

# CROWN BOILER CO.

## **BWC070, BWC090, BWC120 Installation Manual Supplement June 12<sup>th</sup>, 2007**

The following pages are copied from the latest edition of the installation manual for the above boilers, which is not yet in print. These pages cover new vent options that have been added for these boilers and which are not shown in the current manual. These options include:

- 1) 80/125mm concentric venting may be used to achieve longer vent runs.
- 2) 80/125mm concentric venting may be used for vertical vent applications.
- 3) An 80/125mm concentric snorkel kit is now offered.
- 4) Metal-Fab "Corr/Guard" may now be used for stainless steel vent applications.

Refer to the installation manual supplied with the boiler for important warnings and other information not covered in this supplement.

## VII Venting

### WARNING

FAILURE TO VENT THIS BOILER IN ACCORDANCE WITH THESE INSTRUCTIONS COULD CAUSE FLUE GAS TO ENTER THE BUILDING RESULTING IN SEVERE PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH:

- \* Do not attempt to vent this boiler with galvanized, PVC, or any other vent components not listed in Table 7.4.
- \* Do not attempt to mix components from different approved vent systems.
- \* Do not obtain combustion air from within the building.
- \* Do not install a barometric damper or draft hood on this boiler.

### CAUTION

Moisture and ice may form on the surfaces around the vent termination. To prevent deterioration, surfaces should be in good repair (sealed, painted, etc.).

### A. Vent System Design

There are four basic ways to vent this boiler:

- **Horizontal (“Side Wall”) Concentric Venting** - Vent system exits the building through an outside wall. Concentric venting consists of a “pipe within a pipe”. Flue gas exits the building through the inner pipe and combustion air is drawn into the boiler through the space between the inner and outer pipe.
- **Horizontal (“Side Wall”) Twin Pipe Venting** - Vent system exits the building through an outside wall. Combustion air and flue gas are routed between the boiler and outdoors using separate pipes.
- **Vertical Concentric Venting** - Vent system exits the building through the roof. Concentric venting consists of a “pipe within a pipe”. Flue gas exits the building through the inner pipe and combustion air is drawn into the boiler through the space between the inner and outer pipe.
- **Vertical Twin Pipe Venting** - Vent system exits the building through a roof. Combustion air and flue gas are routed between the boiler and outdoors using separate pipes.

All of these systems are considered “direct vent” because in all of them air for combustion is drawn directly from the outdoors into the boiler. A description of all of these venting options are shown in Tables 7.1 and 7.9. For clarity, these vent options are numbered from 1 to 6. One of the vent option columns in Tables 7.1 or 7.9 must match the planned vent and air intake system exactly. In addition, observe the following guidelines:

- 1) **Approved vent systems** - Use only one of the approved vent systems shown in Tables 7.4 or 7.5. These vent systems fall into two basic categories:

- **Concentric Vent System** - The standard boiler is supplied with a concentric vent system having a maximum usable length of 25” (Figure 1.1). For longer runs, additional straight lengths and elbows are available from Crown. In some cases, larger diameter concentric pipe must be used. Each Crown concentric vent component consists of an inner pipe of polypropylene and the outer pipe of steel. Integral gaskets on each concentric fitting provide a gas tight seal. A list of all Crown concentric vent components is shown in Table 7.4.

In this manual, concentric pipe sizes are called out in terms of the inner and outer pipe nominal diameters in millimeters. For example, “60/100mm” pipe consists of a 60mm exhaust pipe inside a 100mm diameter outer pipe.

- **Twin Pipe Vent Systems** - Approved vent systems are made of a special stainless steel alloy (AL29-4C) for protection against corrosive flue gas condensate. They are designed to provide a gas tight seal at all joints and seams so that flue gas does not enter the building. Each approved vent system has a unique method for installation - **do not attempt to mix components from different vent systems**. A list of approved twin pipe vent systems is shown in Table 7.5. Note that a special vent collar (Crown PN 230510) is required if the boiler is to be vented with one of the approved stainless vent systems.

- 2) Maximum Vent and Air Intake Lengths - The maximum length of the vent air intake piping depends upon the vent option selected and the boiler size. See Table 7.1 or 7.9 for the maximum vent length. In horizontal vent systems, the lengths shown in Table 7.1 are in addition to the first standard elbow on top of the boiler. For vertical vent systems, the maximum vertical vent lengths shown in Table 7.9 are in addition to two standard radius elbows. If more elbows are desired, the maximum allowable vent length must be reduced by the amount shown in Table 7.8 for each additional elbow used. Termination fittings are never counted, although the length of the concentric terminal section is counted.

Example:

A 60/100mm concentric vent system is planned for a horizontally vented BWC120 which has the following components:

80/125 x 60/100mm Reducing Elbow (supplied with the boiler)

5ft Straight Pipe

90 elbow

1-1/2ft Straight Pipe

45Elbow

Uncut Terminal Section (supplied with the boiler)

The Vent Option #1 column in Table 7.1 describes a horizontal direct vent system using 60/100mm concentric vent pipe. From this column, we see that a BWC120 may have a vent length of up to 18ft. The 90 degree reducing elbow is not considered. The length of the terminal section (not including the plastic terminal itself) is approximately 22 1/2" (1.9ft) installed. From Table 7.8, we see that the equivalent length of the 60/100mm elbow is 4.5ft and that the equivalent length of the 45 degree elbow is 4ft. The total equivalent length of the planned venting system is therefore:

5ft (Straight ) + 4.5ft (90 Elbow) + 1.5ft (Straight ) + 4 ft (45 Elbow) + 1.9ft (Uncut Terminal Section) = 16.9ft.

Since Table 7.1 shows a maximum allowable vent length of 18ft, the planned vent system length is acceptable.

- 3) Minimum Vent and Air Intake Lengths - Observe the minimum vent lengths shown in tables 7.1 and 7.9.
- 4) Permitted Terminals for Horizontal Venting:
- **Vent Option 1** - The 60/100mm concentric vent terminal is supplied with the boiler as part of the standard vent system.
  - **Vent Option 2** - The exhaust terminal is Crown PN 230511. The air intake fitting is a 90 degree elbow with a rodent screen supplied by the installer. This elbow is made out of the same material as the rest of the air inlet system (either galvanized or PVC) and is installed as shown in Figure 7.3.
  - **Vent Option 3** - Two terminals are permitted:
    - a) 80/125mm Concentric Vent Terminal (Crown PN 230531)
    - b) 80/125mm Snorkel Terminal (Crown PN 230540) . This terminal allows the vent system to exit the building close to grade and go up the exterior wall far enough to provide adequate clearance between the terminal itself and the snow line (Figure 7.7).
- 5) Horizontal Vent and Air Intake Terminal Location - Observe the following limitations on the vent terminal location (also see Figures 7.6, 7.7). When locating a concentric terminal, observe the limitations outlined below for "vent terminals".
- Vent terminals must be at least 1 foot from any door, window, or gravity inlet into the building.
  - For twin pipe terminals, maintain the correct clearance and orientation between the vent and air intake terminals. The vent and air intake terminals must be at the same height and their center lines must be between 12 and 36 inches apart. Both terminals must be located on the same wall.
  - The bottom of all terminals must be at least 12" above the normal snow line. In no case should they be less than 12" above grade level.
  - The bottom of the vent terminal must be at least 7 feet above a public walkway.
  - Do not install the vent terminal directly over windows or doors.
  - The bottom of the vent terminal must be at least 3 feet above any forced air inlet located within 10 feet.
  - A clearance of at least 4 feet horizontally must be maintained between the vent terminal and gas meters, electric meters, regulators, and relief equipment. Do not install vent terminal over this equipment.
  - Do not locate the vent terminal under decks or similar structures.
  - Top of vent terminal must be at least 5 feet below eaves, soffits, or overhangs. Maximum depth of overhang is 3 ft.

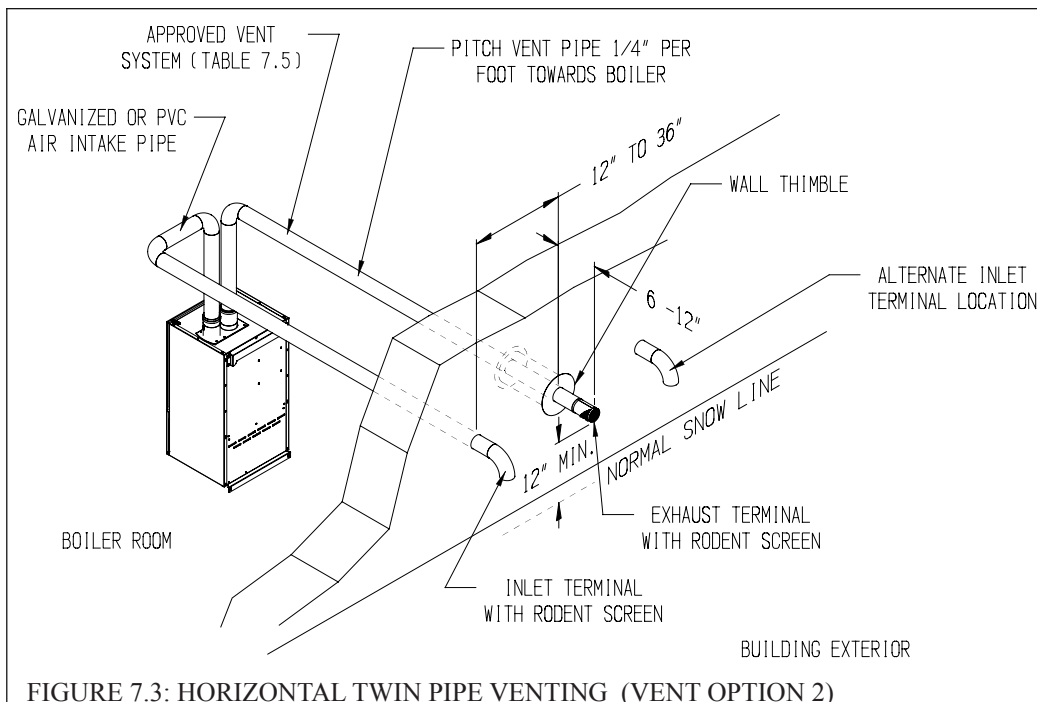
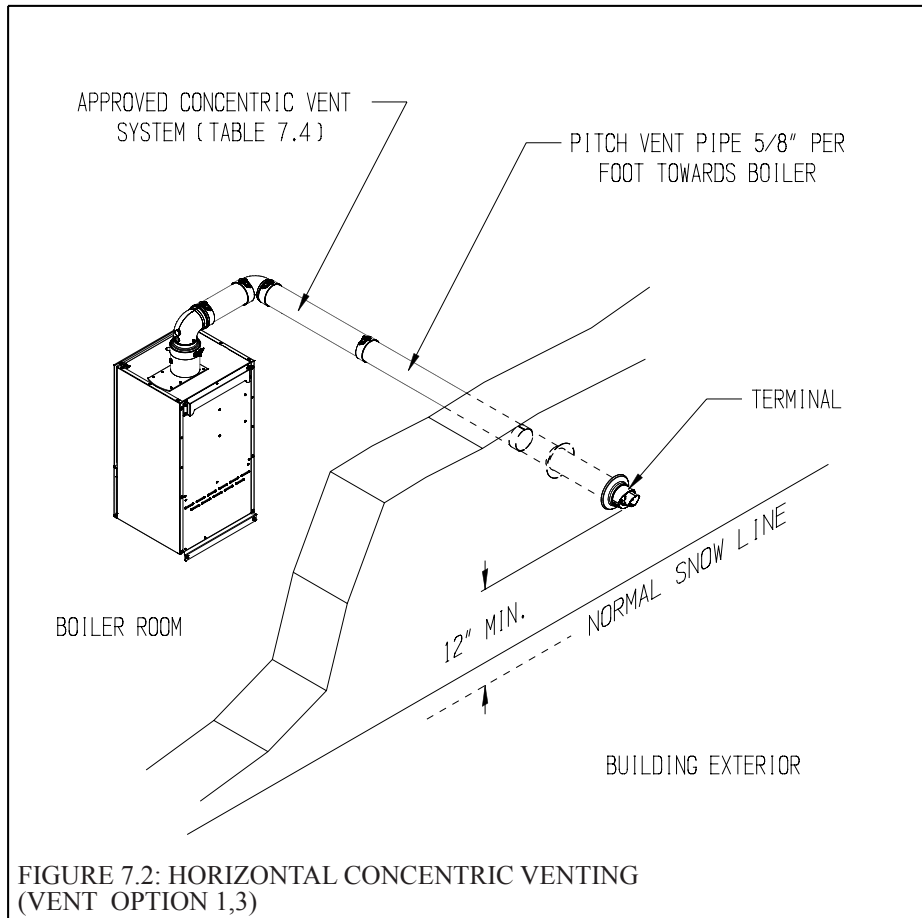
Horizontal Terminal Clearance Requirements (continued):

- Vent terminal must be at least 6 feet from an inside corner.
- Under certain conditions, water in the flue gas may condense, and possibly freeze, on objects around the vent terminal including on the structure itself. If these objects are subject to damage by flue gas condensate, they should be moved or protected.
- If possible, install the vent and air intake terminals on a wall away from the prevailing wind. Reliable operation of this boiler cannot be guaranteed if these terminals are subjected to winds in excess of 40 mph.
- Air intake terminal must not terminate in areas that might contain combustion air contaminants, such as near swimming pools. See Section IV for more information on possible contaminants.

