

IV. Venting B. CPVC/PVC Venting (continued)

NOTICE

Exterior run to be included in equivalent vent/combustion air lengths.

i. Vent Piping

- After penetrating wall, install a Schedule 40 PVC 90° elbow so that the elbow leg is in the up direction.
- Install maximum vertical run of seven (7) feet of Schedule 40 PVC vent pipe. See Figure 11.
- At top of vent pipe length install another PVC 90° elbow so that elbow leg is opposite the building's exterior surface.
- Install Rodent Screen and Vent Terminal (supplied with boiler), see Figure 10 for appropriate configuration.
- Brace exterior piping if required.

ii. Combustion Air Piping

- After penetrating wall, install a Schedule 40 PVC 90° elbow so that elbow leg is in the up direction.
- Install maximum vertical run of seven (7) feet of Schedule 40 PVC vent pipe. See Figure 11.
- At top of air pipe length install another PVC 90° elbow so that elbow leg is opposite the building's exterior surface.
- Install Rodent Screen and Combustion Air Terminal (supplied with boiler), see Figure 10 for appropriate configuration.
- Brace exterior piping if required.

6. Vertical Vent Termination

a. Standard Two-Pipe Termination

Refer to Figures 10, 12 and 13.

i. Vent Piping

- Install fire stops where vent passes through floors, ceilings or framed walls. The fire stop must close the opening between the vent pipe and the structure.
- Whenever possible, install vent straight through the roof. Refer to Figures 12 and 13.
 - Size roof opening to maintain minimum clearance of 1" from combustible materials.
 - Extend vent pipe to maintain minimum vertical and horizontal distance of twelve (12) inches from roof surface. Additional vertical distance for expected snow accumulation. Provide brace as required.

CAUTION

Vertical venting and combustion air roof penetrations (where applicable) require the use of roof flashing and storm collar, which are not supplied with boiler, to prevent moisture from entering the structure.

- Install storm collar on vent pipe immediately above flashing. Apply Dow Corning Silastic 732 RTV Sealant between vent pipe and storm collar to provide weather-tight seal.
- Install Rodent Screen and Vent Terminal (supplied with boiler), see Figure 10 for appropriate configuration.
- Brace exterior piping if required.

WARNING

All CPVC pipe and elbow supplied with boiler vent carton must be used as part of vent system prior to connecting supplied PVC vent terminal.

Do not operate boiler without the rain cap over vent pipe in place.

ii. Combustion Air Piping

- Locate combustion air termination on the same roof location as the vent termination to prevent nuisance boiler shutdowns. Combustion air terminal can be installed closer to roof than vent.

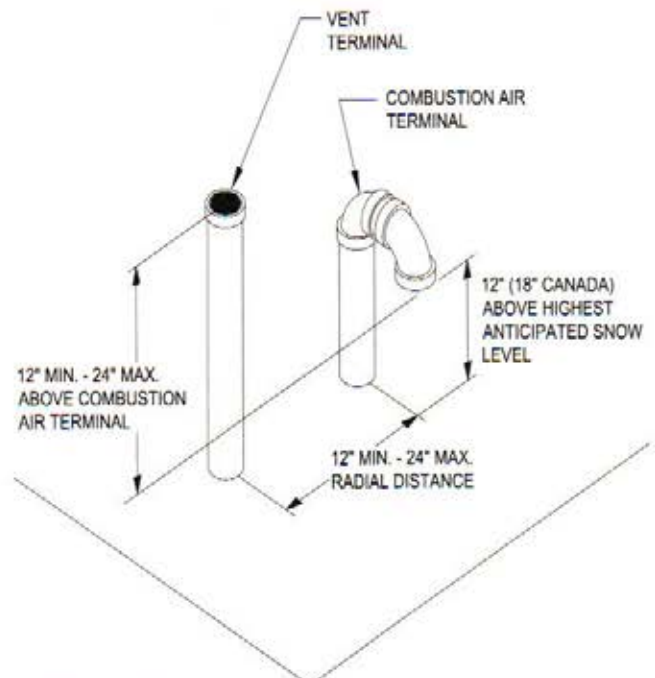
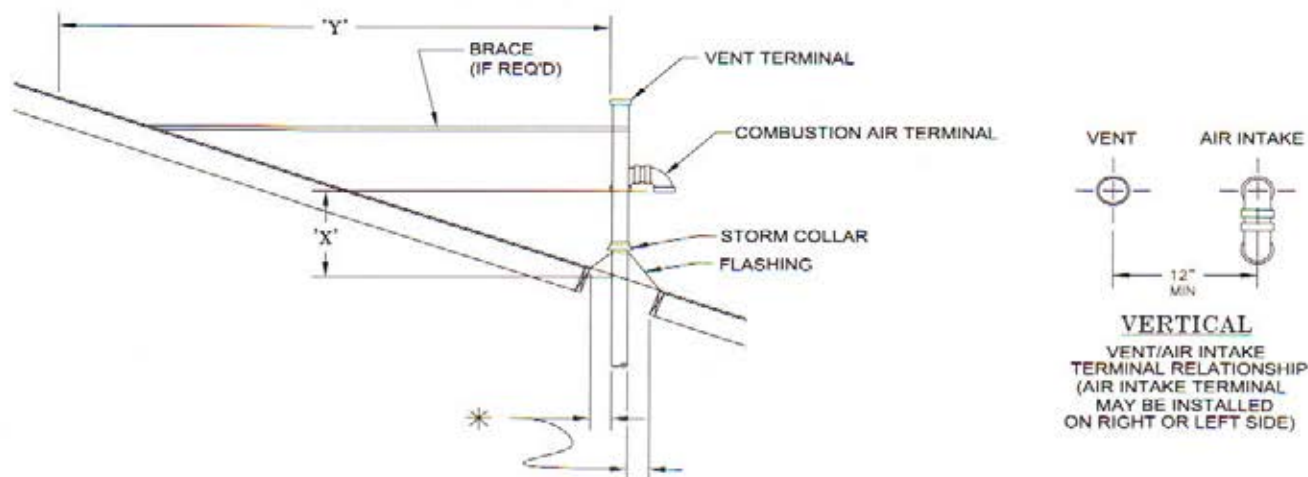


Figure 12: Direct Vent - Vertical Terminations

IV. Venting B. CPVC/PVC Venting (continued)



* VENT PIPE MINIMUM CLEARANCE TO COMBUSTIBLE MATERIAL IS ONE (1) INCH. COMBUSTION AIR PIPE MINIMUM CLEARANCE TO COMBUSTIBLE MATERIAL IS ZERO (0) INCHES.

Figure 13: Direct Vent - Vertical Terminations with Sloped Roof

Extend vent/combustion air piping to maintain minimum vertical ('X') and minimum horizontal ('Y') distance of twelve (12) inches (18 inches Canada) from roof surface. Allow additional vertical ('X') distance for expected snow accumulation.

- Size roof opening to allow easy insertion of combustion air piping and allow proper installation of flashing and storm collar to prevent moisture from entering the structure.
- Use appropriately designed vent flashing when passing through roofs. Follow flashing manufacturers' instructions for installation procedures.
- Extend combustion air pipe to maintain minimum vertical and horizontal distance of twelve (12) inches from roof surface. Allow additional vertical distance for expected snow accumulation. Provide brace as required.
- Install storm collar on combustion air pipe immediately above flashing. Apply Dow Corning Silastic 732 RTV Sealant between combustion air pipe and storm collar to provide weather-tight seal.
- Install Rodent Screen and Combustion Air Terminal (supplied with boiler), see Figure 10 for appropriate configuration.
- Brace exterior piping if required.

Polypropylene vent system manufactures are listed below:

Approved Polypropylene Vent System Manufacturers	
Make	Model
M&G/DuraVent	PolyPro Single Wall Rigid Vent
	PolyPro Flex Flexible Vent (APX399 and APX500)
Centrotherm Eco Systems	InnoFlue SW Rigid Vent Flex Flexible Vent (APX399 and APX500)

NOTE: Do not mix vent components from approved manufacturers.

M&G/DuraVent PolyPro Single Wall Rigid Vent and PolyPro Flex Flexible Vent comply with the requirements of ULC-S636-08 'Standard for Type BH Gas Venting Systems'.

Centrotherm Eco Systems InnoFlue SW Rigid Vent and Flex Flexible Vent comply with the requirements of UL 1738 'Standard for Safety for Venting Systems' and ULC-S636-08 'Standard for Type BH Gas Venting Systems'.

For polypropylene vent system installation details refer to an approved manufacturer either Rigid Single Wall Polypropylene Vent Installation Instructions, or Flexible Polypropylene Vent Installation Instructions provided with a manufacturer specific kits. See Tables 9 and 10.

Refer to Table 8 'Vent/Combustion Air Pipe Length - Two-Pipe Direct Vent System Options' for minimum and maximum listed equivalent length values.

All terminations must comply with listed options for two-pipe venting system. See Figures 8 thru 12 for details.

C. Polypropylene Venting

Apex boilers have been approved for use with polypropylene vent system.

It is an installing contractor responsibility to procure listed below polypropylene vent system pipe and related components.

IV. Venting C. Polypropylene Venting (continued)

Table 9: Approved Polypropylene Pipe, Fittings and Terminations - M&G/DuraVent

Boiler Model	M&G / DuraVent Part Numbers/Sizes					
	Male Boiler Adapter, PVC to PP	Rigid Pipe	Flex Pipe	Pipe Joint Locking Band	Side Wall Termination Tee	Chimney Kit for Venting Only
APX399	4PPS-04PVCM-4PPF	100 mm	100 mm	43PPS-LB	43PPS-TB	4PPS-FK
APX500						
APX800	6PPS-06PVCM-6PPF	150 mm	N/A	6PPS-LBC	6PPS-E90B	N/A

Table 10: Approved Polypropylene Pipe, Fittings and Terminations - Centrotherm Eco

Boiler Model	Centrotherm Eco Part Numbers/Sizes					
	Male Boiler Adapter, PVC to PP	Rigid Pipe	Flex Pipe	Pipe Joint Locking Band	Side Wall Termination Tee	Chimney Kit for Venting Only
APX399	ISAA0404 ISSAL0404	110 mm	110 mm	IANS04	ISTT0420	IFCK0425 and IFCK0435
APX500						
APX800	ISAA0606 ISSAL0606	160 mm	N/A	IANS06	ISTT0620	N/A

When using flexible polypropylene vent pipe (liner):

- Flexible pipe must be treated carefully and stored at temperatures higher than 41°F (5°C).
- Do not bend or attempt to install flexible pipe if it has been stored at lower ambient temperature without allowing the pipe to warm up to a higher temperature first.

