

# THE Challenger

## Concentric Vent/Air System Supplement



### **! WARNING**

This document is intended to be used by a qualified heating contractor or service technician. Read all instructions within this document and within the CHALLENGER Installation and Maintenance Manual, before proceeding with the installation. It is recommended to follow the procedures in the steps given, skipping or missing procedural steps could result in severe personal injury, death or substantial property damage.

### **NOTICE**

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1/ NFPA 54, and/or Natural Gas and Propane Installation Code, CAN/CSA B149.1.

**PRODUCT AND SAFETY INFORMATION**

---

Definitions . . . . . 1

**SECTION I - PRE-INSTALLATION ITEMS**

---

General Requirements . . . . . 2  
Vent/Air System Kit Components . . . . . 2  
Assembled Vent/Air System Kit Dimensions . . . . . 3  
Optional Vent/Air System Components . . . . . 3

**SECTION II - VENT/AIR SYSTEM INSTALLATION**

---

Vent/Air System Clearance Requirements . . . . . 4  
Determine Termination Location . . . . . 4-5  
Concentric Vent/Air Adapter Installation . . . . . 5-6  
Vent/Air System Joint Assembly . . . . . 7  
Termination Installation - Horizontal . . . . . 8  
Termination Installation - Vertical . . . . . 8-9  
Cutting Termination Fitting or CCVPIP04 to Length . . . . . 9  
Adjustable Length Vent/Air System Pipe . . . . . 10  
Fire Stop Support Plate . . . . . 10  
Multiple Vent/Air System Terminations . . . . . 10

**SECTION III - MAINTENANCE PROCEDURES**

---

Inspect Vent/Air System . . . . . 11

## Definitions

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the appliance.

 **WARNING**

Indicates a potentially hazardous situation which, if ignored, can result in death, serious injury or substantial property damage.

**NOTICE**

Indicates special instructions on installation, operation or maintenance, which are important to appliance but not related to personal injury hazards.

**NOTICE**

This Vent/Air System is listed to ULCS636 as Type BH Class IIC Vent System with a 110°C (230°F) maximum flue temperature rating.

**NOTICE**

Triangle Tube reserves the right to modify the technical specifications and components of its products without prior notice.

## SECTION I - Pre-Installation Items

### General Requirements

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1/ NFPA 54, and/or Natural Gas and Propane Installation Code, CAN/CSA B149.1.

The vent/air system must be fully constructed using **ONLY** the CHALLENGER Concentric Vent/Air System components from Triangle Tube. Do not mix other vent components or joining methods from other manufacturers.

#### WARNING

**Do not mix vent components or joining methods from any other vent manufacturer with Triangle Tube's CHALLENGER Concentric Vent/Air System. Failure to comply with this requirement could cause vent failure resulting in leakage of flue products into the living space of the building.**

#### NOTICE

**Use of cellular core PVC (ASTM F891) cellular core CPVC, or Radel® (polyphenolsulfone) in venting system is prohibited.**

#### NOTICE

**Covering PVC/CPVC or Polypropylene vent pipe and fittings with thermal insulation is prohibited.**

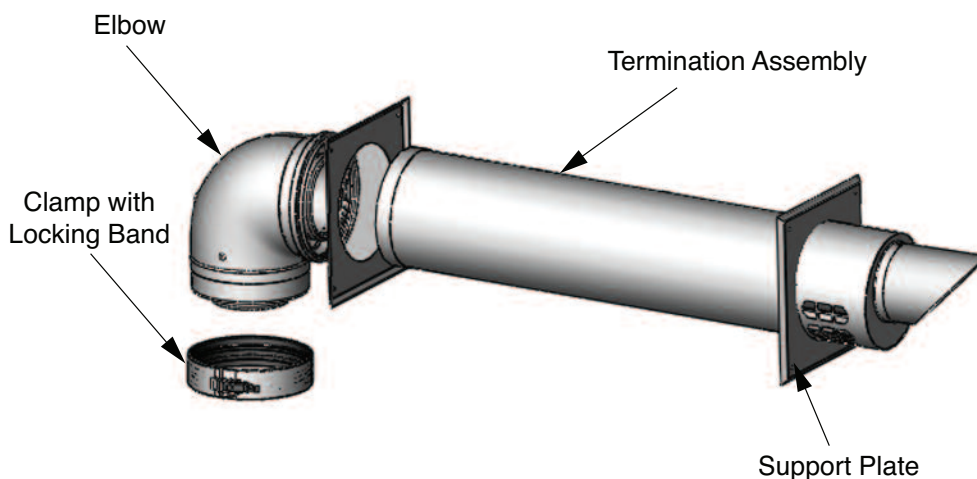
Do not connect more than a single appliance into the vent/air system.