TABLE 7.1: SUMMARY OF HORIZONTAL VENTING OPTIONS

VENT OPTION #		1	2	3	
CLASSIFICATION USED IN THIS MANUAL		HORIZONTAL CONCENTRIC	HORIZONTAL TWIN PIPE	HORIZONTAL CONCENTRIC	
ILLUSTRATED IN FIGURE		7.2	7.3	7.2	
VENT PIPE PENETRATION THROUGH STRUCTURE		WALL	WALL	WALL	
AIR INTAKE PIPE PENETRATION THROUGH STRUCTURE		WALL	WALL	WALL	
VENT PIPE SIZE		60/100 mm CONCENTRIC	3"	80/125 mm CONCENTRIC	
AIR INTAKE PIPE SIZE			3"		
MAXIMUM LENGTH	VENT	BWC070	32ft	55ft	55ft
		BWC090	32ft	55ft	55ft
		BWC120	18ft	55ft	55ft
	INLET	BWC070	32ft	55ft	55ft
		BWC090	32ft	55ft	55ft
		BWC120	18ft	55ft	55ft
MINIMUM LENGTH	VENT	BWC070	10in	2ft	2ft
		BWC090	10in	2ft	2ft
		BWC120	10in	2ft	2ft
	INLET	BWC070	10in	2ft	2ft
		BWC090	10in	2ft	2ft
		BWC120	10in	2ft	2ft
VENT TERMINAL		60/100 mm CONCENTRIC	CROWN #230511	Crown 230531 CONCENTRIC or 230540 SNORKEL	
AIR INTAKE TERMINAL			3" 90 ELBOW		
VENT MATERIAL		CROWN 60/100mm VENT COMPONENTS SHOWN IN TABLE 7.4a (Note #1)	APPROVED STAINLESS STEEL VENT SYSTEM SHOWN IN TABLE 7.5	CROWN 80/125mm VENT COMPONENTS SHOWN IN TABLE 7.4b	
AIR INTAKE MATERIAL			GALVANIZED OR PVC		

Note #1: In Vent Option #1, the 80/125mm concentric straight section (PN 230515) shown in Table 7.4a may be used between the boiler and the first 80/125 x 60/100 reducing elbow. If this is done, the overall maximum vent length is still restricted to that shown for Vent Option #1 in Table 7.1 above.



**TABLE 7.4a: CROWN CONCENTRIC 60/100 VENT COMPONENTS  
(VENT OPTION 1)**

CROWN PN	DESCRIPTION	SIZE	USED ON VENT OPTION #	COMMENTS
230521	80/125 x 60/100mm REDUCING ELBOW	80/125 x 60/100mm	1	INCLUDED WITH STANDARD BOILER
230520	TERMINAL SECTION	60/100mm	1	INCLUDED WITH STANDARD BOILER
230522	WALL GROMMET	60/100mm	1	INCLUDED WITH STANDARD BOILER
230505	39" STRAIGHT	60/100mm	1	OPTIONAL - MAY NOT BE CUT
230504	78" STRAIGHT	60/100mm	1	OPTIONAL - MAY NOT BE CUT
230506	19 1/2" STRAIGHT	60/100mm	1	OPTIONAL - CAN BE CUT
230507	90 DEGREE ELBOW	60/100mm	1	OPTIONAL
230508	45 DEGREE ELBOW	60/100mm	1	OPTIONAL
230515	39" STRAIGHT	80/125mm	1	OPTIONAL - CAN BE CUT (Note #1)

Note #1: On 60/100mm vent systems, this may only be used between the boiler and the first 80/125 x 60/100 Reducing elbow (see text).

**TABLE 7.4b: CROWN CONCENTRIC 80/125 VENT COMPONENTS  
(VENT OPTIONS 3,6)**

CROWN PN	DESCRIPTION	SIZE	USED ON VENT OPTION #	COMMENTS
230527	90 DEGREE EL (STANDARD)	80/125mm	3,6	
230528	90 DEGREE EL (SWEEP)	80/125mm	3,6	
230526	45 DEGREE EL	80/125mm	3,6	
230517	19 1/2" STRAIGHT	80/125mm	3,6	CAN BE CUT
230515	39" STRAIGHT	80/125mm	3,6	CAN BE CUT
230518	39" STRAIGHT	80/125mm	3,6	MAY NOT BE CUT
230519	78" STRAIGHT	80/125mm	3,6	MAY NOT BE CUT
230525	TELESCOPING STRAIGHT	80/125mm	3,6	ADJUSTABLE FROM 12-1/2" TO 16-1/2"
230531	HORIZONTAL TERMINAL	80/125mm	3	
230540	SNORKEL KIT	80/125mm	3	(NOTE #1)
230532	VERTICAL TERMINAL	80/125mm	6	(NOTE #2)
230533	FLAT ROOF FLASHING	80/125mm	6	
230535	SLOPED ROOF FLASHING	80/125mm	6	(NOTE #3)
230530	SUPPORT ELBOW WITH CHIMNEY CHASE BRACKET	80/125mm	6	(NOTE #4)
230536	SUPPORT BAND	80/125mm	3,6	

Table 7.4b Notes:

- 1) Snorkel kit includes parts needed to offset terminal on exterior wall by up to 46".
- 2) Vertical terminal can be used with either of the roof flashings listed beneath it.
- 3) Sloped roof flashing suitable for roof angles between 25 and 45 degrees.
- 4) Used at base of vertical run inside unused masonry chimney.

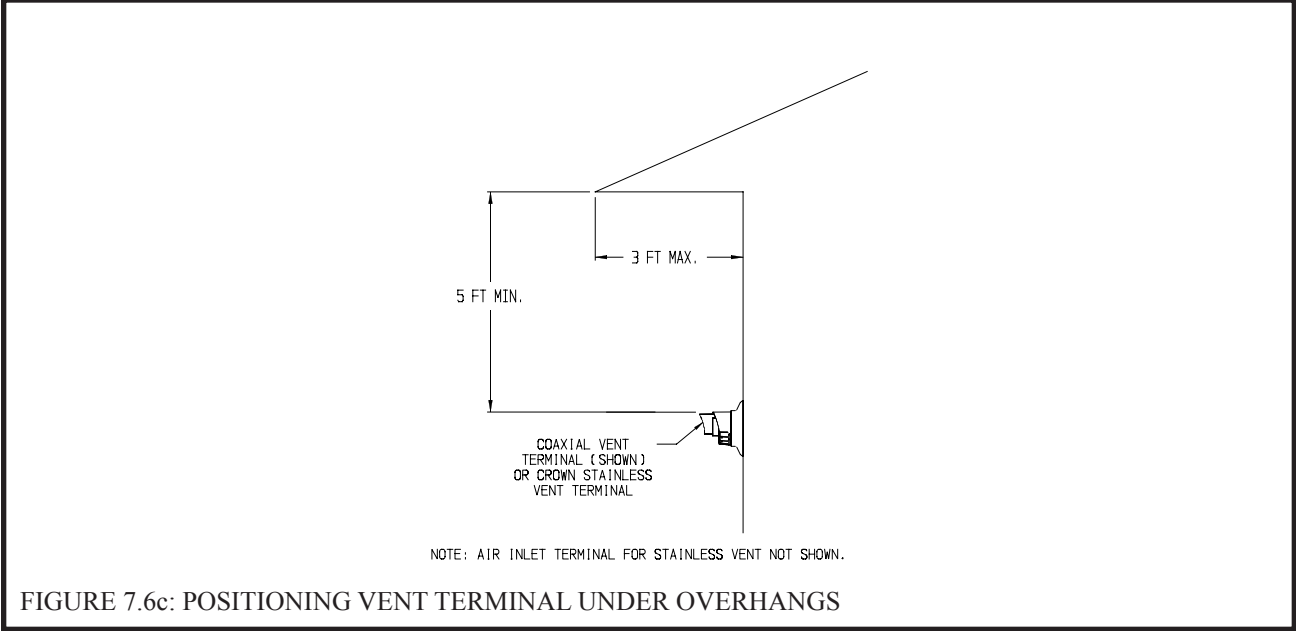
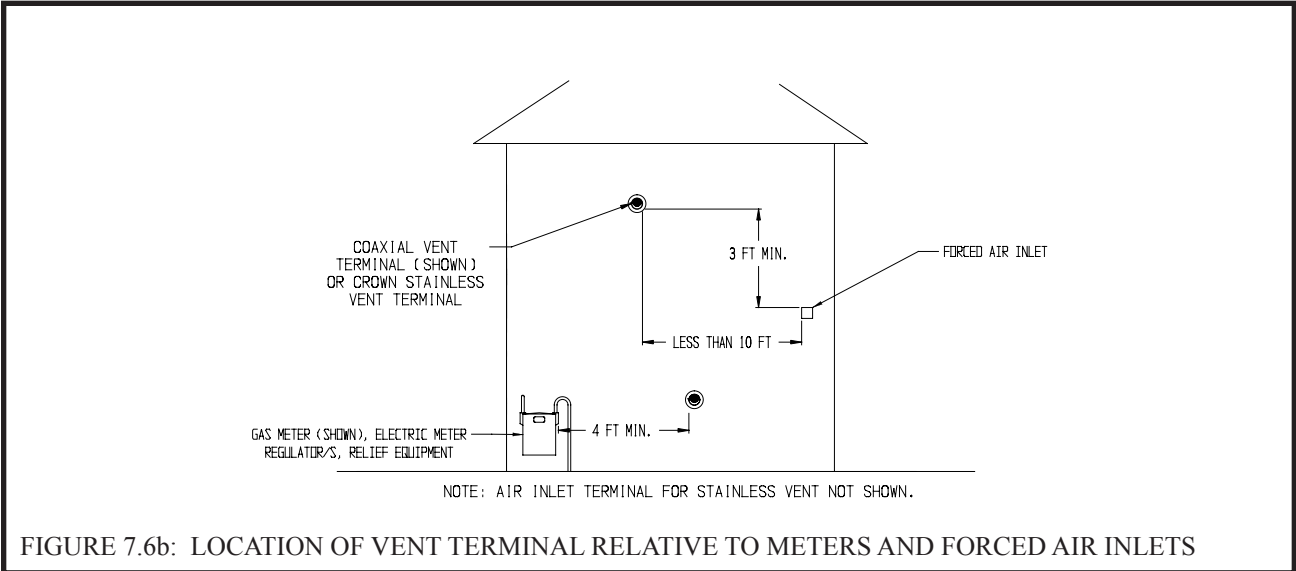
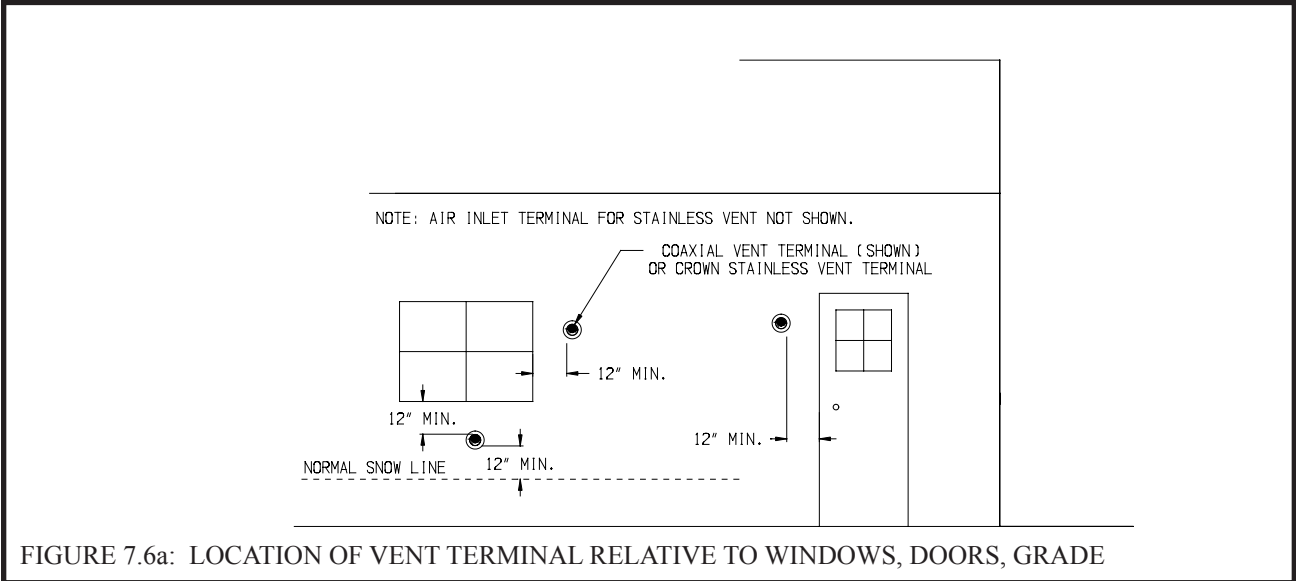
- 6) Permitted Terminals for Vertical Venting -
- **Vent Option 5** - A straight termination is installed in the end of the vent pipe. Vent manufacturer part numbers for these screens are shown in Table 7.5. The air inlet terminal consists of a 180 degree elbow (or two 90 degree elbows) with a rodent screen as shown in Figure 7.10.
  - **Vent Option 6** - Use Crown PN 230532 with the appropriate flashing (Table 7.4b)
- 7) Vertical Vent Terminal Locations (Vent Options 5,6) - Observe the following limitations on the location of all vertical vent terminals (see Figures 7.10, 7.11):
- The top of the vent pipe must be at least 2 feet above any object located within 10 feet.
  - For Vent Option #5, the vertical distance between top of the vent and air inlet terminal openings must be at least 12”.
  - The bottom of the air inlet terminal must be at least 12” above the normal snow accumulation that can be expected on the roof. The terminal used in Vent Option #6 has a fixed distance above the storm collar of 19”. If a greater distance is needed to provide the clearance above the snow line, build a chase on the roof and mount the vertical terminal on top of the chase.
  - For Vent Option #5, the air intake terminal must be located on the roof and must be no further than 24” horizontally from the exhaust pipe.
- 8) Wall thimbles – Wall thimbles are required where single wall vent pipe passes through combustible walls with less than the required clearance shown in Table 4.2 or as required by local codes. Stainless vent manufacturer’s wall thimble part numbers are shown in Table 7.5. Note that concentric vent has a “zero” clearance to combustibles and therefore does not require the use of wall thimbles.

**TABLE 7.5: PERMISSIBLE STAINLESS STEEL VENT SYSTEMS  
AND PRINCIPLE VENT COMPONENTS  
(VENT OPTIONS 2, 5)**

MANUFACTURER	VENT SYSTEM	SIZE	COMPONENT	PART NUMBER
HEAT FAB	SAF-T VENT EZ SEAL	3	BOILER COLLAR	CROWN 230510
		3	WALL THIMBLE	HEAT FAB 7393, 7393GCS, 5391CI
		3	HORIZONTAL TERMINAL	CROWN 230511
		3	VERTICAL TERMINAL	HEAT FAB 9392
PROTECH SYSTEMS INC.	FASNSEAL	3	BOILER COLLAR	CROWN 230510
		3	WALL THIMBLE	FSWT3
		3	HORIZONTAL TERMINAL	CROWN 230511
		3	VERTICAL TERMINAL	FSBS3
Z-FLEX	SVE SERIES III ("Z-VENT III")	3	BOILER COLLAR	CROWN 230510
		3	WALL THIMBLE	2SVSWTEF03
		3	HORIZONTAL TERMINAL	CROWN 230511
		3	VERTICAL TERMINAL	24SVSTPF03
METAL-FAB	CORR/ GUARD	3	BOILER COLLAR	CROWN 230510
		3	WALL THIMBLE	CGSWWPK(3")
		3	HORIZONTAL TERMINAL	CROWN 230511
		3	VERTICAL TERMINAL	CGSWHTM(3")

NOTES:

- 1) See vent system manufacturer’s literature for other part numbers that are required such as straight pipe, elbows, firestops and vent supports.
- 2) Crown 230510 collar replaces factory-mounted concentric collar (Figure 7.16).