CAUTION

Bending or attempting to install flexible pipe if it has been stored at ambient temperature below 41°F (5°C) will cause material to become brittle and lead to cracks.

When flexible polypropylene pipe (liner) is used for combustion product venting, it must not be installed at an angle greater than 45 degrees from vertical plane. This will insure proper condensate flow back towards the boiler.

CAUTION

Do not install flexible polypropylene pipe at an angle greater than 45 degrees from vertical plane when used for combustion product venting. Failure to do so will result in improper condensate drainage towards the boiler and possible subsequent vent pipe blockage.

- When flexible polypropylene pipe (liner) is used for combustion air supply to a boiler, the pipe (liner) can be installed in vertical or horizontal position.
- Follow flexible polypropylene pipe (liner) manufacturer specific installation instructions regarding application/listing, permits, minimum clearances to combustibles; installation details

(proper joint assembly, pipe support and routing, gasket and fitting installation, optional tooling availability/usage, routing thru masonry chimney for combustion product venting or, combination of combustion product venting and combustion air supply).

- When there is a conflict between flexible polypropylene pipe (liner) manufacturer installation instructions and Apex boiler Installation, Operating and Service Instructions, the more restrictive instructions shall govern.

Apex Boiler Two-Pipe Vent System Connector Field Modification Procedure To Accept Polypropylene Vent Piping:

Apex boilers are factory supplied with a model-specific boiler two-pipe CPVC/PVC vent system connector shipped within a model-specific boiler CPVC gasketed vent kit carton.

Locate and remove a model-specific boiler two-pipe CPVC/PVC vent system connector.

When using M&G/DuraVent polypropylene pipe for combustion product venting and/or air supply, male PVC to PP boiler adapter (4PPS-04PVCM-4PPF or 6PPS-06PVCM-6PPF as applicable) is installed into the two-pipe vent system connector vent or combustion air supply port as follows (see Figure 14):

- APX399 and APX500 models** - Apply provided dielectric grease (grease pouch taped to the vent system connector) all around to the vent or air connection inner red silicon gasket.
- APX399 and APX500 models** - Push and twist PVC to PP boiler adapter (4PPS-04PVCM-4PPF) into two-pipe vent system connector vent connection or air supply port until bottomed out.

IV. Venting C. Polypropylene Venting (continued)

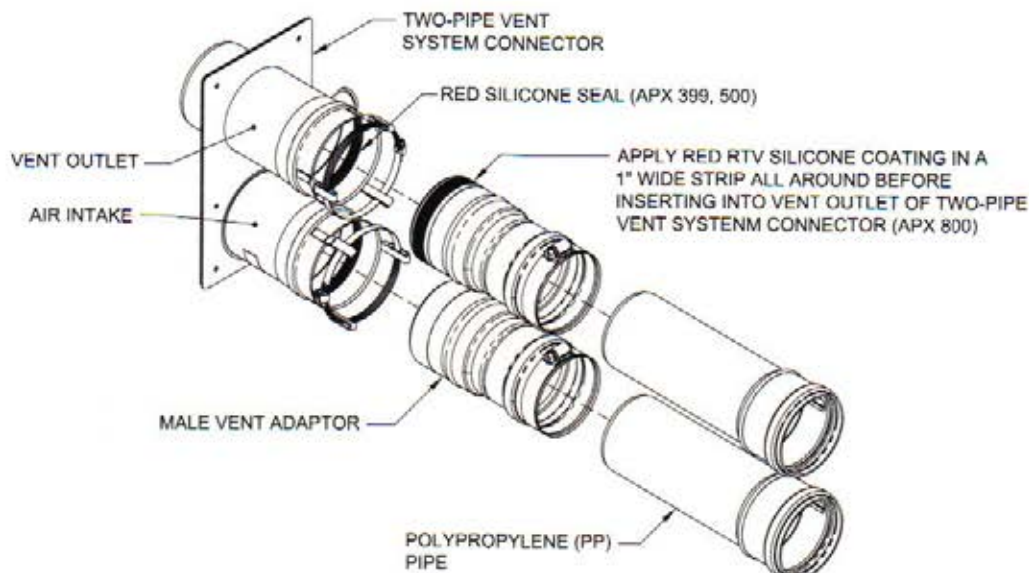


Figure 14: Vent System Field Modification to Install PVC to PP Adapter (M&G/DuraVent Shown)

- 3) Tighten the worm band clamp screw to secure PVC to PP boiler adapter.
- 4) Do not install PVC to PP boiler adapter at the lower combustion air supply port of the two-pipe vent system connector when using PVC pipe for combustion air supply to boiler.
- 5) **APX800 model** - Apply a coating of supplied red RTV silicon sealant, at least 1" wide, to PVC to PP boiler adapter (6PPS-06PVCM-6PPF) male end, **when used for combustion product venting**. If polypropylene pipe is also used for combustion air supply, application of the silicon sealant to PVC to PP boiler adapter (6PPS-06PVCM-6PPF) male end is not required.
- 6) **APX800 model** - Push and twist PVC to PP boiler adapter (6PPS-06PVCM-6PPF) into two-pipe vent system connector vent port or air supply port until bottomed out.
- 7) Tighten the worm band clamp screw to secure PVC to PP boiler adapter.
- 8) Do not install PVC to PP boiler adapter at the lower combustion air supply port of the two-pipe vent system connector when using PVC pipe for combustion air supply to boiler.

When using **Centrotherm Eco** polypropylene pipe for combustion product venting and/or air supply PVC to PP boiler adapter (ISAA0404 or ISAAL0404 and ISAA0606 or ISAAL0606 as applicable) is installed into the two-pipe vent system connector vent or combustion air supply port as follows (see Figure 14):

- 9) **APX399 and APX500 models** - Apply provided dielectric grease (grease pouch taped to the vent system connector) all around to the vent or air connection inner red silicon gasket.

- 10) **APX399 and APX500 models** - Push and twist PVC to PP boiler adapter (ISAA0404 or ISAAL0404) into two-pipe vent system connector vent connection or air supply port until bottomed out.
- 11) Tighten the worm band clamp screw to secure PVC to PP boiler adapter.
- 12) Do not install PVC to PP boiler adapter at the lower combustion air supply port of the two-pipe vent system connector when using PVC pipe for combustion air supply to boiler.
- 13) **APX800 model** - Apply a coating of supplied red RTV silicon sealant, at least 1" wide, to PVC to PP boiler adapter (ISAA0606 or ISAAL0606) male end, **when used for combustion product venting**. If polypropylene pipe is also used for combustion air supply, application of the silicon sealant to PVC to PP boiler adapter (ISAA0606 or ISAAL0606) male end is not required.
- 14) **APX800 model** - Push and twist PVC to PP boiler adapter (ISAA0606 or ISAAL0606) into two-pipe vent system connector vent port or air supply port until bottomed out.
- 15) Tighten the worm band clamp screw to secure PVC to PP boiler adapter.
- 16) Do not install PVC to PP boiler adapter at the lower combustion air supply port of the two-pipe vent system connector when using PVC pipe for combustion air supply to boiler.

Optional Two-pipe Vertical Venting Installation – Running Flexible Polypropylene Vent (Liner) Thru Unused Chimney Chase (see Figure 15).

Apex APX399 and APX500 boilers are approved for vertical venting by installing Flexible Vent in an UNUSED masonry chimney/chase and supplying combustion air thru a separate wall or roof air intake terminal.