All penetrations of the vent/air system through ceilings, floors, walls or roofs must be properly fire stopped. The installer must comply with all local codes and requirements regarding fire stops and vent/air penetrations.

The vent/air system must not penetrate or be routed through any active vent system or chimney.

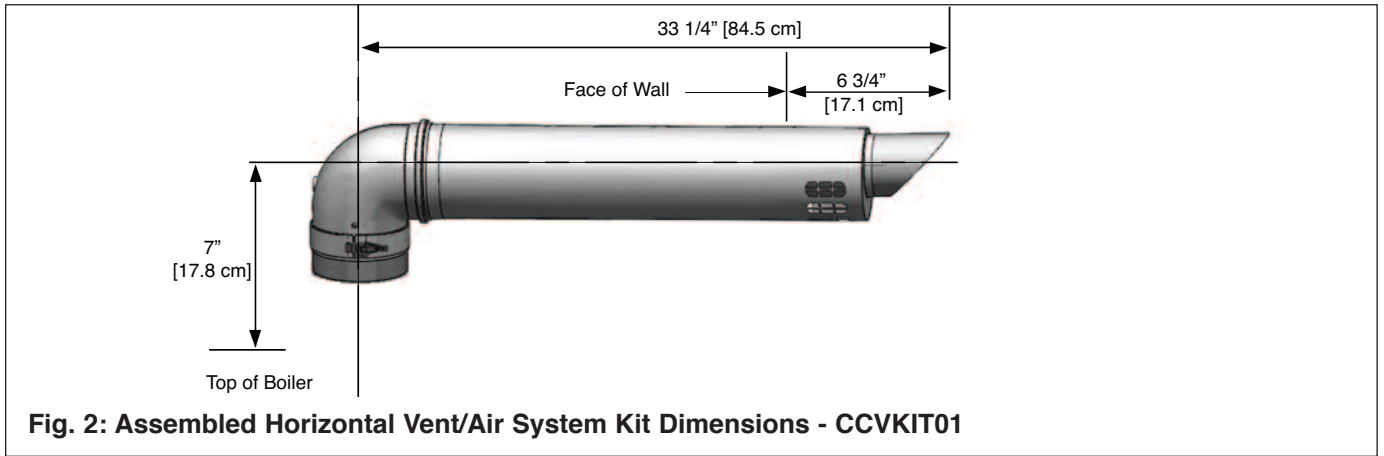
### Vent/Air System Kit Components









Prior to installation of the vent/air system check to ensure all parts required for the completion of the system are present. See Figure 1 for complete breakdown of horizontal concentric vent/air system kit parts and Fig. 3, page 3 for optional components including vertical venting.



- Note:**
1. Concentric Vent/Air Adapter and mounting hardware are not shown
  2. For vertical venting order parts separately as listed in Fig. 3. Do not order - CCVKIT01

**Fig. 1: Concentric Vent/Air System Kit Components Horizontal - CCVKIT01**



Part #	Description	Qty	
CCVADT011	Challenger Vent/Air Adapter	1	
CCVPIP01	Common Vent Pipe – 39 Inches (990mm) Lgth	1	
CCVPIP02	Common Vent Pipe – 79 inches (2007mm) Lgth	1	
CCVPIP03	Vent Pipe adjustable length with clamp (10.8” to 15.5”) [ 27.3 mm to 39.4 mm]	1	
CCVPIP04	Vent Pipe Cutable with Clamp 19.7” (50 cm)		
CCELB01	90° Elbow with Clamp	1	
CCELB01	45° Elbow with Clamp	1	
CCVTERM01	Concentric Vertical Termination with Support Bracket	1	
CCVCLP01	Fire Stop Plate	1	
CCVCLP01	Clamp Hanging	1	
CCVCLP02	Clamp (repair part only)	1	
CCVFLA03	Exterior Roof Flashing – 0° / Flat	1	
CCVFLA01	Exterior Roof Flashing – 0° - 25° Pitch	1	
CCVFLA02	Exterior Roof Flashing – 25° - 45° Pitch	1	
CCGSK01	Inner Pipe gasket – 85 mm	1	

