamber	30 ^a	762 ^a	36	914	Firing Side		Opposite Side	
Unlined fire chamber	30 ^a	762 ^a	36	914	24	610	18	457
					36	914	18	457

^a To combustible material or metal cabinets. If the underside of such combustible material or metal cabinet is protected with sheet metal of not less than 24 gauge [0.024 in. (0.61 mm)], spaced out 1 in. (25.4 mm), the distance shall be permitted to be reduced to not less than 24 in. (610 mm).

^b Adequate clearance for cleaning and maintenance shall be provided.

^c Provisions for fuel storage shall be located at least 36 in. (914 mm) from any side of the appliance.

^d For clearances from air ducts, see NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*.

Table 12.6.2.1 Reduction of Appliance Clearance with Specified Forms of Protection

Clearance Reduction Applied to and Covering All Combustible Surfaces within the Distance Specified as Required Clearance with No Protection (See 12.6.1 through 12.6.1.3)	Maximum Allowable Reduction in Clearance (%)		Minimum Clearance			
	As Wall Protector	As Ceiling Protector	As Wall Protector		As Ceiling Protector	
			in.	mm	in.	mm
(a) 3½ in. (90 mm) thick masonry wall without ventilated air space	33	—	24	610	—	—
(b) ½ in. (13 mm) thick noncombustible insulation board over 1-in. (25.4-mm) glass fiber or mineral wool batts without ventilated air space	50	33	18	457	24	610
(c) 0.024-in. (0.61-mm), 24-gauge sheet metal over 1-in. (25.4-mm) glass fiber or mineral wool batts reinforced with wire, or equivalent, on rear face with ventilated air space	66	50	12	305	18	457
(d) 3½ in. (90 mm) thick masonry wall with ventilated air space	66	—	12	305	—	—
(e) 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	12	305	18	457
(f) ½ in. (13 mm) thick noncombustible insulation board with ventilated air space	66	50	12	305	18	457
(g) 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space over 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	12	305	18	457
(h) 1-in. (25.4-mm) glass fiber or mineral wool batts sandwiched between two sheets 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	12	305	18	457

- Notes:
1. All clearances and thicknesses are minimums; larger clearances and thicknesses may be permitted.
 2. To calculate the minimum allowable clearance, the following formula can be used: $C_{pr} = C_{un} (1 - R/100)$. C_{pr} is the minimum allowable clearance, C_{un} is the required clearance with no protection, and R is the maximum allowable reduction in clearance.
 3. Refer to Figures 12.6.2.1(e) and 12.6.2.1(f) for other reduced clearances using materials found in (a) through (h) of this table.

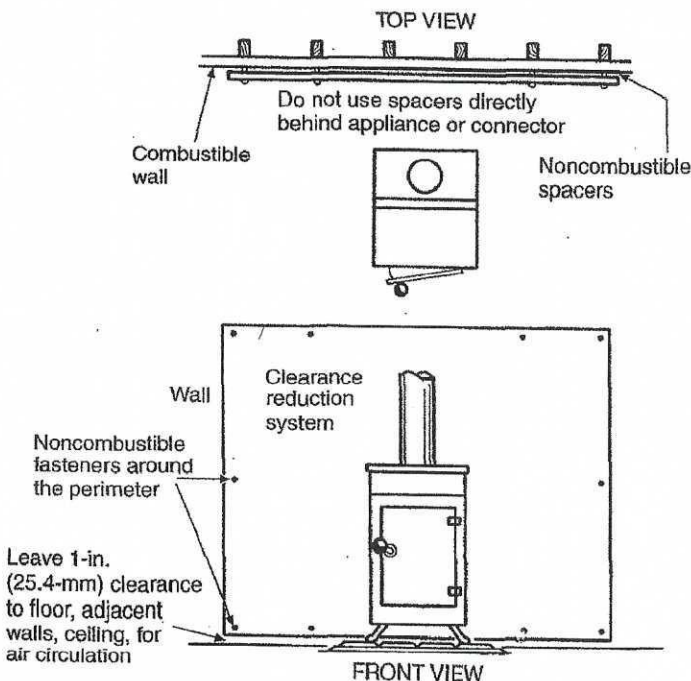


FIGURE 12.6.2.1(a) Clearance Reduction System — Fastener Location.