IV. Venting C. Polypropylene Venting (continued)

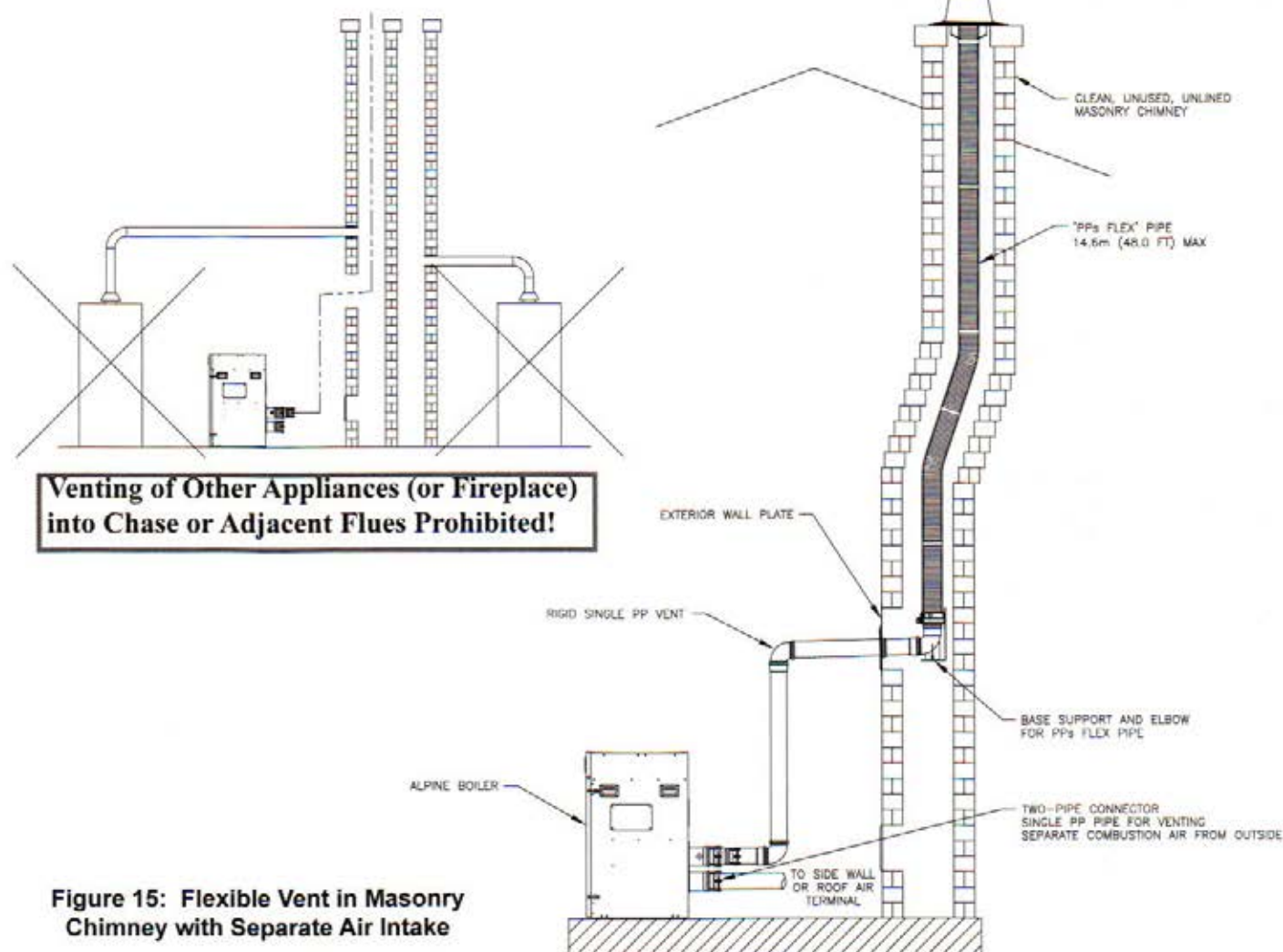


Figure 15: Flexible Vent in Masonry Chimney with Separate Air Intake

WARNING

Follow installation instructions included by the original polypropylene venting component manufacturers, M&G/DuraVent or Centrotherm, whichever applicable.

Flexible Polypropylene Vent must be installed in an UNUSED chimney. A chimney, either single or multiple flue type, is considered UNUSED when none of the flues is being used for any appliance venting.

Where one of the multiple flues is being used for an appliance venting, the flexible vent installation is not permitted thru any of adjacent flues.

Observe all precautions outlined in either M&G/DuraVent or Centrotherm instructions in addition to those outlined in these instructions.

Examine all components for possible shipping damage prior to installation.

Proper joint assembly is essential for safe installation.

The venting system must be free to expand and contract and supported in accordance with installation instructions included by the original polypropylene venting component manufacturers, M&G/DuraVent or Centrotherm, whichever applicable.

Do not mix vent components or joining methods for different vent systems.

Where a conflict arises between M&G/DuraVent or Centrotherm instructions and these instructions, the more restrictive instructions shall govern.

Do not apply thermal insulation to vent pipe and fittings.

Do not obtain combustion air from within the building.

IV. Venting D. Stainless Steel Venting (continued)

D. Stainless Steel Venting

CAUTION

Vent systems made by Heat Fab, Protech and Z-Flex rely on gaskets or proper sealing. When these vent systems are used, take the following precautions:

- Make sure that gasket is in position and undamaged in the female end of the pipe.
- Make sure that both the male and female pipes are free of damage prior to assembly.
- Only cut vent pipe as permitted by the vent manufacturer in accordance with their instructions. When pipe is cut, cut end must be square and carefully de-burred prior to assembly.

WARNING

All condensate that forms in the vent must be able to drain back to the boiler.

1. Vent Length Restrictions

- a. Vent length restrictions are based on equivalent length of vent/combustion air pipe (total length of straight pipe plus equivalent length of fittings). Maximum vent/combustion air lengths are listed in Table 8. Do not exceed maximum vent/combustion air lengths. Do not include vent/combustion air terminals in equivalent feet calculations. See "Combustion Air/Vent, Equivalent Length Work Sheet".
- b. The vent termination location is restricted as per 'General Guidelines', Section A.5. (Refer to Figure 4)
- c. Where the use of "silicone" is called for in the following instructions, use GE RTV 106 or equivalent for the vent collar. Air inlet piping sections are sealed with any general-purpose silicone sealant such as GE RTV102. PVC air inlet piping sections are connected with PVC cement.
- d. Longitudinal welded seams should not be placed at the bottom of horizontal sections of exhaust pipe.
- e. Do not drill holes in vent pipe.
- f. Do not attempt to mix vent components of different vent system manufacturers.

2. Near Boiler Connection

To install the stainless steel vent adapter [P/N 102220-01 (4")]:

- a. Push the stainless steel vent adapter onto the CPVC/PVC connector with a slight twisting motion. Make sure that the stainless steel vent adapter is inserted at least 1" (refer to Figure 16).
- b. Secure the adapter to the CPVC/PVC connector by tightening the metal strap.

To install the stainless steel vent adapter [P/N 103285-01 (6")]:

- c. Apply a coating of supplied red RTV silicone sealant, at least 1" wide, all around male end of the stainless steel vent adapter.
- d. Afterwards, insert the male end of the adapter with a slight twisting motion into vent section of installed two-pipe CPVC/PVC vent connector.
- e. Secure the adapter to the two-pipe CPVC/PVC vent connector by tightening the metal strap.

3. System Assembly

- a. Plan venting system to avoid possible contact with plumbing or electrical wires. Start at vent connector at boiler and work towards vent termination.
- b. Refer to Tables 11A and 11B for approved AL29C Vent Systems.
- c. Do not exceed maximum Vent/Combustion air length. Refer to Table 8.
- d. Follow all manufacturer instructions and warnings when preparing pipe ends for joining and using the primer and the cement.
- e. Assemble the air intake system using either galvanized or PVC pipe.
 - i. If PVC piping is used, use PVC cement to assemble the PVC intake system components. See Part B for air intake installation instructions.
 - ii. If galvanized piping is used, use at least two sheet metal screws per joint. Seal the outside of all joints.

4. Horizontal Vent Termination

- a. Standard Two-Pipe Termination
Refer to Figure 9A.
 - i. Vent Termination
 - Use Burnham Commercial stainless exhaust terminal [P/N 100184-01 (4")]. The outer edge of this terminal must be between 6" and 12" from the surface of the wall. **The joint between the terminal and the last piece of pipe must be outside of the building.**
 - Male end of terminal will fit into the female end of any of the approved stainless vent systems.

IV. Venting D. Stainless Steel Venting (continued)

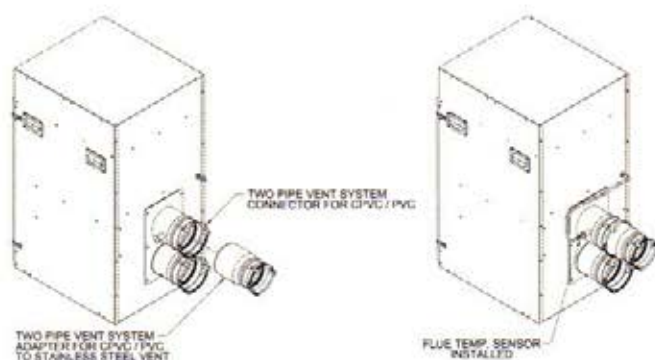


Figure 16: Field Installation of Two-Pipe Vent System Adapter for Stainless Steel

- Apply a heavy bead of silicone to the male end of the terminal before inserting it into the last piece of pipe. Orient the terminal so that the seam in the terminal is at 12:00.
- Smooth the silicone over the seam between the terminal and the last piece of pipe, applying additional silicone if necessary to ensure a tight seal.
- Allow the silicone to cure per the silicone manufacturer's instructions before operating the boiler.

ii. Combustion Air Termination

- Horizontal intake terminal is a tee in the upright position. Tee should protrude the same distance from the wall as the exhaust terminal. See Figure 9A.
- Install a rodent screen (not supplied) in the inlet terminal. Use a screen having 1/2" x 1/2" mesh.

b. Optional Two-Pipe Snorkel Termination

Refer to Figure 11.

This installation will allow a maximum of seven (7) feet vertical exterior run of the vent/combustion air piping to be installed on the approved AL29-4C Stainless Steel horizontal venting application.

i. Vent Termination

- After penetrating wall, install the appropriate manufacturer's 90° elbow so that the elbow leg is in the up direction.
- Install maximum vertical run of seven (7) feet of appropriate manufacturer's vent pipe. See Figure 11.
- At top of vent pipe length install another appropriate manufacturer's 90° elbow so that the elbow leg is opposite the building's exterior surface.
- Install horizontal vent terminal.
- Brace exterior piping if required.

Table 11A: Burnham Commercial Vent System Components (Stainless Steel)

Vent System Component	Part Numbers		Equivalent Feet of Pipe
	APX399 and APX500	APX800	
	4" Vent	6" Vent	
SS Vent Kit	102501-02		N/A
Horizontal Vent Terminal (Included in Kit)	8116313		
PVC to SS Vent Adapter (Included in Kit)	102220-01		
Vertical Vent Terminal	102680-02		
Pipe x 1 Ft.	100176-01	N/A	1
Pipe x 3 Ft.	100177-01		3
Pipe x 5 Ft.	100178-01		5
Pipe x Adjustable	100179-01		Equal to Installed Length (1.06 to 1.64)
90° Elbow	100180-01		8.0 (4")
45° Elbow	100181-01		4.5 (4")
Horizontal Drain Tee	100182-01		2
Vertical Drain Tee	100183-01		7½
Single Wall Thimble	100184-01		N/A

Table 11B: Alternate Vent Systems and Vent Components (Stainless Steel)

Manufacturer	Vent System	Size	Wall Thimbles	Horizontal Termination	Vertical Termination
Protech Systems Inc..	FasNseal	4	FSWT4	Tee: FSTT4	FSBS4
		6	FSWT6	Tee: FSTT6	FSBS6
Z-Flex	SVE Series III ("Z-Vent III")	4	2SVSWTEF04	Tee: 2SVSTTF04	24SVSTPF04
		6	N/A	N/A	N/A
Flex-L Intl.	Star-34	4	SR04WT15	Tee: SRTT-04	SRTP-04
		6	N/A	N/A	N/A

NOTE: See vent system manufacturer's literature for other part numbers that are required such as straight pipe, elbows, firestops and vent supports.

