



D E S I G N E D T O L E A D

BWC Series

Direct Vent Condensing Boilers

INSTALLATION SUPPLEMENT FOR BOILERS VENTED WITH PPs FLEX VENT SYSTEM

These instructions must be affixed on or adjacent to the boiler.

Models:

- **BWC070**
- **BWC090**
- **BWC120**
- **BWC151**
- **BWC150**
- **BWC225**
- **BWC300**

WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury, or loss of life. For assistance or additional information, consult a qualified installer, service agency or the gas supplier. Read these instructions carefully before installing.



Manufacturer of Hydronic Heating Products

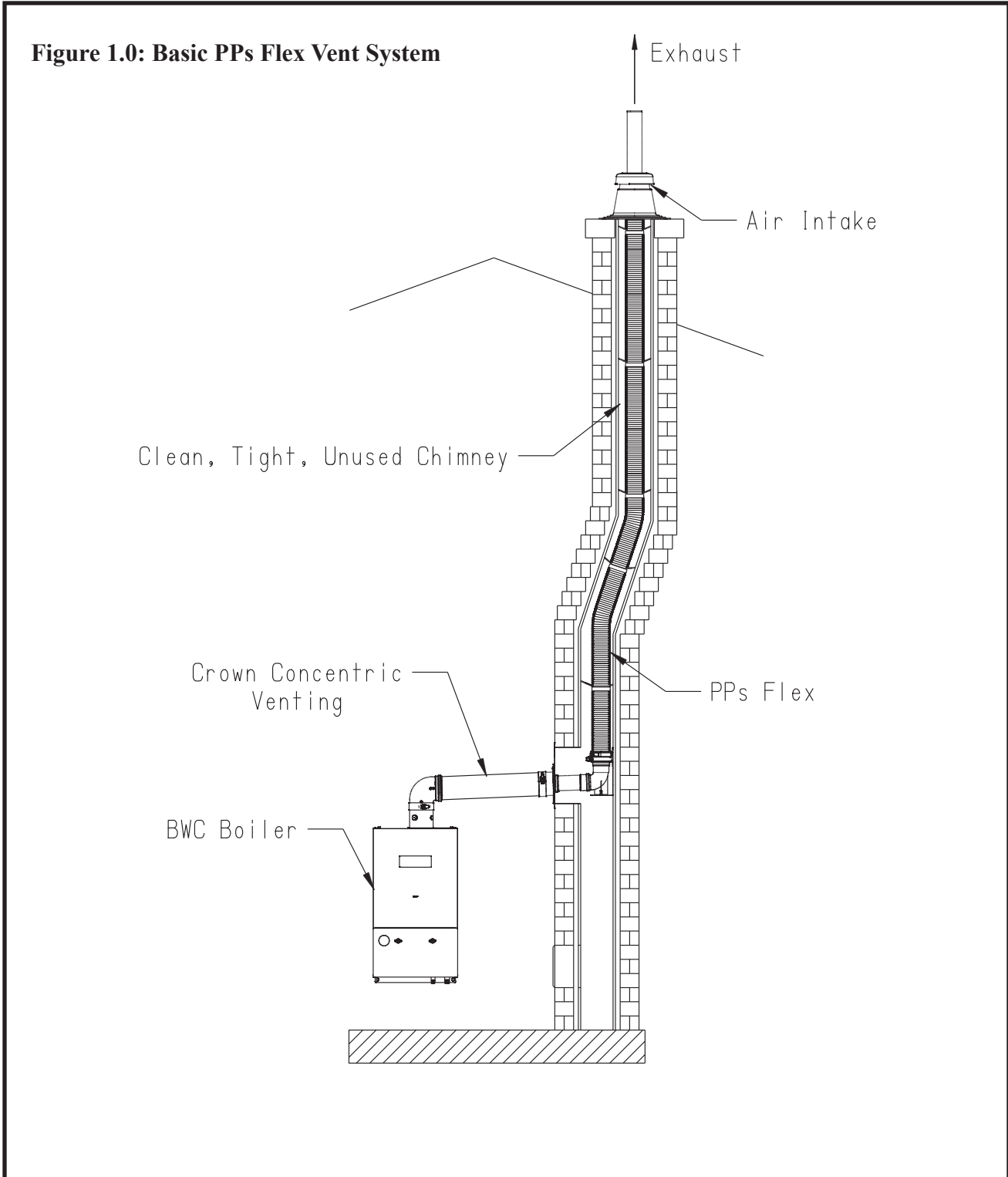
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A. Product Description