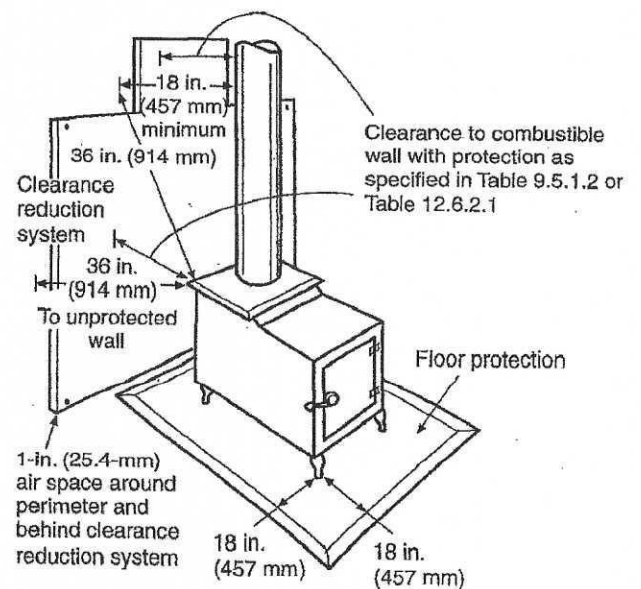


FIGURE 12.6.2.1(b) Distance to Combustible Wall/Floor.

Table 9.5.1.1 Chimney Connector and Vent Connector Clearances from Combustible Materials

Description of Appliance	Minimum Clearance (see Note 1)	
	in.	mm
Residential-Type Appliances		
<i>Single-Wall Metal Pipe Connectors</i>		
Gas appliances without draft hoods	18	457
Electric, gas, and oil incinerators	18	457
Oil and solid-fuel appliances	18	457
Unlisted gas appliances with draft hoods	9	229
Boilers and furnaces equipped with listed gas burners and with draft hoods	9	229
Oil appliances listed as suitable for use with Type L vents	9	229
Listed gas appliances with draft hoods and other Category I gas appliances listed for use with Type B vents (see Note 3)	6	152
<i>Type L Vent Piping Connectors</i>		
Gas appliances without draft hoods	9	229
Electric, gas, and oil incinerators	9	229
Oil and solid-fuel appliances	9	229
Unlisted gas appliances with draft hoods	6	152
Boilers and furnaces equipped with listed gas burners and with draft hoods	6	152
Oil appliances listed as suitable for use with Type L vents	(See Note 2)	
Listed gas appliances with draft hoods and other Category I gas appliances listed for use with Type B vents	(See Note 3)	
<i>Type B Gas Vent Piping Connectors</i>		
Listed gas appliances with draft hoods and other Category I gas appliances listed for use with Type B vents	(See Note 3)	
Low-Heat Appliances		
<i>Single-Wall Metal Pipe Connectors</i>		
Gas, oil, and solid-fuel boilers, furnaces, and water heaters	18	457
Ranges, restaurant-type	18	457
Oil unit heaters	18	457
Unlisted gas unit heaters	18	457
Listed gas unit heaters with draft hoods	6	152
Other low-heat nonresidential appliances	18	457
Medium-Heat Appliances		
<i>Single-Wall Metal Pipe Connectors</i>		
All gas, oil, and solid-fuel appliances	36	914
High-Heat Appliances		
<i>Masonry or Metal Connectors</i>		
All gas, oil, and solid-fuel appliances	(See Note 4)	

Notes:

1. If the listing of an appliance specifies a different clearance, the listed clearance takes precedence.
2. If listed Type L vent piping is used, the clearance is permitted to be in accordance with the vent listing.
3. If listed Type B or Type L vent piping is used, the clearance is permitted to be in accordance with the appliance and vent listing.
4. See 9.5.1.2.

9.5.1.2.6 If a single-wall connector passes through a masonry wall used as a wall shield, there shall be at least ½ in. (13 mm) of open, ventilated air space between the connector and the masonry.

9.5.1.2.7 There shall be at least 1 in. (25.4 mm) between the connector and the protector.

9.5.1.2.8 In no case shall the clearance between the connector and the wall surface be reduced below that allowed in the table.

9.5.2* Engineered systems installed for the protection of combustible materials shall reduce the temperature rise of such materials to 90°F (50°C) above ambient.

9.5.3 All clearances shall be measured from the outer surface of the connector to the combustible material, disregarding any intervening protection applied to the combustible material.

9.5.3.1 The clearance protection material shall not interfere with the accessibility of the connector.

9.5.4 Materials and products listed for the purpose of reducing clearance to combustibles shall be installed in accordance with the conditions of the listing and the manufacturer's instructions.

9.5.5 For clearance reduction systems using an air space between the combustible wall and the wall protector, air circulation shall be provided by one of the methods specified in 9.5.5.1 through 9.5.5.3.

9.5.5.1 Air circulation shall be provided by leaving all edges of the wall protector open with at least a 1-in. (25.4-mm) air gap.

9.5.5.2 Where wall protectors are mounted on a single flat wall away from corners, air circulation shall be provided by leaving only the bottom and top edges or only the side and top edges open with at least a 1-in. (25.4-mm) air gap.