**Fig. 3: Concentric Vent System Components**

## SECTION II - Vent/Air System Installation

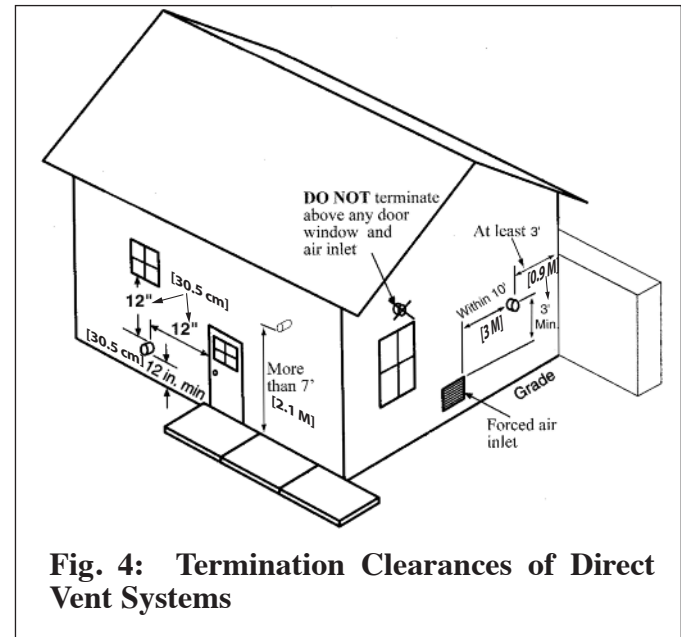
### Vent/Air System Clearance Requirements

The vent/air system may maintain zero clearance to combustible & non-combustible materials.

#### Determine Termination Location

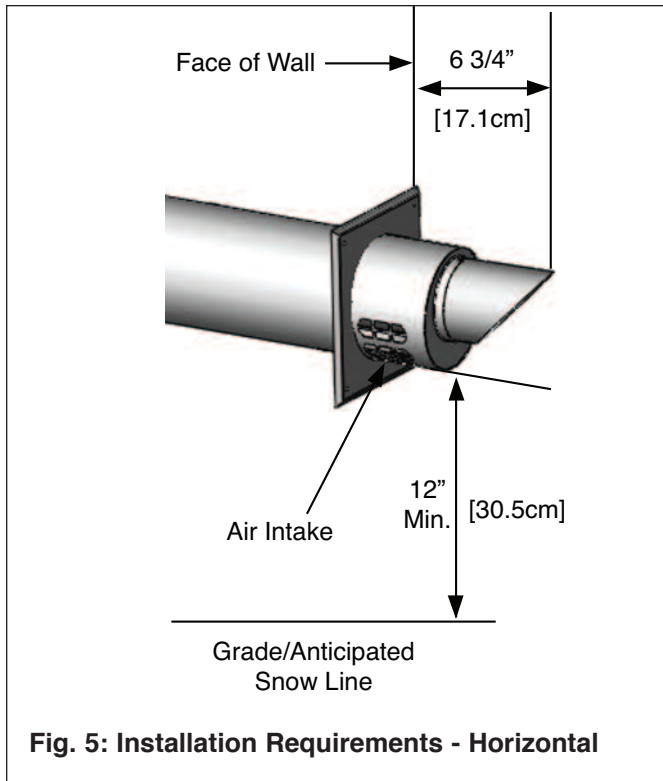
1. The maximum equivalent length of the concentric vent/air system should not exceed 85 Ft [25.9 M] (excluding the termination). For each 90° elbow in the system, the equivalent length is reduced by 10 feet [3 M]. For each 45° elbow in the system, the equivalent length is reduced by 5 feet [1.5 M].
2. The installer must consider the following when determining the location of the vent/air system termination:
  - a. Locate the termination where flue vapors will not damage surrounding shrubs, plants or air conditioning equipment or be objectionable to the homeowner.
  - b. The flue products will form a noticeable plume as they condense in colder air. Avoid terminating in areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of flue gas condensation and a buildup of water/ice on surrounding plants, building surfaces or combustion air inlet.
  - d. Avoid locations of possible accidental contact of flue vapors with persons or pets.
  - e. Avoid locations where prevailing winds could affect the performance of the appliance or cause recirculation of the flue gases, such as inside corners of buildings or near adjacent buildings or vertical surfaces, window wells, stairwells, alcoves, courtyards, or other recessed areas.
  - f. Do not terminate above any doors or windows; flue condensate could freeze causing ice formations.
  - g. Locate the termination to prevent possible condensate damage to exterior finishes.

