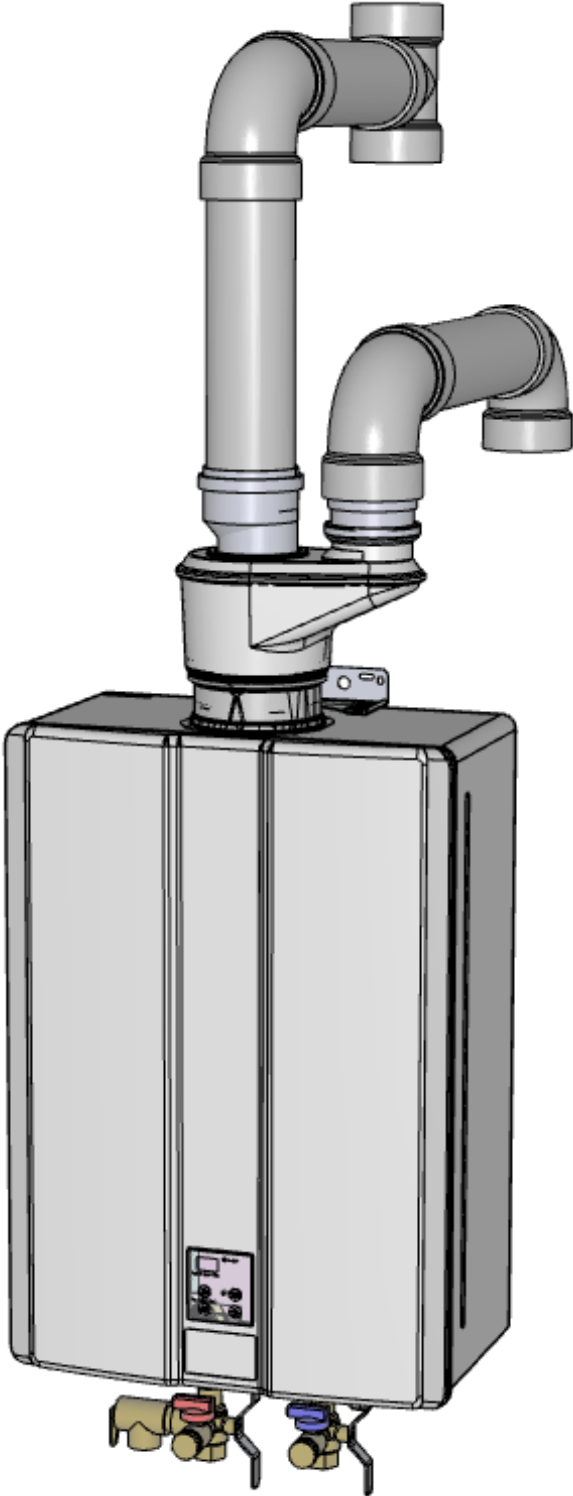




**TWIN PIPE PVC/CPVC VENTING GUIDE FOR CONDENSING  
TANKLESS WATER HEATERS**

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## WARNING

This guide must only be used by a qualified installer/service technician. Read all instructions, including the Water Heater manual and all other information shipped with the water heater and/or concentric adaptor before installing. Failure to comply could result in severe personal injury, death or substantial property damage.

## Important Safety Information

### Safety Definitions



This is the safety alert symbol. This symbol alerts you to potential hazards that can kill or hurt you and others.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

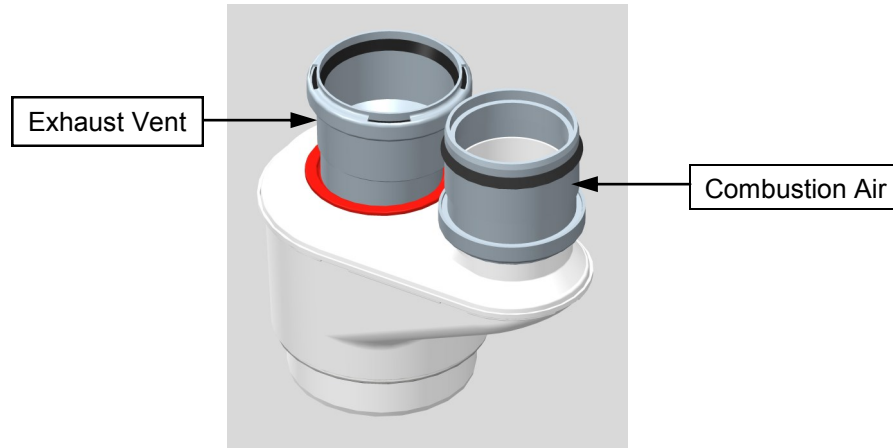
The purpose of this guide is to inform/instruct about changes with regard to venting for the following tankless water heater products only:

## REU-KB3237FFUD-US (RU98i) and REU-KB2530FFUD-US (RU80i).

The changes consist of:

- Certification of PVC and CPVC as optional venting materials.
- Extension of maximum equivalent vent lengths.

Rinnai has certified the Ubbink® 3”/5” to 3”/3” Concentric to Twin Pipe Adaptor (Figure 1) and other venting equipment to be used with the optional PVC/CPVC twin pipe venting system for both natural and propane units.



**Figure 1: Ubbink® 3”/5” to 3”/3” Concentric to Twin Pipe Adaptor**

### NOTE

The Ubbink Concentric to Twin Pipe Adaptor (above) is ULC S636 approved and is listed by the applicable agencies having jurisdiction and is certified for use throughout the U.S. and Canada. The Concentric to Twin Pipe Adaptor is supplied exclusively through Rinnai and/or its distributors.

These changes are immediate and can be implemented on existing RU units (not RC units) already in distribution. This will allow our customers more flexibility when installing the product, and means no changes to part numbers for ease through distribution.

### SUPPLEMENTARY INSTRUCTIONS FOR ALTERNATIVE TWIN PIPE PVC/CPVC VENTING SYSTEM:

The newly certified vent system is comprised of a Concentric to Twin Pipe Adaptor (adaptable to 3 and 4 inch sizes), PVC/CPVC pipes, fittings and either the IPEX Concentric Vent Kit (CVK) Assembly (System 636), snorkel termination or tee termination.

### ! NOTICE

PVC venting **CANNOT** be used with the condensing water heater, under the following conditions:

- The water heater is installed in a recirculation system and the thermostat setting is greater than 150F (65.5C).
- The water heater is used in a combination domestic water and space heating application which requires a thermostat setting greater than 150F (65.5C).

## DANGER

Tankless Water Heaters must be vented and furnished with intake air and exhaust vent using piping and methods described in this guide and the appliance installation instructions. Each water heater must have its own intake and vent. DO NOT common vent with any other appliance using this method. Inspect finished vent and intake air piping thoroughly to ensure all are airtight and comply with the instructions provided and with all requirements of applicable codes. Failure to provide a properly installed vent and air system will cause severe personal injury or death.

## WARNING

**Combustion Air Intake** - Install combustion air inlet piping for the condensing tankless water heaters as described in the Water Heater Manual and this guide. The combustion air intake termination fitting must be installed with the clearances and geometry relative to the exhaust (vent) depicted in this document to ensure that flue products do not enter the combustion air intake. Ensure that the intake air will not contain any of the contaminants as outlined in the “**Determine Installation Location**” section of this document. Contaminated intake air will damage the water heater, resulting in possible severe personal injury, death, or substantial property damage.

**Exhaust** - Provide exhaust (vent) piping to Water Heater as specified in this guide and as required by all applicable codes. The exhaust (vent) termination fitting must be installed with the clearances and geometry relative to the combustion air pipe as depicted in this document to ensure that flue products do not enter the combustion air intake

## NOTICE

If the vent and/or combustion air intake piping configurations covered in the Water Heater Manual and this guide cannot be applied to a specific installation, contact Rinnai’s Application Engineer group for assistance. Other configurations may be available.

## WARNING

Installations must comply with local requirements and with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 for U.S. installations or CSA B149.1 for Canadian installations. **DO NOT** use cellular core PVC, CPVC, or Radel based pipe materials for the exhaust vent. Vents **MUST** be of solid core pipes ONLY.

## WARNING

Use only the materials listed in the Water Heater Manual and this guide for vent, combustion air intake pipe and fittings (See table 1). Failure to comply with this warning could result in severe personal injury, death or substantial property damage.

## WARNING

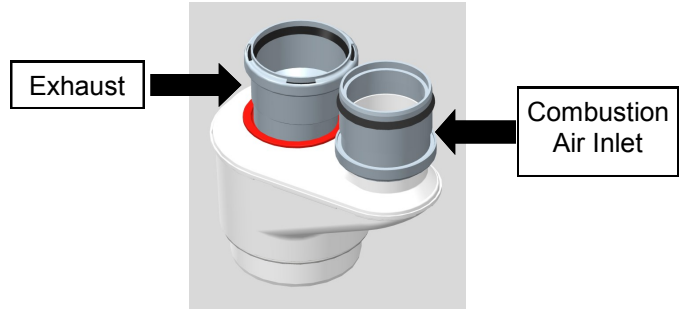
If used, a masonry chimney can **ONLY** be used as a **PIPE CHASE** for the exhaust and combustion air intake pipes. The exhaust and air piping must be installed as instructed in this guide and applicable Water Heater Manual. The chimney must be used only for Rinnai Water Heater(s) vent chase. **NO OTHER** appliance or fireplace can be connected to the chimney. Exhaust and air piping materials must comply with this instruction. The chimney must be fitted with a sealed access opening to facilitate interior inspection. The chimney chase (and liner, if installed) to be inspected annually for any degradation. Failure to comply could result in severe personal injury, death, or substantial property damage.

# Installation Instructions

## Installation Requirements

- Installation should be performed by a licensed professional
- All PVC/CPVC IPEX Concentric Vent Kit (CVK) assemblies are certified to ULC S636. Where ULC S636 compliance is required, use only System 636 pipe, fittings and cement at terminal connection.
- DO NOT mix pipe, fittings, cements, or joining methods from different vent manufacturers, this can result in unsafe conditions and will void the certification.
- DO NOT use cellular core PVC, CPVC, nor Radel piping for vent.
- DO NOT use PVC/CPVC on Non-Condensing Units.
- DO NOT operate unit until venting is completely installed and all solvents and glues have bonded.
- All PVC/CPVC exhaust vent material used in Canada must be S636 certified.

If the preferred venting option is a twin pipe PVC/CPVC configuration, the Rinnai approved twin pipe adaptor must be used.