9.5.5.3 Wall protectors that cover two walls in a corner shall be open at the bottom and top edges with at least a 1-in. (25.4-mm) air gap.

9.6 Location. Where the connector used for a gas appliance having a draft hood or for Category I appliances is located in or passes through an attic, crawl space, or other cold area, that portion of the connector shall be one of the following:

- (1) Listed Type B or Type L vent material
- (2) Listed vent connector material having at least an equivalent insulating value

9.7 Installation.

9.7.1 A connector to a masonry chimney shall comply with the following:

- (1) Extend through the wall to the inner face or liner, but not beyond
- (2) Be firmly cemented to masonry

9.7.1.1 If a thimble is used to facilitate removal of the chimney connector for cleaning, the thimble shall be permanently cemented in place with high-temperature cement.

9.7.2 A chimney connector or vent connector shall not pass through any floor or ceiling or through a fire wall or fire partition.

Table 9.5.1.2 Reduction of Connector Clearance with Specified Forms of Protection

Clearance Reduction Applied to and Covering All Combustible Surfaces within the Distance Specified as Required Clearance with No Protection (See 9.5.1 and Table 9.5.1.1.)	Maximum Allowable Reduction in Clearance (%)		Minimum Clearance			
	As Wall Protector	As Ceiling Protector	As Wall Protector		As Ceiling Protector	
			in.	mm	in.	mm
3½-in. (90-mm) thick masonry wall without ventilated air space	33	—	12	305	—	—
½-in. (13-mm) thick noncombustible insulation board over 1-in. (25.4-mm) glass fiber or mineral wool batts without ventilated air space	50	33	9	229	12	305
0.024-in. (0.61-mm), 24-gauge sheet metal over 1-in. (25.4-mm) glass fiber or mineral wool batts reinforced with wire, or equivalent, on rear face with ventilated air space	66	50	6	152	9	229
3½-in. (90-mm) thick masonry wall with ventilated air space	66	—	6	152	—	—
0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	6	152	9	229
½-in. (13-mm) thick noncombustible insulation board with ventilated air space	66	50	6	152	9	229
0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space over 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	6	152	9	229
1-in. (25.4-mm) glass fiber or mineral wool batts sandwiched between two sheets 0.024-in. (0.61-mm), 24-gauge sheet metal with ventilated air space	66	50	6	152	9	229

Notes:
 1. All clearances and thicknesses are minimum; larger clearances and thicknesses may be permitted.
 2. To calculate the minimum allowable clearance, the following formula can be used: $C_{pr} = C_{un} (1 - R/100)$, where C_{pr} is the minimum allowable clearance, C_{un} is the required clearance with no protection, and R is the maximum allowable reduction in clearance.

9.7.3 Connectors for listed gas appliances with draft hoods, other listed Category I gas appliances (Table 5.2.3.1, Column I), and oil appliances listed for Type L vents (Table 5.2.3.1, Column III) shall be permitted to pass through walls or partitions constructed of combustible material provided one of the following conditions is met:

- (1) They are made of listed Type B or Type L vent material for gas appliances or of listed Type L vent material for oil appliances and are installed with not less than listed clearances to combustible material.
- (2) They are made of single-wall metal pipe and guarded by a ventilated metal thimble not less than 4 in. (102 mm) larger in diameter than the vent connector.

9.7.4 Connectors for residential-type appliances (Table 5.2.2, Column I) shall be permitted to pass through walls or partitions constructed of combustible material if one of the following is true of the connector:

- (1) It is listed for wall pass-through.
- (2) It is routed through a device listed for wall pass-through and is installed in accordance with the conditions of the listing.

9.7.5 Connectors for residential-type appliances (Table 5.2.2, Column I) with inside diameters less than or equal to 10 in. (254 mm) shall be permitted to pass through walls or partitions

constructed of combustible material to a masonry chimney, provided the connector system selected or fabricated is installed in accordance with the conditions and clearances specified in Figure 9.7.5.

9.7.5.1 Any unexposed metal that is used as part of a wall pass-through system and is exposed to flue gases shall be constructed of stainless steel or other equivalent material that resists corrosion, softening, or cracking from flue gases at temperatures up to 1800°F (982°C).

9.7.6 A connector for a medium- or high-heat appliance (Table 5.2.2, Columns IV and V) shall not pass through walls or partitions constructed of combustible material.

9.7.7 Connectors shall maintain a pitch or rise of at least ¼ in./ft (6.4 mm/305 mm) of horizontal length of pipe from the appliance to the chimney.

9.7.8 Connectors shall be installed without sharp turns or other construction features that would create excessive resistance to the flow of flue gases.

9.7.9* A device, other than a damper, that obstructs the free flow of flue gas shall not be installed in a connector, chimney, or vent unless listed for such use. (For requirements regarding dampers, see Section 9.9.)