- h. Locate the vent and combustion air terminations in a manner to protect from damage by foreign objects, such as stones, balls, or buildup of leaves or sediment.
3. Maintain the following clearances to the termination:
  - a. At least 3 feet [0.9 M] from adjacent walls
  - b. No closer than 3 feet [0.9 M] below roof overhangs
  - c. At least 7 feet [2.1 M] above any public walkways
  - d. At least 3 feet [0.9 M] above any forced air intake within 10 feet [3 M] (does not apply to the combustion air inlet of a direct vent appliance).
  - e. Must be at least 4 feet [1.2 M] (6 feet [1.8 M] Canada) from any electric meters, gas meters, gas meter-regulators, relief valves or other equipment. Never terminate above or below any of these items within 4 feet [1.2 M] (6 feet [1.8 M] Canada) horizontally.



- f. No closer than 12" [30.5 cm] below or horizontally from any door or window or gravity air inlet.
- g. Horizontal air intake must terminate at least 12 inches above grade (18" [45.7 cm] Canada) or anticipated snow line as shown in Fig. 5, page 5.

- h. Horizontal termination must not extend more than 6-3/4 inches [17.1 cm] beyond the exterior wall as shown in Fig. 5, page 5.



- Horizontal or vertical runs of the vent/air system must be supported at every joint. The installer should use an optional Hanging Clamp, or perforated metal strap hangers or equivalent, to support the piping.
- The vent/air system must terminate using the termination supplied in the horizontal kit - CCVKIT01 or vertically with - CCVTERM01.
- The vent/air system must be pitched back to the appliance at minimum 5/8 inch per foot [16mm/30cm] on any horizontal runs.

## Concentric Vent/Air Adapter Installation

### Step 1: Removal of Existing Adapter 3" 2-Pipe Adapter

- Remove the front cover of the Challenger.
- While holding the flue tube in place, rotate the existing 3" 2-pipe adapter counterclockwise less than 1/4 turn until it can be removed.
- Remove the o-ring from the adapter. Save this o-ring to be installed onto the bottom of the New Adapter.

### Step 2: Install the New Adapter

- Install the O-ring onto the New Adapter. As shown in Fig. 6.
- Place the New Adapter onto the top of the Challenger, positioning the flue tube inside the adapter. The test port should face the front of the Challenger and the O-ring should fit into the top cover of the Challenger.



**Fig. 6: Installation of O-Ring**

- Rotate the New Adapter (Clockwise) until it clicks into place (less than 1/4 turn) and is square with the front of the Challenger.



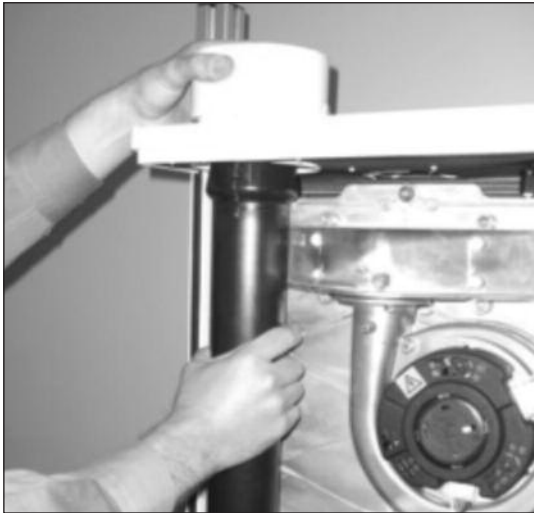


Fig. 7: Inspecting Flue Tube/Adapter Connection

**Step 3: Inspect Condensate Pan and Reinstall the Front Cover.**

1. With the new Adapter in place inspect the Flue and Condensate Pan to ensure proper fit.
2. Push up on the Condensate Pan underneath the heat exchanger while pushing down on the Condensate Pan where it engages with the Condensate Trap. As shown in Fig. 8.

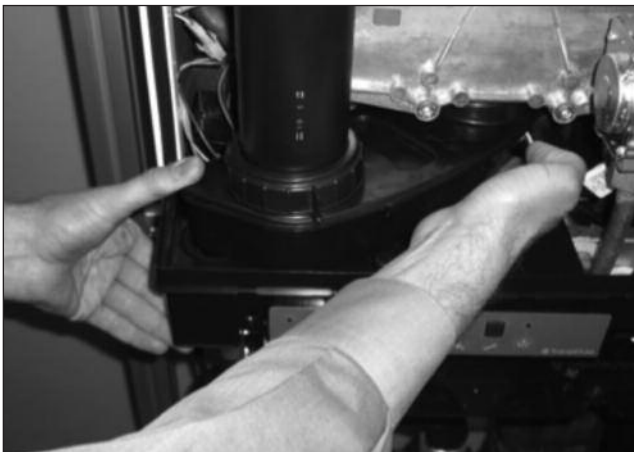


Fig. 8: Inspection of Condensate Pan

3. Inspect the connection with the Condensate Trap to ensure the Condensate Pan fits snugly in the gasketed connection to the Condensate Trap.