9) Pitch of Horizontal Piping - Pitch all horizontal piping so that any condensate which forms in the piping will run towards the boiler:

- Pitch Crown horizontal concentric venting 5/8" per foot
- Pitch Stainless steel venting 1/4" per foot.

10) Supporting Pipe - Vertical and horizontal sections of pipe must be properly supported:

- Support Crown concentric venting near the female end of each straight section of pipe.

Exception: Vertical runs of concentric pipe in an unused chimney (Figure 7.36) need only be supported at the terminal and at the base of the run.

- Support stainless steel venting as called for by the vent manufacturer's instructions.

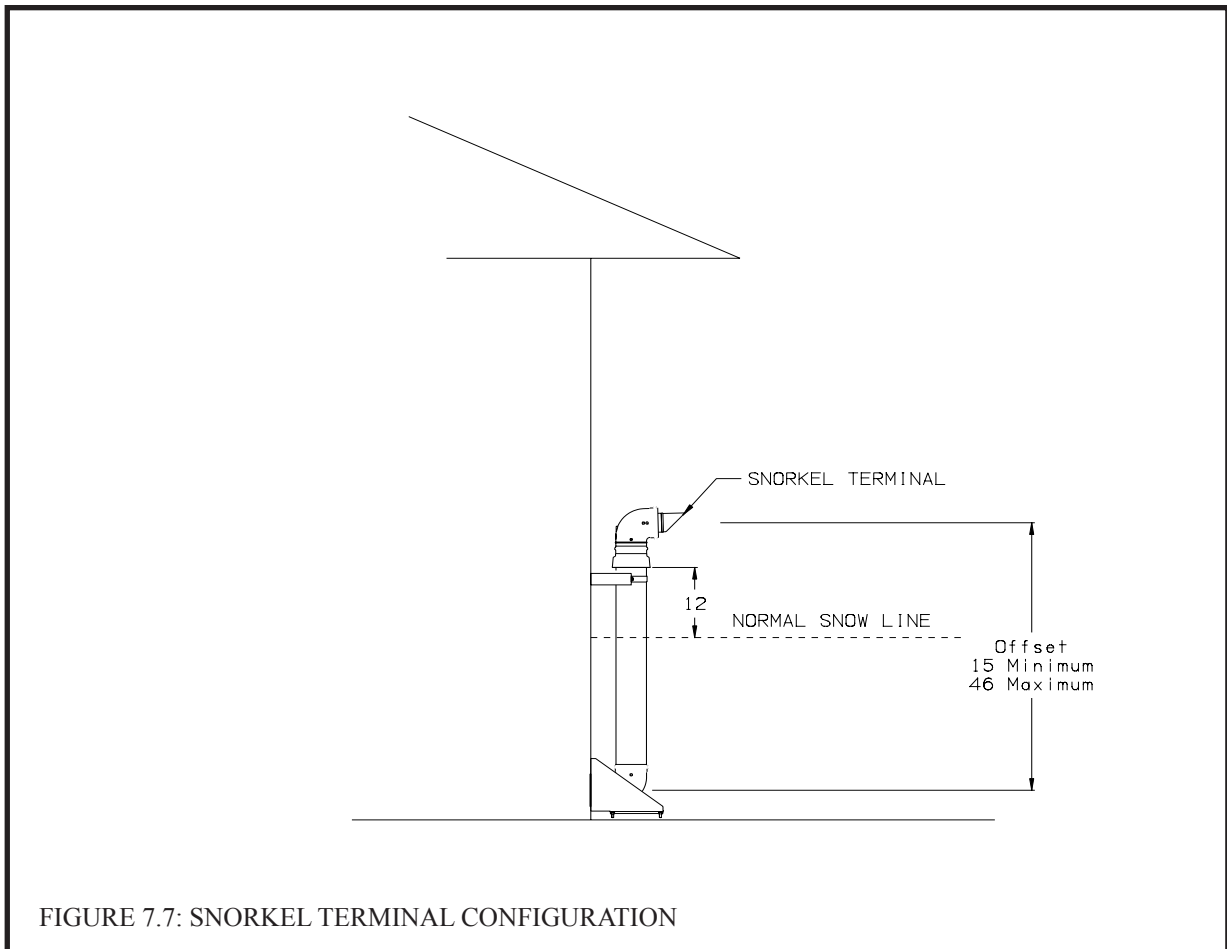


FIGURE 7.7: SNORKEL TERMINAL CONFIGURATION

TABLE 7.8: VENT/ AIR INTAKE FITTING EQUIVALENT LENGTH

VENT FITTING	EQUIVALENT LENGTH (ft)
60/100mm 90° CONCENTRIC ELBOW	4.5
60/100mm 45° CONCENTRIC ELBOW	4.0
80/125mm 90° CONCENTRIC ELBOW	8.5
80/125mm 90° SWEEP CONCENTRIC ELBOW	5.5
80/125mm 45° CONCENTRIC ELBOW	3.0
80/125mm 90° CONCENTRIC SUPPORT ELBOW	8.5
3" SINGLE WALL 90° ELBOW	5.5
3" SINGLE WALL 45° ELBOW	4.0

TABLE 7.9: SUMMARY OF VERTICAL VENTING OPTIONS

VENT OPTION #		5	6	
CLASSIFICATION USED IN THIS MANUAL		VERTICAL TWIN PIPE	VERTICAL CONCENTRIC	
ILLUSTRATED IN FIGURE		7.10	7.11	
VENT PIPE PENETRATION THROUGH STRUCTURE		ROOF	ROOF	
AIR INTAKE PIPE STRUCTURE THROUGH STRUCTURE		ROOF	ROOF	
VENT PIPE SIZE		3"	80/125 mm CONCENTRIC	
AIR INTAKE PIPE SIZE		3"		
MAXIMUM LENGTH	VENT	BWC070	49.5ft	49.5ft
		BWC090	49.5ft	49.5ft
		BWC120	49.5ft	49.5ft
	INLET	BWC070	49.5ft	49.5ft
		BWC090	49.5ft	49.5ft
		BWC120	49.5ft	49.5ft
MINIMUM LENGTH	VENT	BWC070	2ft	2ft
		BWC090	2ft	2ft
		BWC120	2ft	2ft
	INLET	BWC070	2ft	2ft
		BWC090	2ft	2ft
		BWC120	2ft	2ft
VENT TERMINAL		STRAIGHT TERMINAL BY VENT SYSTEM MFR. (TABLE 7.5)	CROWN #230532 CONCENTRIC TERMINAL (TABLE 7.4b)	
AIR INTAKE TERMINAL		3" 180° ELBOW (FIGURE 7.10)		
VENT MATERIAL		APPROVED STAINLESS STEEL VENT SYSTEM	CROWN 80/125 mm VENT COMPONENTS SHOWN IN TABLE 7.4b	
AIR INTAKE MATERIAL		GALVANIZED OR PVC		

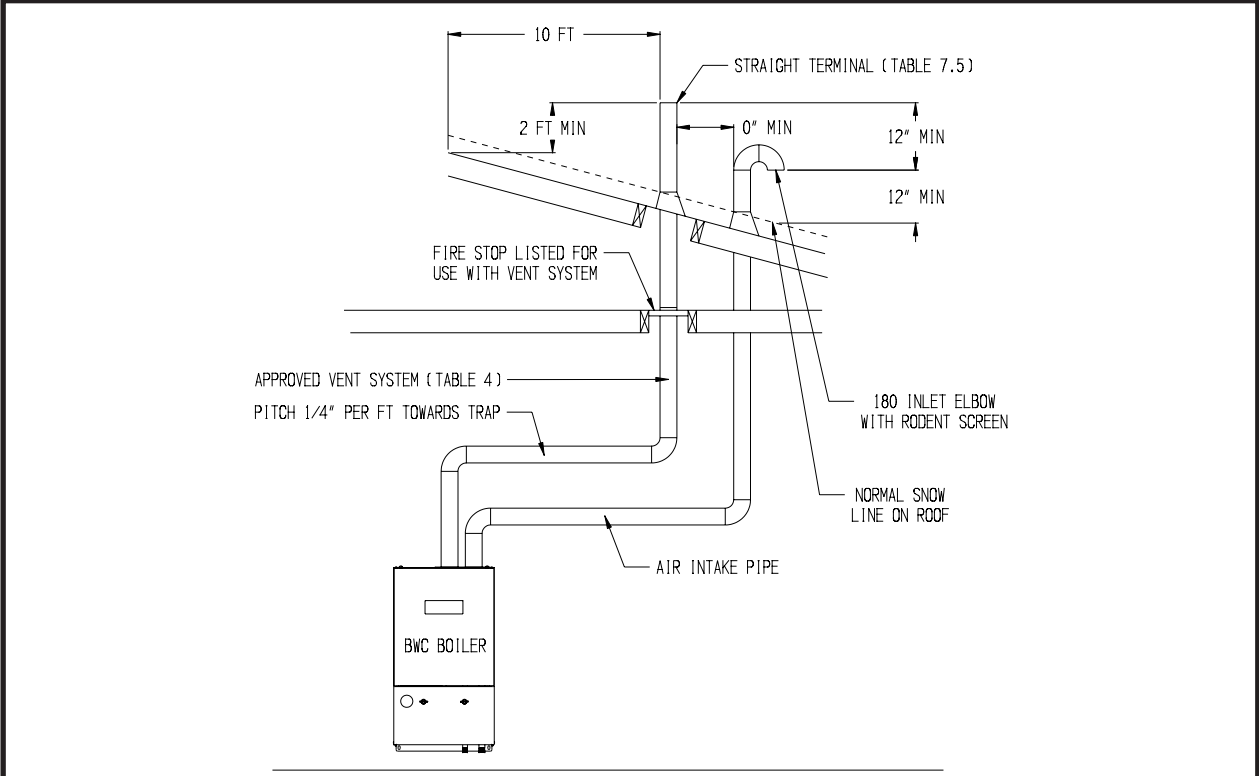


FIGURE 7.10: VERTICAL TWIN PIPE VENT SYSTEM (VENT OPTION 5)

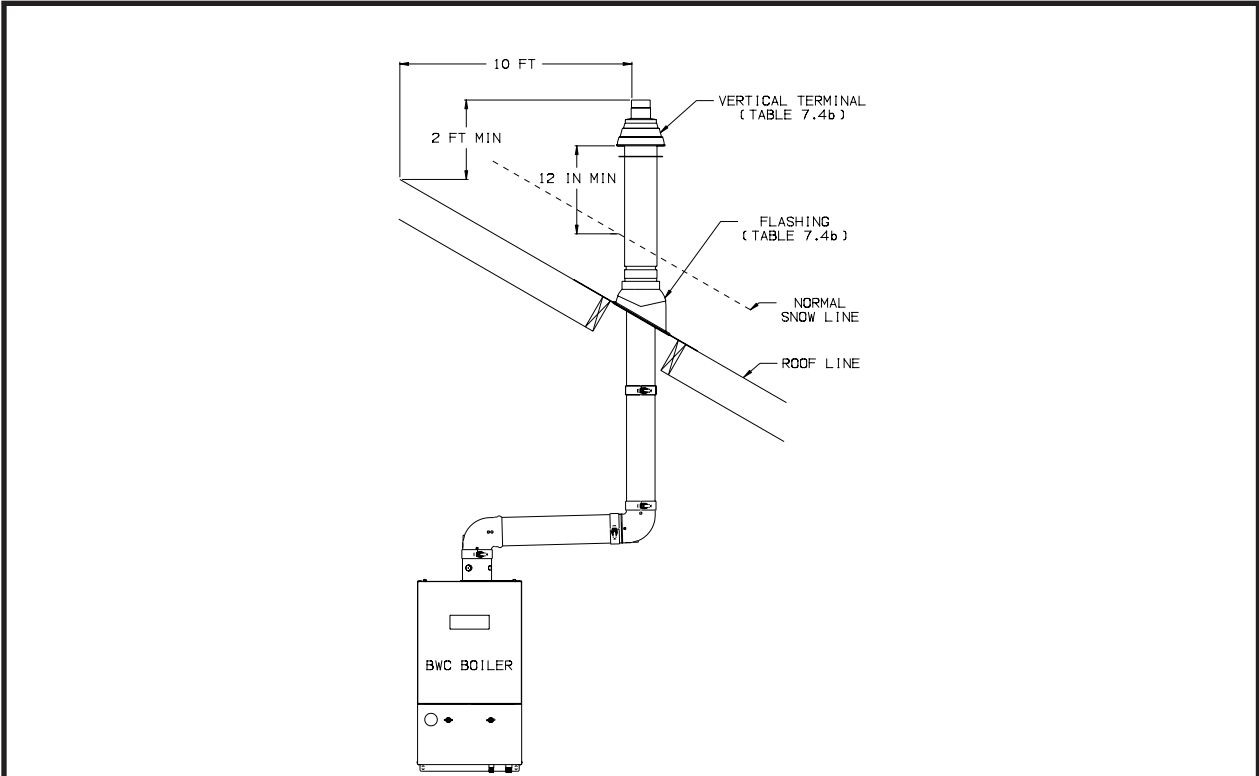


FIGURE 7.11: VERTICAL CONCENTRIC VENT SYSTEM (VENT OPTION 6)

## B. Removing an Existing Boiler From a Common Chimney

Read this only if the BWC boiler is replacing an existing boiler that is being removed from a common chimney. This section does not apply to the installation of a BWC boiler.

In some cases, when an existing boiler is removed from a common chimney, the common venting system may be too large for 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.

- (a) Seal any unused openings in the common venting system.
- (b) 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.
- (c) Insofar as practical, close all building doors and windows and all doors between the space in which all 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.
- (d) Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so the appliance will operate continuously.
- (e) Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
- (f) 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 appliances to their previous condition of use.
- (g) Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1. When re-sizing any portion of the common venting system, the common venting system should be re sized to approach the minimum size as determined using the appropriate tables in Part 11 of the National Fuel Gas Code, ANSI Z223.1.