(Reference Fig. 17 in the Parts sections for more information on the adaptor)

For further details on listed PVC/CPVC venting material (Table 1) refer to the installation manual of the PVC/CPVC manufacturer.

**(For installation examples refer to Figs. 6 and 7)**

**Table 1: Vent and Air Piping Materials**

Item	Material	Standard for Installation in North America	
		United States	Canada
<b>Thermoplastic Piping Materials</b>			
Vent or combustion air intake pipe & Fittings	PVC schedule 40	ANSI/ASTM D1785	Thermoplastic vent pipe must be certified to ULC S636. Intake pipe may be of any material listed (left).
	PVC-DWV	ANSI/ASTM D2665	
	CPVC schedule 40	ANSI/ASTM F441	
PVC pipe cement & primer	PVC	ANSI/ASTM D2564	
	CPVC	ANSI/ASTM F493	
<b>IPEX bird screens (purchase separately)</b>			
Termination Vent Screens	Polyethylene	3" Vent screen: IPEX part # 196051; 4" Vent screen: part #: 196052 (Screens are friction fitted inside termination fitting bells.)	

## NOTE

The listed vent, vent fittings, termination, cleaner and glue are all certified as part of the water heater vent system.

## ⚠ DANGER ⚠

Failure to correctly install vent and combustion air intake pipes of the water heater to atmosphere as outlined in this guide and the **VENTING** section of the Installation Instructions, will result in death from asphyxiation (from carbon monoxide), fire or explosion. **NEVER** operate the water heater without proper venting (exhaust and combustion air intake). Always inspect the vent terminal unit, combustion air intake pipe, and the entire vent system affixed to the water heater for proper installation at equipment commissioning and at least annually thereafter.

# Determine Installation Location

## Environment

Air surrounding the water heater, venting, and vent termination(s) is used for combustion and must be free of any compounds that cause corrosion of internal components. These include corrosive compounds that are found in aerosol sprays, detergents, bleaches, cleaning solvents, oil based paints/ varnishes, and refrigerants. The air in beauty shops, dry cleaning stores, photo processing labs, and storage areas for pool supplies often contains these compounds. Therefore it is recommended that outdoor models be used for these locations where possible.

The water heater, venting, and vent termination(s) should not be installed in any areas where the air may contain these corrosive compounds. If it is necessary for a water heater to be located in areas which may contain corrosive compounds, the following instructions are strongly recommended.

### IMPORTANT CONSIDERATIONS:

- **DO NOT** Install in areas where air for combustion can be contaminated with chemicals.
- Before installation, consider where air has the ability to travel within the building to the water heater.
- Where possible, install the water heater in a sealed closet so that it is protected from the potential of contaminated indoor air.
- Chemicals that are corrosive in nature should not be stored or used near the water heater.
- Locate the vent outlet where flue gases will not harm surrounding plants and/or cooling equipment. All vent locations must adhere to the recommended vent/combustion air intake terminal position as outlined in Table 2.
- Avoid locating vent where prevailing winds could affect the performance of the water heater or cause recirculation of the flue gases.
- **DO NOT** terminate the venting over a public walkway or over an area where condensate or vapor can create a nuisance / hazard or where condensate can be detrimental to the operation of equipment such as regulators or relief valves.
- Water Heater flue gases must be piped from the appliance to the outside, Installer **MUST** adhere to the instructions provided herein and the most recent Water Heater Manual and all applicable codes.

- The exhaust and combustion air must terminate through the same sidewall or roof as the terminations must be in the same pressure zone and face the same direction.
- The vent pipe must terminate either through the sidewall or through the roof, exhaust/vent termination and/or intake air openings shall adhere to clearances as set forth in the Direct Vent Termination Clearances diagram.
- Each Condensing Tankless Water Heater requires a separate vent system.
- If common venting is required, refer to Rinnai Common Vent Installation Manual (latest revision) for instructions on optional venting method as well as to verify which tankless models may be common vented.
- Use only PVC/CPVC 3" and 4" Venting.

Damage and repair due to corrosive compounds in the air is not covered by warranty.

For PVC/CPVC vent systems reduce the maximum allowable length for each elbow and termination type as follows and as referenced in Tables 4-7 of this document:

### Exhaust and Combustion Air Intake Pipe Diameters and Max Lengths:

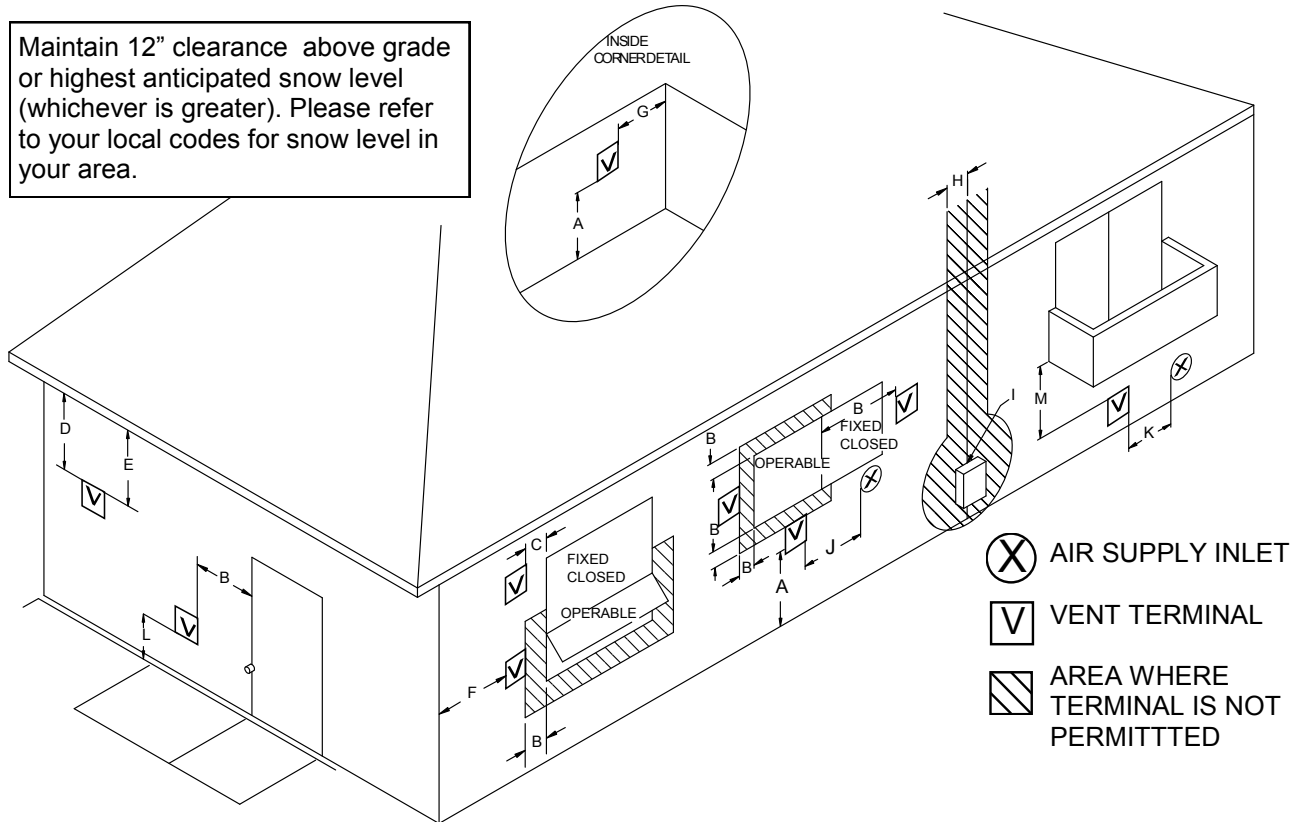
- For PVC/CPVC vent systems reduce the maximum allowable length for each elbow and termination type as follows:
  - ◇ 2.5 feet for every 45° elbow.
  - ◇ 5 feet for every 90° elbow.
  - ◇ Termination (refer to Table 10 of this document.)
- Exhaust and combustion air intake pipe diameters to be as specified in Tables 4-7 of this document.
- Do not exceed exhaust and combustion air intake pipe **MAXIMUM** lengths as outlined in Tables 4-7 of this document. (Lengths are specific to models and fuel type).

# Vent Termination Clearances

**Table 2 Recommended Vent/Combustion Air Intake Terminal Position**

Terminals should be positioned to avoid products of combustion entering openings into buildings or other vents.

Maintain 12" clearance above grade or highest anticipated snow level (whichever is greater). Please refer to your local codes for snow level in your area.



Ref	Description	Canadian Installations	US Installations
A	Clearance above grade, veranda, porch, deck, or balcony	12 inches (30 cm)	12 inches (30 cm)
B	Clearance to window or door that may be opened	36 inches (91 cm)	12 inches (30 cm)
C	Clearance to permanently closed window	*	*
D	Vertical clearance to ventilated soffit, located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	*	*
E	Clearance to unventilated soffit	*	*
F	Clearance to outside corner	*	*
G	Clearance to inside corner	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm) within a height 15 feet (4.5 m) above the meter/regulator assembly	*
I	Clearance to service regulator vent outlet	36 inches (91 cm)	*
J	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	36 inches (91 cm)	12 inches (30 cm)
K	Clearance to a mechanical air supply inlet	6 feet (1.83 m)	3 feet (91 cm) above if within 10 feet (3 m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m) ①	*
M	Clearance under veranda, porch, deck, or balcony	12 inches (30 cm) ②	*

[1] A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

[2] Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

\* For clearances not specified in ANSI Z223.1/NFPA 54, clearances are in accordance with local installation codes and the requirements of the gas supplier.

Clearance to opposite wall is 24 inches (60 cm).

**Additional Clearance Requirements:**

- Avoid termination locations near a dryer vent.
- Avoid termination locations near commercial cooking exhaust.
- Install vent termination at least 12in (304.8mm) above grade or anticipated snow level.

