

## Endurance Concentric Vent Kits

Laars is now offering vent kits for the Endurance products that have built-in silicone gaskets. This system eliminates the need for user-applied sealant, which saves time and ensures a consistent seal. The kits were designed to accommodate the majority of concentric vent systems that Laars has seen with the Endurance products. Separate parts can be used to supplement the kits when necessary. This LTD describes the kits that are available, individual parts to supplement kits, and how the parts can be used.

There are two Laars concentric vent kits available.

- 1) Horizontal Vent Kit 2400-009
- 2) Vertical Vent Kit 2400-011

Full descriptions of these kits are shown in the following pages.

## Direct Vent

Endurance units can be "direct vented." The term "direct vent" is often misused to describe a horizontal vent system, but in actuality, "direct vent" indicates a sealed system that consists of an appliance with combustion air ducted to it, and the products of combustion vented directly outdoors.

## Concentric Direct Vent

A concentric direct vent system places the vent pipe in the center of the combustion air pipe, and most often has one penetration through the wall,

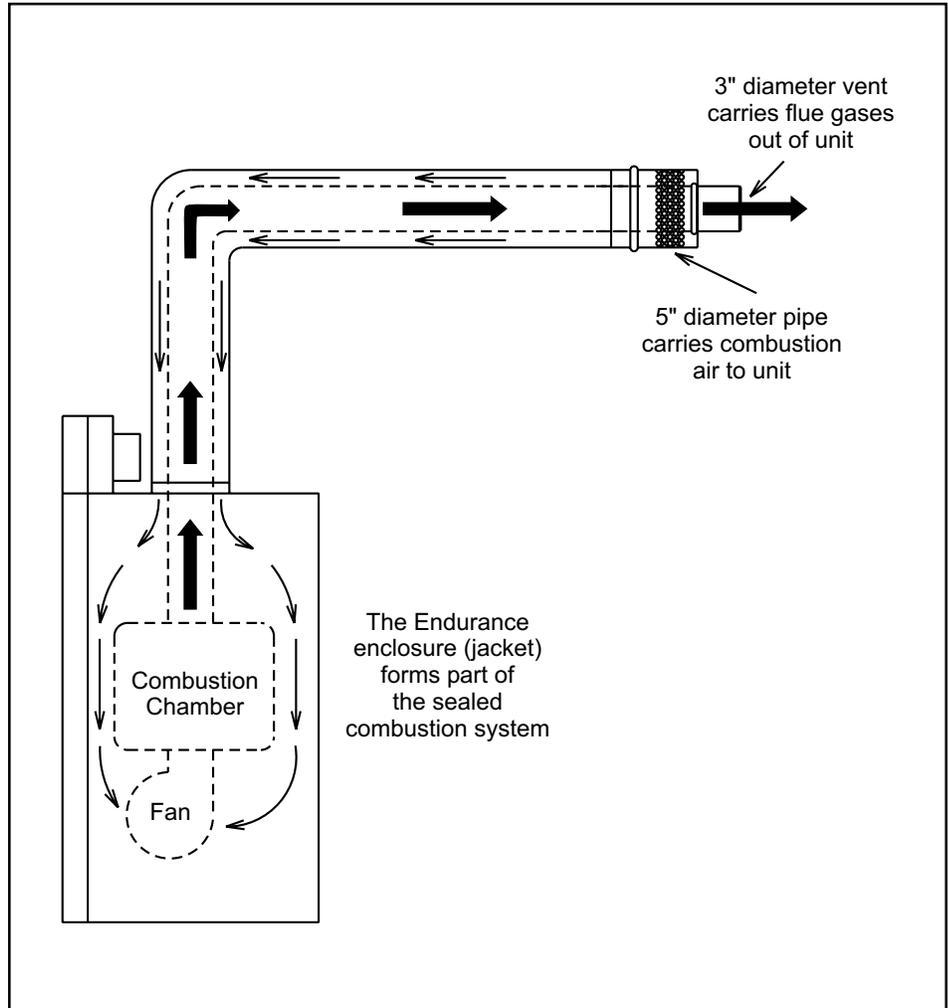


Figure 1. Combustion Air and Flue Gas Paths.

with a terminal that keeps the vent products from mixing with the combustion air.

The Endurance concentric vent kits consist of a 3" stainless steel vent pipe that is surrounded by a 5" stainless steel ducted air pipe. Three of the biggest advantages of the concentric direct vent system are:

- (1) Only one penetration is needed through the wall or roof.
- (2) The pipe can be installed through, and can come in contact with,

combustible material. This is because the hot vent pipe is surrounded by the cooler intake air (see Figure 1).