### WARNING

NEVER COMMON VENT A BWC BOILER WITH OTHER APPLIANCES.

## C. Assembly of Crown 60/100mm Concentric Venting

(IMPORTANT - Skip to Section D for 80/125mm Concentric Vent Assembly)

### WARNING

Failure to follow the instructions could result in flue gas leakage into the combustion air or indoor air, resulting in unsafe or unreliable operation.

- Do not lubricate concentric gaskets with anything other than water.
- Do not attempt to cut any piping except as permitted in this section. When cutting these sections, make sure all cuts are square and allow for proper insertion.
- Do not attempt to try to mix this concentric pipe with other venting systems.

- 1) Concentric vent components supplied with the boiler are packed inside the boiler carton and include the following:
  - a) 80/125 x 60/100mm reducing elbow (Crown PN 230521).
  - b) 60/100mm terminal section (straight section with a terminal and overall length of 27 3/4" (Crown PN 230520).
  - c) Two (2) Rubber wall grommets (Crown PN 230522).
- 2) Unless the 80/125 straight riser (PN 230515) is used, start by attaching the reducing elbow to the boiler collar. To do so, remove the clamp from the large end of the reducing elbow and set aside. Apply a small amount of water to the brown gasket on the boiler collar. Push the elbow onto the boiler collar until the bead on the elbow contacts the top edge of the collar (Figure 7.20).
- 3) Reinstall the clamp removed in Step (2) so that the elbow is secured to the boiler collar.
- 4) If no additional sections of concentric pipe are required, attach the terminal section to the elbow. In most cases, it will need to be cut before doing so. Use the following procedure to cut the pipe:
  - a) Measure distance "L" from the outside surface of the exterior wall to the end of the elbow as shown in Figure 7.21.
  - b) Add 2-1/8" to distance "L". Carefully mark this length on the pipe as shown in Figure 7.22.
  - c) Press in the two tabs holding the plastic terminal in the terminal section (Figure 7.22). Carefully pull out the terminal and the inner pipe.
  - d) Cut the **outer pipe only** at the point marked in Step (b) 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.
  - e) Cut the plastic inner pipe so that it will protrude 3/8" beyond the outer pipe when reinstalled in the terminal section (Figure 7.23). Use a fine tooth hacksaw or a PVC saw 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, razor blade, or fine sandpaper.
  - f) Reinstall the inner pipe in the terminal section. Slip the outside wall grommet over the terminal section and position so that it covers the joint between the outer pipe and the terminal (Figure 7.24).
  - g) Make a mark on the terminal section 1" from the cut end of the outer pipe as shown in Figure 7.24.
  - h) Pass the terminal section through the wall from the outside. Push the remaining wall grommet over the terminal section on the inside of the wall. Push the terminal section into the elbow until the mark made in Step (g) is no longer visible. If necessary, the brown gasket in the inner pipe may be lubricated with a few drops of water.
  - i) The terminal section must be attached to the elbow with a single #10 x 1/2" sheet metal screw (not supplied) at the top of the elbow. Drill a 1/8" hole in the location shown in Figure 7.25. **Use a short drill bit or a drill stop to ensure that the drill bit does not penetrate the pipe by more than 3/8"**. Install a #10 x 1/2" screw in this hole. **Do not use a screw longer than 1/2" long.**
  - j) If not already done, make sure that both wall grommets are firmly against the interior and exterior wall surfaces. Seal any cracks or other openings near the terminal through which exhaust could enter the building.
- 5) If additional pieces of pipe are used, install them starting at the boiler elbow. Support each section of straight pipe at its female end.

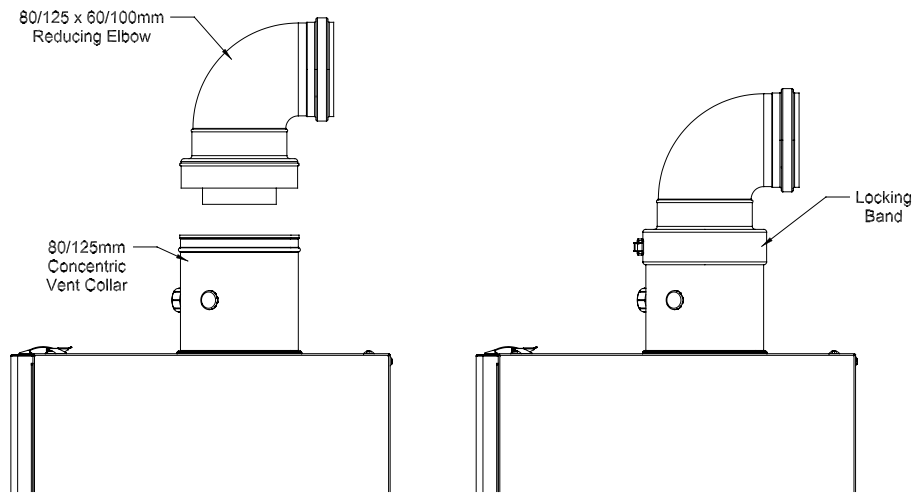


FIGURE 7.20: INSTALLATION OF REDUCING ELBOW ON CONCENTRIC BOILER COLLAR

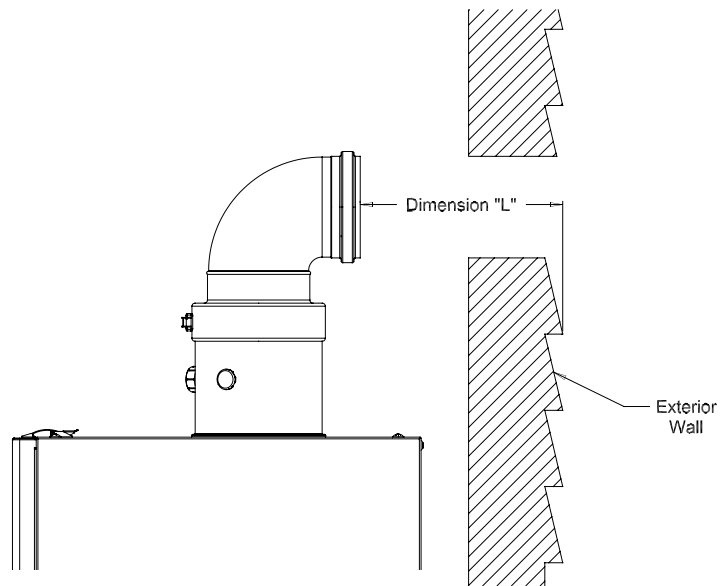
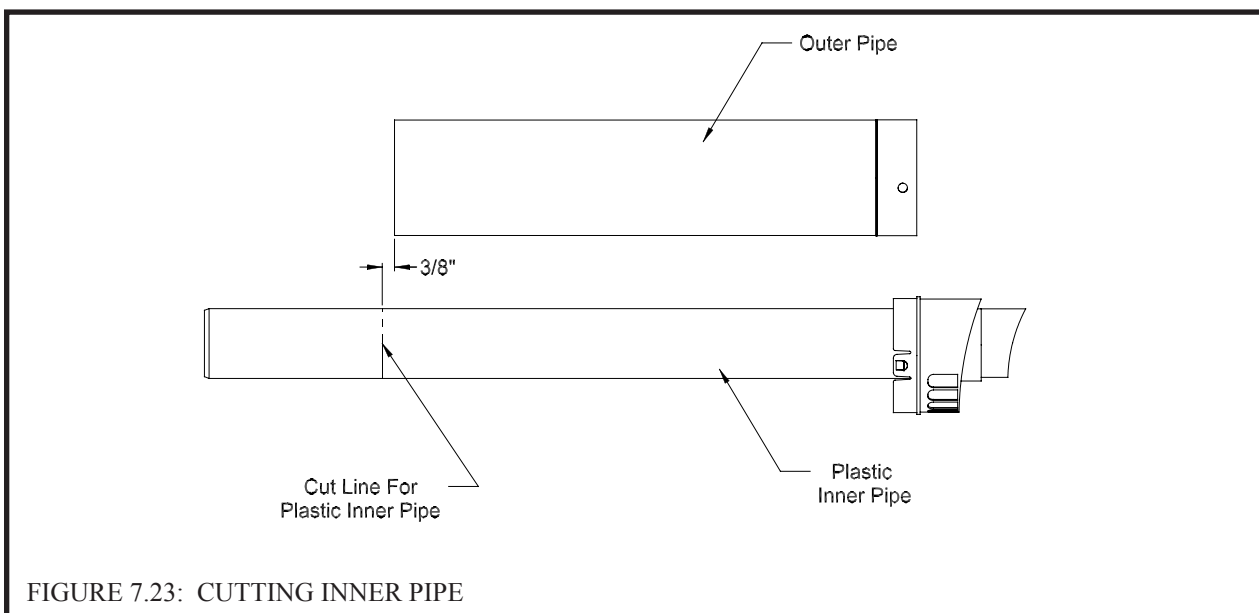
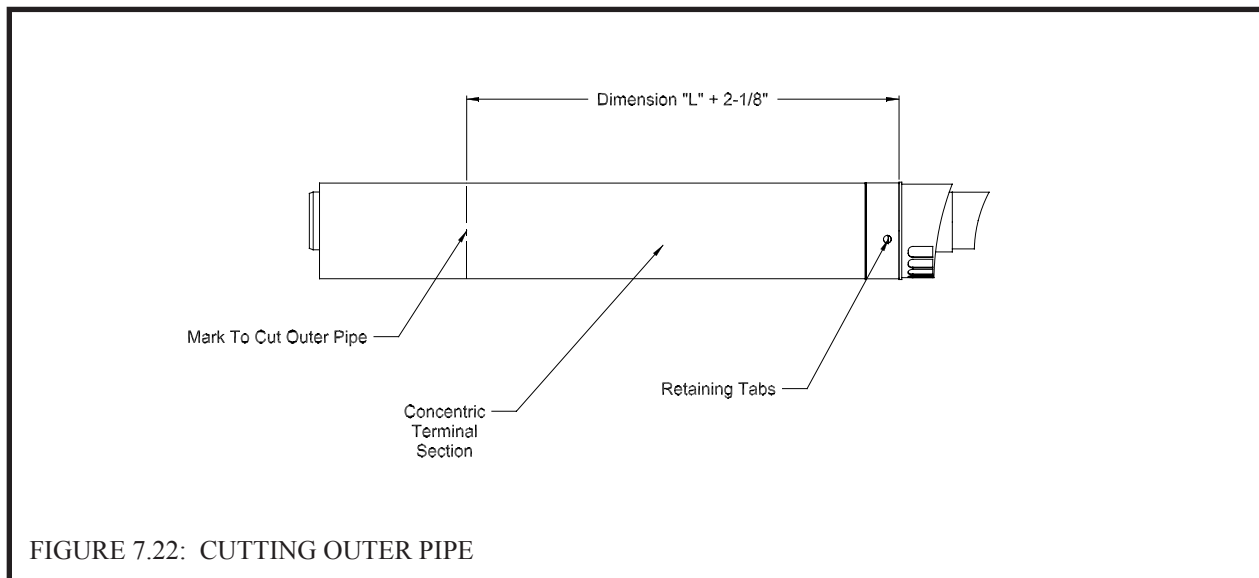


FIGURE 7.21: DIMENSION "L"

- 6) Use locking bands provided to join adjacent sections of non-cuttable pipe as well as fittings. The male end of the terminal section and other cuttable sections must be held to the female end of the adjoining pipe with at least three #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".**
- 7) The only straight pipe that can be cut is the terminal section, the 19-1/2" section (Crown PN 230506) and the 80/125 straight riser (PN230515). To cut this pipe:
- Cut pipe from the male end. After marking the desired length of the outer pipe, remove the plastic inner pipe by pulling it out from the female end.
  - Cut the **outer pipe only** at the point marked in Step (b) 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.
  - Cut the plastic inner pipe so that it will protrude 3/8" beyond 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 pipe square. De burr the cut edge of the plastic pipe with a file, razor blade, or fine sandpaper.
  - Reinstall the inner pipe.
- 8) Install the terminal as outlined in Step (4) above. Dimension "L" described in Step 4 is the distance from the exterior surface of the wall to the end of the last piece of pipe inside the building.



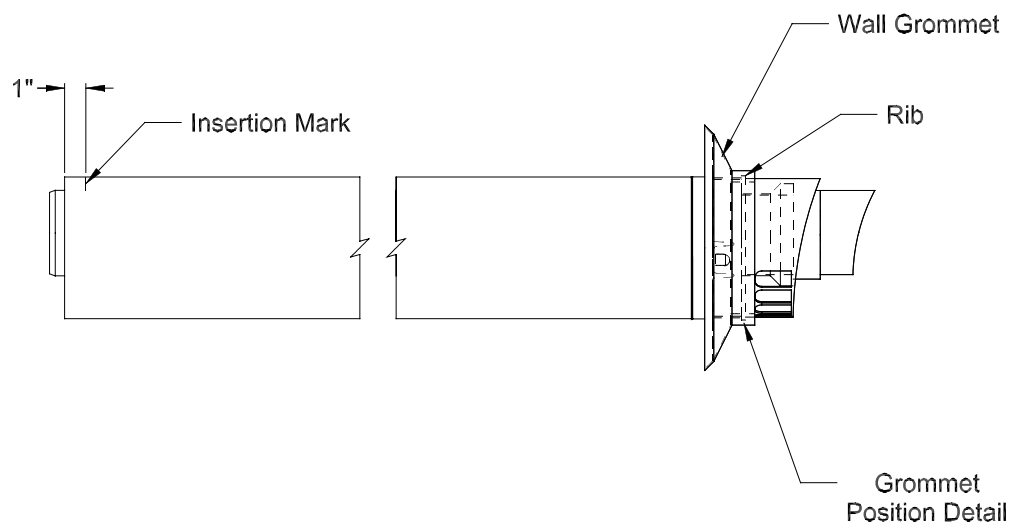


FIGURE 7.24: PREPARING 60/100mm TERMINAL SECTION FOR INSTALLATION IN THE WALL

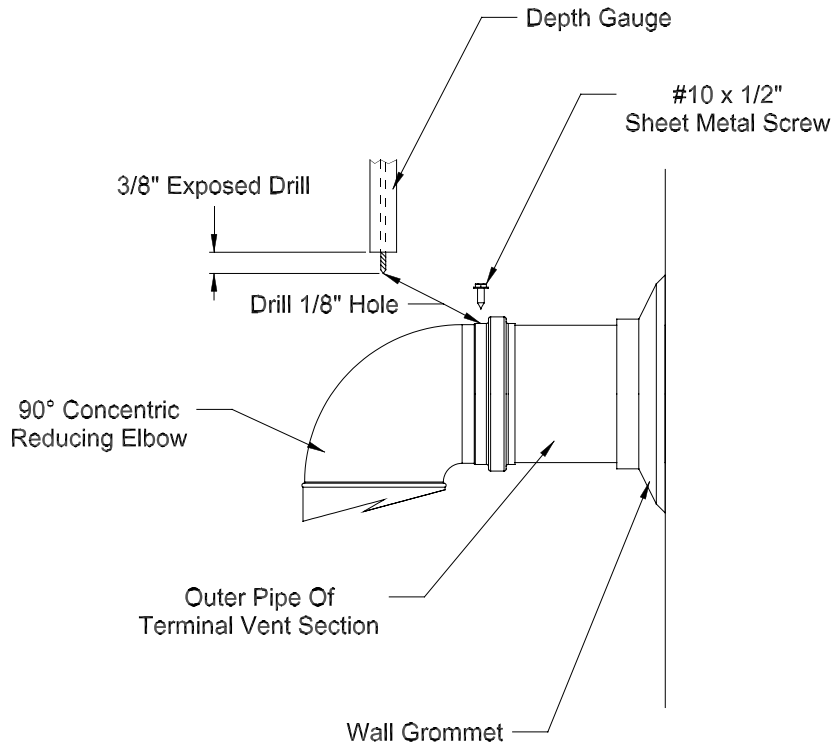


FIGURE 7.25: ATTACHING 60/100mm TERMINAL SECTION



D. Assembly of Crown 80/125mm Concentric Venting  
(IMPORTANT - See Section C for 60/100mm Concentric Vent Assembly)

**WARNING**

Failure to follow the instructions could result in flue gas leakage into the combustion air or indoor air, resulting in unsafe or unreliable operation.