IV. Venting D. Stainless Steel Venting (continued)

ii. Combustion Air Termination

- After penetrating wall, install a 90° elbow so that the elbow leg is in the up direction.
- Install maximum vertical run of seven (7) feet of combustion air pipe. See Figure 11.
- At top of vent pipe length install another 90° elbow so that the elbow leg is opposite the building's exterior surface.
- Install Rodent Screen (not supplied) and horizontal vent terminal.
- Brace exterior piping if required.

5. Vertical Vent Termination

a. Standard Two-Pipe Termination

Refer to Figures 12 and 13.

i. Vent Termination

- Use the terminal supplied by the vent system manufacturer shown in Table 11B. Follow manufacturer's instructions to attach terminal to vent system.

ii. Combustion Air Termination

- Install vertical combustion air terminal. Vertical combustion air terminal consists of an 180° bend (comprised of two (2) 90° elbows) as shown in Figure 12.
- Install rodent screen (not supplied) in the combustion air terminal. Use a screen having 1/2" (2 x 2) or larger mesh.

E. Concentric Polypropylene Venting

1. Vent Length Restrictions

- Vent length restrictions are based on equivalent length of vent pipe i.e. total length of straight pipe plus equivalent length of fittings. See Table 12 for specified vent length details. Do not exceed maximum vent length. Table 13 lists available concentric vent components and includes equivalent vent length for fittings.
- The vent termination location is restricted as per 'General Guidelines', Paragraph A, 5 (refer to Figure 4).

2. Field Installation of Boiler Concentric Vent Collar

- Locate and remove six mounting screws from the Miscellaneous Parts Carton.
- Position the Collar onto jacket combination rear/bottom panel and insert collar inner stainless steel vent pipe into the heat exchanger vent outlet.

Table 12: Concentric Vent Length

Boiler Model	Inner/Outer Pipe Dia., mm	Vent Length (Equiv. Ft.)		Wall Opening Diameter
		Minimum	* Maximum	
APX399	100/150 mm	32 in.	60	6-1/2 in
APX500	100/150 mm	32 in		
APX800	N/A	N/A	N/A	N/A

* with optional concentric vent components, see Table 13 for details.

Table 13: Concentric Vent Components (Applicable to APX399 and APX500 only)

Part Number	Component Description	Size	Component Equivalent Vent Length, Ft	Comments
101548-01	90° Elbow – Long Radius	100/150 mm	8.0	
101549-01	45° Elbow - Long Radius	100/150 mm	3.0	
101550-01	1 Cut -To-Length Extension, 500 mm (19-1/2")	100/150 mm	1.63	** Can be cut
101551-01	Cut -To-Length Extension, 1000 mm (39")	100/150 mm	3.25	** Can be cut
101553-01	Fixed Extension, 2000 mm (78")	100/150 mm	6.5	*** Must not be cut
101809-01	Horizontal (Wall) Terminal	100/150 mm	* NA	Supplied with boiler
101557-01	Vertical (Roof) Terminal	100/150 mm	* NA	See Note 1
101558-01	Flat Roof Flashing	100/150 mm		
101559-01	Sloped Roof Flashing	100/150 mm		See Note 2
101560-01	Support Elbow with Chimney Chase Bracket	100/150 mm	10.0	See Note 3
101561-01	Hanger Wall Bracket	100/150 mm		

Notes:

* NA – do not include vent terminal into total vent length calculations.

** These sections have plain male end and beaded female end. See Figure 18 for details.

*** These sections have beaded male end and beaded female end. See Figure 19 for details.

- Vertical terminal can be used with either of the roof flashings listed beneath it.
- Sloped roof flashing suitable for roof angles between 25° and 45°.
- Used at base of vertical run inside unused masonry chimney.

IV. Venting E. Concentric Polypropylene Venting (continued)

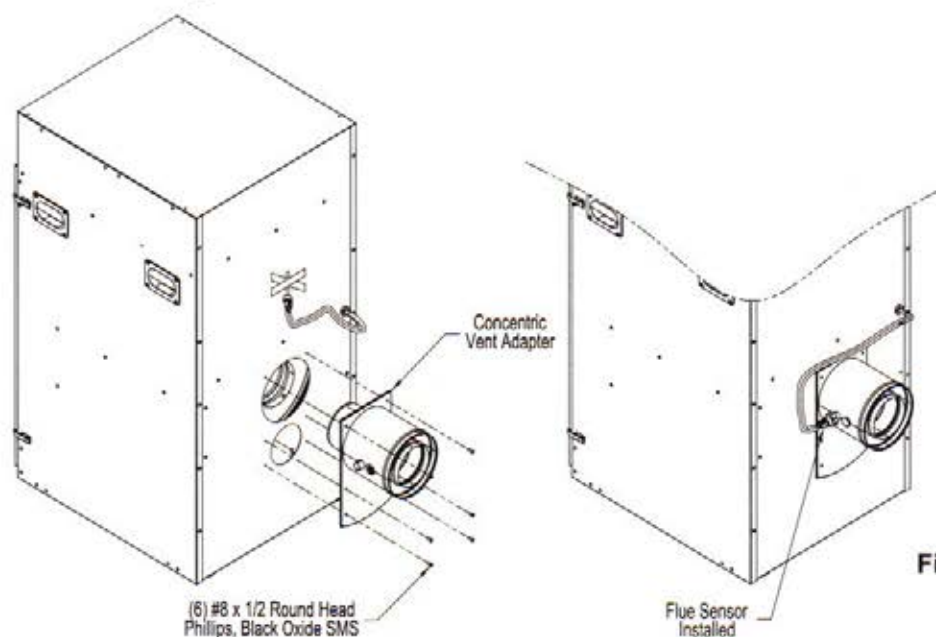


Figure 17: Field Installation of Boiler Concentric Vent Collar

- c. Align collar plate clearance holes with rear/bottom panel engagement holes; then secure the collar to rear/bottom panel with six mounting screws. See Figure 17.
- d. Flue temperature sensor, factory attached to the boiler wiring harness, is secured to the left boiler jacket panel with tape.
- e. Remove the tape and push the sensor rubber plug into Concentric Vent Collar sensor port until the plug is securely engaged. See Figure 17.

The installation of the Concentric Vent Collar is now completed.

3. System Assembly

- a. Plan venting system to avoid possible contact with plumbing or electrical wires. Start at vent connector at boiler and work towards vent termination.
- b. Do not exceed maximum Concentric vent length. Refer to Table 12.
- c. If additional concentric vent piping is needed:
 - i. Concentric Vent Cut-To-Length Extension pipes, identified in Table 13 **CAN BE CUT** to required length when used as an extension. **These pipes have plain male end and beaded female end. Always cut the pipe from plain male end.** See Figure 18 'Cut-To-Length Extension (Cutttable)'.



Figure 18: Cut-To-Length Extension (Cutttable)

- ii. The remaining Concentric Vent Fixed Extensions shown in Table 13 **CANNOT BE CUT**. These pipes have beaded male and beaded female ends. See Figure 19 'Fixed Extension (Non-Cutttable)'.



Figure 19: Fixed Extension (Non-Cutttable)

- d. To cut the Concentric Vent Straight pipe to required length refer to Figure 20 'Cutting Straight Pipe' and the following procedure:
 - i. Determine the required length of the outer pipe. When doing this allow an additional 1" of length for insertion into the female end of the adjoining pipe. Mark the cut line on the outer pipe.
 - ii. Remove the plastic inner pipe by pulling it out from the female end.
 - iii. Cut the **OUTER PIPE ONLY** at the point marked in Step (a) using aviation shears, a hacksaw, or an abrasive wheel cutter. Be careful to cut the pipe square. De-burr the cut end with a file or emery cloth.
 - iv. Make an insertion mark 1" from the male end of the outer pipe.
 - v. Cut the plastic inner pipe so that it will protrude 3/8" beyond the male end of the outer pipe when reinstalled in the outer pipe. Use a fine tooth hacksaw or a PVC saw to cut the plastic pipe and be careful to cut the

IV. Venting E. Concentric Polypropylene Venting (continued)

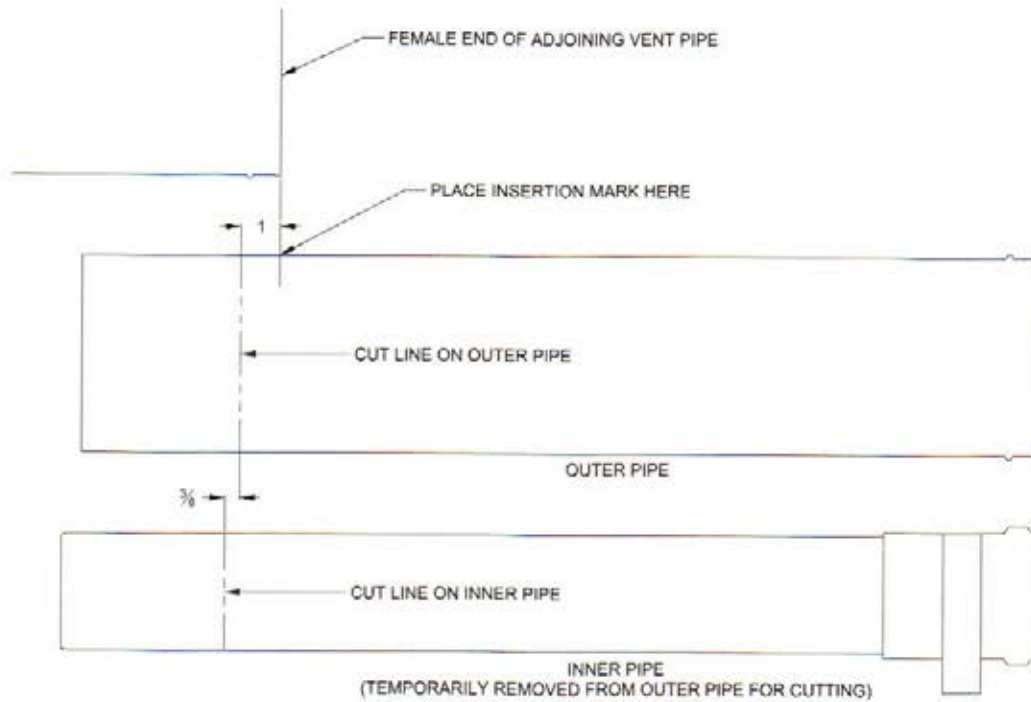


Figure 20: Cutting Straight Pipe

pipe square. De-burr the cut edge of the plastic pipe with a file, razor blade or fine sandpaper.