The Crown PPs Flex Vent system consists of a corrugated flexible polypropylene (PPs) chimney liner and hardware needed to install this liner in an unused masonry chimney. This kit is designed for use with Crown BWC boilers only with Crown concentric pipe used between the boiler and the base of the chimney. All air for combustion is drawn from the top of the chimney through the space between the ID of the old chimney and the OD of the PPs Flex. Crown concentric vent must be used between the boiler and the base of the chimney. A typical installation is shown in Figure 1.0.



WARNING

Failure to install this vent kit in accordance with these instructions could cause flue gas to enter the building resulting in severe property damage, personal injury, or loss of life:

- This kit is for use in an unused chimney only. If this chimney consists of more than one flue, all flues must be unused. (Figure 1.2). See text for other chimney requirements.
- Do not use these instructions to install this vent kit with any appliance other than a Crown BWC Series boiler.
- This PPs Flex vent kit may be also supplied with installation instructions included by the original manufacturer, Muelink and Grol (M&G). Not all of the vent configurations shown in the M&G manual are approved by Crown for use with BWC boilers. Observe all precautions outlined in the M&G manual in addition to those outlined in this manual. Where a conflict arises between these instructions and those provided by M&G, the more restrictive instructions shall govern.
- PPs Flex Liner and single wall PPs components must only be installed within the chimney chase used to obtain combustion air as described in this manual.
- Examine all components for possible shipping damage prior to installation.
- Proper joint assembly is essential for safe installation.
- This vent system must be free to expand and contract. This vent system must be supported in accordance with these instructions.
- Different vent manufacturers have different joint systems and adhesives. Do not mix vent components or joining methods for different vent systems.
- Do not apply thermal insulation to vent pipe or fittings.
- Do not obtain combustion air from within the building.
- Do not install a barometric damper, vent damper, or draft hood on this boiler.

B. Before Installing

- 1) Table 1.1 describes the vent systems in which this PPs Flex Vent kit may be used. One of the columns in Table 1.1 must describe the planned vent system exactly. Note the following:
 - a) The total maximum vent length (from the boiler to the top of the chimney) is shorter than that shown in the BWC installation manual. The length of the PPs Flex Liner is counted as part of the overall vent length.
 - b) The height of the PPs Flex Liner system may not exceed 32ft (Figure 1.2).
 - c) Refer to the BWC boiler installation manual for the method of calculating equivalent length of the vent system. In calculating the equivalent length, the elbow at the base of the chimney chase and the first elbow down stream of the boiler are ignored.
- 2) Although the old chimney is no longer handling flue gas, it is still providing structural support for the PPs Flex Liner system and is also a conduit for combustion air. For this reason, **THE CHIMNEY USED FOR THIS INSTALLATION MUST BE CLEAN AND IN GOOD CONDITION.** Specifically, it must be:
 - Lined with clay tile, metal, or cast-in-place liner that is tight and in good condition.
 - Structurally sound
 - Free of creosote, soot, loose mortar or other residue.
 - Free of loose brick, tile, or other large objects.
 - Have no cracks that would allow leakage between the chase and either the inside of the structure or the outdoors.
 - Rain and water tight

Ensuring that the chimney meets the above requirements will require that it be thoroughly inspected and cleaned, and/or repaired as necessary, before being used as a chase. If it is impossible to confirm that the chimney meets all of these requirements, do not use this kit.
- 3) Be sure that the chimney chase has the minimum inside cross sectional dimensions called for in Table 1.1 over its entire length (also see Figure 1.2)