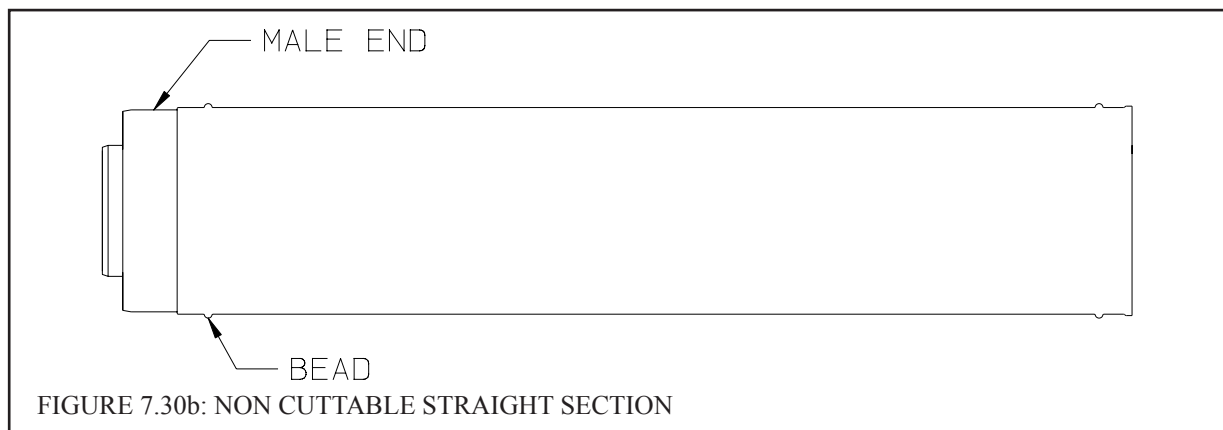
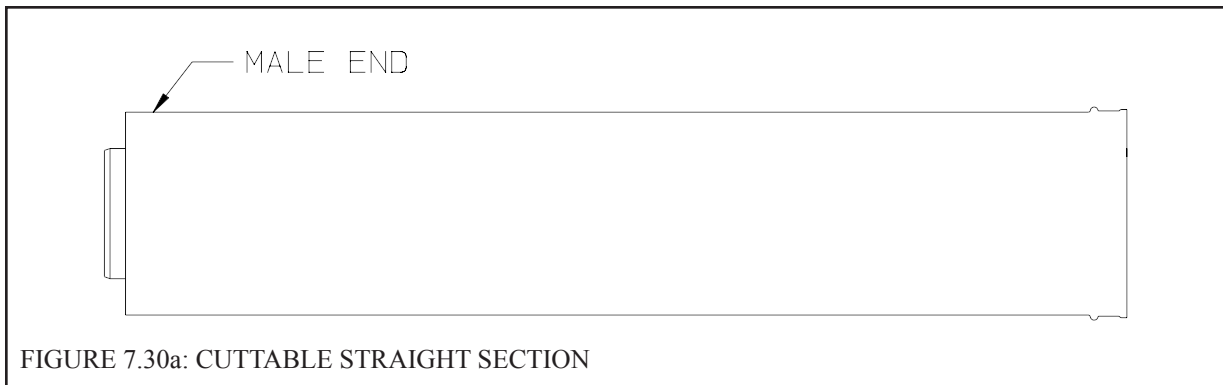
- Do not lubricate concentric gaskets with anything other than water.
- Do not attempt to cut any piping except as permitted in this section. When cutting these sections, make sure all cuts are square and allow for proper insertion.
- Do not attempt to try to mix this concentric pipe with other venting systems.

1) The 60/100mm terminal section and concentric reducing elbow supplied with the boiler are not used in 80/125mm vent systems. The components listed in Table 7.4b are required for 80/125mm installations and are not supplied with the boiler. Before starting assembly of an 80/125mm vent system, make sure that the planned installation is in accordance with the “Vent System Design” section of this manual and that all required 80/125mm vent components are on hand. These components are available through Crown distributors.

2) Cutting Straight Pipe - The following straight pipe sections may be cut:

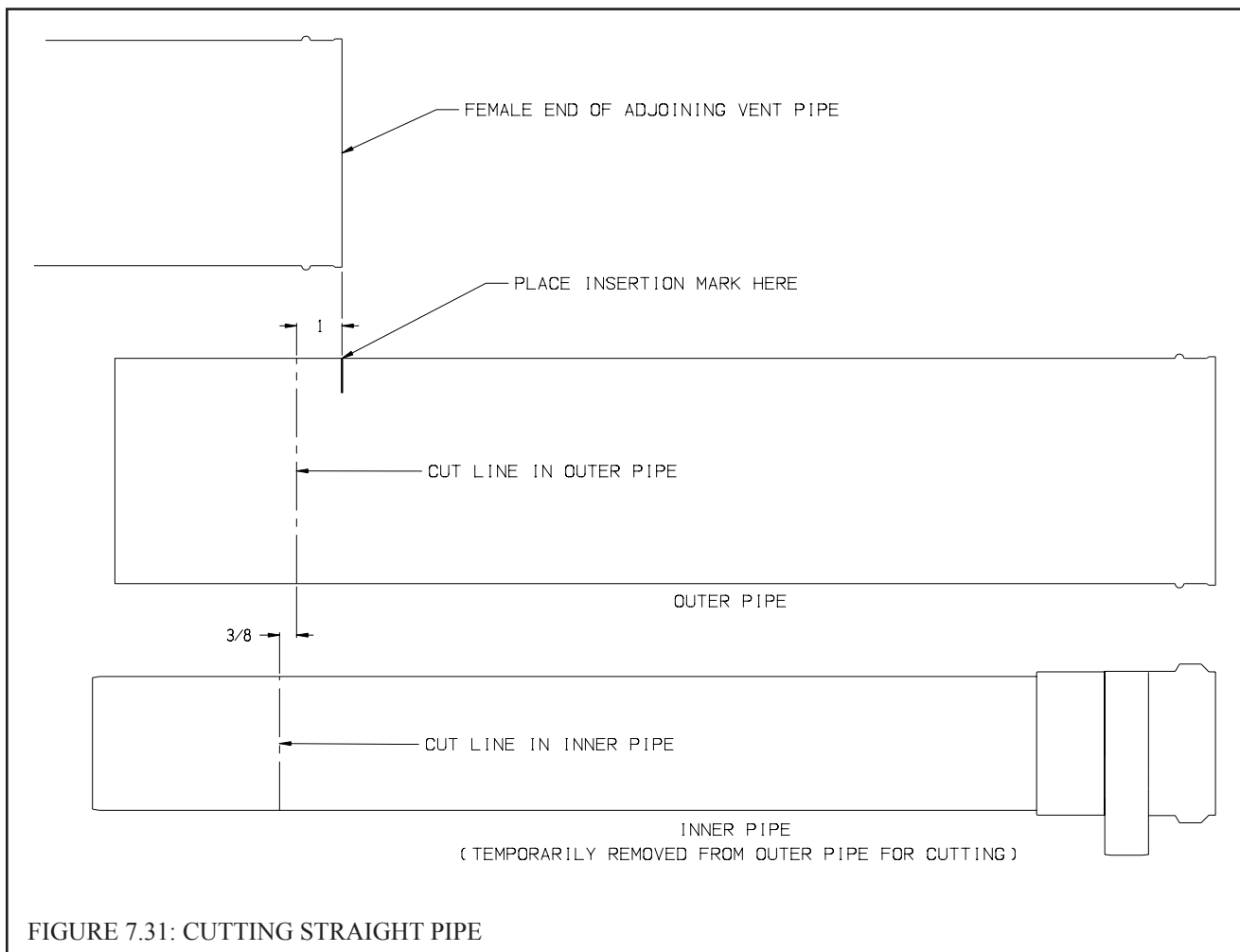
Part #	Description
230517	19 1/2” Straight
230515	39” Straight

These sections have a plain male end (without beads - see Figure 7.30a). They are always cut from the male end. Sections not shown on the above list may not be cut. These sections have beads on the male end (Figure 7.30b).



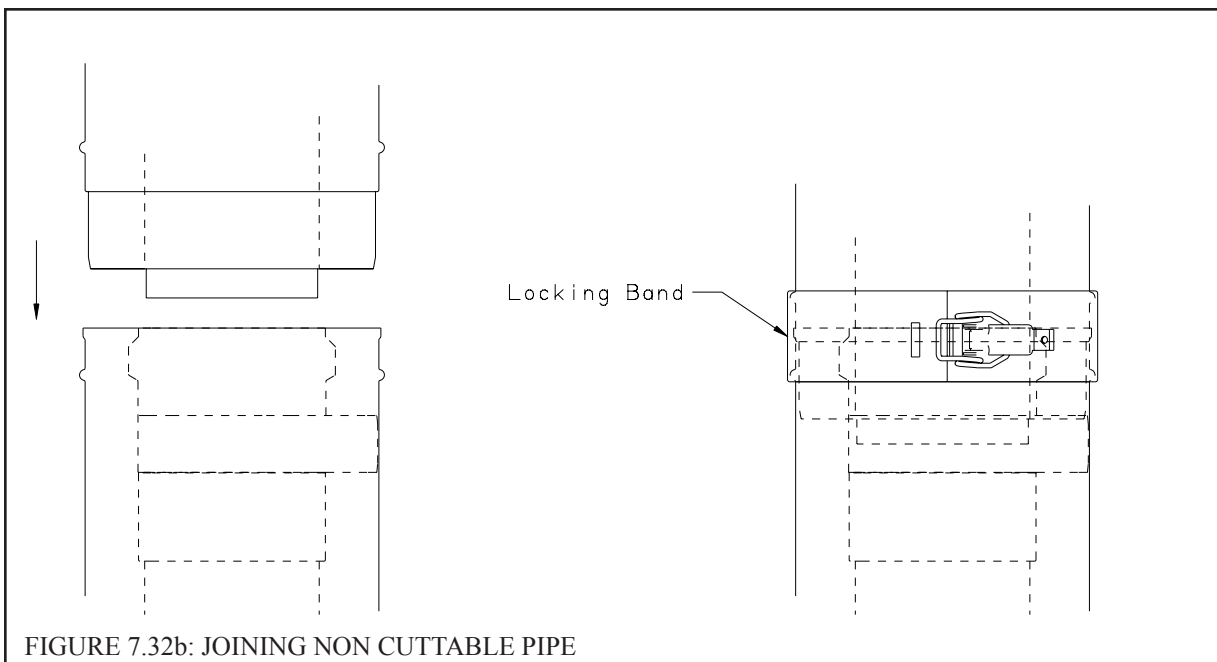
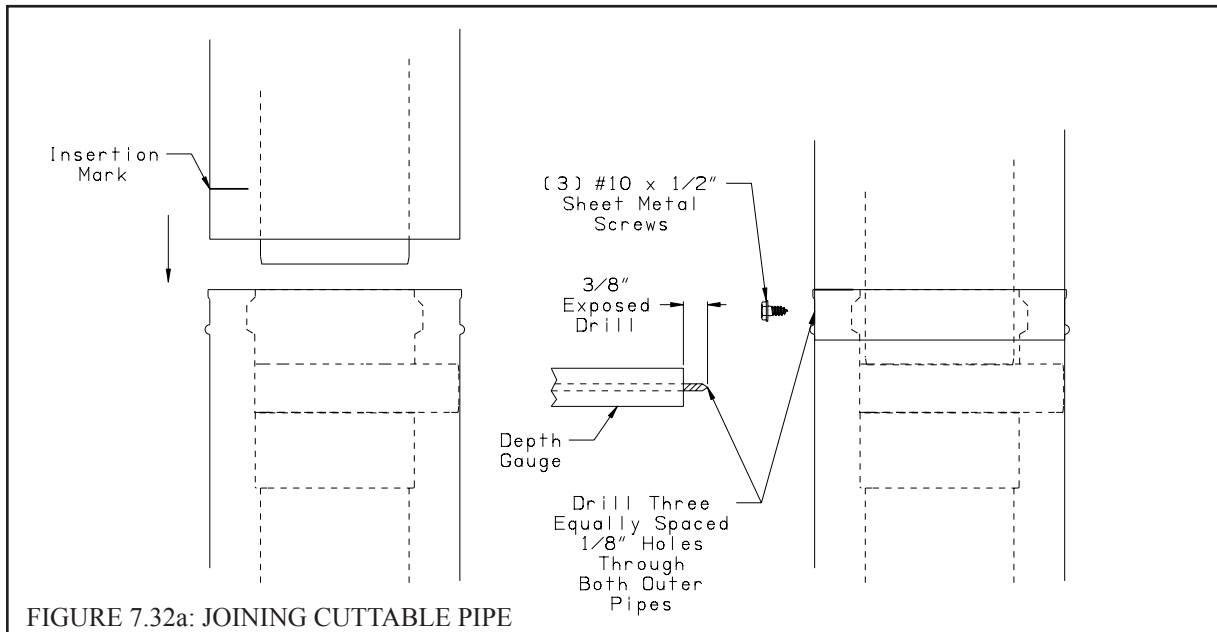
To cut the straight sections listed above refer to Figure 7.31 and the following instructions:

- a) 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.
- b) Remove the plastic inner pipe by pulling it out from the female end.
- c) 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.
- d) Make an insertion mark 1" from the male end of the outer pipe.
- e) 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 pipe square. De burr the cut edge of the plastic pipe with a file, razor blade, or fine sandpaper.
- f) Reinstall the inner pipe.