- vi. Reinstall the inner pipe.
- e. To join Concentric Vent Pipe refer to Figure 21 "Joining Cuttable Pipe" and Figure 22 "Joining Non-Cuttable Pipe" and follow the procedure below:
 - i. Start assembly of the vent system at the boiler. Lubricate the brown gasket in the boiler vent collar with a few drops of water.
 - ii. Push the male end of the first fitting into the boiler collar until it bottoms out. The male end of cuttable sections should go 1" into the collar until the insertion mark (made in Step 4 above) is covered. On other fittings, the bead on the male pipe will be bottom out on the collar (see Figure 22).
 - iii. The male end of cuttable fittings must be held to the collar with three (3) #10 x 1/2" sheet metal screws. Drill a 1/8" hole through both outer pipes to start this screw. Use a **drill stop or other means to ensure that the drill bit does not penetrate more than 3/8" into the outer pipe. Do not use a sheet metal screw longer than 1/2"** (see Figure 21).
 - iv. Use locking bands (provided with all fittings) to secure non-cuttable pipe, as well as fittings, to the boiler collar (see Figure 22).

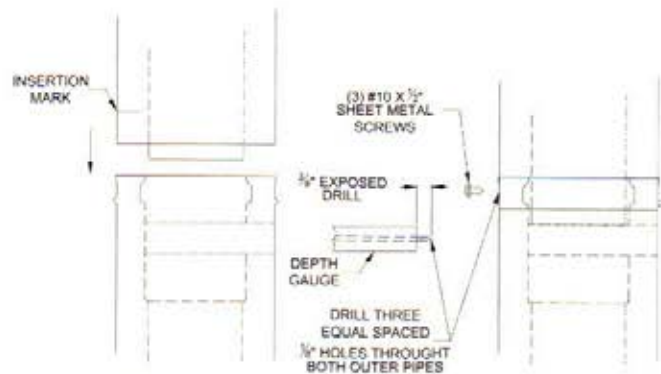


Figure 21: Joining Cuttable Pipe

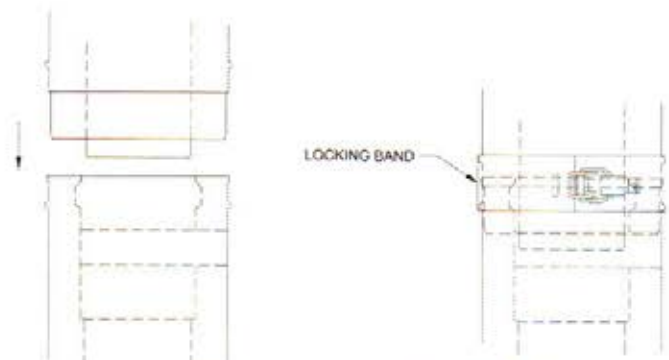


Figure 22: Joining Non-Cuttable Pipe

IV. Venting E. Concentric Polypropylene Venting (continued)

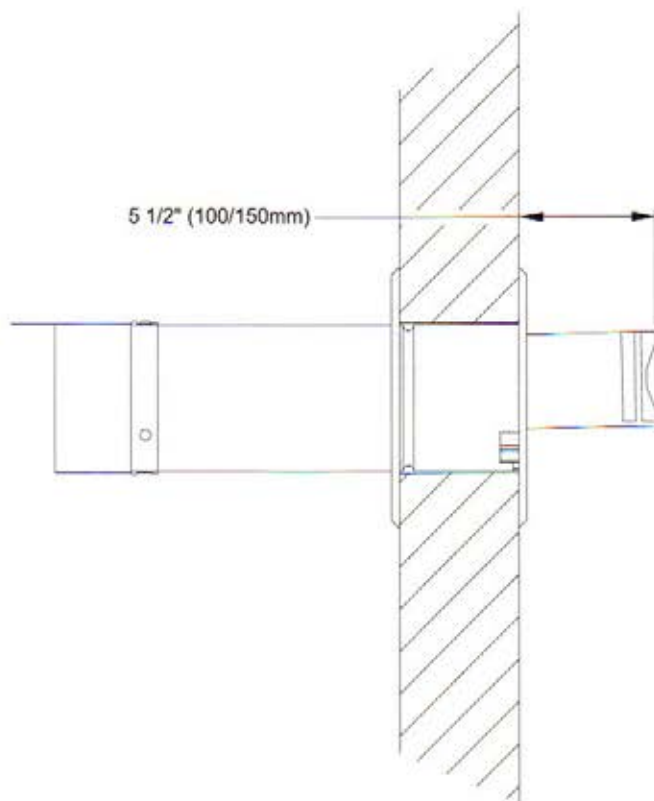


Figure 23: Horizontal Concentric Venting

- v. Use the same method to join all remaining vent components except for the terminal.

4. Horizontal Vent Termination

a. Standard Concentric Termination

Refer to Figure 23.

- i. Permitted terminals for horizontal venting: Horizontal (Wall) Terminal, [100/150 mm (P/N 101809-01)] - see Table 13.
- ii. Concentric Vent components supplied with the boiler are packed inside boiler carton and include the following:
 - Horizontal (Wall) Terminal,
 - Horizontal (Wall) Terminal consists of Straight section having plain male end with locking band clamp installed; Terminal Assembly with offset vent termination, and Outside Wall Plate, both riveted on the opposite end; overall length is approximately 28-1/8".
 - Separate Inside Wall Plate
 - Two Hardware Bags (each bag contains four screws and four anchors) to attach vent terminal Outside Wall Plate to exterior wall and Inside Wall Plate to interior wall.

- iii. For horizontal (sidewall) installation, the Horizontal (Wall) Terminal will extend past outer wall surface by 5 1/2" (100/150 mm). See Figure 23 "Horizontal Concentric Venting".
- iv. Install the Horizontal (Wall) Terminal:
 - Cut a 6 1/2" (for 100/150 mm) at the planned location of the horizontal terminal.
 - Measure dimension "L" from exterior wall outer surface to the end of the last fitting. See Figure 24 "Dimension 'L'".

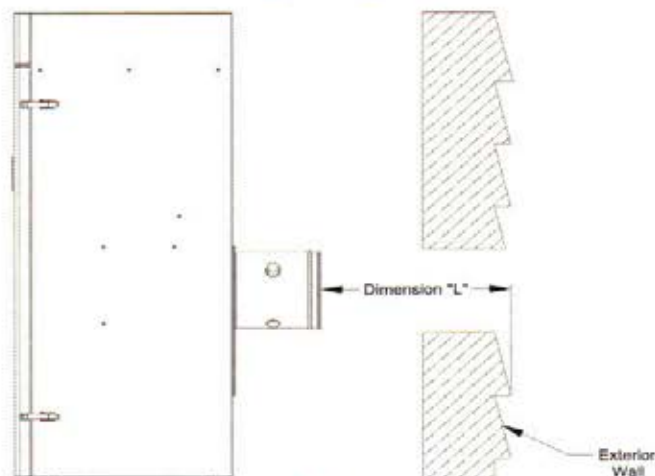


Figure 24: Dimension "L"

- When factory Horizontal (Wall) Terminal needs to be shortened, measure dimension "L" plus 1 1/4" from inside of the attached Outside Wall Plate and mark the Horizontal (Wall) Terminal outer pipe. To achieve a square cut of the outer pipe, place several marks around the outer pipe to establish a cut line. See Figure 25 "Cutting Vent Terminal Pipe".
- Carefully cut the outer pipe at the marked line using aviation shears, a hacksaw etc. Ensure the pipe is cut square and cut end is de-burred.
- Mark the end of the Horizontal (Wall) Terminal inner polypropylene vent pipe to extend 3/8" past the cut end of the outer pipe. To achieve a square cut of the inner pipe, place several marks around the inner pipe to establish a cut line.
- Cut off the marked end of inner polypropylene vent pipe with a fine tooth blade hacksaw etc. and de-burr. See Figure 25 "Cutting Vent Terminal Pipe". This pipe can be removed from the terminal to ease cutting, if desired.