**! WARNING**

Improper installation may result in flue gas leakage which may result in severe personal injury or death.

4. This condition where the Condensate Pan does not engage into the Condensate Trap as shown in Fig. 10 is not acceptable and will result in flue gas recirculation, harming the boiler. Adjust the Condensate Pan to properly engage into the Condensate Trap gasket. As shown in Fig. 9.



Fig. 9: Proper Engagement of Condensate Pan

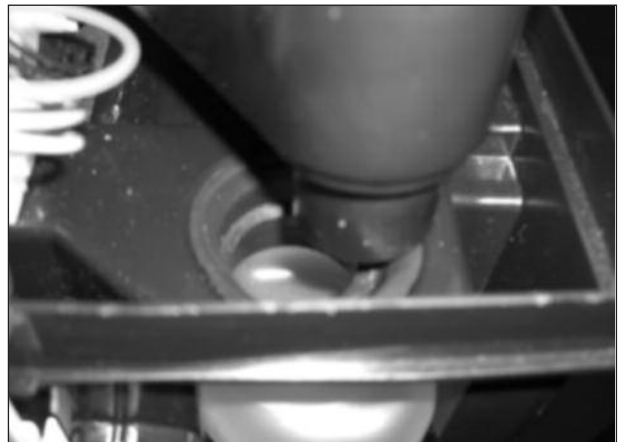


Fig. 10: Improper Engagement of Condensate Pan

5. Reinstall the front cover of the Challenger.

**! WARNING**

Failure to properly support the vent and air piping at the appliance may result in severe personal injury or death.



### Vent/Air System Joint Assembly

1. When installing the vent system, the female end of the pipe or fitting should face up or away from the appliance.
2. Prior to assembly of any piping or fittings inspect and ensure the inner pipe gasket seal is present, undamaged and properly seated in the groove of the pipe.
3. Insert and rotate the male end of the inner pipe into the female end of the previous pipe section. It is recommend to moisten the gasket seal with clean water prior to assembly.

**NOTICE**

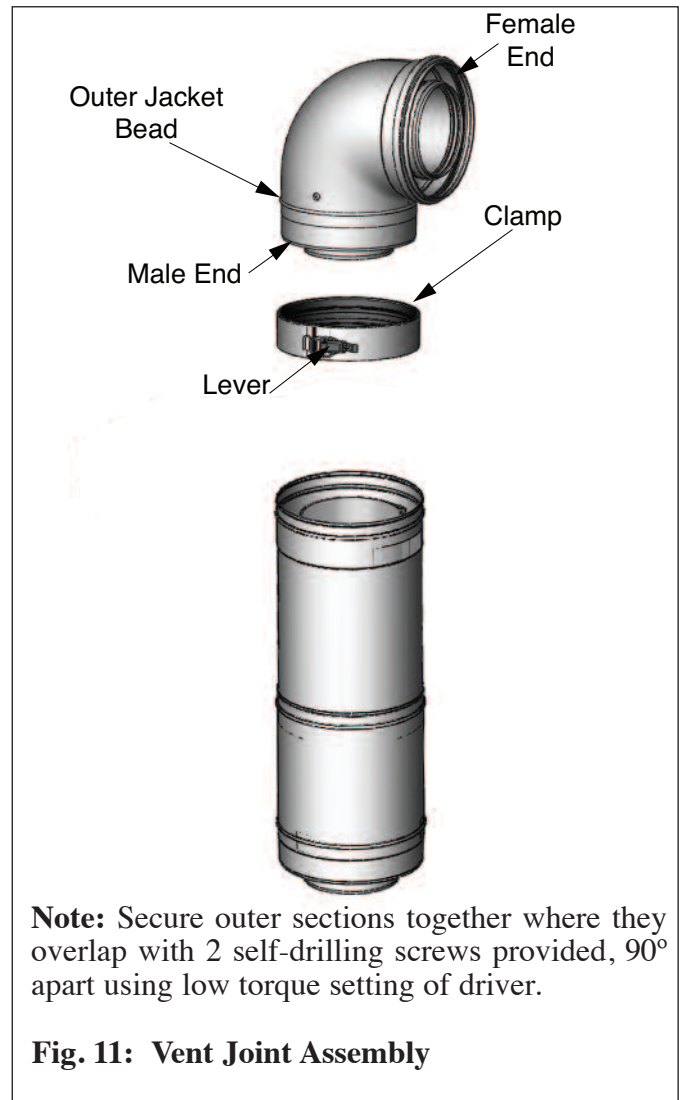
To aid in the assembly of the pipes and fittings use only clean water to moisten the gasket and the mating male end of the pipe. Use a twisting motion as the pipe ends are pressed together.