### 3) Joining Pipe -

- a) Start assembly of the vent system at the boiler. Lubricate the brown gasket in the boiler vent collar with a few drops of water.
- b) 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 2d above) is covered. On other fittings, the bead on the male pipe will be bottom out on the collar (Figure 32).
- c) The male end of cuttable fittings must be held to the collar with three #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"** (Figure 7.32a).
- d) Use locking bands (provided with all fittings) to secure non-cuttable pipe, as well as fittings, to the boiler collar (Figure 7.32b).
- e) Use the same method to join all remaining vent components except for the terminal.



#### 4) 80/125mm Horizontal Terminal Installation -

- a) Cut a 5-1/2" diameter hole through the exterior wall at the planned location of the horizontal terminal.
- b) Measure distance "L" from the outside surface of the exterior wall to the end of the last fitting as shown in Figure 7.33a.
- c) Add 1-1/4" to distance "L". Carefully mark this length on the pipe as shown in Figure 7.33b.
- d) Remove the plastic inner pipe from the terminal, by gently pulling on it from the male end. Set aside.
- e) Cut the **outer pipe only** at the point marked in Step (c) 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 emory cloth.
- f) Reinstall the plastic inner pipe in the terminal, making sure that the female end of this pipe is completely bottomed out over the aluminum male connection visible behind the air intake grill. Place a mark on the plastic inner pipe 3/8" beyond the end of the outer pipe (Figure 7.33c). Use a fine tooth hacksaw or a PVC saw to cut the plastic pipe and be careful to cut the pipe square (if necessary, the plastic pipe can be removed from the terminal again for cutting). De-burr the cut edge of the plastic pipe with a file, razor blade, or fine sandpaper.
- g) Make a mark on the terminal section 1" from the cut end of the outer pipe as shown in Figure 7.33c.
- h) Slip the terminal section through the wall from the outside. Pass the terminal through the inner wall plate and push into the last section of vent pipe until the mark made in Step (h) is not longer visible (Figure 7.33d). 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".**
- i) Slip the outer wall plate over the terminal and secure to the wall (Figure 7.33d). Apply a 1/8" bead of weather resistant RTV over the joint between the outside wall plate and the terminal. Secure the other wall plate to the inside wall.

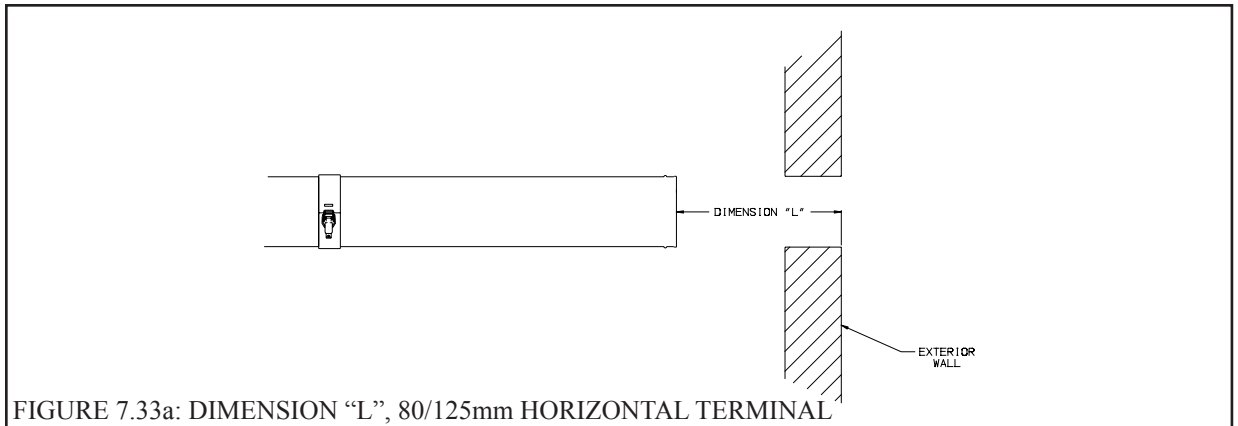


FIGURE 7.33a: DIMENSION "L", 80/125mm HORIZONTAL TERMINAL

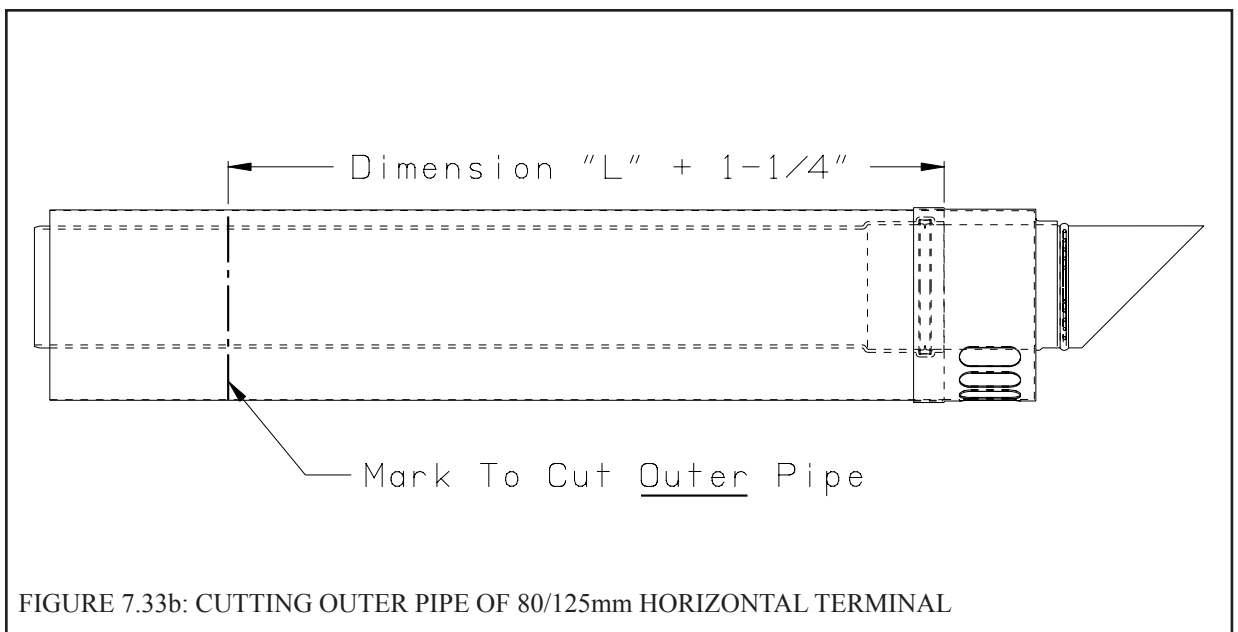
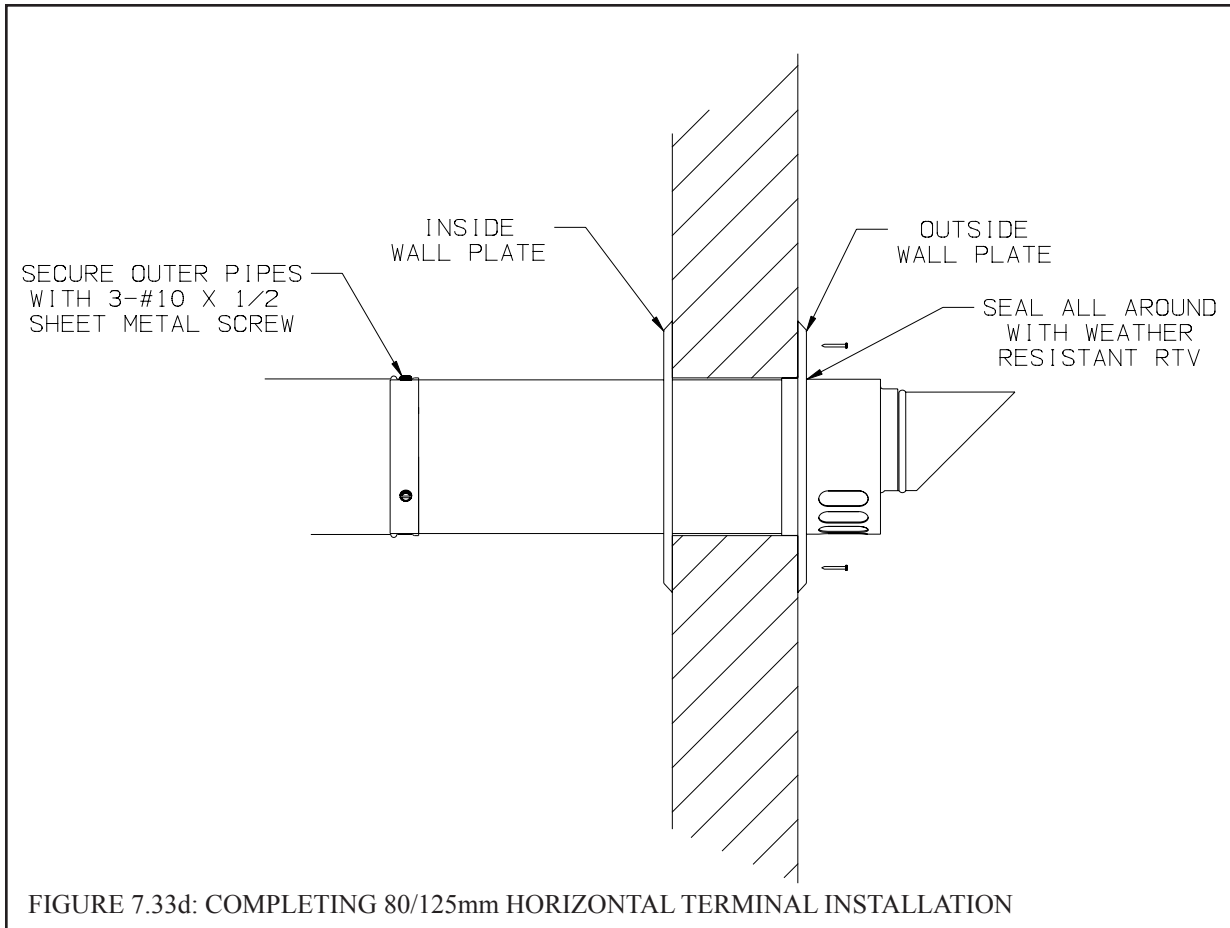
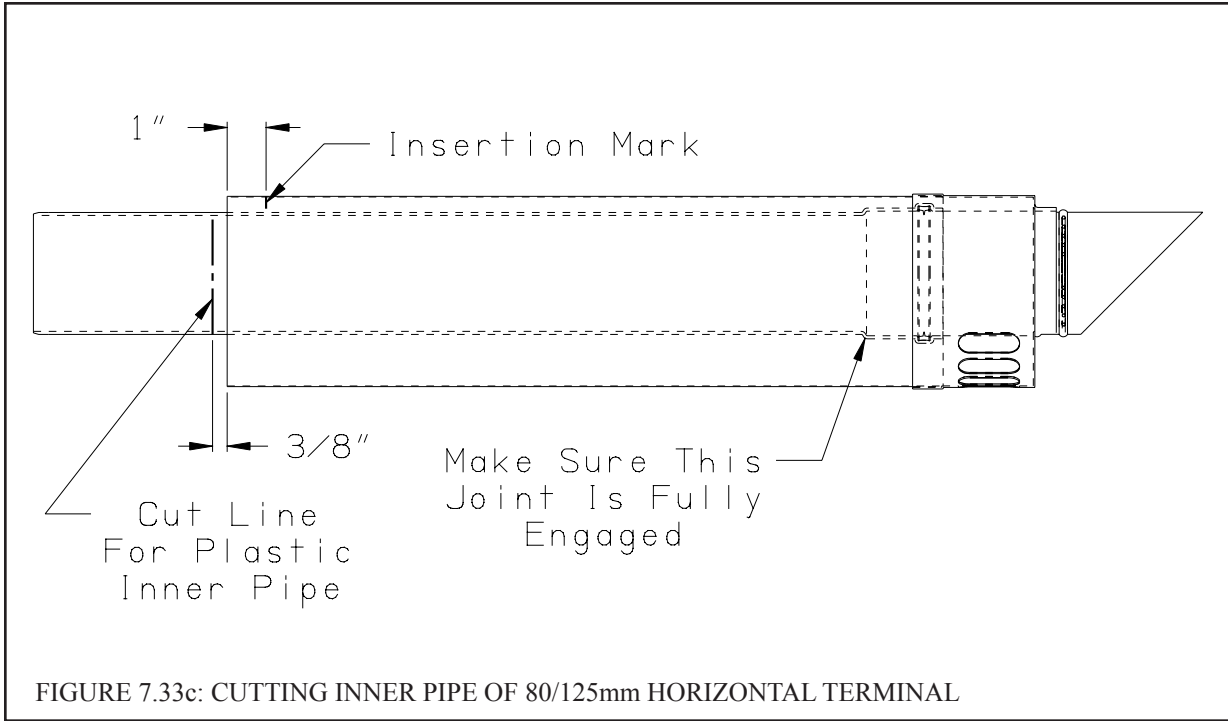