- (3) Direct vent terminal can be closer to windows than a side-wall vent terminal (per the National Fuel Gas Code in the U.S.), which allows for more installation flexibility.

Endurance units are certified for concentric direct venting with a maximum of 15 linear feet of concentric pipe and three sets of concentric 90° elbows. (For vertical

concentric vents, a condensate trap is required when the vent run is more than 7 feet).

## Horizontal Vent Kit, 2400-009

The horizontal vent kit is for concentric direct vent installations. The kit can be used in two basic configurations. The first is shown in figure 2, and will supply a maximum vertical run of 26", and a maximum horizontal of 28". The second configuration is shown in figure 3, and will supply a maximum vertical run of 16", and a maximum horizontal of 38". The kit comes with a telescoping boiler adapter, and a telescoping length of pipe, to make the kit more versatile and easier to install. This kit consists of:

- (1) 3" terminal (with screen)
- (1) 5" terminal (with screen)
- (1) 3"/5" telescoping concentric boiler adapter
- (1) 3"/5" x 11"-22" telescoping concentric pipe
- (1) 3"/5" 90° elbow
- (1) 3"/5" x 12" concentric pipe
- (1) wall flange, galvanized
- (1) wall flange, grey rubber
- (16) self-drilling screws

## Vertical Vent Kit, 2400-011

The vertical vent kit is for concentric direct vent installations, straight off the top of the Endurance, from 2 feet to 7 feet. (Note that additional components can be used to extend the kit to 15 feet of venting, maximum.) A highlight of this kit is a newly-designed concentric condensate trap that can be used in a vertical, horizontal or inclined position. Because it will work in a vertical position, there is no need for a horizontal offset in a vertical vent system (which used to be necessary to have a point to collect the condensate). It is important to stress that when this kit is used, the condensate trap

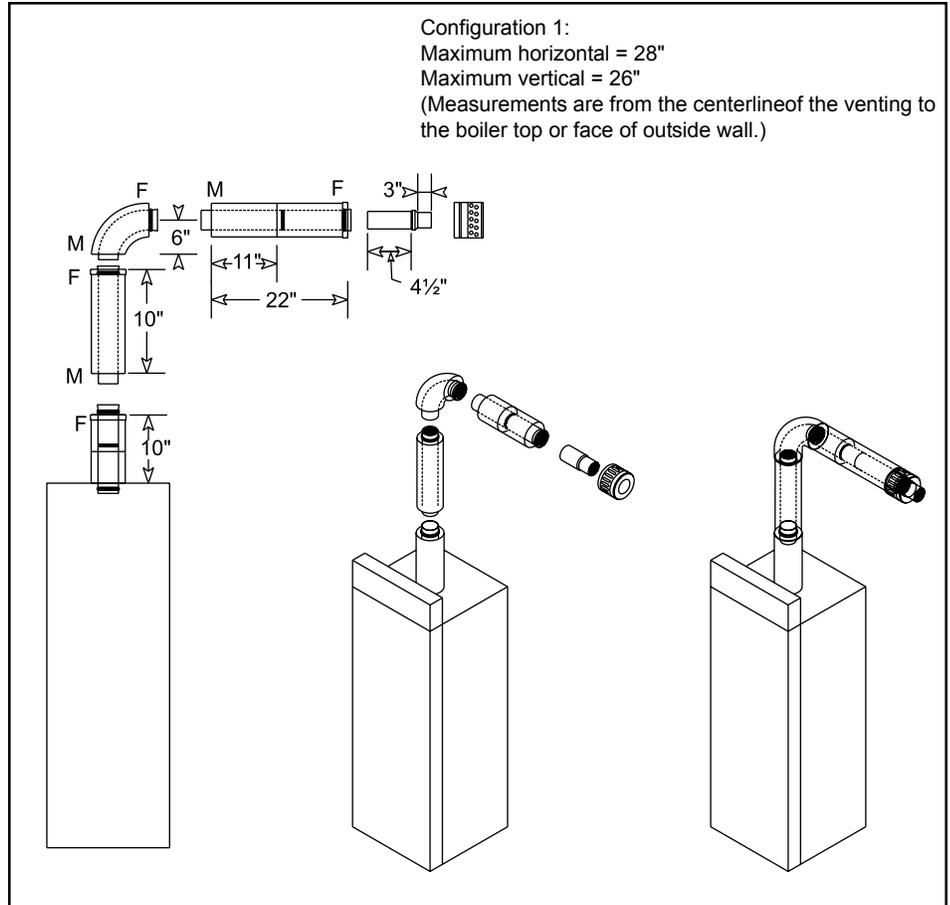


Figure 2. Kit 2400-009, Configuration 1.