4. Push the sections together firmly until the outer jacket bead of the new section has made contact with the edge of the female end of the previous section. When fully assembled, the outer female end of the previous section will overlap the male end by approximately 1”[25mm].
5. Use 2 self-drilling screws provided to secure the outer sections together where they overlap. Install screws 90° apart from one another. No pre-drilling is required.

**WARNING**

Do not over tighten the self-drilling screws into the sections. Use a low torque screw drive to prevent stripping out the holes. If a hole becomes stripped due to over tightening, a larger diameter screw (length of screw must not exceed 1/2” [13mm]) or a short pop rivet may be used.

6. Seal the two components together by placing a clamp over the connection and pressing down on the clamp lever. The clamp should be centered over the connection and the edge of the clamp should cover the beads on the end of each component. If the clamp does not cover and lock onto the component jacket beads, ensure the components are fully pressed together and interlocked.



**WARNING**

It is very important that the clamp be properly installed. Failure to properly connect the vent components could lead to vent failure and can result in death, serious injury or substantial property damage.

### Termination Installation - Horizontal

1. Determine the termination location using the guidelines listed on page 4 and 5 and drill or cut a 5 inch hole [12.7 cm].
2. Install the interior support plate on the inside wall using the screws provided in the kit.
3. Mount the termination fitting through the interior support plate from the exterior side of the wall. Ensure the air inlet holes of the termination fitting are facing down and that the fitting is mounted level.

#### NOTICE

To determine the appropriate length of the termination fitting, mount the exterior support plate temporarily prior to the installation of the interior support plate. Insert the termination fitting from the interior side of the wall through the exterior support plate. The termination fitting has a formed bead that limits the distance of penetration through the exterior support plate. The termination fitting should be measured and cut to length prior to mounting the support plates. The termination may be installed through a wall thickness of up to 20" [50.8 cm] maximum. For information on measuring and cutting the termination fitting, reference page 9.

4. Mount the exterior support plate around the termination on the outside wall. Ensure the support plate is flush to the formed end of the termination fitting and the fitting is mounted level.

#### NOTICE

The termination fitting must be installed level without pitch either to the appliance or away from appliance.

5. The gaps between the outer pipe of the termination fitting and the support plates must be sealed with a high quality silicone caulk. Also apply the silicone caulk along the outer edge of the support plates sealing the plates to the wall.

### Termination Installation - Vertical

#### NOTICE

When venting vertically do not order the Concentric Vent/Air Horizontal Kit - CCVK-IT01 as shown in Fig. 1, order required parts separately only from listed parts in Fig. 3.

#### NOTICE

When using an inoperative chimney as a means of a chase for the vent/air piping the surrounding space within the chimney cannot be used to draw combustion air or vent another appliance.