FIGURE 7.33b: CUTTING OUTER PIPE OF 80/125mm HORIZONTAL TERMINAL



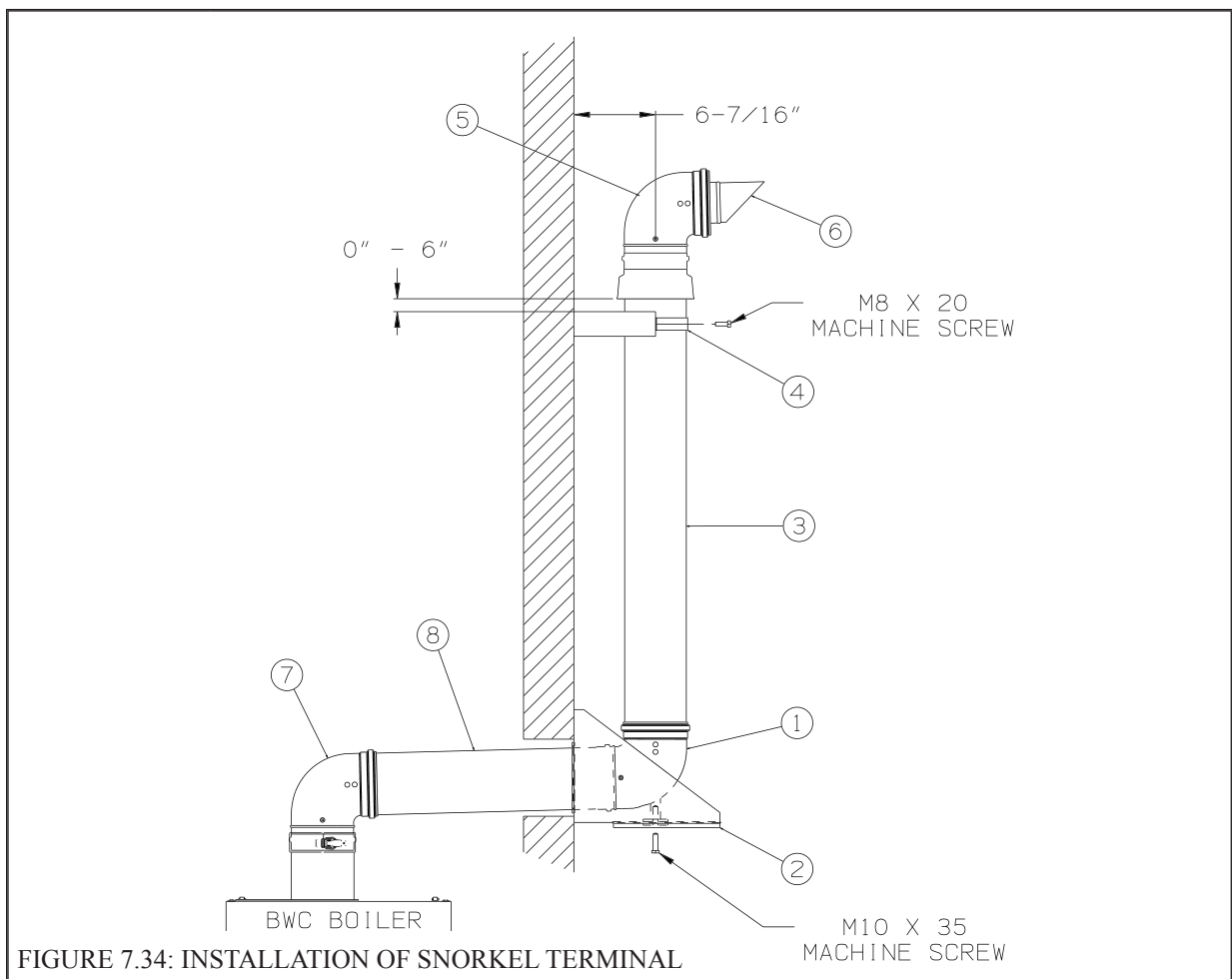
5) Snorkel Terminal Installation - The Snorkel Kit (PN 230540) consists of the following (Also see Figure 7.34):

Key #	Part #	Description
1	230541	Support Elbow
2	230542	Lower Wall Bracket
3	230543	Air Intake Section
4	230544	Wall Bracket
5	230545	Terminal Elbow
6	230546	Exhaust Terminal
7	230527	Standard Elbow
8	230547	Wall Penetration Section
*	230548	Outer Joint Gasket (2 provided)

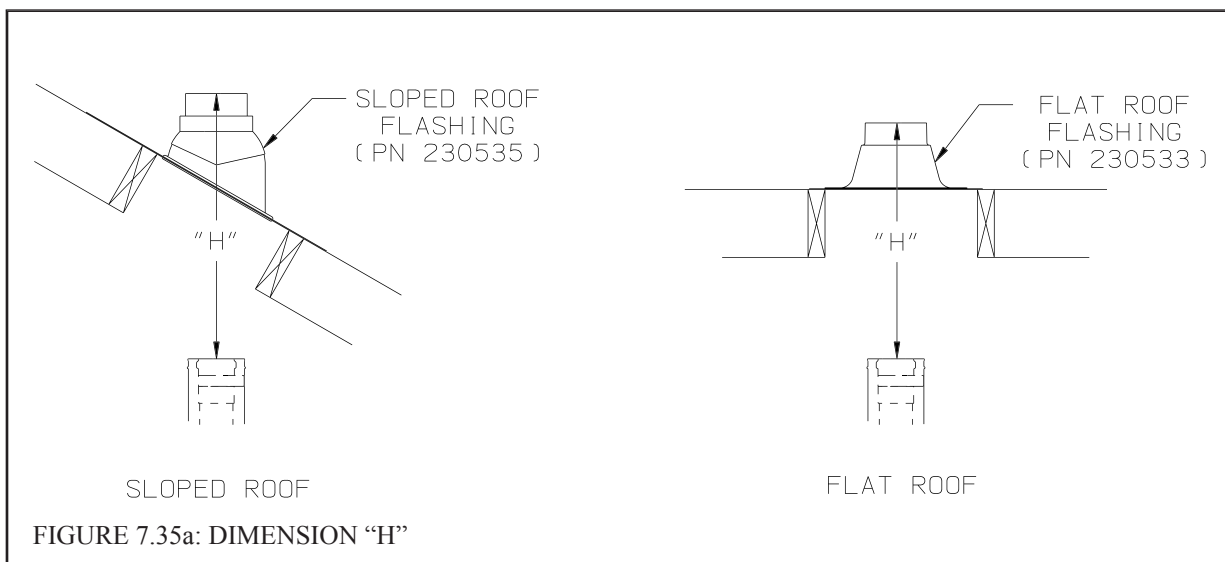
**IMPORTANT**

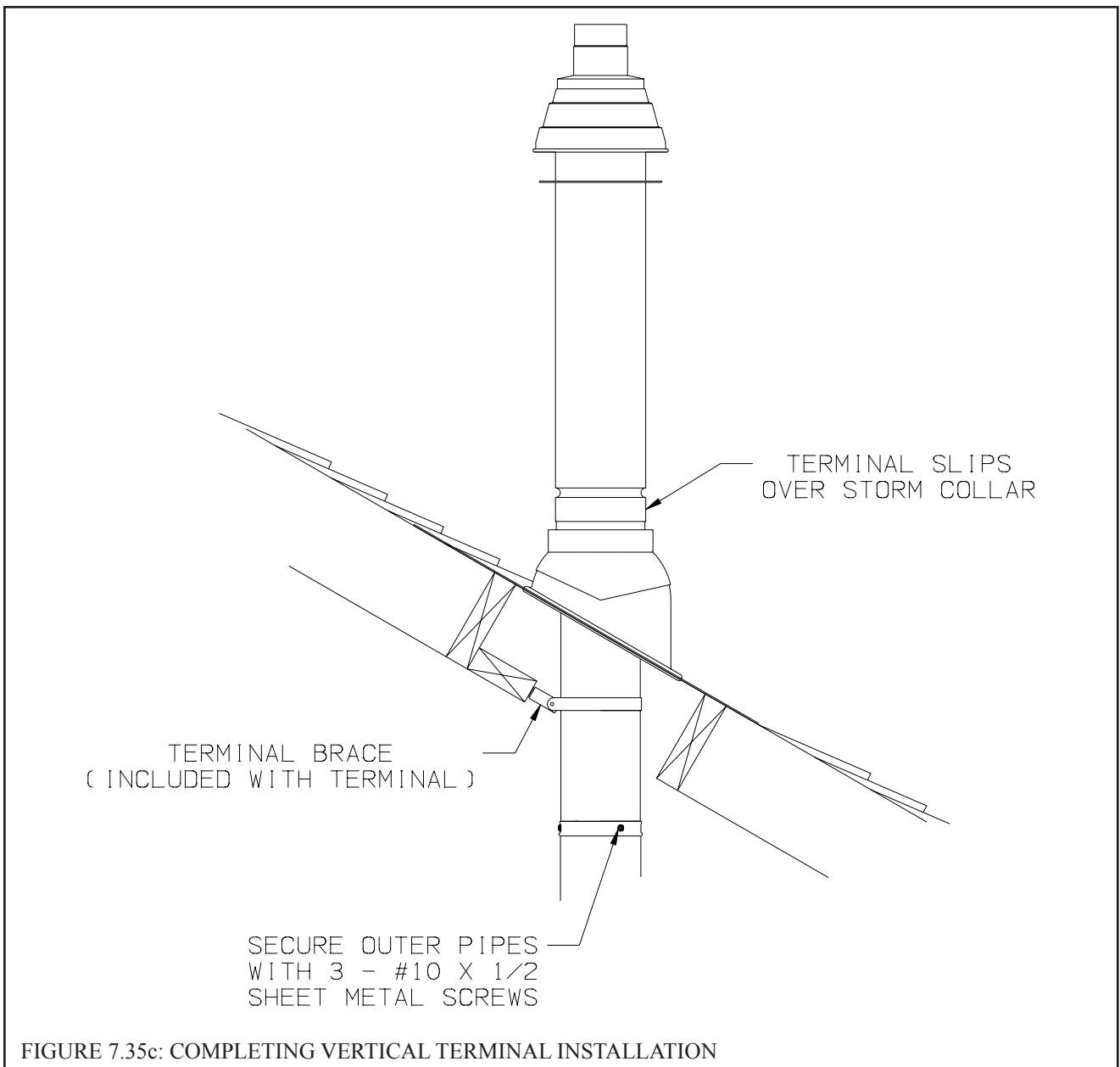
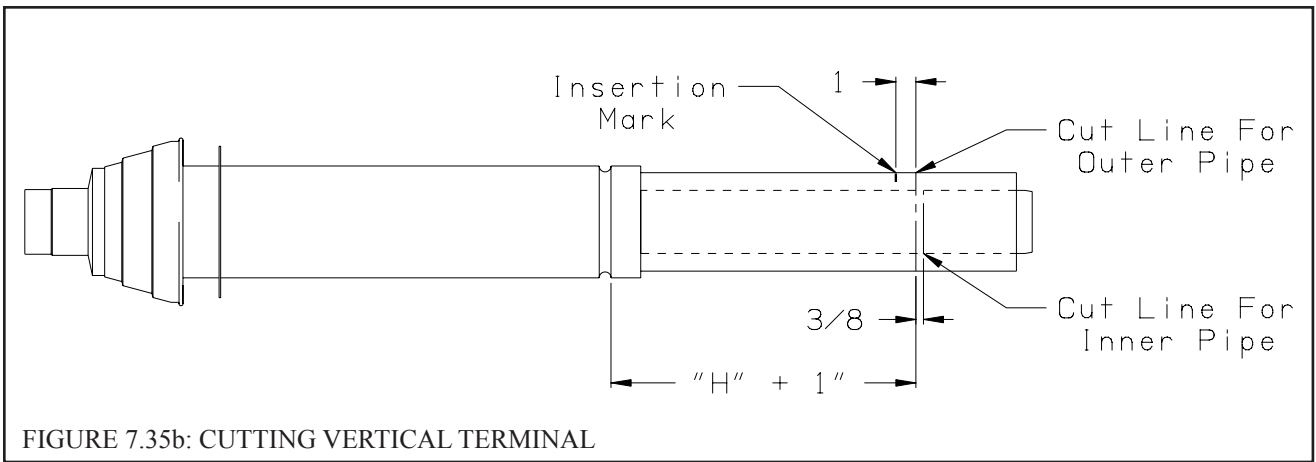
The Terminal Elbow and Wall Penetration Section included in the snorkel kit have gaskets in the female end of the outer pipe. These gaskets prevent infiltration of rain water into the air intake section. Do not interchange with similar components shown in Table 7.4b.

- Cut a 6" diameter hole through the exterior wall at the planned exit point of the vent. A minimum of 4" is needed between the center line of this hole and grade to install the lower wall bracket.
- Before mounting the lower wall bracket, loosen the M10 x 35 screw on this bracket. Adjust this bolt forward or backward so that its center is 6-7/16" from the wall (Figure 7.34) and tighten.
- Center the Lower Wall Bracket on the hole in the wall and mark the location of the four mounting screws on the wall. 5/16" mounting screws (not supplied) are recommended for mounting this bracket. Drill mounting holes and mount the bracket.



- d) Complete the vent system inside the structure. The support elbow sits on the M10 x 35 screw as shown in Figure 7.34. Cut the Wall Penetration Section to the length required to connect the interior vent system to the Support Elbow following the instructions on Page 26.
  - e) Remove the Support Elbow from the Lower Support Bracket and attach it to the Wall Penetration Section. Slip this assembly through the Lower Support Bracket. Connect to the interior vent system.
  - f) Slide an Outer Joint Gasket over the male end of the Air Intake Section with the tapered edge of the gasket pointing up. Attach the Air Intake Section to the Support Elbow. If necessary, the Air Intake Section can be shortened by cutting the male end as described on page 26. After attaching the Air Intake Section to the Support Elbow, slide the Outer Joint Gasket down over the joint between the two fittings to prevent rain infiltration.
  - g) Attach the Wall bracket to the wall 0"-6" from the bottom edge of the intake bell (Figure 7.34). Use 1/4" screws (not provided) to mount this bracket.
  - h) Slide the remaining Outer Joint Gasket over the male end of the Terminal Elbow. Attach the Terminal Elbow to the Air Intake Section, pointing it away from the wall. Secure the Terminal Elbow to the Air Intake section with a single #10 x 1/2" sheet metal screw (Figure 7.34). 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".** Slide the Outer Joint Gasket down over the joint between the Terminal Elbow and the Air Intake Section to prevent rain infiltration.
  - i) Attach the Exhaust Terminal to the Terminal Elbow (Figure 7.34).
- 6) Vertical Terminal Installation - In addition to the vertical terminal, either a Flat Roof Flashing (PN 230533) or Sloped Roof Flashing (PN 230535) is required for this installation.
- a) Determine the center line of the terminal location on the roof. If the roof is flat, cut a 5-1/2" diameter hole for the terminal. If the roof is sloped, cut a hole large enough for the terminal to pass through the roof while remaining plumb. **Caution: If the boiler is installed directly under the hole, cover it while cutting the hole to prevent saw dust and other debris from falling into the boiler.**
  - b) Install the roof flashing using standard practice for the roofing system on the structure.
  - c) 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 (Figure 7.35a).
  - d) Measure distance "H" from the top edge of the storm collar to the end of the last fitting as shown in Figure 7.35a.
  - e) Add 1" to distance "H". Carefully mark this length on the pipe as shown in Figure 7.35b.
  - f) 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.
  - g) Place a mark on the aluminum inner pipe 3/8" beyond the end of the outer pipe (Figure 7.35b). Use a fine tooth hacksaw to cut the aluminum pipe and be careful to cut the pipe square. De-burr the cut edge of the aluminum pipe with a file or emery cloth.
  - h) Make a mark on the terminal section 1" from the cut end of the outer pipe as shown in Figure 7.35b.
  - i) 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".**
  - j) Secure the terminal section to the inside of the roof structure using the mounting bracket provided with the terminal (Figure 7.35c).