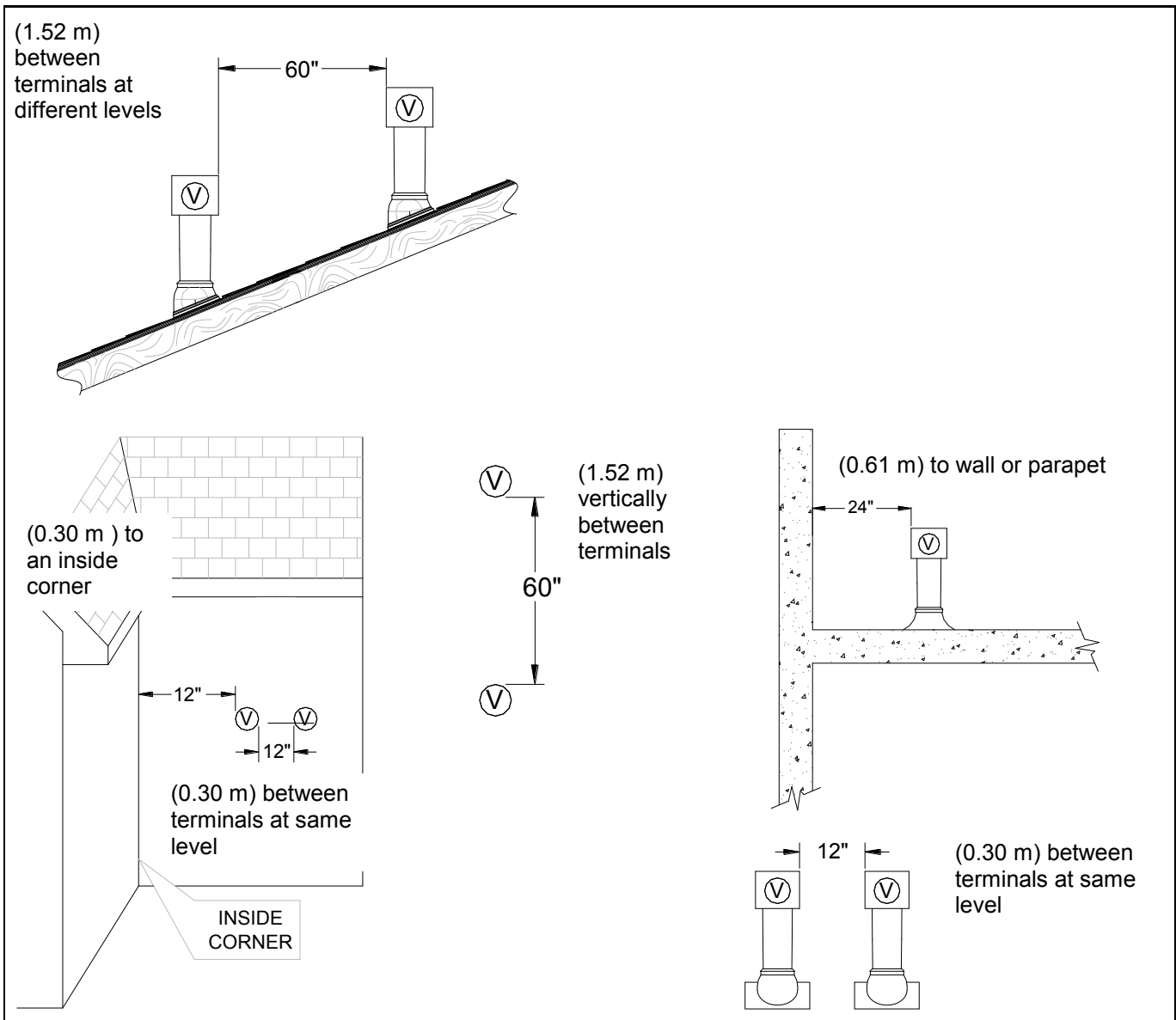
**Vents shall not terminate:**

- Over public walkways; or near soffit vents or crawl space vents or other area where condensate or vapor could create a nuisance or hazard or cause property damage.
- Where condensate or vapor could cause damage or could be detrimental to the operation of regulators, relief valves, or other equipment.

**Important considerations for locating vent termination under a soffit (ventilated or unventilated or eave vent; or to a deck or porch):**

- **DO NOT** install vent termination under a soffit vent such that exhaust can enter the soffit vent
- Install vent termination such that exhaust and rising moisture will not collect under eaves. Discoloration to the exterior of the building could occur if installed too close.
- **DO NOT** install the vent termination too close under the soffit where it could present recirculation of exhaust gases back into the combustion air intake part of the termination.

**Figure 2: Required Clearances for Ubbink Concentric PP, PVC/CPVC Snorkel and Tee Terminations**





# Determining Total System Equivalent Length

There are two options for determining the vent lengths/components necessary for the installation.

**Option 1:** The installer can use the vent length calculation sheet (below), filling in the quantity of the vent components in order to calculate the total equivalent vent lengths.

**Option 2:** The installer can use the maximum vent lengths tables on the next pages to determine the amount of straight pipe that can be used with a specific termination type and quantity of elbows.

## OPTION 1:

### Calculation of equivalent piping lengths for venting system:

Choose the vent type and fill out the Table 3 below. When determining equivalent combustion air and vent length, add 5 feet for each 90° elbow, 2.5 feet for each 45° elbow.

**Example of calculation** (assume 3" diameter pipes for natural gas unit):

- Twin pipe (parallel) with snorkel terminal
- Combustion air pipe length: 40 ft straight pipe with 3 x 90° elbows
- Exhaust pipe length: 40 ft straight pipe with 3 x 90° elbows (**include all interior and exterior elbows**)
- Snorkel Termination: 10 equivalent feet (reference Table 10 of this document)

**Table 3: Equivalent Vent Length Calculation Sheet**

	Fitting / Termination Type	Number of fittings		Equivalent Vent Length	=	Total Equivalent Length
1)	90 elbow	3	x	5	=	15
2)	45 elbow		x	2.5	=	0
3)	IPEX Low Profile Termination		x	5	=	0
4)	IPEX 4" Concentric Termination		x	20	=	0
5)	IPEX 3" Concentric Termination		x	20	=	0
6)	3" Tee Termination		x	5	=	0
7)	4" Tee Termination		x	5	=	0
8)	3" Snorkel Termination	1	x	10	=	10
9)	4" Snorkel Termination		x	10	=	0
10)	Length of Straight Section in feet	NA		40	=	40
				<b>Total</b> (add up lines 1 through 10)		<b>65</b>

(A blank copy of the Vent Length Calculation Sheet is located at the end of this guide)

Ensure switch #1 in the bank of eight tan dip switches is in OFF position if vent length is greater than 21ft (6.4m).

### Calculation:

- Equivalent Combustion air pipe length:  $[40+(3 \times 5)+10] = 65$  ft
- Equivalent Vent Length:  $[40+(3 \times 5)+10] = 65$  ft
- Total = 65 ft. for both exhaust and combustion air pipes, which is the maximum allowable vent length for 3" PVC/CPVC on a natural gas unit. If longer lengths are required, go to the 4" diameter pipe configuration which is certified for up to 100 equivalent feet.

## ⚠ ATTENTION ⚠

Maximum equivalent vent lengths are specific to the fuel type of the tankless water heater. It is imperative when performing equivalent vent length calculations, that the following be taken in consideration:

Vent Type	Natural Gas Units Maximum Equivalent Vent Length	Propane Units Maximum Equivalent Vent Length
3" PVC/CPVC	65 Feet	41 Feet
Concentric PP	65 Feet	41 Feet
4" PVC/CPVC	100 Feet	65 Feet
Twin Pipe PP (Centrotherm)	41 Feet	41 Feet

**OPTION 2: Maximum Equivalent Vent Length Tables:**

1. Determine the number of 90 degree elbows in the vent system. (two 45 degree elbows count as one 90 degree elbow.)
2. Refer to Tables 4-7 to find the maximum vent length based on the number of elbows and termination style.

<b>Table 4 - Natural Gas Units</b>				
<b>Total Equivalent Vent Length (Intake/outlet) for Twin Pipe 3" PVC/CPVC</b>				
<b>Maximum Vent Length</b>	<b>65 Feet</b>			
<b>Termination Type</b>	<b>IPEX Concentric Vent Kit</b>	<b>Snorkel Termination</b>	<b>Side Wall Tee Termination</b>	<b>Low Profile Termination</b>
<b>Termination Equivalent Length in feet (meters) (Already factored into the straight pipe lengths below)</b>	<b>20 (6.1)</b>	<b>10 (3.0)</b>	<b>5 (1.5)</b>	<b>5 (1.5)</b>
<b># of 90° Elbows (each: 5 equivalent feet)</b>	<b>Max. straight pipe vent length in feet (meters)</b>			
0	45 (13.7) **	55 (16.8) **	60 (18.3) **	60 (18.3) **
1	40 (12.2) **	50 (15.2) **	55 (16.8) **	55 (16.8) **
2	35 (10.7) **	45 (13.7) **	50 (15.2) **	50 (15.2) **
3	30 (9.1) **	40 (12.2) **	45 (13.7) **	45 (13.7) **
4	25 (7.6) **	35 (10.7) **	40 (12.2) **	40 (12.2) **
5	20 (6.1) **	30 (9.1) **	35 (10.7) **	35 (10.7) **
6	15 (4.6) **	25 (7.6) **	30 (9.1) **	30 (9.1) **

<b>Table 5 - Natural Gas Units</b>				
<b>Total Equivalent Vent Length (Intake/outlet) for Twin Pipe 4" PVC/CPVC</b>				
<b>Maximum Vent Length</b>	<b>100 Feet</b>			
<b>Termination Type</b>	<b>IPEX Concentric Vent Kit</b>	<b>Snorkel Termination</b>	<b>Side Wall Tee Termination</b>	<b>Low Profile Termination</b>
<b>Termination Equivalent Length in feet (meters) (Already factored into the straight pipe lengths below)</b>	<b>20 (6.1)</b>	<b>10 (3.0)</b>	<b>5 (1.5)</b>	<b>5 (1.5)</b>
<b># of 90° Elbows (each: 5 equivalent feet)</b>	<b>Max. straight pipe vent length in feet (meters)</b>			
0	80 (24.4) **	90 (27.4) **	95 (29.0) **	95 (29.0) **
1	75 (22.9) **	85 (25.9) **	90 (27.4) **	90 (27.4) **
2	70 (21.3) **	80 (24.4) **	85 (25.9) **	85 (25.9) **
3	65 (19.8) **	75 (22.9) **	80 (24.4) **	80 (24.4) **
4	60 (18.3) **	70 (21.3) **	75 (22.9) **	75 (22.9) **
5	55 (16.8) **	65 (19.8) **	70 (21.3) **	70 (21.3) **
6	50 (15.2) **	60 (18.3) **	65 (19.8) **	65 (19.8) **

\*\*Dip switch one (bank of eight - TAN COLORED) off for lengths greater than or equal to 21 feet



Maximum vent lengths are specific to the fuel type of the tankless water heater. It is imperative when performing equivalent vent length calculations, that the gas type be taken into consideration.