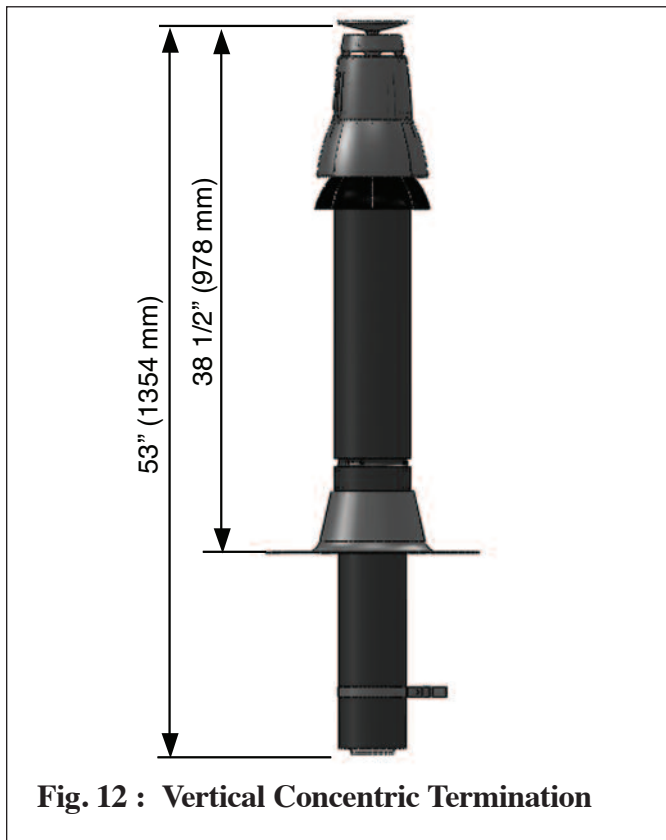
#### ⚠ WARNING

A gas vent extending through a roof should not terminate near an adjacent wall or below any building extensions such as roof eaves, balconies or decks. Failure to comply with the required clearances in this manual could result in severe personal injury, death or substantial property damage.

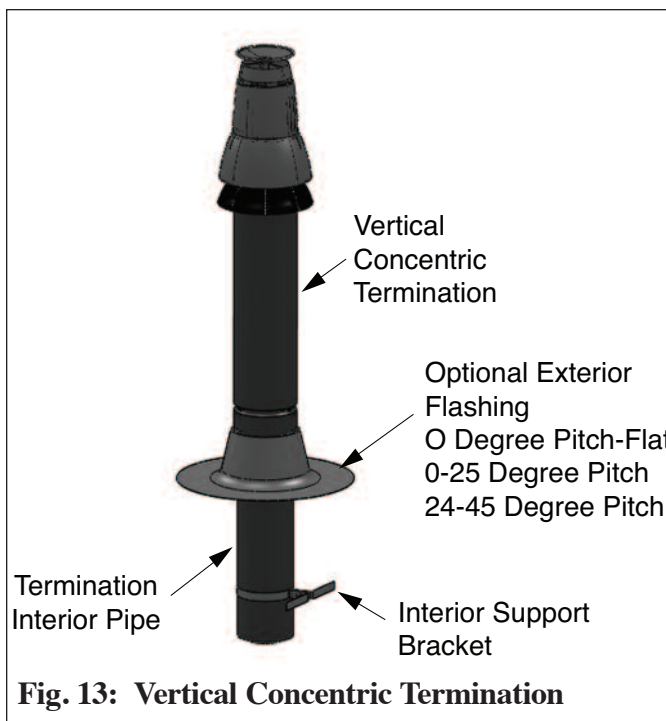
1. Determine the termination location using the guidelines listed on page 4 and 5 and drill or cut a 5 inch [12.7 cm] hole.
2. Secure appropriately pitched flashing as listed in Fig. 3.
3. Seal flashing to roof with appropriate sealant (field supplied).

#### NOTICE

To determine the appropriate length of the termination fitting, temporarily mount the vertical termination - CCVTERM01 onto the roof flashing. The termination fitting should be measured and cut to length prior to securing termination to flashing. The termination may be installed through a wall thickness of up to 20" [50.8 cm] maximum.



**Fig. 12 : Vertical Concentric Termination**



**Fig. 13: Vertical Concentric Termination**

4. Secure and support vertical termination to flashing with included hardware.
5. Seal all exterior joints including pivot points with silicone sealant.

**Cutting Termination Fitting or CCVPIP04 to Length**

1. Only the termination fitting and CCVPIP04 can be cut to length if required.

**NOTICE**

**Components that may be cut will have a label on the male end of the part stating “CAN BE CUT THIS END ONLY”**

2. Add 3/4” [19 mm] to the required length and mark the end of the outer pipe.

**NOTICE**

**Make sure to add 3/4” [19 mm] to the overall required length when cutting both inner and outer pipes.**

3. Cut the pipes using an abrasive cutoff saw or hacksaw (minimum 32 teeth per inch). Make sure that the inner pipe remains centered in the outer pipe while cutting. It may be helpful to temporarily connect the vent section to be cut into another vent pipe to keep the center pipe centered while cutting.
4. Mark the end of the outer pipe at the required length. The length of the outer pipe should be 3/4” [19 mm] less than the inner pipe.
5. Cut through the outer pipe ONLY using a hacksaw (minimum 32 teeth per inch), or snips.
6. File off any burrs or rough edges on both pipes. Clean off any dust or dirt.
7. If the cutting process distorted the roundness of the pipes, carefully use your thumbs to correct the distortion.

**⚠ WARNING**

When cutting or correcting the shape of the outer pipe, **WEAR GLOVES**. The ends of the vent pipes can become very sharp when cut.