7) Chimney Chase Installation - A vertical 80/125mm vent system can be installed in an unused masonry chimney. This installation is similar to other vertical installations with the following exceptions (Also see Figure 7.36):

- a) The chimney chase elbow kit (PN230530) is used at the base of the chimney. This kit consists of a support elbow and a mounting bracket. 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 on the back of the support bracket on the back wall of the chimney. Drill a 7/16" dia x 2-1/2" deep hole at this location to support the back of the bracket. The front of the elbow mounting bracket is supported by the bottom of the opening into the chimney or by an installer supplied bracket.
- b) 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.

### WARNING

- Do not attempt to construct a vertical vent system inside a chimney that is used to vent a fireplace or other appliances.
- Do not attempt to construct a vertical vent system inside a chimney flue adjacent to another flue used by a fireplace or other appliances.

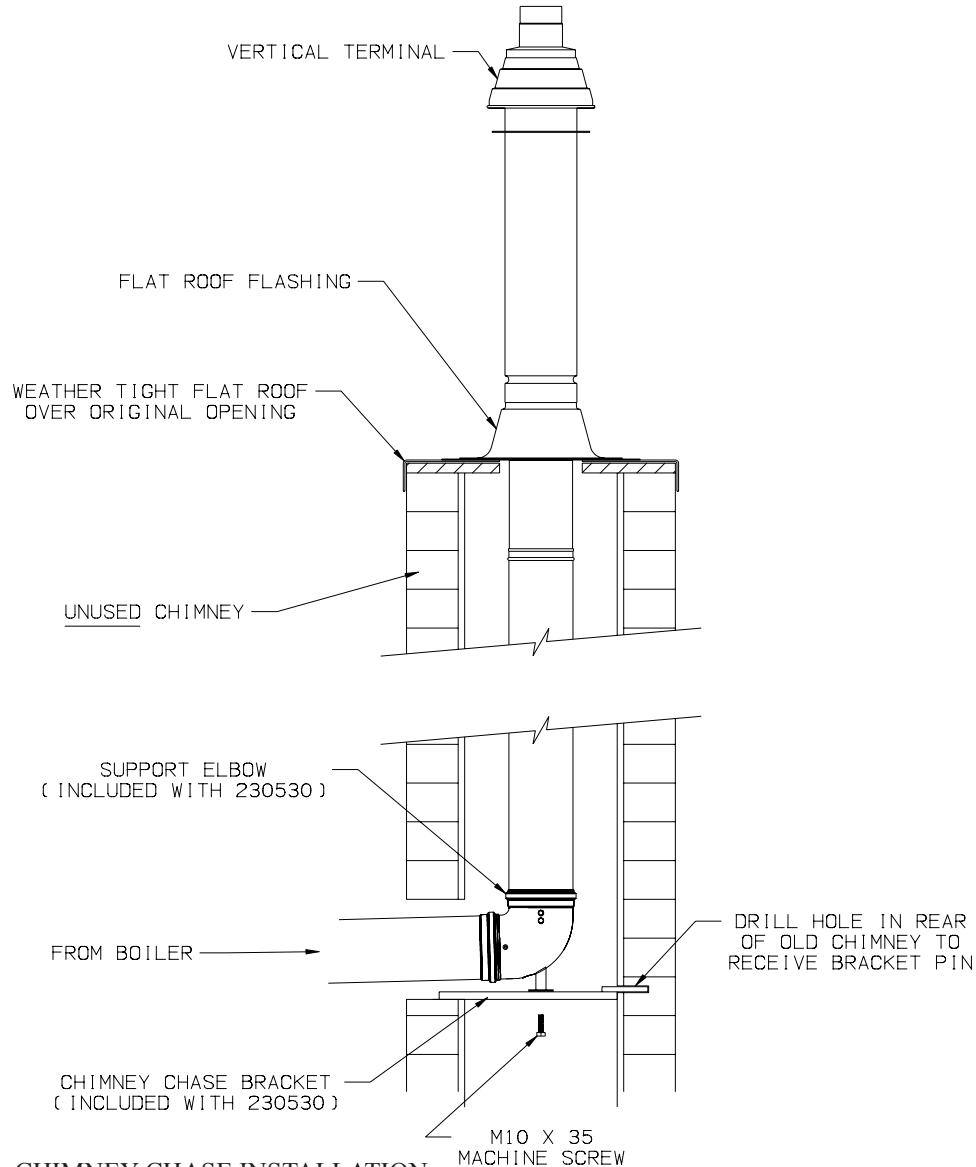


FIGURE 7.36: CHIMNEY CHASE INSTALLATION

## E. Assembly of Stainless Steel Venting

### CAUTION

Vent systems made by Heat Fab, Protech, Z-Flex, and Metal-Fab rely on gaskets for 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.

#### 1) General Assembly Notes:

- a) Where the use of “silicone” is called for in the following instructions, use GE RTV 106 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.
- b) Longitudinal welded seams should not be placed at the bottom of horizontal sections of exhaust pipe.
- c) Do not drill holes in vent pipe.
- d) Do not attempt to mix vent components of different vent system manufacturers.

2) Mounting Stainless steel vent collar -The use of stainless steel venting requires the stainless steel vent collar (Crown PN 230510) which replaces the 80/125mm concentric collar supplied with the boiler. To install the stainless steel vent collar:

- a) Remove the six #10 sheet metal screws which attach the 80/125mm collar to the boiler.
- b) Remove the collar from the boiler (this may be easier if a twisting motion is applied to the collar while removing it).
- c) Lubricate the brown gasket in the female end of the plastic vent stub (inside the boiler) with a few drops of water.
- d) Push the stainless steel vent collar onto the boiler with a slight twisting motion. Make sure that the stainless steel vent adaptor is inserted at least 1” into the boiler stub.
- e) Secure the collar flange to the top of the boiler with the sheet metal screws removed in Step (a)

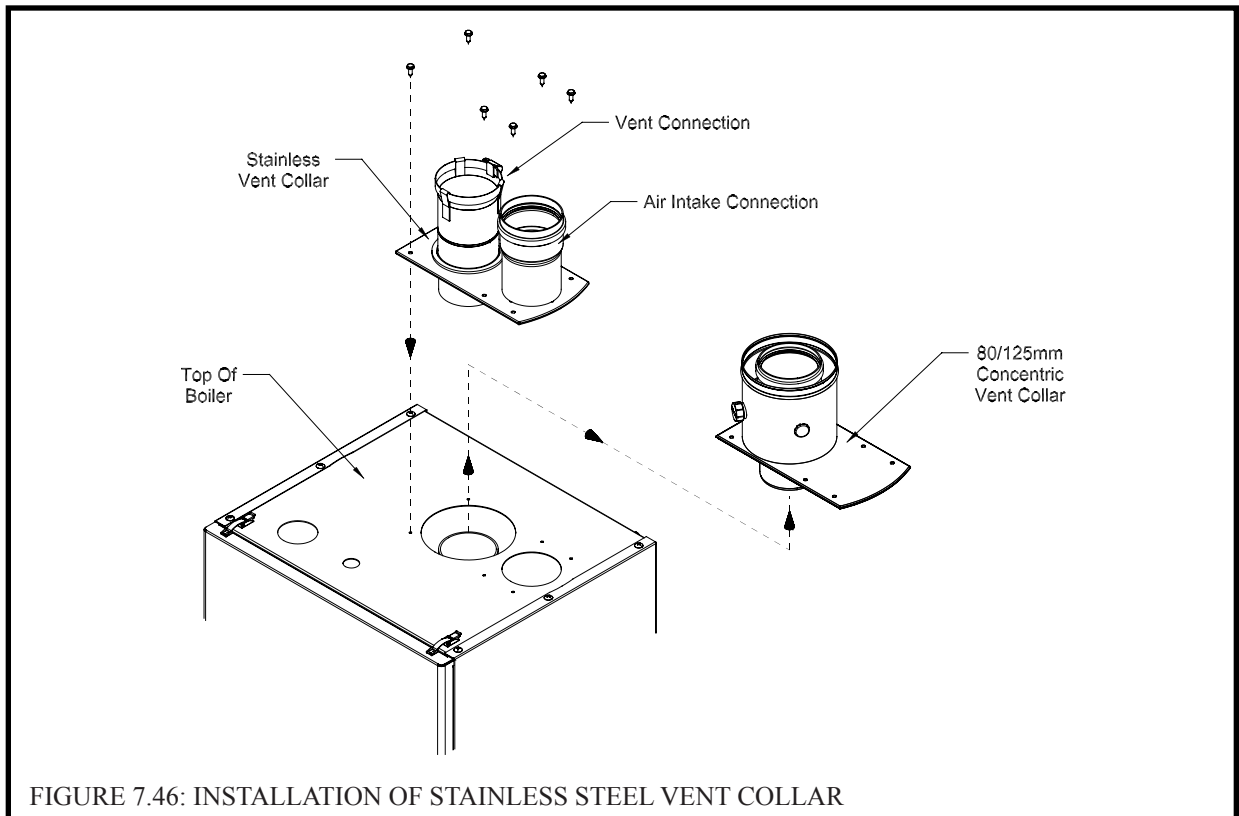
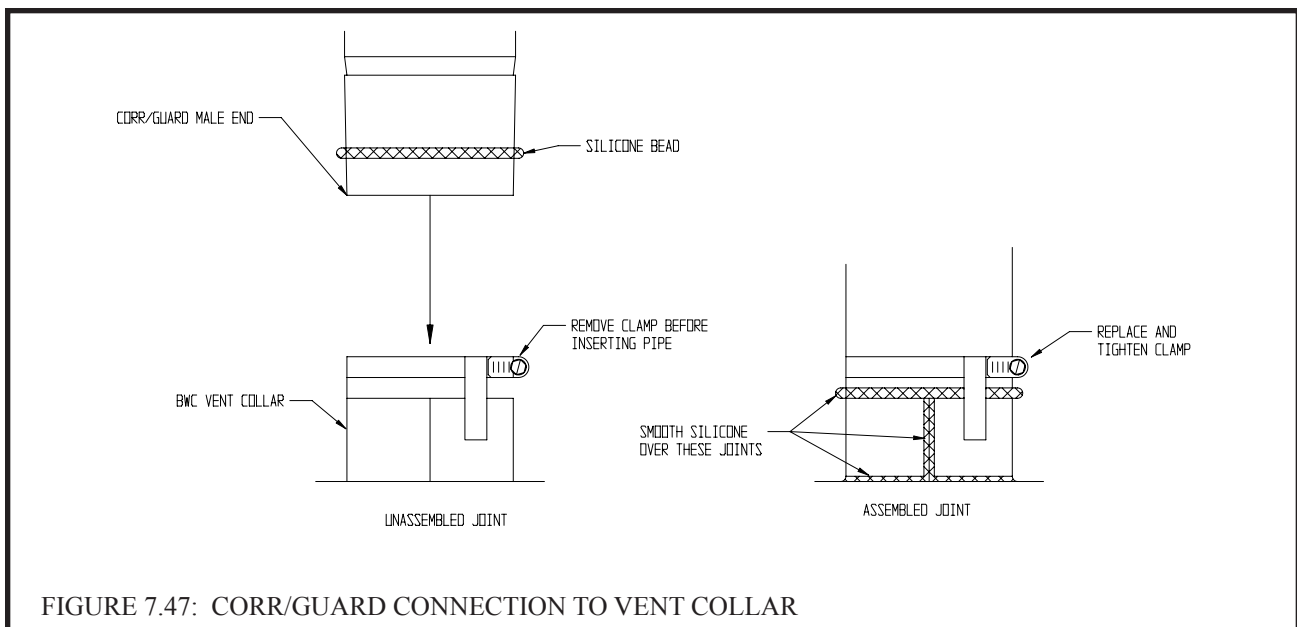


FIGURE 7.46: INSTALLATION OF STAINLESS STEEL VENT COLLAR

### 3) Assembly of Metal-Fab Corr/Guard Vent System:

#### a) Corr/Guard General Notes:

- Do not cut Corr/Guard vent components.
  - Refer to Corr/Guard installation instructions for proper methods of support.
  - Orient Corr/Guard components so that the male ends of all fittings point in the direction of the boiler.
- b) Start assembly of the vent system at the boiler. Remove the hose clamp shipped on the BWC vent collar. Bend the three hose clamp tabs on this collar outward slightly.
- c) Clean the exterior of the male end of the first piece of pipe and the inside of the vent collar on the boiler. Remove dirt, grease, and moisture from the surfaces to be sealed. Dry surfaces or allow to dry thoroughly.
- d) On the male end of the pipe, apply a 1/4" wide bead of silicone approximately 1/2" from the end of the pipe (Fig 7.47).
- e) Insert the male end of the pipe into the boiler vent collar until it bottoms out.
- f) Apply an additional bead of silicone over the outside of the joint and smooth out.
- g) Replace and tighten the clamp on the vent collar.
- h) Assemble remaining Corr/Guard components in accordance with the Corr/Guard installation instructions.
- i) Allow the silicone to cure per the silicone manufacturer's instructions before operating the boiler.



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