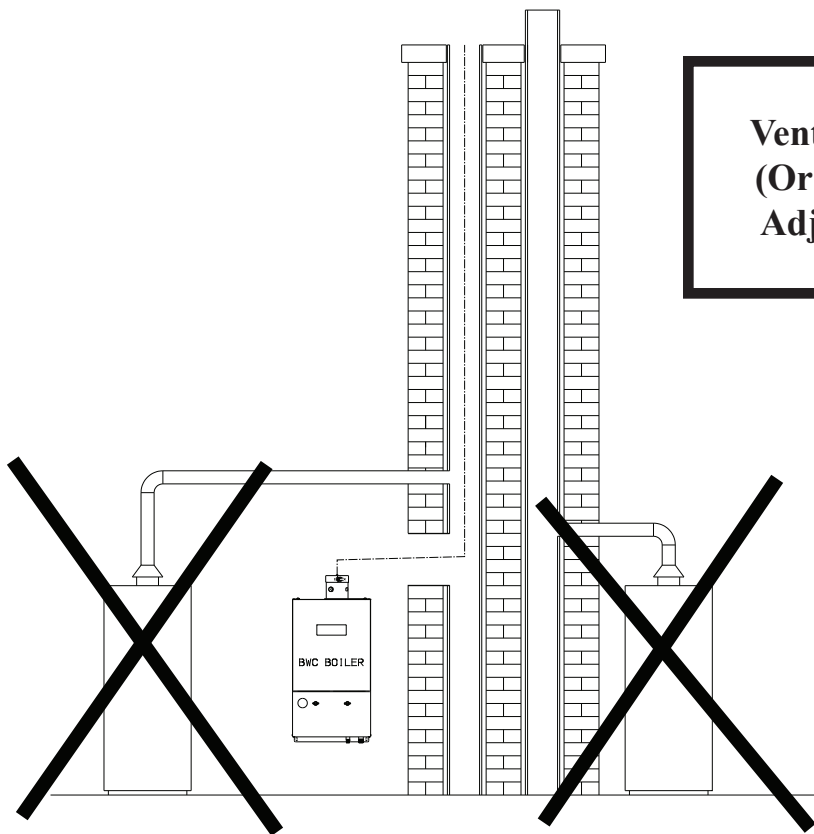
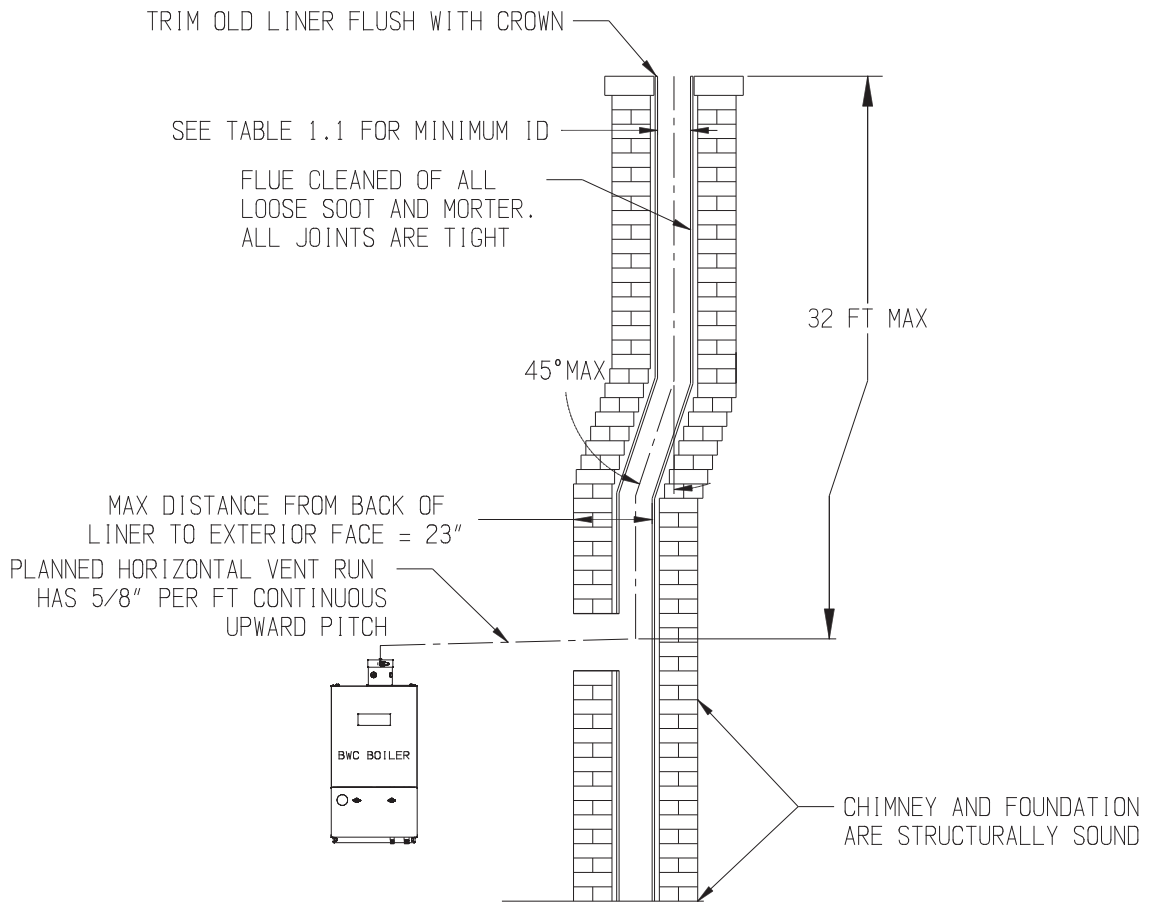
Table 1.1: Summary of PPs Flex Venting Options