**Option 2: Maximum Vent Length Tables (continued)**

<b>Table 6 - Propane Units</b>				
<b>Total Equivalent Vent Length (Intake/outlet) for Twin Pipe 3" PVC/CPVC</b>				
<b>Maximum Vent Length</b>	<b>41 Feet</b>			
<b>Termination Type</b>	<b>IPEX Concentric Vent Kit</b>	<b>Snorkel Termination</b>	<b>Side Wall Tee Termination</b>	<b>Low Profile Termination</b>
<b>Termination Equivalent Length in feet (meters) (Already factored into the straight pipe lengths below)</b>	<b>20 (6.1)</b>	<b>10 (3.0)</b>	<b>5 (1.5)</b>	<b>5 (1.5)</b>
<b># of 90° Elbows (each: 5 equivalent feet)</b>	<b>Max. straight pipe vent length in feet (meters)</b>			
0	21 (6.4) **	31 (9.4) **	36 (11.0) **	36 (11.0) **
1	16 (4.9) **	26 (7.9) **	31 (9.4) **	31 (9.4) **
2	11 (3.4) **	21 (6.4) **	26 (7.9) **	26 (7.9) **
3	6 (1.8) **	16 (4.9) **	21 (6.4) **	21 (6.4) **
4	-	11 (3.4) **	16 (4.9) **	16 (4.9) **
5	-	6 (1.8) **	11 (3.4) **	11 (3.4) **
6	-	-	6 (1.8) **	6 (1.8) **

<b>Table 7 - Propane Units</b>				
<b>Total Equivalent Vent Length (Intake/outlet) for Twin Pipe 4" PVC/CPVC</b>				
<b>Maximum Vent Length</b>	<b>65 Feet</b>			
<b>Termination Type</b>	<b>IPEX Concentric Vent Kit</b>	<b>Snorkel Termination</b>	<b>Side Wall Tee Termination</b>	<b>Low Profile Termination</b>
<b>Termination Equivalent Length in feet (meters) (Already factored into the straight pipe lengths below)</b>	<b>20 (6.1)</b>	<b>10 (3.0)</b>	<b>5 (1.5)</b>	<b>5 (1.5)</b>
<b># of 90° Elbows (each: 5 equivalent feet)</b>	<b>Max. straight pipe vent length in feet (meters)</b>			
0	45 (13.7) **	55 (16.8) **	60 (18.3) **	60 (18.3) **
1	40 (12.2) **	50 (15.2) **	55 (16.8) **	55 (16.8) **
2	35 (10.7) **	45 (13.7) **	50 (15.2) **	50 (15.2) **
3	30 (9.1) **	40 (12.2) **	45 (13.7) **	45 (13.7) **
4	25 (7.6) **	35 (10.7) **	40 (12.2) **	40 (12.2) **
5	20 (6.1) **	30 (9.1) **	35 (10.7) **	35 (10.7) **
6	15 (4.6) **	25 (7.6) **	30 (9.1) **	30 (9.1) **

\*\*Dip switch one (bank of eight - TAN COLORED) off for lengths greater than or equal to 21 feet



Maximum vent lengths are specific to the fuel type of the tankless water heater. It is imperative when performing equivalent vent length calculations, that the gas type be taken into consideration.

## Adaptor Installation

### NOTICE

For installation in Canada, field-supplied PVC/CPVC used for combustion venting must comply with CAN/CGA B149.1 (latest edition) and be certified to Type BH Gas Venting Systems, ULC-S636.

Components of any certified system CANNOT be substituted with any other vent system(s) or unlisted pipes and/or fittings. All listed components, primers and glues are part of the certified vent system and therefore MUST be from a single manufacturer.

#### When installing the Ubbink adaptor with the twin pipe PVC/CPVC system:

- Install the system in according to Ubbink/Rolux, and Rinnai Installation Instructions.
- Use the 3”/5” Concentric to Twin pipe Adaptor with 3” or 4” diameter PVC/CPVC venting only.
- It is the responsibility of the installer to follow all national codes, standards and local ordinances, in addition to instructions laid out in this manual for vent/intake clearances and other safety requirements.
- If venting conflicts arise between this guide and the respective OEM’s manual, the manufactures’ installation instruction will take precedence providing they meet the intent of all national codes, standards and local ordinances having jurisdiction. Follow this guide together with applicable codes, standards and/or ordinances for installation of the intake/vent pipe(s) and all other applicable water heater installation procedures.

### WARNING

Current codes prohibit the application of external insulation on plastic vent pipe together with the use of cellular core PVC, CPVC, and Radel as venting materials.

#### PVC/CPVC Twin Pipe Adaptor Installation Instructions:

The vent size (diameter) and maximum vent lengths must be followed as detailed in the installation Instructions supplied with the appliance and as stated in Tables 4-7 of this document. Thoroughly read and understand the venting section of the appliance manual before proceeding with the following steps outlined in this guide.

#### STEP 1:

Carefully read and understand the venting section of the Installation Instructions supplied with the water heater prior to determining a suitable location for the water heater and vent termination. Locate water heater to have the straightest (shortest) practical vent length to outside. Measure the total venting distance required to reach the outside wall or roof. Determine the diameter of venting components to be used based on required vent length (refer to vent tables in tankless water heater manual or Tables 4-7 of this document).

#### STEP 2:

Before installing the concentric to twin pipe adaptor, inspect each vent component for damage making sure the gaskets for each component are undamaged. Do not attempt to install or repair damaged components. If a gasket is damaged, these are available through Rinnai and its distributors. Do not use gaskets from another manufacturer.

#### STEP 3:

Adaptor vent pipe MUST be securely fastened to structure, at the eccentric increaser or as close as possible thereafter (Figure 3). Straps to be field supplied. Use straps, clamps or other fasteners that will not score or damage pipes and be acceptable by local codes.

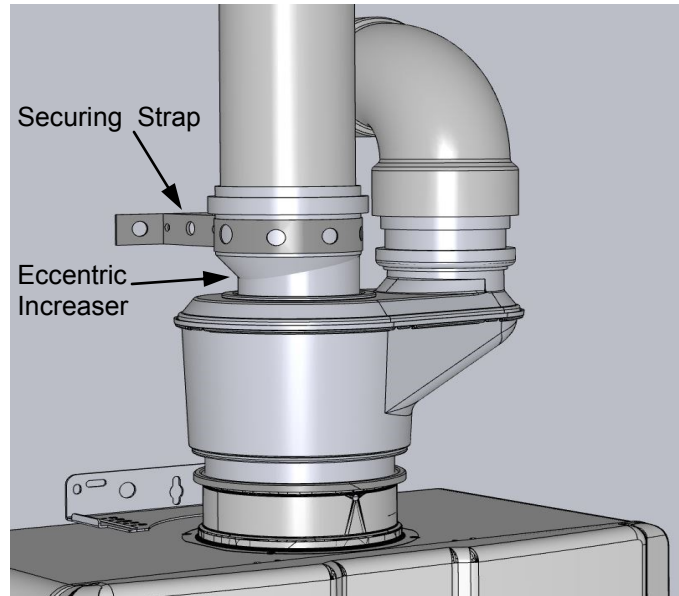


Figure 3: Wall support for Eccentric Increaser

## Adaptor Installation (continued)

### STEP 4:

Use PVC to Polypropylene Eccentric Increaser (supplied with the adaptor) to transition from PP to PVC 3"; additional PVC/CPVC bushing, or other type of reducing fittings is required to transition to 4" pipe.

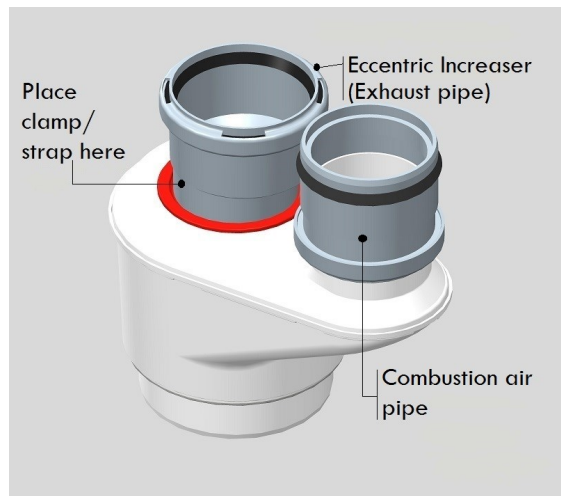


Figure 4: 3/5 Concentric to Twin Pipe Adaptor

### STEP 5:

Apply lubricant to the gasket surface and coupling with finger prior to component attachment (refer to installation examples Figure 5 below). To make the insertion of the gasketed fittings into the PVC coupling easier, Centrocerin gasket lubricant is recommended (supplied with adaptor in box).



Figure 5: Applying Lubricant to Gasket

### NOTICE

For further details on listed PVC/CPVC venting material (Table 2) and proper handling and installation (e.g. priming, gluing etc.), refer to the installation manual of the respective PVC/CPVC manufacturer.

### WARNING

Use only water or Centrocerin lubricant for lubricating the gaskets and pipe ends to allow easy insertion of fittings onto the vent adaptor. **DO NOT** use any other brand of lubricant as it may cause deterioration of the gaskets, which could result in leakage of dangerous flue gases into the occupied space. If disassembly of vent pipes are required after the gasket has dried, wet joints thoroughly with water to loosen the connection.

### WARNING

Follow vent manufacturer's instructions for additional venting installation instructions, to avoid situations that can lead to property damage, personal injury, and/or loss of life.

### CAUTION

- **DO NOT** use solvent cement that has become curdled, lumpy, or thickened.
- **DO NOT** thin solvent cement. Observe precautions printed on the containers.
- Use appropriate temperature-type solvent cement for applications below 32°F.
- Appropriate solvent and cleaner must be used for the type of vent pipe used (PVC, or CPVC).