IV. Venting E. Concentric Polypropylene Venting (continued)

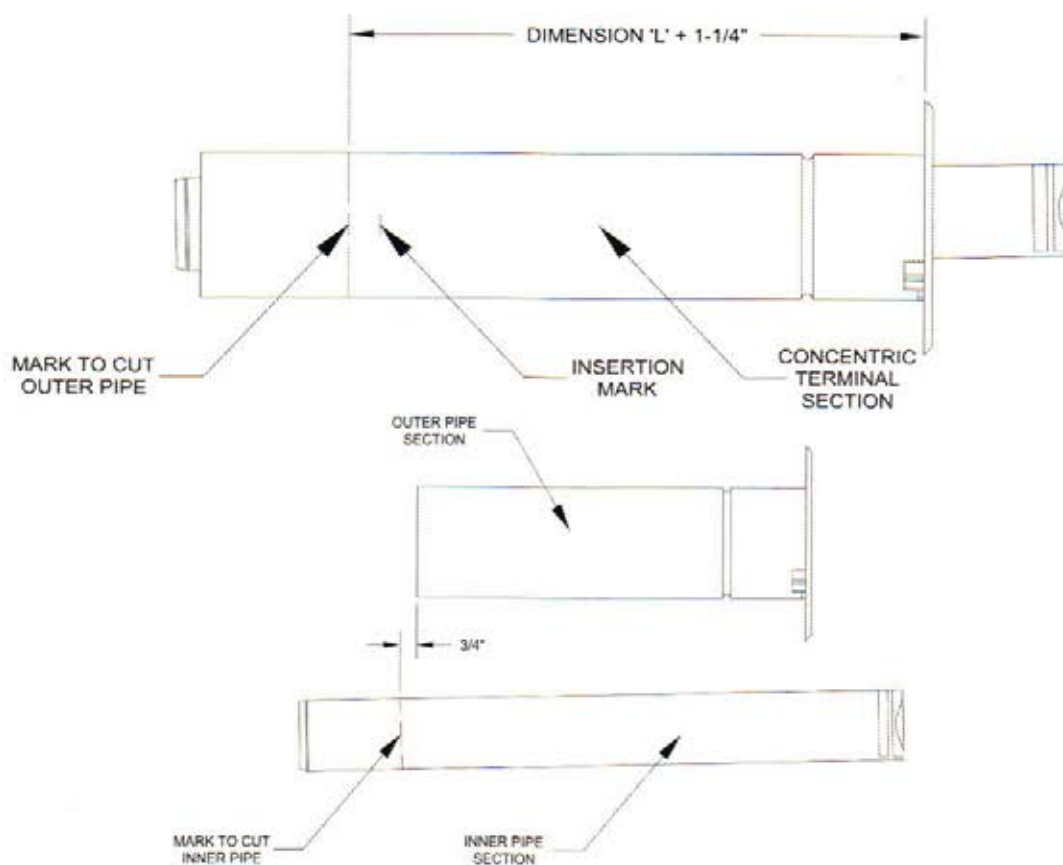


Figure 25: Cutting Vent Terminal Pipe

CAUTION

Exterior wall surface must be reasonably flat to attach the Outside Wall Plate. When exterior wall surface is not flat (covered with vinyl or wood shingle siding etc.) the siding must be removed, and a flat surface build up flash or above siding exterior surface to secure/seal the terminal Outside Wall Plate.

- Install the supplied Inside Wall Plate onto the shortened Horizontal (Wall) Terminal interior end and move the plate to cover interior wall cut opening. Secure the plate with provided fasteners, then, apply the sealant around plate sides to seal it to interior wall (refer to Figure 26).
- Lubricate the brown gasket inside boiler concentric vent collar or the last section of the vent pipe with small amount of water.
- Ensure that inner pipe of the terminal is evenly engaged into the gasket all around, then push the termination male end inside boiler concentric vent collar or the last section of the vent pipe, until the

mark (see Step v) is no longer visible.

- Re-install locking band clamp onto the joint to secure the terminal to the collar or the last section of the vent pipe.

5. Vertical Vent Termination

a. Standard Concentric Termination

Refer to Figures 27 thru 31.

- In addition to the vertical terminal, either a Flat Roof Flashing or Sloped Roof Flashing is required for this installation. Refer to Table 12 'Concentric Vent Components' for details.
- Determine the centerline of the terminal location on the roof. For flat roof, cut 6½" (100/150 mm) for the terminal. For sloped roof, cut a hole in the roof large enough for the terminal to pass through the roof while remaining plumb.

CAUTION

If the boiler is located directly under the hole, cover it while cutting the hole to prevent debris from falling onto boiler.

IV. Venting E. Concentric Polypropylene Venting (continued)

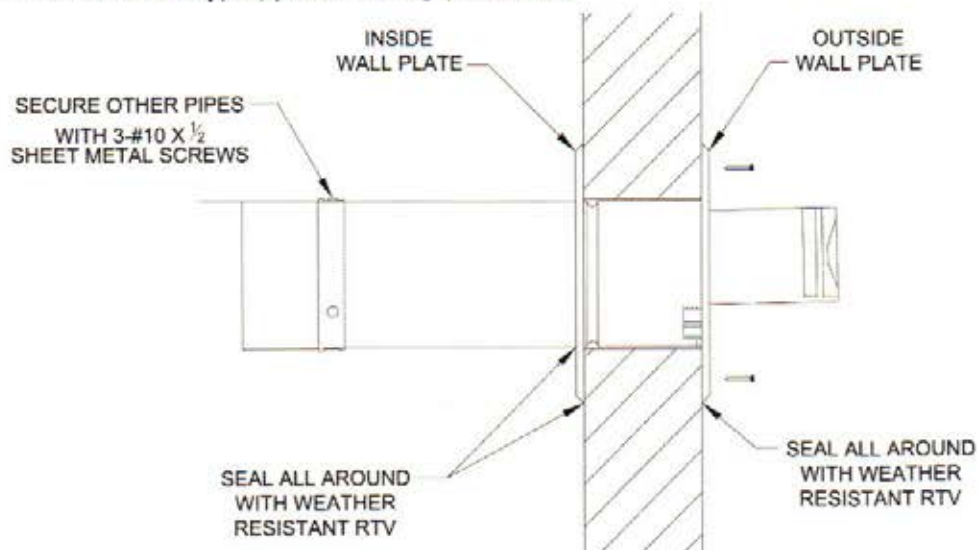


Figure 26: Completing Horizontal (Wall Terminal Installation)

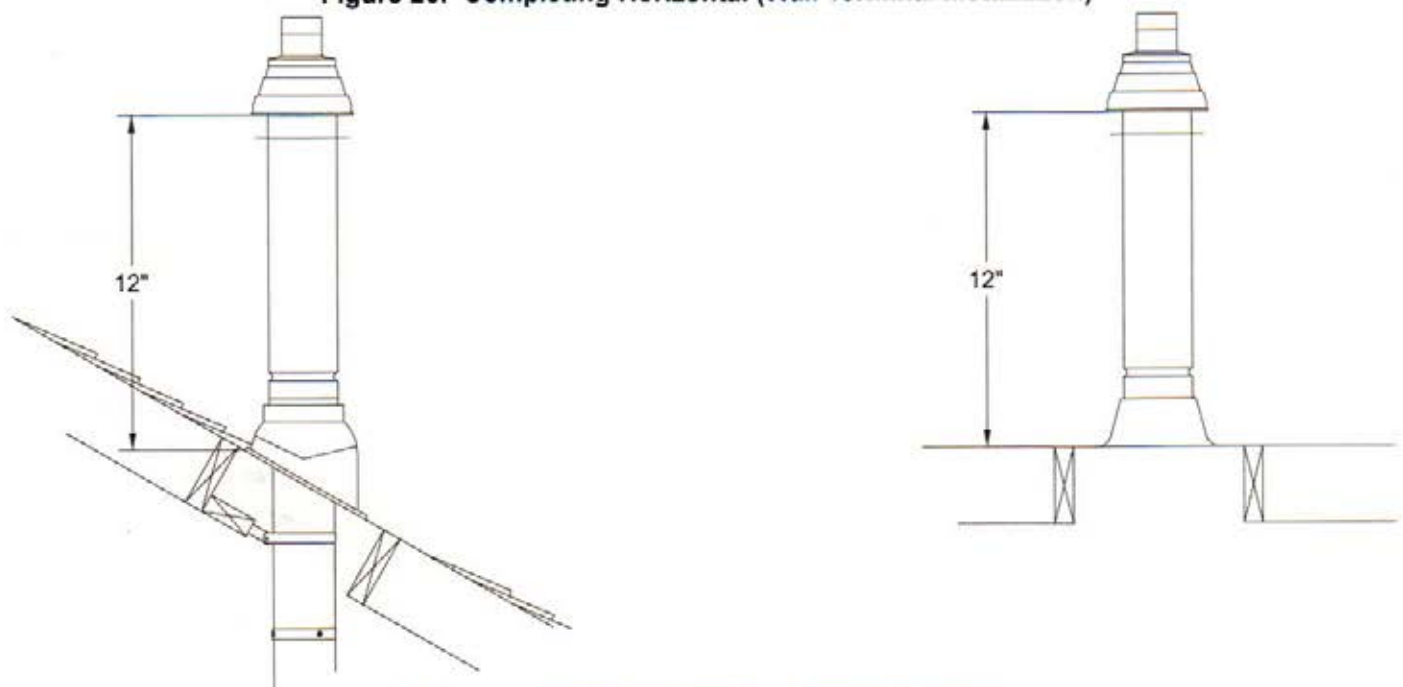


Figure 27: Vertical Concentric Vent Installation

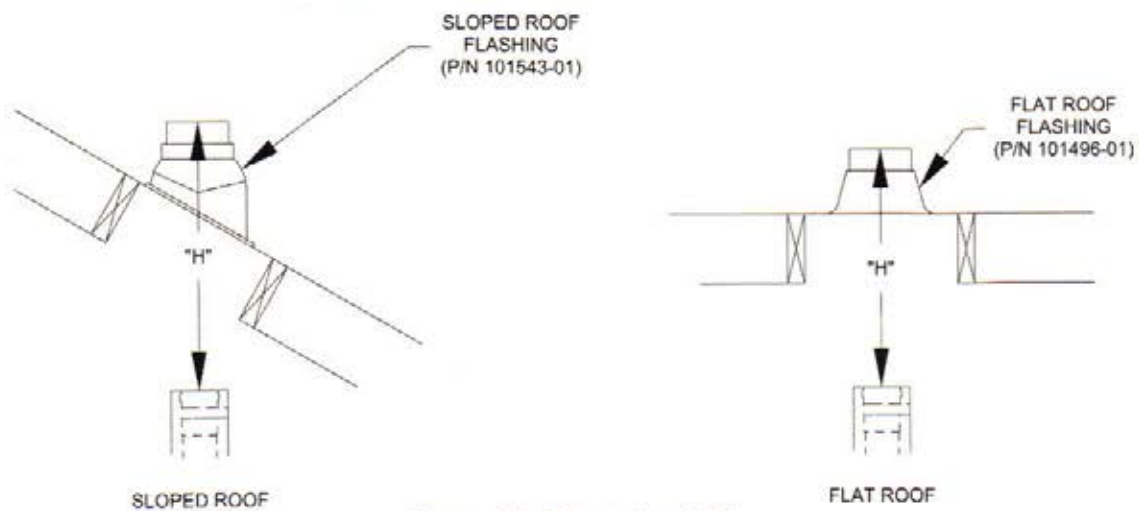


Figure 28: Dimension "H"

IV. Venting E. Concentric Polypropylene Venting (continued)

- Install the roof flashing using standard practice on the roofing system of the structure.
- If not already done, assemble the venting system inside the building. The last section of pipe needs to be on the same center line as the terminal and within 19-1/4" of the top edge of the roof flashing.
- Measure distance "H" from the top edge of the storm collar to the end of the last fitting as shown in Figure 28.
- Add 1" to distance "H". Carefully mark this length on the pipe as shown in Figure 29.
- Cut the **outer pipe only** at the point marked in Step (e) using aviation shears, a hacksaw, or an abrasive wheel cutter. Be careful to cut the pipe square. De-burr the cut end with a file or emery cloth.
- Place a mark on the plastic inner pipe 3/8" beyond the end of the outer pipe (Figure 29). Use a fine tooth hacksaw to cut the plastic pipe and be careful to cut the pipe square. De-burr the cut edge of the plastic pipe with a file or emery cloth.
- Make a mark on the terminal section 1" from the cut end of the outer pipe as shown in Figure 29.