VENT OPTION #		9	10	
CLASSIFICATION USED IN THIS MANUAL		PPs FLEX (MASONRY)	PPs FLEX (MASONRY)	
ILLUSTRATED IN FIGURE		1.0	1.0	
VENT PIPE PENETRATION THROUGH STRUCTURE		CHIMNEY CAP	CHIMNEY CAP	
AIR INTAKE PENETRATION THROUGH STRUCTURE		CHIMNEY CAP	CHIMNEY CAP	
MIN CHASE ID (ROUND)		6" DIA	7" DIA	
MIN CHASE ID (RECTANGULAR)		6" x 6"	7" x 7"	
NOMINAL PPs FLEX LINER SIZE		80 mm	100mm	
CONCENTRIC VENT/INTAKE CONNECTOR SIZE		80/125	100/150	
MAXIMUM TOTAL VENT LENGTH (INCLUDING PPs FLEX IN CHASE)	VENT	BWC070	51ft	
		BWC090	51ft	
		BWC120	51ft	
		BWC151	51ft	
		BWC150	47ft	
		BWC225		45ft
		BWC300		68ft
	INLET	BWC070	51ft	
		BWC090	51ft	
		BWC120	51ft	
		BWC151	51ft	
		BWC150	47ft	
		BWC225		45ft
		BWC300		68ft
MAX CHASE HEIGHT		32ft	32ft	
CROWN PPs FLEX LINER PART # (32ft COIL)		230955	230956	
CROWN PPs FLEX INSTALLATION KIT PART #		230958	230959	

WARNING

Failure to ensure that the chimney is clean, leak tight, water tight, and structurally sound could result in severe corrosion damage to the boiler, damage to the vent system, restriction of combustion air supply, or the entry of flue products into the structure which in turn could cause unreliable operation, property damage, personal injury, or loss of life.

- 4) Installation of this kit will require an opening at the base of the chimney (at the level of the horizontal vent connection) that is approximately 7" wide and 12" tall. A slightly smaller, or significantly larger opening may be required depending on the chimney wall thickness. Before attempting to install this kit, make sure that such an opening either exists, or can be made, without compromising the structural integrity of the chimney (much of this opening will be re-closed later in the installation process).
- 5) Maximum distance from center of chimney chase to outside surface of chimney base is 23" (Figure 1.2).
- 6) Verify that there are no offsets in the chimney that will cause the PPs Flex Liner to bend more than 45 degrees.
- 7) Verify that it will be possible to maintain a 5/8in per ft. pitch towards the boiler in all horizontal piping between the boiler and the elbow at the base of the chimney chase.
- 8) PPs Flex Liner and the hardware needed for a single PPs Flex Liner installation are sold separately. All hardware is included in a "PPs Flex Installation kit". Table 1.1 shows the Crown part numbers for these kits and the PPs Flex Liner itself.