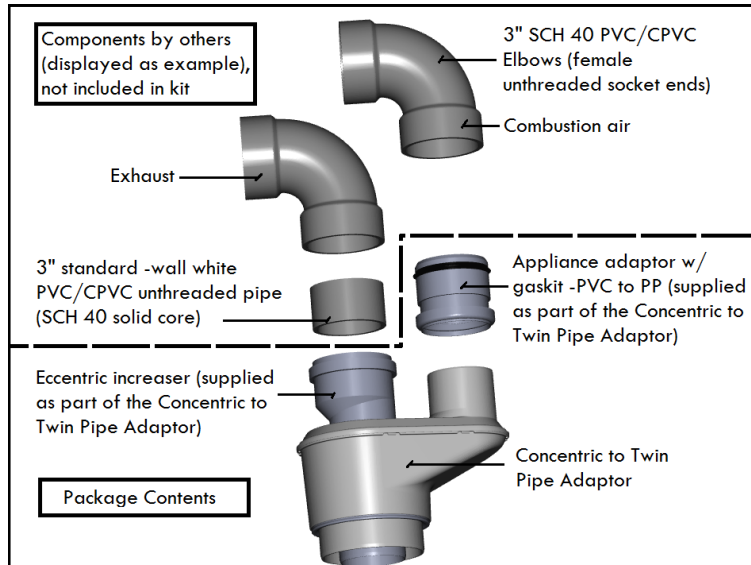
## Adaptor Installation (continued)

### Installation Examples for PVC/CPVC Twin Pipe Venting

Note the correct position of combustion air inlet and gas flue outlet, as these are **NOT** interchangeable. For the correct position and design of the twin pipe gas flue outlet and combustion air inlet refer to the installation instructions supplied with the appliance.

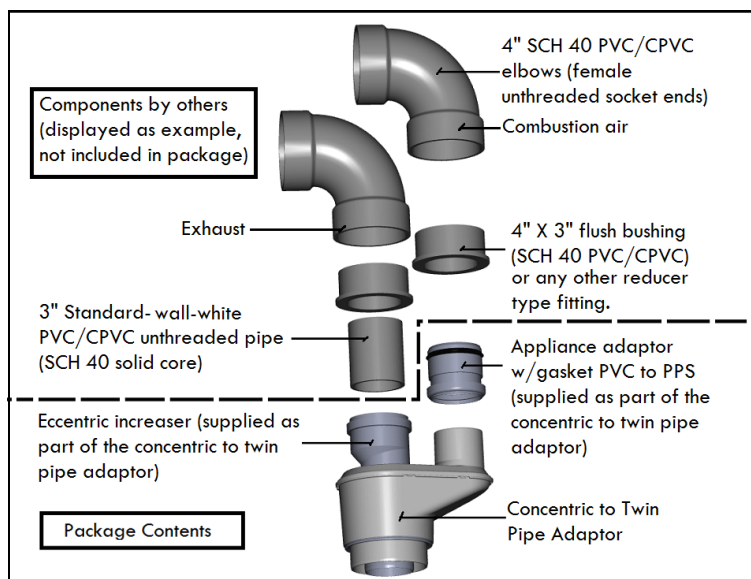
**Figure 6: Required Parts For 3" PVC/CPVC Assembly Configuration**

The adaptor as supplied requires no additional parts to be used with standard 3" 3rd party solid core PVC/CPVC pipes; refer to Figure 6 below for required parts for 3" PVC/CPVC assembly configuration.



**Figure 7: Required Parts For 4" PVC/CPVC Assembly Configuration**

Conversely, the concentric to twin pipe adaptor require 2 additional (4"x 3" Flush – Schedule 40 PVC) bushing to be used with 4" PVC/CPVC assembly configuration (refer to Figure 7 below).



## WARNING

Failure to correctly assemble the components according to these instructions may result in property damage, serious injury, or death.

# Certified PVC/CPVC Vent Termination Options

## Vent Termination Configurations

There are three configurations for vent terminations that can be used:

1. Concentric Termination (IPEX Concentric Vent Kit)
  - Allows for only one penetration through a wall or roof.
2. Snorkel Termination
  - Allows for easier clearance above grade when having to terminate through lower point
3. Side Wall Tee Termination

## Termination Installation

- Exhaust and combustion air piping must be securely fastened to structure every 4 feet, to ensure dimensions shown in Figures throughout this document are maintained.
- **DO NOT** strap vertical vent too tightly as the strapping must permit the vent to move in the event of expansion and contraction.
- Straps are field supplied. Use straps, clamps or equivalent that will not score or damage the pipe. Expansion and contraction should be addressed between appliance and termination point.
- All penetrations must be sealed according to local building codes. Caulking for side wall terminations and flashing for roof penetrations are typical. Use only PVC/CPVC compatible sealing material, contact PVC/CPVC manufacturer for a complete list.

## IPEX Concentric Vent Kit (CVK) Installation

- For installations with multiple terminations, maintain appropriate clearances between terminals. (refer to figures 11a and 11b).
- The pipe length of the concentric vent kit can be shortened; providing that the cutting and cementing procedures adhere to the System 636 guidelines; reference IpeX installation instructions and Figure 10 of this guide for further information.
- Pipe lengths and/or fittings **CANNOT** be added to the socket of the rain cap in order to divert the exhaust gas.

## WARNING

Moisture in the flue gas will condense as it leaves the vent terminal. In cold weather this condensate can freeze on the exterior wall, under the eaves, and on surrounding objects. Some discoloration to the exterior of the building is to be expected. However, improper location or installation can result in severe damage to the structure or exterior finish of the building.

## WARNING

Danger of fire or bodily injury – Solvent cements and primers are highly flammable. Provide adequate ventilation and do not assemble near heat source or open flame. Do not smoke. Avoid skin or eye contact. Observe all cautions and warnings on material containers.

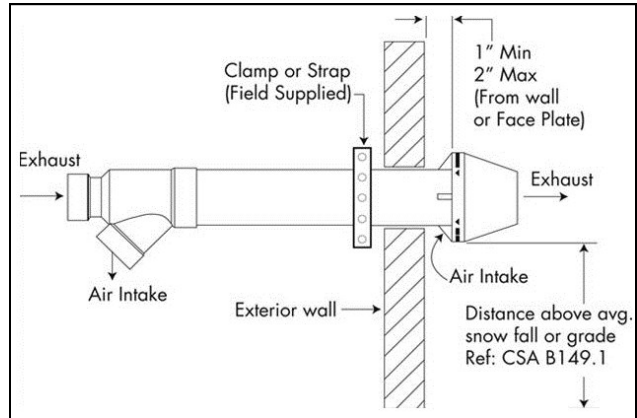


Figure 8: Wall Termination

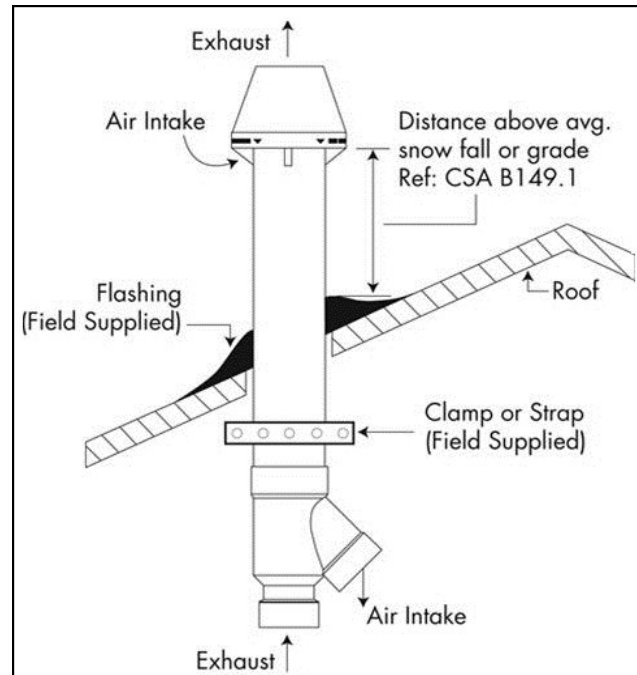


Figure 9: Roof Termination

## Certified PVC/CPVC Vent Termination Options (continued)

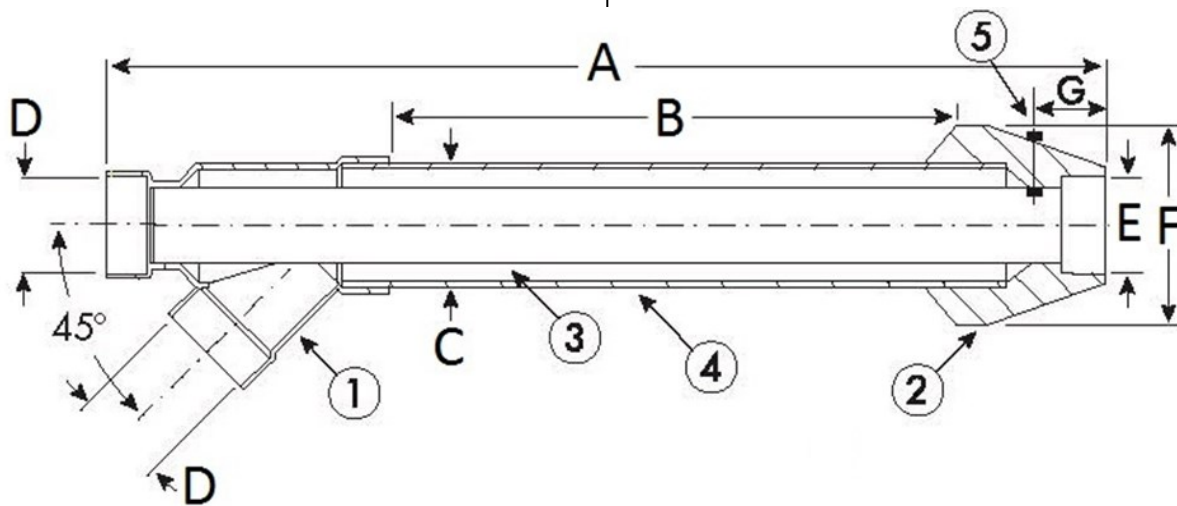
### IPEX Concentric Vent Kit Assembly (System 636):

- Once the proper location has been determined, cut a hole in the roof or wall large enough to accommodate the outer pipe. The size of the hole can vary greatly depending on the roof pitch.
- As per the procedures outlined, solvent cement the inner pipe to the concentric Wye fitting.
- Solvent cement the outer pipe to the concentric Wye fitting.
- Slide the assembly through the roof or wall penetration. (Install flashing as required)
- To permanently affix the rain cap, it should be solvent cemented to the inner pipe. For installations where removal of the cap may be required for service or cleaning the cap, it can be fastened mechanically (see instructions). For either installation method, the outer pipe is only a friction fit with the cap.

### MECHANICALLY FASTENED RAIN CAP:

The Rain Cap must be installed with the supplied Stainless Steel screw and lock nut, and in accordance with the instructions and diagram below.