Figure 29: Cutting Vertical Terminal

- Slip the terminal section through the roof from the outside. Push into the last section of vent pipe until the mark made in Step (h) is not longer visible. Secure the terminal to the last piece of pipe with three #10 x 1/2" sheet metal screws. Drill a 1/8" hole through both outer pipes to start these screws. **Use a drill stop or other means to ensure that the drill bit does not penetrate more than 3/8" into the outer pipe. Do not use a sheet metal screw longer than 1/2".**
- Secure the terminal section to the inside of the roof structure using the mounting bracket provided with the terminal (Figure 30).

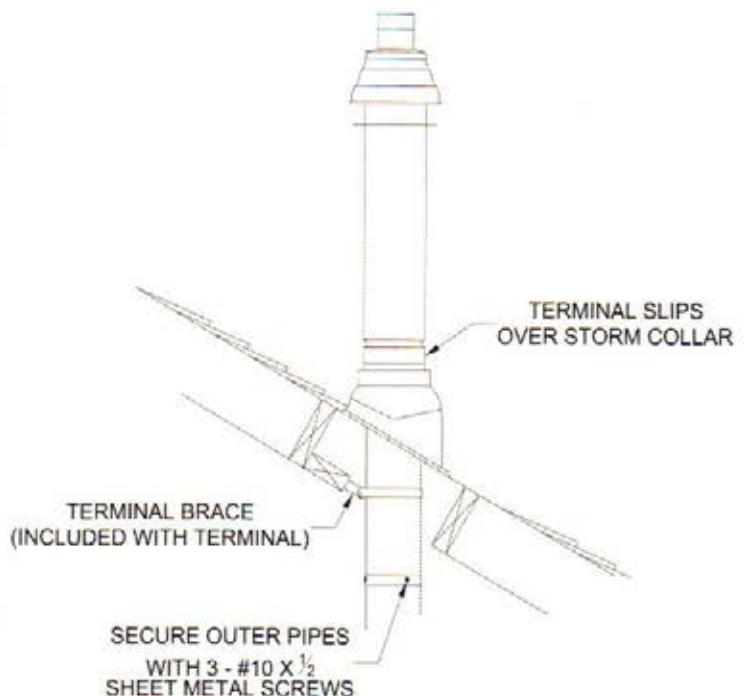


Figure 30: Completing Vertical Terminal Installation

- Optional Concentric Chimney Chase Installation
Refer to Figure 31.

- A vertical concentric vent system can be installed in an **UNUSED** masonry chimney.
 - The Chimney chase Support Elbow with attached Mounting Bracket is used at the base of the chimney. Refer to Table 12 'Concentric Vent Components' for details. Slip the elbow over the M10 x 35 screw in the support bracket. Determine the desired vertical location of the support elbow in the chimney and mark the location of the pin, positioned on the back of the support bracket, onto the chimney rear wall. Drill a 7/16" diameter x 3-1/2" deep hole in the marked location, then, insert the back bracket pin into the hole. The front of the elbow mounting bracket should be supported either by bottom of the opening into chimney or installer supplied spacer.
 - Construct a weather-tight flat roof to cover the top of the old chimney. Install the vertical terminal through this roof using the flat roof flashing.

F. Removing the Existing Boiler

For installations not involving the replacement of an existing boiler, proceed to Step B.

IV. Venting F. Removing the Existing Boiler (continued)

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the remaining appliances. At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation:

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion, and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common

venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range-hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

4. Place in operation the appliance being inspected. Follow the Lighting (or Operating) Instructions. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after five (5) minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.
6. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.
7. Any improper operation of the common venting system should be corrected so the installation conforms with the *National Fuel Gas Code*, NFPA 54/ANSI Z223.1. When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in Part II in the *National Fuel Gas Code*, NFPA 54/ANSI Z223.1.

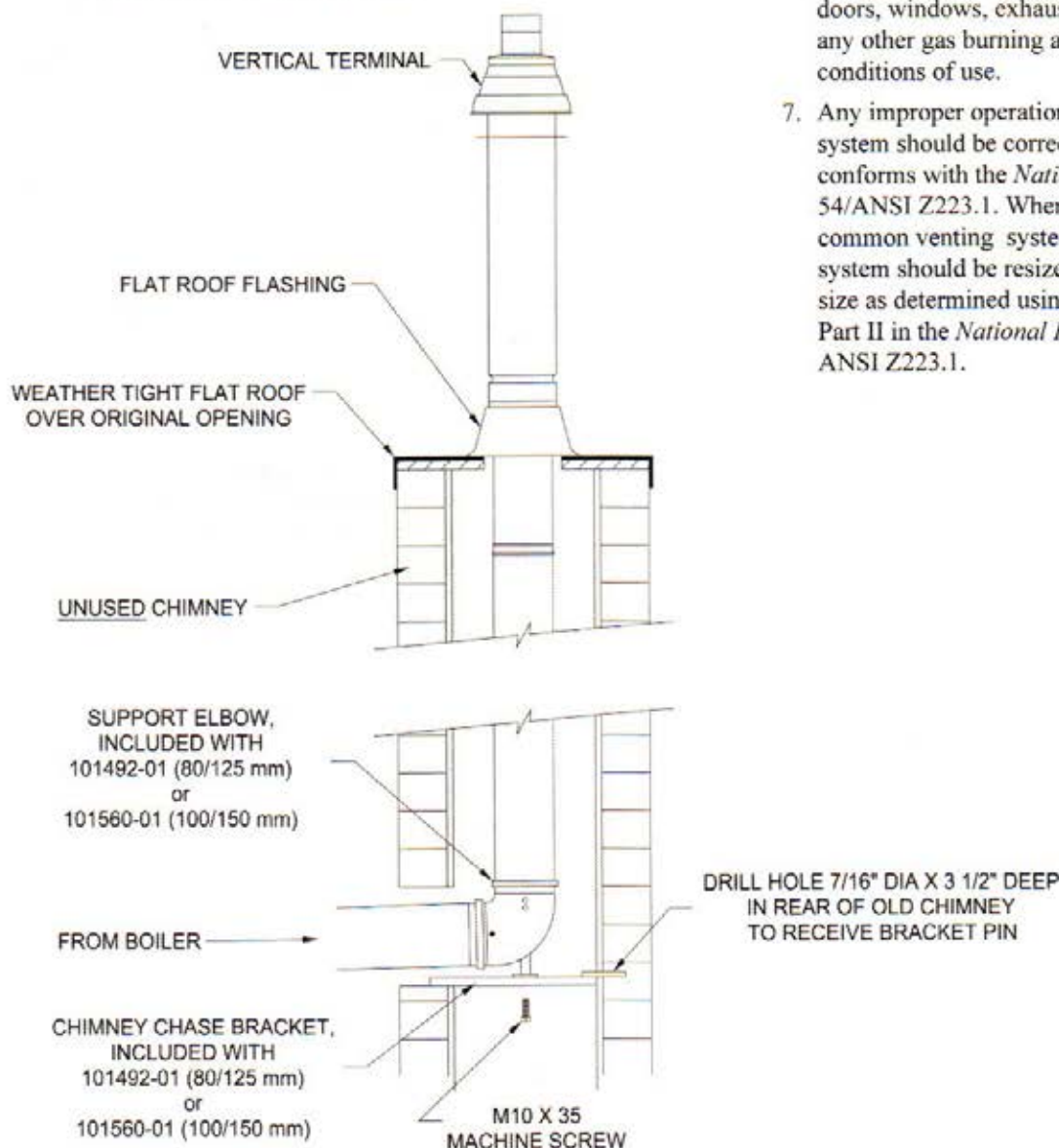


Figure 31: Chimney Chase Installation

IV. Venting G. Multiple Boiler Installation Venting (continued)

G. Multiple Boiler Installation Venting

1. CPVC/PVC or Polypropylene Venting

- Multiple Boiler CPVC/PVC or polypropylene direct venting is shown in Figure 32.
- Each individual module (boiler) must have own vent pipe and vent terminal. Refer to Paragraphs B thru E (as applicable) for individual module (boiler) venting guidelines and options.

WARNING

No common manifolded venting (vent piping and vent terminals) is permitted.

- The individual module (boiler) maximum vent length - see Table 8.
- For sidewall venting the minimum horizontal distance between any adjacent individual module (boiler) vent terminations is twelve (12) inches.

Additional horizontal spacing between any adjacent individual module (boiler) vent terminations as well as extending the distance from building surfaces to vent termination end are recommended to avoid frost damage to building surfaces where vent terminations are placed.

CAUTION

Installing multiple individual module (boiler) vent terminations too close together may result in combustion product water vapor condensation on building surfaces, where vent termination are placed, and subsequent frost damage. To avoid/minimize frost damage, extend the distance from building surfaces to vent termination end and increase the horizontal distance between adjacent vent terminations.