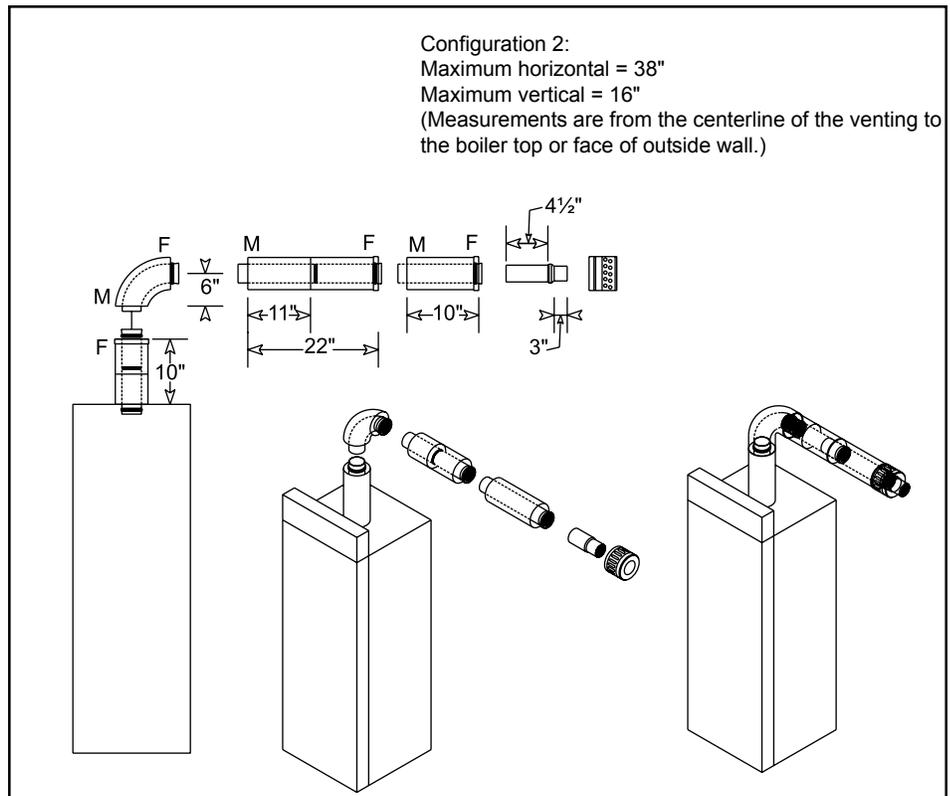


Figure 3. Kit 2400-009, Configuration 2.

that is included with the kit must be used, regardless of the height of the vent system. This is important, because the vent cap used in the kit is not a rain-proof cap, and if rain water enters, it needs a place to go. (An alternate cap, 2400-370, is available for installations that do not have a condensate trap.) The vertical vent kit consists of:

- (2) 3"/5" x 36" concentric pipe
- (1) 3"/5" telescoping concentric boiler adapter
- (1) 3"/5" concentric vertical termination adapter
- (1) 3"/5" concentric condensate trap
- (1) concentric rain cap
- (1) cone flashing
- (1) cone flashing seal, grey rubber

(1) 5" support clamp  
 (16) self-drilling screws  
 Figure 4 shows the configuration of this kit.

The kits were designed to accommodate the majority of concentric vent systems that Laars has seen with the Endurance products. Separate parts can be used to supplement the kits when necessary. If longer runs (up to 15 linear feet), or additional elbows are required, additional concentric parts can be ordered to supplement the kits. Figure 5 shows the part numbers and drawings of the parts that are available from Laars.

**Non-Concentric Direct Vent**

Direct vent can also be accomplished when the air and vent pipes are separated (non-concentric direct vent). A tee (part number 2400-435) is used at the outlet of the Endurance to split the piping systems from one another (see Figures 6 and 7 for examples). Separate vent and ducted air terminals are used. The method is used when more than 15 linear feet of venting/combustion air is required.