- Locate the drill location dimple on the outside of the rain cap.
- At this location, drill through the cap and the inner pipe wall. Ensure that the path of the hole is perpendicular to the inner pipe **NOT** the outside of the cap. For the 3" kit, drill a 3/16" hole, for the 4" kit, drill a 1/4" hole. Clean any resulting debris.
- Insert the screw and tighten, **DO NOT OVER TIGHTEN.**

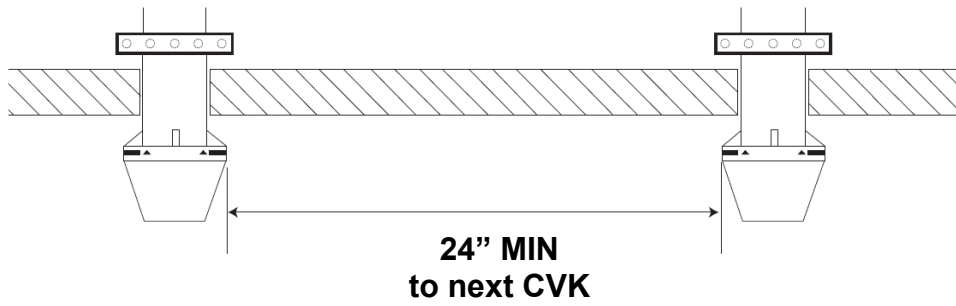


System 636 Concentric Vent Kits Termination Kits Include:		Nominal Pipe Size (Dimension in Inches)						
Item #	Concentric Kit	A	B*	C+	D	E	F	G
196006	3" x 20" PVC	36.1	20	4.5	3	3	8.75	2.25
196021	4" x 36" PVC	56	37.3	6.62	4	4	10	3.5
197009	3" x 20" CPVC	36.1	20	4.5	3	3	8.75	2.25
197021	4" x 36" CPVC	56	37.3	6.62	4	4	10	3.5
1 Wye - (Concentric)		B* Dimension be may be shortened to a minimum of 12". Inner pipe (item 3) must remain "F" inches longer than the outer pipe (item 4). Cut pipe ends square and solvent cement as outlined in the System 636 installation manual. C+ Installation cutout should be at least 1/2" larger than dimension "C". Lengthening the units is not permitted.						
2 Rain Cap								
3 Exhaust Vent Pipe (Inner)								
4 Fresh Air Intake Pipe (Outer)								
5 Stainless Steel Screw & Nut								

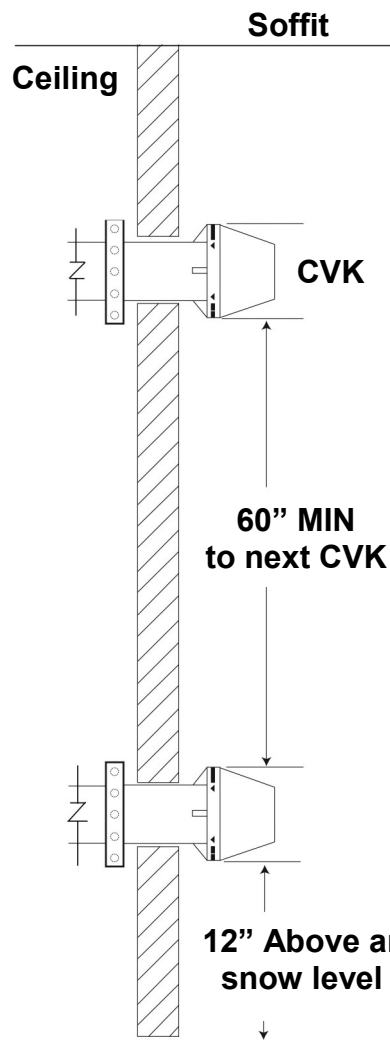
Figure 10: Twin Pipe to Concentric Termination Physical Data



**ACCEPTABLE VENTING CLEARANCES FOR IPEX CONCENTRIC VENT KIT (CVK) TERMINATION:**



**Figure 11a: TWO OR MORE VENT TERMINALS ON SAME LEVEL**



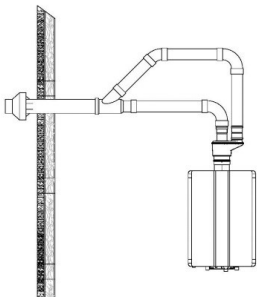
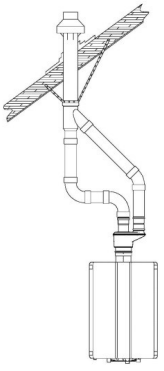
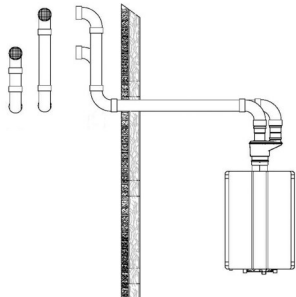
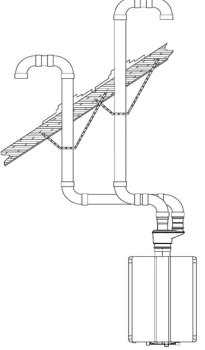
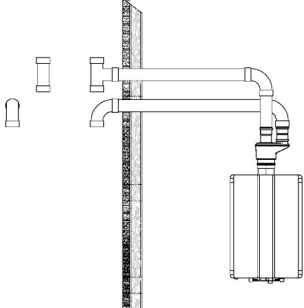
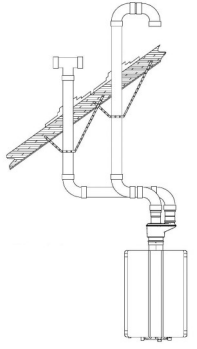
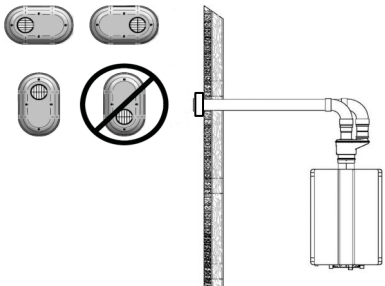
Reference "General Clearance Requirements" section of this guide for important considerations for locating vent termination under a soffit (ventilated or unventilated), eave, or deck/porch.

**Figure 11b: Vertical between Terminals**

**NOTE**

Vent spacing depicted above are specific to IPEX PVC/CPVC- FGV Concentric Vent Kit **ONLY**; for required spacing for all other termination types, refer to Figures 12 thru 16.

**Table 8: Approved PVC/CPVC Vent Configurations**

<p>Rinnai 3" or 4" PVC/CPVC Concentric Side Wall Termination Configuration</p>		<p>Rinnai 3" or 4" PVC/CPVC Concentric Vertical Termination Configuration</p>	
<p>Rinnai 3" or 4" PVC/CPVC Snorkel Termination Configuration</p>		<p>Rinnai 3" or 4" PVC/CPVC Standard upside down "U" Vertical Termination Configuration</p>	
<p>Rinnai 3" or 4" PVC/CPVC Tee Side Wall Termination Configuration</p>		<p>Rinnai 3" or 4" PVC/CPVC Tee Vertical Termination Configuration</p>	
<p>Rinnai 3" or 4" PVC/CPVC Low Profile Termination Configuration</p>			

**VENTING INSTALLATION SEQUENCE**

1. Install the water heater.
2. Determine the termination method—sidewall or vertical, concentric or separate pipes, etc.
3. Determine proper location for wall or roof penetration for each termination.
4. Install termination assembly as described in this manual.
5. Install air and vent piping from water heater to termination.
6. Slope horizontal exhaust run towards the water heater 1/4 per foot. **DO NOT** slope combustion air pipe towards unit. Be sure to dispose of condensate per local codes.
7. Install pipe supports and brackets every 4 feet allowing for movement from expansion or as per local code requirements.

# Certified PVC/CPVC Vent Termination Options (continued)

## 3" and 4" Low Profile Vent Termination Kits

The following information should be used in conjunction with the IPEX System 636 Installation Guide:

- Termination kits are to be tested and certified for use with the brand of pipe-fitting-cement system that is to be utilized in the application. The IPEX Low Profile termination is fully certified for use with IPEX product only.
- System 636 PVC Low Profile Vent kits are rated to 65°C maximum and are made from certified compound.
- All termination kits must be located and installed in accordance with these instructions, local building code, and CSA B149.1 Natural Gas and Propane Installation Code.

### Installation:

1. Once location is determined, cut 2 appropriately sized holes in the wall to accommodate the pipe. (Reference the Low Profile Termination Kit-Dimensions table below)
2. Slide intake and exhaust pipes through the holes. Secure (using solvent cement) both pipes to the base of the vent termination kit. (Be sure to follow guidelines for solvent cementing as described in the System 696 Installation Guide)
3. Use the supplied screws and anchors to secure the base to the wall. (a drilled 3/16" hole, 1-3/16" deep will be needed for the anchors.) Use the base as a template to locate the anchor hole.
4. Using the supplied screws, secure the Cap to the Base.
5. Upon securing the vent termination and pipes, seal the wall penetrations (from the interior) using a PVC compatible sealant material.

### NOTICE

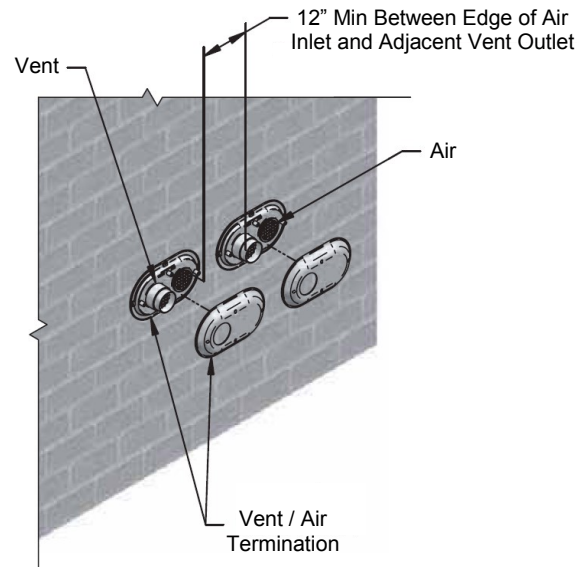
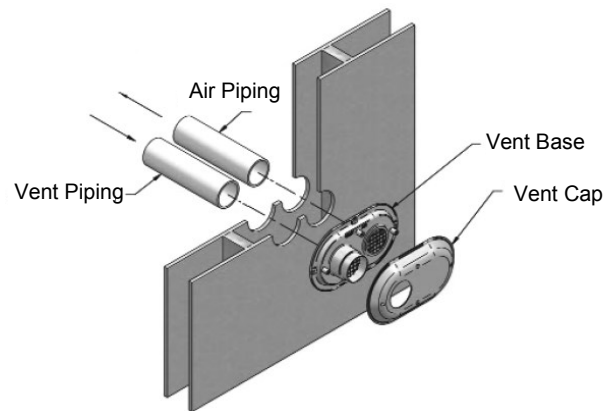
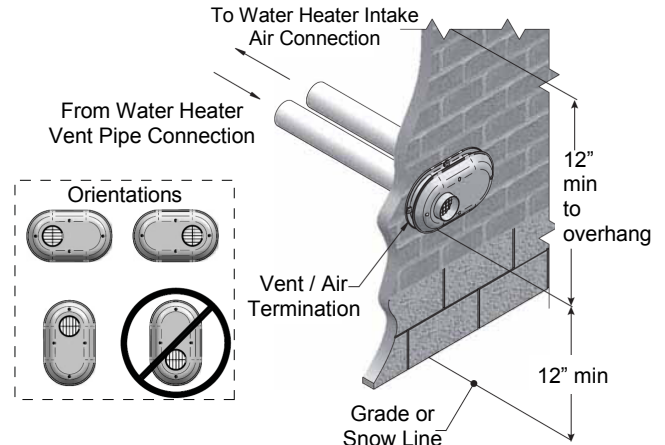
All exhaust vents and air inlets must terminate at the same height to avoid severe personal injury, death, or substantial property damage.