- Individual module (boiler) sidewall vent terminals must be placed at least twelve (12) inches above the ground plus the expected snow accumulation.
- Multiple individual module vertical vent pipes may be piped through a common conduit or chase so that one roof penetration may be made. The minimum horizontal distance between any adjacent individual module (boiler) roof vent terminations is one (1) foot.

2. PVC Pipe Air Intake Piping

- Multiple Boiler PVC air intake piping is shown in Figure 32.
- Each individual module (boiler) must have own combustion air intake pipe and combustion air intake terminal. Refer to Paragraphs B thru E (as applicable) for individual module (boiler) combustion air intake guidelines and options.

- The individual module (boiler) maximum combustion air intake pipe length - see Table 8.
- If possible, locate each individual module (boiler) both combustion air intake termination and vent termination on the same sidewall, to prevent nuisance boiler shutdowns. However, if same sidewall placement is problematic, an individual module (boiler) may be installed using vertical venting and sidewall combustion air intake termination (or, vice versa)

3. Concentric Combination Venting/Combustion Air Intake Piping

- Concentric Combustion Venting and air intake is shown in Figure 33.
- Each individual module (boiler) must have own concentric vent pipe and vent termination. Follow Section IV "Venting" of this manual for individual module (boiler) concentric venting guidelines.

WARNING

No common manifolded concentric venting is permitted.

- The individual module (boiler) maximum concentric vent length - see Table 8.
- For sidewall venting any adjacent individual module (boiler) concentric vent terminals must be spaced no closer than 12 inches horizontally and three (3) feet vertically from each other to prevent combustion air contamination. Additional horizontal spacing between any adjacent individual module (boiler) concentric vent terminations and increased distance from building surfaces to concentric vent termination end are recommended to avoid frost damage to building surfaces where vent terminations are placed.
- Individual module (boiler) sidewall concentric vent terminals must be placed at least twelve (12) inches above the ground plus the expected snow accumulation.
- For vertical through the roof venting any adjacent individual module (boiler) vertical vent terminals, if level with each other, must be spaced no closer than 12 inches horizontally. If vertical vent terminals cannot end in one plane, they must be spaced no closer than three (3) feet horizontally.
- Chimney chase concentric venting is permitted for modules, when stackable, providing concentric vertical (roof) vent terminals, if level with each other, are spaced no closer than 12 inches horizontally.

IV. Venting G. Multiple Boiler Installation Venting (continued)

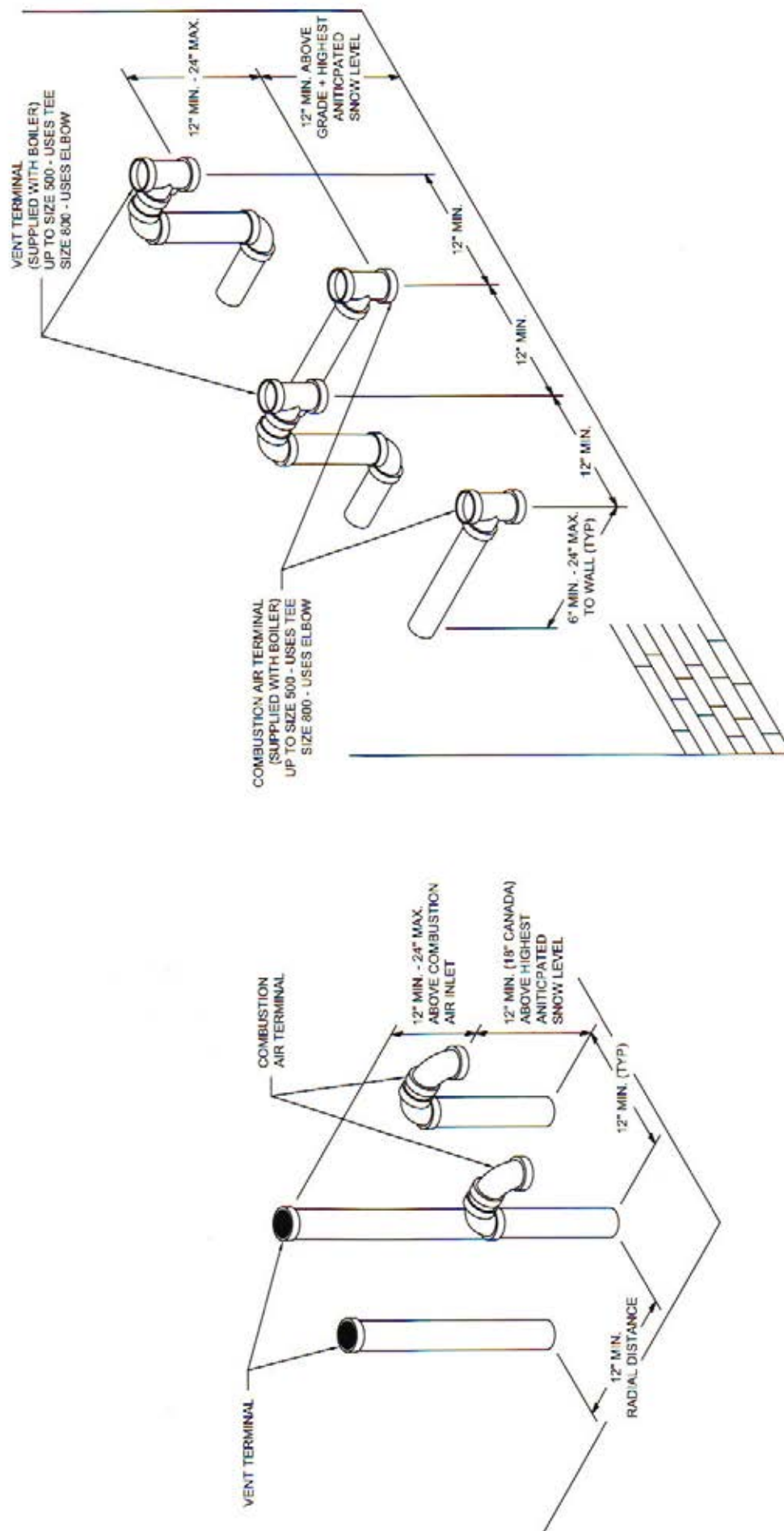


Figure 32: Multiple Boiler Direct Vent Termination

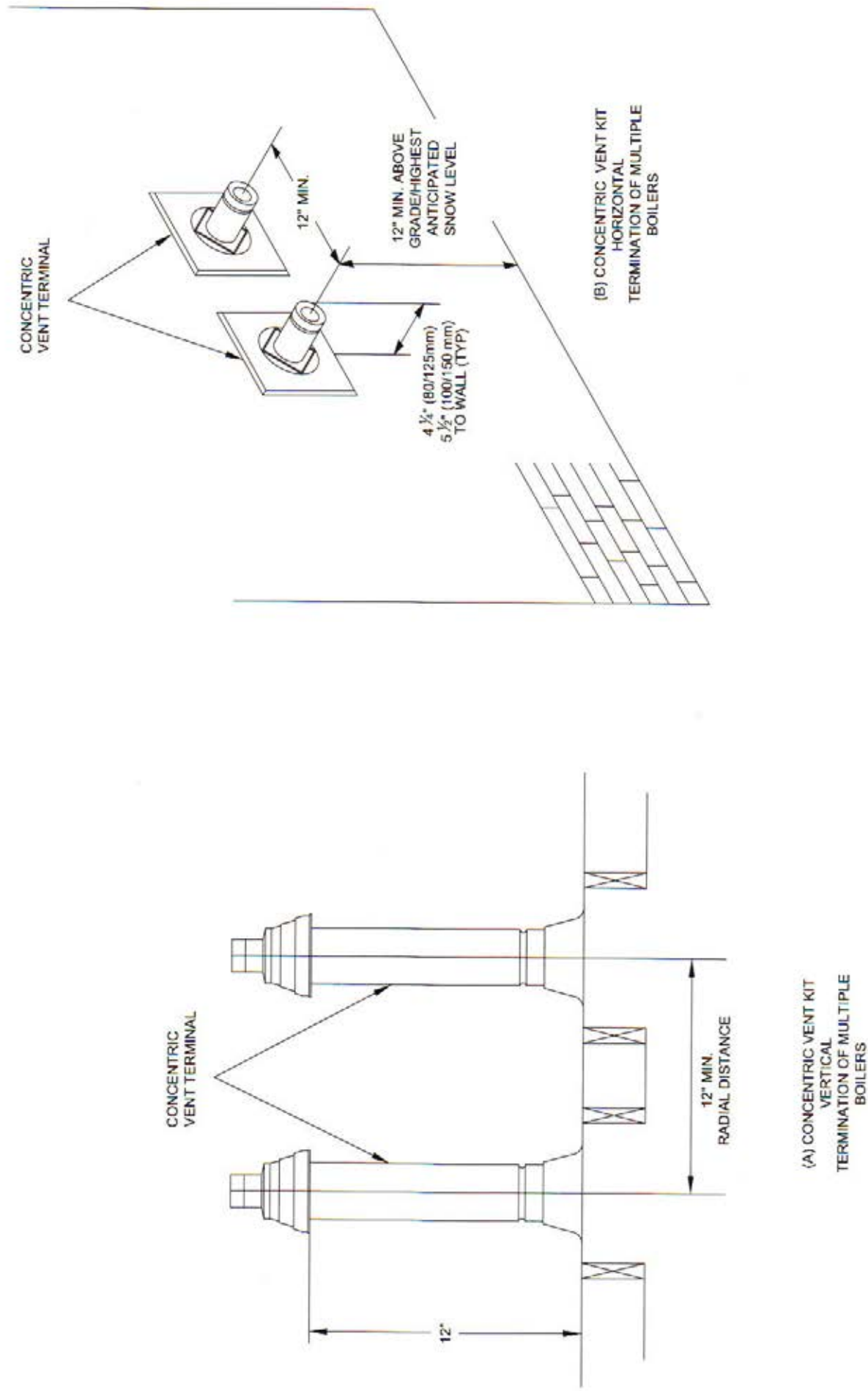


Figure 33: Multiple Boiler Concentric Vent Termination