**Separate Vent System**

Endurance units are certified for non-concentric vent runs (any

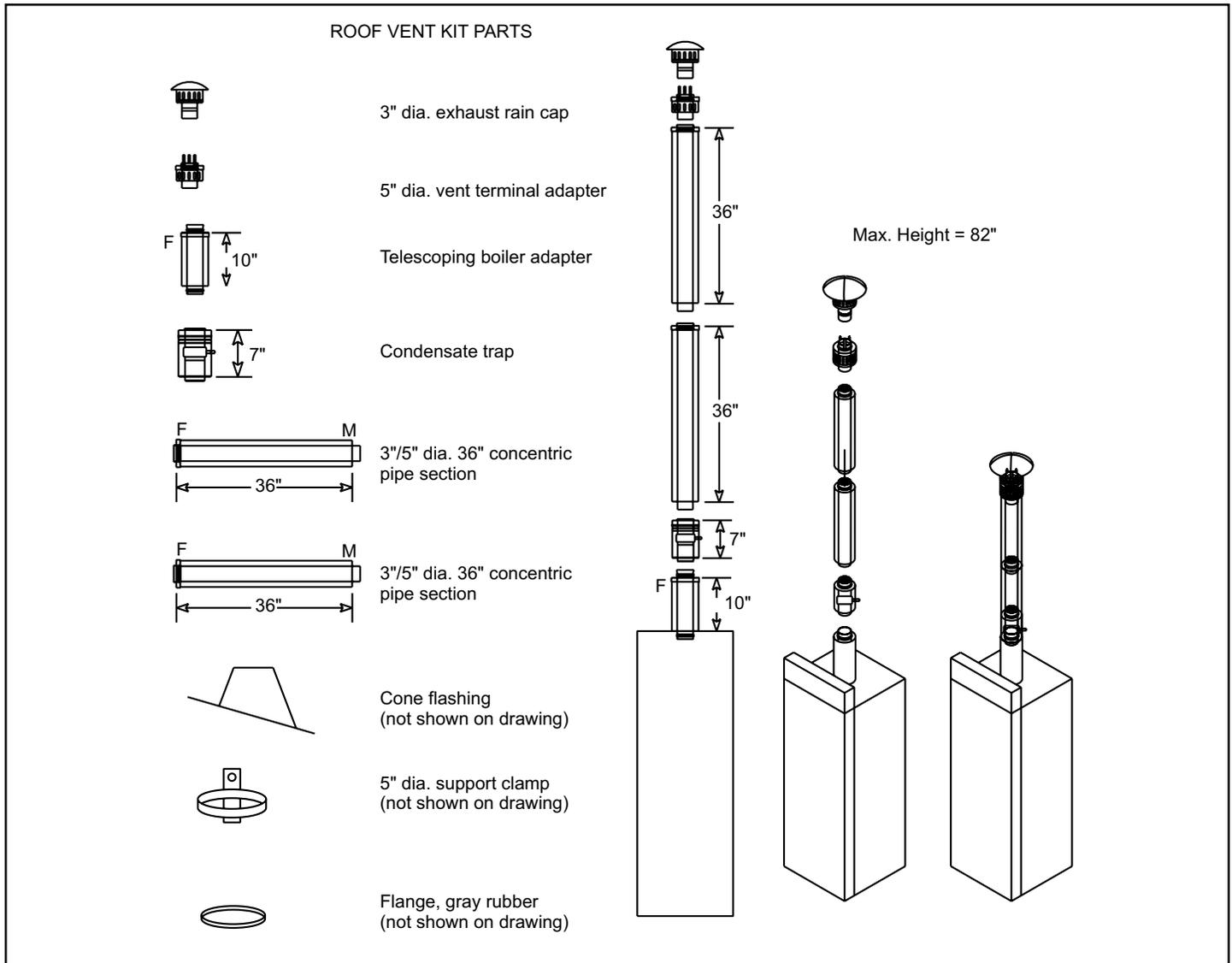


Figure 4. Kit 2400-011.