### Low Profile Termination Kits-Dimensions

Item #	Description	Pipe Outside Diameter	Hole Spacing (Ctr to Ctr)
196985	3" Flush Mount Vent Kit	3.5"	5.6"
196986	4" Flush Mount Vent Kit	4.5"	5.6"

### Kit Contents

Qty	Item Description
1	Base (Two Holes)
1	Cap (One Hole)
8	Stainless Steel Screws
4	Plastic Anchors



# Certified PVC/CPVC Vent Termination Options (continued)

## Twin Pipe (PVC/CPVC) Terminations

### PVC/CPVC Sidewall (Tee and Snorkel) Terminations:

Locate the vent and intake air termination using the following guidelines:

1. The total length of the vent or intake air piping must not exceed the limits given in Tables 4-7 (this document). The equivalent length for 90° elbows and termination associated with the respective vent and intake air piping arrangement **MUST** be subtracted from total length listed in Tables 4-7.
2. Specific to Side Wall Tee Termination, the vent and intake air piping must terminate at the outside surface of the outer wall, minimum 1" between wall, tee, and elbow socket ends (Figure 12).
3. Termination must be installed 12" (30.5 cm), above the highest anticipated snow level (Figures 12,13).
4. Refer to Table 2 this document for recommendation on vent/combustion air intake terminal position.

### NOTE

If the vent is terminated on a sidewall which is subject to high winds it is recommended to terminate the vent using a tee. A tee provides the best protection against wind.

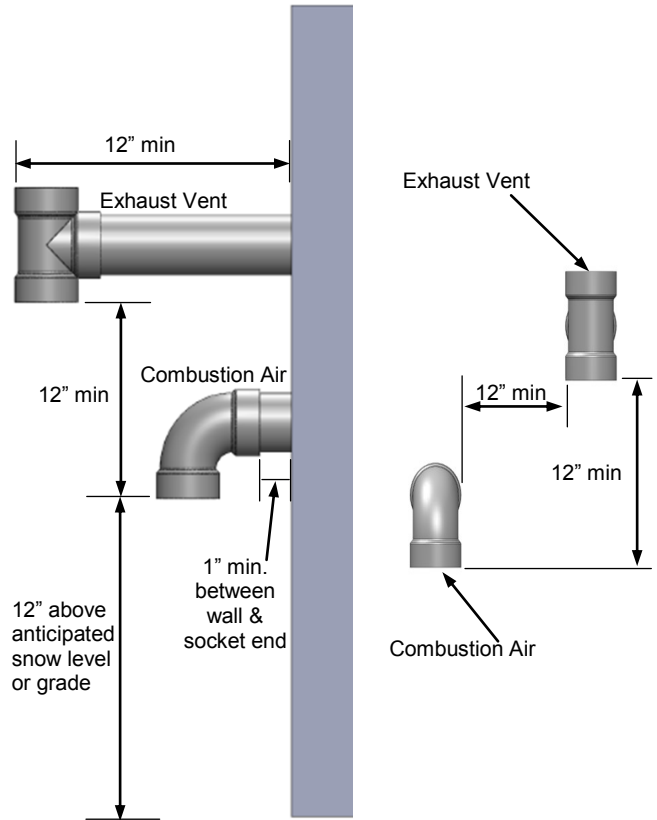
5. The intake air pipe must terminate using a 90° elbow directed away from the vent termination. Both vent and air intake pipe terminations must be installed 12" (30.5 cm) minimum above grade or highest anticipated snow level and as shown in Figures 12 and 13.

### NOTICE

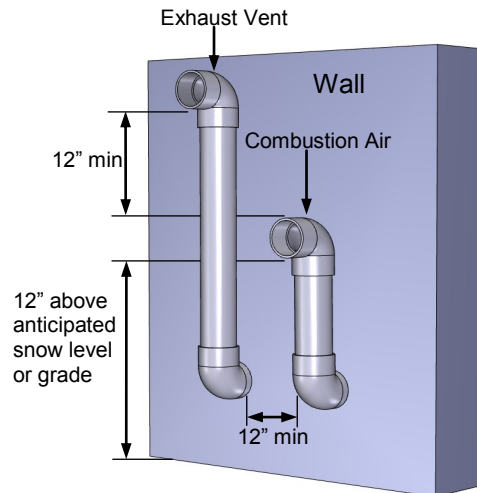
The information and figures depicting method of terminating the vent and combustion air intake pipes are directly related to PVC/CPVC vent systems. When utilizing other than PVC/CPVC vent system there may be some variations. Consult the respective vent manufacturer or the water heater manual for recommendations and clarifications.

### NOTICE

Slope horizontal exhaust piping downward toward the water heater a minimum of 1/4 inch per foot. **DO NOT** slope combustion air piping down towards water heater. Dispose of condensate per local codes.



**Figure 12: Sidewall Vent and Combustion Air Piping with Tee Termination**



**Figure 13: Sidewall Vent and Combustion Air Piping with Snorkel Termination**

## Certified PVC/CPVC Vent Termination Options (continued)

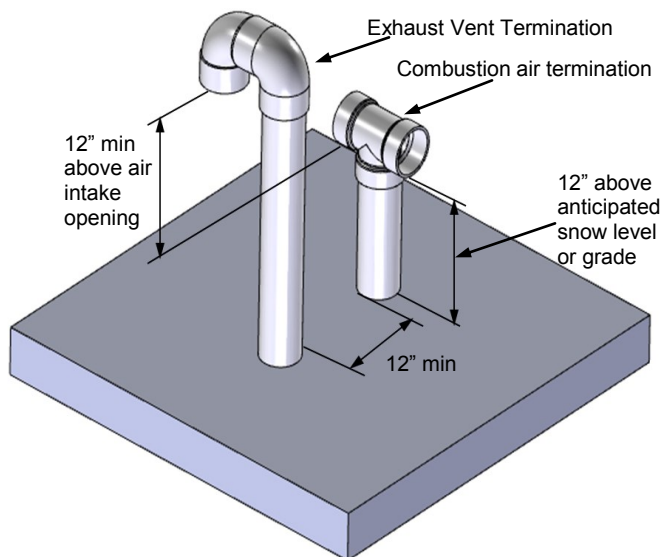
### NOTE

All figures shown in this section is in reference to flat roofs. For heights of venting passing through a pitched roof, refer to NFPA 54/ANSI Z223.1-09 (table and figure 12.7.2) and/or CSA B149.1-10 (figure 8.1)

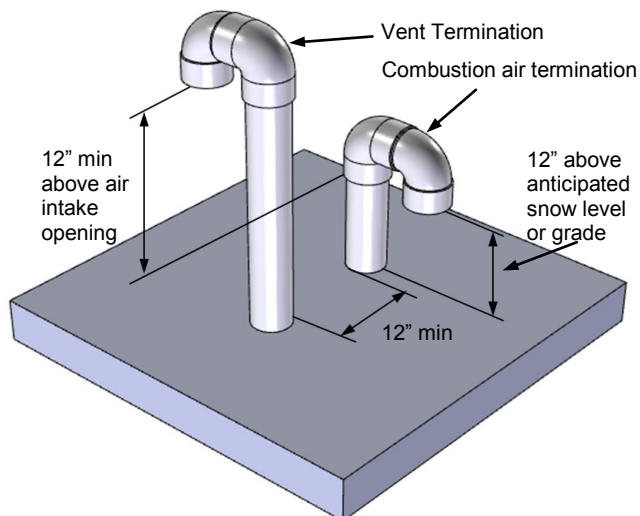
#### PVC/CPVC Roof (Tee and upside down "U") Terminations:

Locate the vent and intake air termination using the following guidelines:

1. The total length of the vent or intake air piping must not exceed the limits given in Table 4-7 (this document). The equivalent length for 90° elbows and termination associated with the respective vent and intake air piping arrangement **MUST** be subtracted from total length listed in Tables 4-7.
2. For roof terminations installed as shown in Figure 15, the intake air piping must terminate using a tee or combination of elbows per figures 14 and 15. The termination must be installed 12" (30.5 cm), above roof or the highest anticipated snow level.
3. The vent must terminate vertically with a coupling to facilitate the bird screen and must be located 12" (30.5 cm) minimum above the combustion air inlet as shown in Figures 14 and 15.
4. The vent and intake air terminations must be located a radial distance of 12" minimum (30.5 cm) from outer wall of vent termination to outer wall of combustion air intake termination; refer to Figures 14 and 15.



**Figure 14: Vertical Termination of Tee-Vent and Combustion Air Pipe**

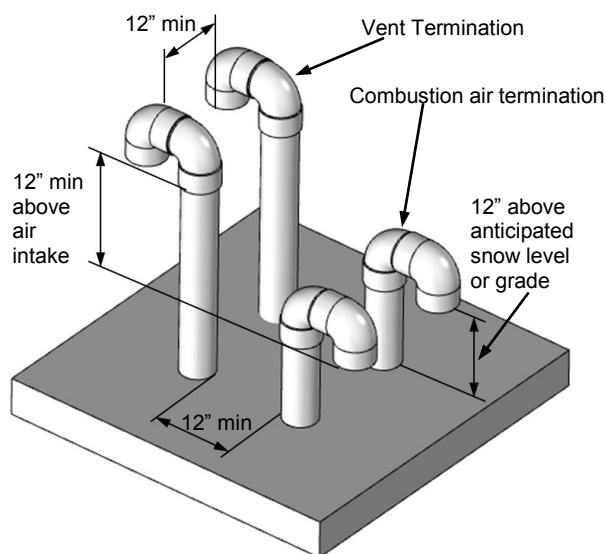


**Figure 15: Vertical Termination of U-Vent and Combustion Air Pipe**

#### Multiple Water Heater Installation – Through the Roof

Locate the vent and intake air termination using the following guidelines:

1. For installations with multiple Tankless Water Heaters, refer to Figure 16 for proper exhaust and combustion air piping placement.
2. Roof penetration of the vent and intake air piping should be such that the combustion air intake is a minimum 12" (30.5 cm) from the adjacent vent pipe of the other water heater. For installations in the U.S. refer to Figure 16. For installations in Canada, refer to clearances required by CAN/CSA B149.1.