### Adjustable Length Vent/Air System Pipe

**⚠ WARNING**

The component piping and fittings (excluding the termination fittings and CCVPIP04) are not design to be cut for custom lengths. Cutting the piping or fittings to length may compromise the vent seal causing potential vent failure or leakage of flue gas resulting in death, serious injury or substantial injury.

1. An adjustable straight vent/air system pipe length is available for applications that require custom lengths.
2. The adjustable length vent/air system pipe is adjustable from a minimum of 12" [30.5 cm] up to a maximum of 16.5" [41.9 cm].
3. To adjust the length, firmly grab each end of the pipe and twist together to shorten or twist apart to lengthen.

### Fire Stop Support Plate

The Fire Stop Support Plate must be used when the vent/air system piping passes through any floors, ceilings, enclosed chase or exterior walls. This plate can be used for vertical or horizontal penetrations.

1. Prepare a 5-inch [12.7 cm] round or square opening. Remove any insulation from the opening.
2. Secure the plate at the corners using the screws provided. For exterior wall penetrations, 2 plates are required, one on each side of exterior wall. For interior wall/floor penetrations, 1 plate is required.
3. Install the concentric pipe through the plate. Secure the pipe to the Fire Stop Support Plate using only the self-drilling screws provided, through the plate tabs and into the concentric pipes outer jacket.

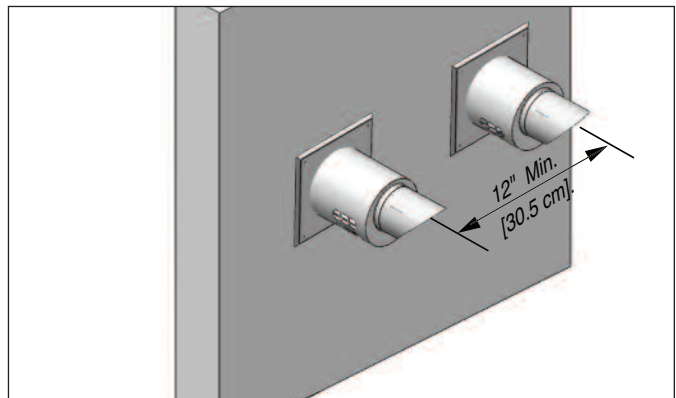
**NOTICE**

The Support Plate provided in the Concentric Vent/Air System Kit does not contain tabs for securing the pipe to the plate, where as the Fire Stop Support Plate does.

4. Seal around the support plate where attached to exterior of building and around pipe penetration, through the support plates with silicone sealant.

### Multiple Vent/Air System Terminations

For multiple appliance vent/air system installations maintain a minimum of 12 inches [30.5 cm] from centerlines as illustrated in Fig. 14.



**Fig. 14: Multiple Vent/Air System Terminations - Horizontal or Vertical (not shown) Installations.**

### SECTION III - Maintenance Procedures

#### Inspect Vent/Air System

Visually inspect the vent/air system annually for blockage, deterioration or leakage. Immediately repair any joints that show signs of deterioration or leakage with the appliance turned off.

 **WARNING**

**Failure to inspect the vent/air system and have any conditions repaired can result in severe personal injury or death.**

## Additional quality water heating equipment available from Triangle Tube

### Brazed Plate Heat Exchangers



- For domestic water, snow melting, radiant floor, refrigeration
- Plates made of stainless steel, with a 99.9 % copper and brazed, ensuring a high resistance to corrosion
- Self cleaning and self descaling
- Computerized sizing available from Triangle Tube/Phase III
- Available in capacities from 25,000 BTU/hr to 5,000,000 BTU/hr

### Prestige Condensing Wall Mounted Boiler



- 95% AFUE - Energy Star Certified
- Fully modulating
- Natural gas or propane
- Stainless Steel Construction
- Direct vent with standard schedule 40 PVC
- Outdoor Reset
- Low Nox

### SMART Indirect Fired Water Heaters



- Exclusive " Tank-in-Tank" design
- Stainless steel construction
- Available in 8 sizes and 2 models
- Limited LIFETIME residential warranty
- Self cleaning/self descaling design

### Maxi-flo Pool and Spa Heat Exchangers



- Constructed of high quality corrosion resistant stainless steel (AISI 316)
- Specially designed built-in flow restrictor to assure maximum heat exchange
- Compact and light weight
- Available in 5 sizes that can accommodate any size pool or spa



Freeway Center - 1 Triangle Lane  
Blackwood, NJ 08012  
Tel: (856) 228 8881 - Fax: (856) 228 3584  
E-mail: Sales@triangletube.com