**Concentric Vent Parts**

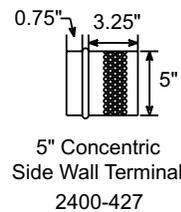
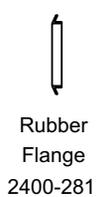
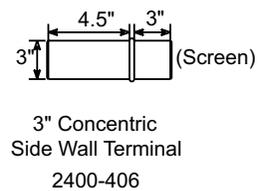
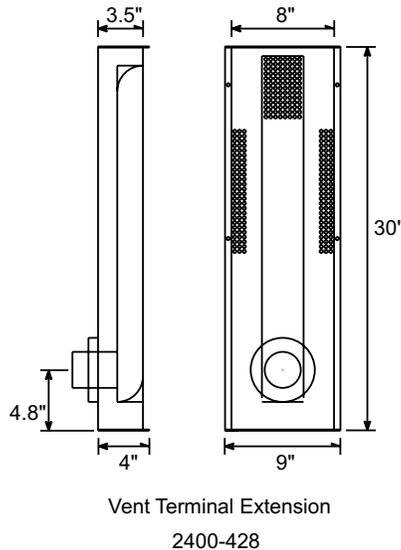
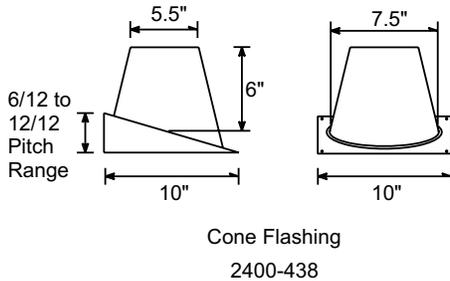
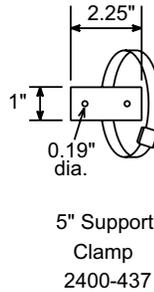
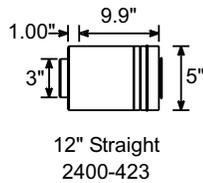
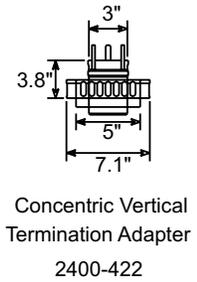
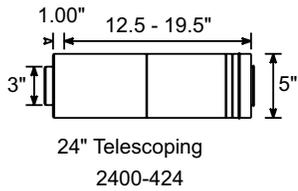
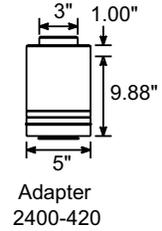
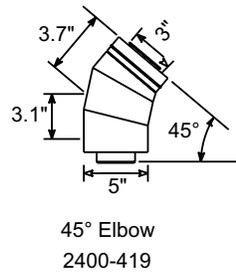
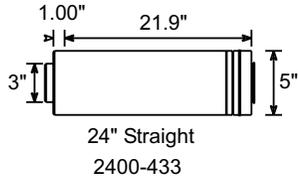
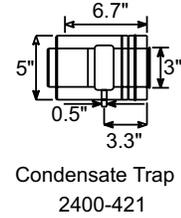
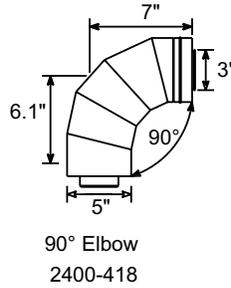
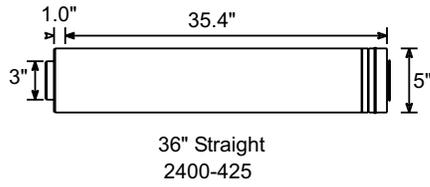


Figure 5. Concentric Vent Parts.  
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combination of horizontal or vertical) of up to 50 equivalent feet with 3" vent material, and up to 100 feet with 4" vent material. Elbows in the vent system are considered to be 5 equivalent feet. This is a Category IV (positive pressure, may condense) vent system, and the material used to vent the Endurance must be stainless steel special gas vent listed to U.L. Standard 1738 and U.L.C. Standard 636.

For 3" horizontal vents, terminal 2400-426 can be used (see Figure 6.) Vertical vents greater than 7 feet must be provided with a condensate trap, part number 2400-409 (see Figure 7). Two vent terminals are available for vertical 3" venting. 2400-416 can be used, but only if the system includes a condensate trap. This is important, because this terminal is not designed to prevent rain water from entering. For vertical 3" vent systems that do not have a condensate trap, terminal 2400-370 should be used. This terminal is designed to prevent rain water from entering. All of the terminals that Laars sells have screens to keep the critters out.

Three-inch pressure vent components are available from Laars as separate pieces for building a non-concentric vent system for your application. A drawing of these parts, with part numbers, can be found in Figure 8.

Four-inch pressure vent components can be field-supplied, and must be stainless steel special gas vent listed to U.L. Standard 1738 and U.L.C. Standard 636. Vent pipe and fittings are manufactured to these standards by Heat-Fab, Inc. under the trade name of Saf-T Vent®, by Z-Flex® under the trade name of Z-Vent®, and by ProTech Systems, Inc. under the trade name of FasNSeal®.