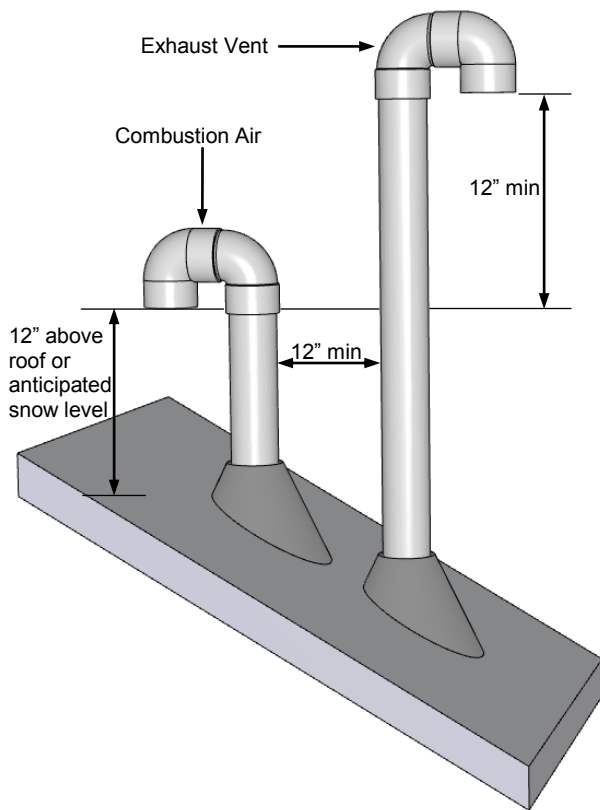
**Figure 16: Vertical Termination of Multiple Water Heaters**

## Certified PVC/CPVC Vent Termination Options (continued)

### **NOTICE**

To prevent possibility of condensate freeze-up, do not install vent kits one above the other. Once the vent terminal location has been determined, make holes through the exterior wall to accommodate the vent pipes. Vent pipes must exit exterior wall horizontally only.

### **Pitched Roof Termination Clearances:**



**Figure 17: Vertical Termination of U-Vent and Combustion Air Pipe on a Pitched Roof**

### **NOTICE**

**DO NOT** use lubricant between two PVC/CPVC components. Refer to cement manufacturer instruction for specific instructions and handling.

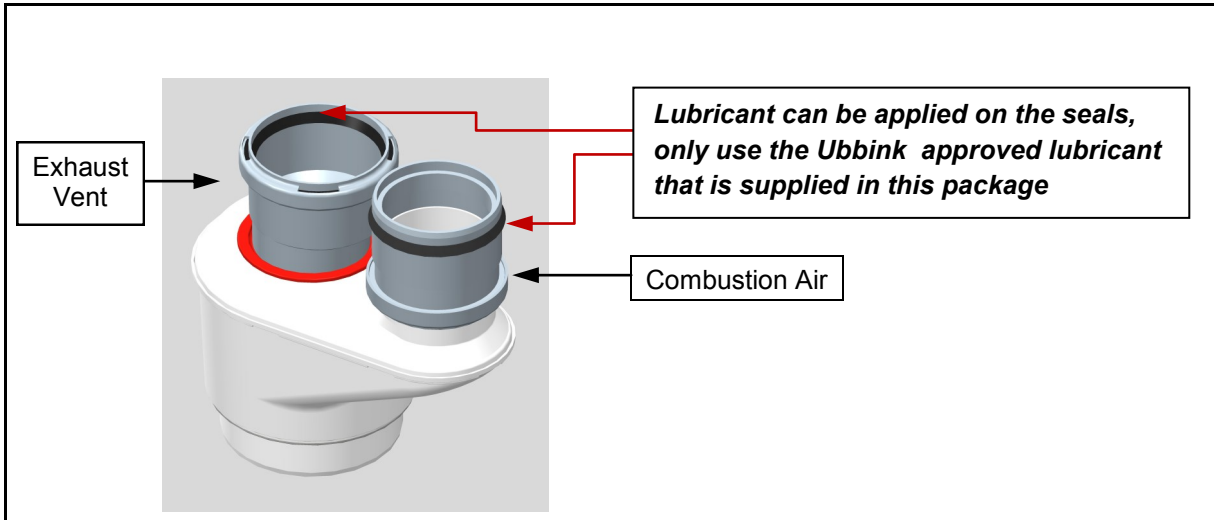
### **Basic Instructions for Cementing Joints:**

1. Cut pipe end square; smooth out jagged edges and burrs. Chamfer end of pipe; then clean fitting socket and pipe joint area of all dirt, grease, or moisture.
2. After checking pipe and socket for proper fit, wipe socket and pipe with cleaner-primer. Apply a liberal coat of primer to inside surface of socket and outside of pipe.



3. Apply a thin coat of cement evenly in the socket. Quickly apply a heavy coat of cement to the pipe and insert pipe into fitting with a slight twisting motion until it bottoms out.
4. Hold the pipe fitting for 30 seconds to prevent the tapered socket from pushing the pipe out of the fitting.
5. Wipe all excess cement from the joint with a rag. Allow 15 minutes before handling. Cure time will vary according to fit, temperature, and Humidity

## Parts Information




**Figure 18: Ubbink® Concentric to Twin Pipe Adaptor**



### Physical Data in inches (mm)

Part #	Nominal Diameter	Overall Height	Effective Height	Offset
187585PP	3 <sup>1</sup> / <sub>5</sub> " (80/125)	9.9" (251)	8.6" (218)	4.8" (121)
<b>Ubbink bv</b> Verhuellweg 9 NL- 6984 AA Doesburg T + 31 (0) 313 480 200 F + 31 (0) 313 473 942 rolux@ubbink.nl www.ubbink.nl		<b>ULc 636 Gas Vent-BH Class IIC-110°C/230°F</b> where applicable		
		 <b>WARNING</b>		
		Improper installation of vent system and components, or failure to follow all installation instructions, can result in property damage or serious injury.		


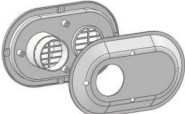




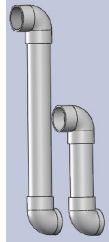
**Table 9: Types of Acceptable PVC/CPVC Elbows for Venting System**

ACCEPTABLE	ACCEPTABLE	NOT ACCEPTABLE
90° Elbows, Female Unthreaded Socket Ends: (Long Turn) Long Sweep	90° Elbows, Female Unthreaded Socket Ends: (1/4 Bend) Short Sweep	90° Elbows, Female Unthreaded Socket Ends: Close Turn
		

## Parts Information (continued)

### Vent Components and Assigned Equivalent Lengths:

The following fittings and accessories (by others) are certified for use with the above mentioned condensing products:

<b>Table 10: Approved PVC/CPVC Termination Components</b>				
<b>OEM</b>	<b>OEM # or Cert.</b>	<b>Product Description</b>	<b>Diagram</b>	<b>Equivalent Length (Ft.)</b>
IPEX (Purchased separately )	196006 / 197009 (3 Inch) 196021 /197021 (4 Inch) (System 636)	PVC/CPVC- FGV Concentric Vent Kit w/ vent screen		20
IPEX (Purchased separately )	196985 (3 Inch) 196986 (4 Inch) (System 636)	Low Profile Termination Kit		5
Field Supplied PVC/CPVC Sch. 40 Fittings or Approved Equal	Comply with CAN/ CGA B149.1 & ULC-S636	3" and 4" SCH 40 (Solid Core) PVC/ CPVC TEE w/ vent screen		5
Field Supplied PVC/CPVC Sch. 40 Fittings or Approved Equal	Comply with CAN/ CGA B149.1 & ULC-S636	3" and 4" SCH 40 (Solid Core) PVC/ CPVC 90° EL w/ vent screen		5
Field Supplied PVC/CPVC Sch. 40 Fittings or Approved Equal	Comply with CAN/ CGA B149.1 & ULC-S636	3" and 4" SCH 40 (Solid Core) PVC/ CPVC 45° EL w/ vent screen		2.5
IPEX (Purchased separately )	196051 (3 Inch) 196052 (4 Inch)	Friction fit vent screen (3" and 4")		0
Field Supplied PVC/CPVC Sch. 40 Fittings or Approved Equal	Comply with CAN/ CGA B149.1 & ULC-S636	3" and 4" SCH 40 (Solid Core) PVC/ CPVC Snorkel vent w/ vent screen		10

- Vent screens are not ULC S636 Certified.
- Friction fit vent screens inside termination fitting is to avoid debris and/or small animals from entering vent.
- Primer shall be used when installing System 636® and other PVC/CPVC products at temperatures below 32 °F (0 °C).
- Primer is required in some jurisdictions regardless of temperature, verify with your local authority having jurisdiction.
- Use only System 636 cements and primers; substituting other cements and primers will void IPEX's certification and warranty; (see OEM's literature).
- For Schedule 40 PVC/CPVC any glue and primer approved by your local authority having jurisdiction may be



# Equivalent Vent Length Calculation Sheet

	Fitting / Termination Type	Number of fittings	Equivalent Vent Length	Total Equivalent Length
1)	90 elbow	x	5	=
2)	45 elbow	x	2.5	=
3)	IPEX Low Profile Termination	x	5	=
4)	IPEX 4" Concentric Termination	x	20	=
5)	IPEX 3" Concentric Termination	x	20	=
6)	3" Tee Termination	x	5	=
7)	4" Tee Termination	x	5	=
8)	3" Snorkel Termination	x	10	=
9)	4" Snorkel Termination	x	10	=
10)	Length of Straight Section in feet	NA	40	=
			<b>Total</b> (add up lines 1 through	

Note: Ensure switch #1 in the tan bank of dip switches is in OFF position if vent length is greater than 21ft (6.4m).

# NOTES

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