**Separate Ducted Air System**

In the U.S., the National Fuel Gas Code differentiates between a direct

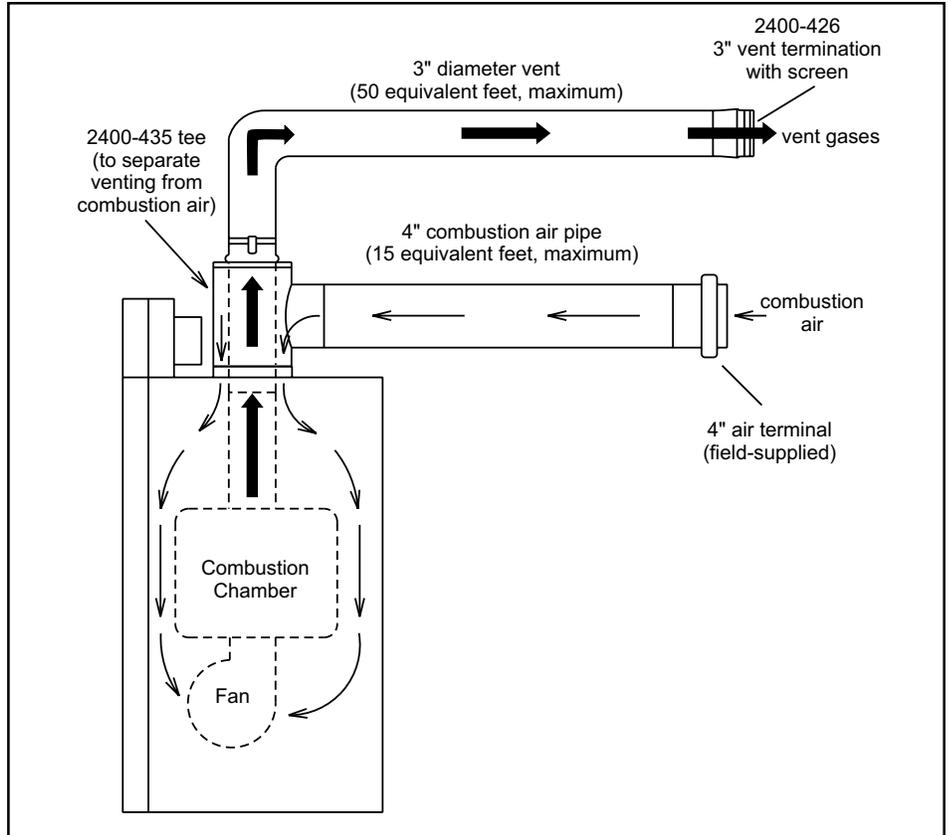


Figure 6. Non-Concentric Direct Vent with Horizontal Vent.

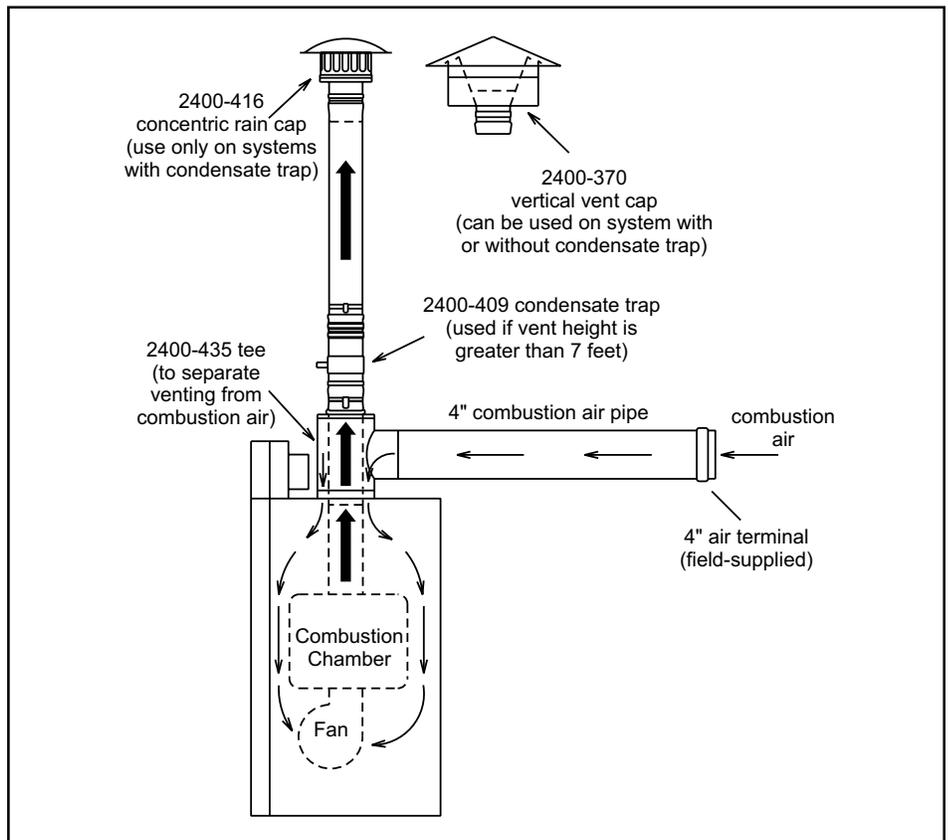
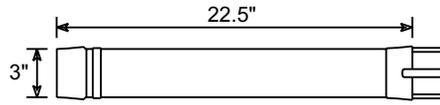


Figure 7. Non-Concentric Direct Vent with Vertical Vent.

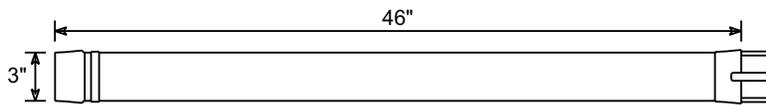
**3" Non-Concentric Vent Parts**



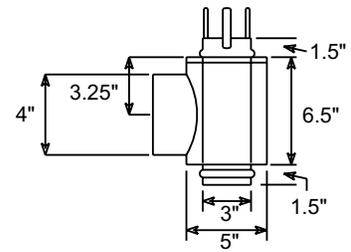
12" Straight  
2400-410



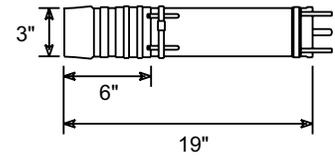
24" Straight  
2400-411



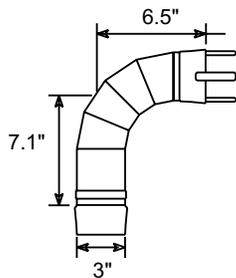
48" Straight  
2400-412



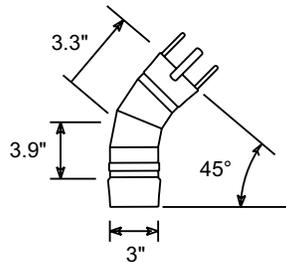
5"x4"  
Fresh Air Tee &  
Boiler Adapter  
2400-435



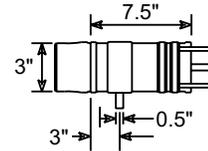
6"-19"  
Telescoping  
Length  
2400-413



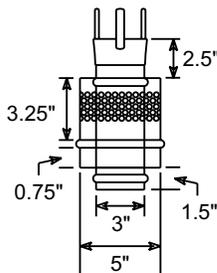
90° Elbow  
2400-407



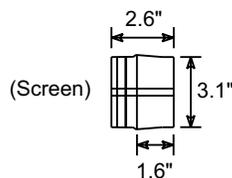
45° Elbow  
2400-408



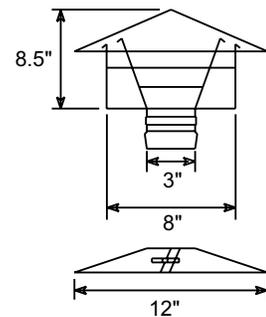
Condensate Tee  
2400-409



3" Room Air  
Adapter w/ Screen  
2400-415



3" Terminal  
with Screen  
2400-426



Vertical  
Vent Cap  
2400-370

Figure 8. 3" Vent Parts.

vent system and other mechanical side-wall vent systems. Among other things, vent termination placement requirements differ. If the vent system is direct vent, (whether concentric or non-concentric) and the appliance has an input over 50,000 Btu/hr (such as the Endurance), the vent terminal must be located at least 12 inches from any air opening (doors, windows, gravity inlets) into a building. However, a mechanical vent terminal that is not considered direct vent requires at least a 4-foot clearance below or horizontally from these openings.

What does this mean to the Endurance? In order to be considered non-concentric direct vent, the air must be piped to the Endurance with stainless steel special gas vent, listed to U.L Standard 1738 and U.L.C. Standard 636 (see "Separate Vent System" section for some manufacturers of this type of field-supplied vent material). This maintains the sealed combustion status for the whole air/vent system, and allows for the vent terminal to be installed per the rules for a direct vent appliance. If vent terminal placement is not an issue in your application, and you have room for the minimum 4-foot clearance, the Endurance air can be taken from the room, or air can be piped to the unit with galvanized pipe (plastic is an acceptable material, but the connection to the separation tee poses a problem when plastic is used.)

The air can be ducted to the Endurance with up to 15 linear feet of pipe. If more than 15 feet is needed, contact the Laars Applications Engineering group.

## **Combustion Air From Room**

Endurance units can also pull air from the room, instead of having it ducted to the unit from the outside. The venting requirements are the same as non-concentric direct vent.

And, as stated in that section, the vent terminal must be placed per the requirements for a mechanical draft system. The requirements for vent placement for a direct vent system do not apply when the air is taken from the room.

When taking air from the room, terminal 2400-415 is used as a screen for the combustion air, as shown in Figure 9.

One or two air openings are required for units that are installed in a "confined space," depending upon the installation. A confined space is defined by the National Fuel Gas Code as a space whose volume is less than 50 cubic feet per 1000 Btu/hr input of all appliances installed in the space. The National Fuel Gas Code allows for the air to come either directly from the outside, or from other spaces of sufficient volume so

that the combined volume of the spaces meets the criteria of an unconfined space.

When air is coming from inside the building, the space needs to meet the requirements of an "unconfined space." Two permanent openings are required. One opening must commence within 12" of the ceiling and the other opening must commence within 12" of the floor. Each opening requires a minimum free area of at least one square inch per 1000 Btu/hr of the input of all the gas equipment in the confined space but, not less than 100 square inches.

## **Combustion Air From Outdoor**

When air is coming from outdoors, there are two methods:

- 1) Two permanent openings, one

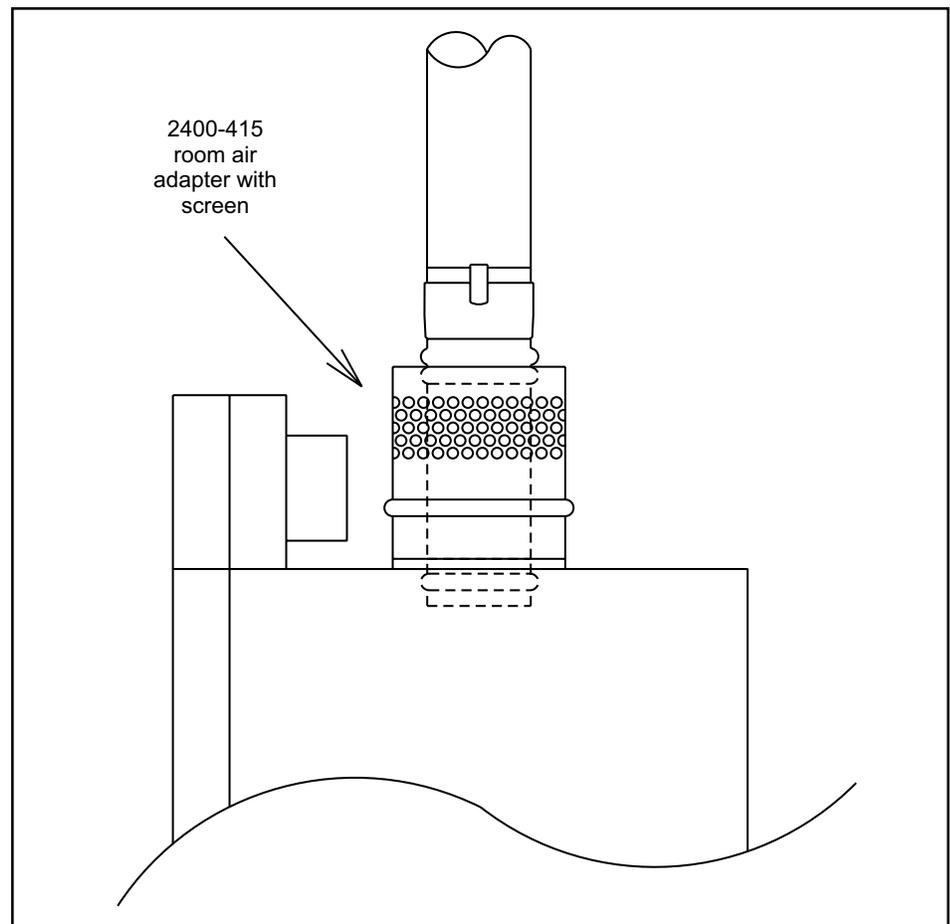


Figure 9. Combustion Air from Room.

commencing within 12" of the ceiling, and one commencing within 12" of the floor. For direct communication with the outdoors, or when the air is coming in from vertical ducts, each opening must have a minimum free area of one square inch per 4000 Btu/hr of the input of all the gas equipment in the confined space. If the air is coming through horizontal ducts to the room, each opening must have a minimum free area of one square inch per 2000 Btu/hr.

2) One permanent opening, commencing within 12" of the ceiling, as long as the appliance has minimum

1" clearance from the back and sides, and 6" clearance from the front. The opening must communicate directly with the outdoors, or through a vertical or horizontal duct to the outside. The opening must be at least one square inch per 3000 Btu/hr of the input of all the gas equipment in the confined space, and it must not be less than the sum of the areas of all vent connectors in that space.

This essay is for discussion purposes only. Be sure to consult the boiler's installation and operation manual, and all local codes, to ensure that your

vent system, air system, and the rest of the installation is correct and acceptable.

In Canada, follow "The Natural Gas and Propane Installation Code," CSA-B149.1.

For additional information about the Endurance Concentric Vent Kits, or about venting Endurance appliances, please contact Laars Applications Engineering. In the U.S., call 603-335-6300. In Canada, call 905-844-8233.