**Venting of Other Appliances
(Or Fireplace) into Chase or
Adjacent Flues Prohibited!**

Figure 1.2: Chimney Chase Requirements

C. PPs Flex Installation

WARNING

Failure to install this vent kit in accordance with these instructions could cause flue gas to enter the building resulting in severe property damage, personal injury, or death:

- PPs Flex may be damaged by handling at low ambient temperatures. Do not bend, or attempt to install, the PPs Flex Liner if it has been stored at a temperature below 42F without allowing it to warm to a higher temperature first.
- Do not bend the PPs Flex Liner more than 45 degrees.
- Proper joint assembly is essential for safe installation.
- This vent system must be free to expand and contract. This vent system must be supported in accordance with these instructions.
- Do not apply thermal insulation to vent pipe or fittings.
- Do not lubricate gaskets in this kit with anything other than water.

- 1) Figure 1.4 shows all of the PPs Flex components referenced in the following instructions. PPs Flex Liner and the PPs Flex Installation kit needed to install it are sold separately. Table 1.3 lists the components included in the PPs Flex Installation Kit.
- 2) If it does not already exist, create an opening in the base of the chimney that is large enough to install the Elbow Support Bracket on the wall of the old flue (Figure 1.5). Position this bracket vertically so that the horizontal vent pipe will have a 5/8" per foot pitch between the elbow and the concentric adaptor. Anchor the Elbow Support Bracket to the wall of the old flue using at least two masonry anchors that are either on center or on opposite sides of the plate and are capable of supporting 50lbs each.

Note: If the old chimney has a corrugated metal liner, it will probably be necessary to cut away the portion of this metal liner below the top of the opening made in the base of the chimney in order to properly locate, and securely mount, the Elbow Support Bracket. If this is done, the void between the outside of this metal liner and the inside of the masonry chimney must be sealed at the bottom of the remaining metal liner. In many cases, this can be done using polyurethane foam with a service temperature rating in excess of 210F (Honeywell Enovate or equivalent). Cut away any foam that expands into the the inside of the metal liner. All exposed masonry below the metal liner must be clean, tight, and structurally sound.

- 3) If the old chimney has a rain cap, remove it. Also remove portion of the tile that protrudes above the crown (Figure 1.2).

Table 1.3: Crown PPs Flex Installation Kit Contents

FIG 1.4 KEY #	DESCRIPTION	80mm INSTALLATION KIT (PN 230598)		100mm INSTALLATION KIT (PN 230959)	
		PART #	QTY	PART #	QTY
1	LOCKING BAND	230539	1	230574	1
2	#6 X 5/8 STAINLESS STEEL SMS	*	4	*	4
3	CONCENTRIC ADAPTER	230970	1	230971	1
4	EXTERIOR WALL PLATE	230972	1	230973	1
5	VENT STUB	230974	1	230975	1
6	ELBOW SUPPORT BRACKET	230976	1	230977	1
7	ELBOW	230978	1	230979	1
8	MALE ADAPTER	230980	1	230981	1
9	MALE ADAPTER CLAMP	230982	1	230983	1
10	PPs FLEX GASKET	230984	2	230985	2
12	SPACER	230986	4	230986	4
13	SUPPORT CROSS	230988	1	230989	1
14	FEMALE ADAPTER	230990	1	230991	1
15	LOWER VENT CAP	230992	1	230993	1
16	UPPER VENT CAP	230994	1	230995	1
17	UPPER VENT CAP GASKET	230996	1	230997	1
18	STAINLESS TERMINATION PIPE	230998	1	230999	1

* Procure Replacement Locally

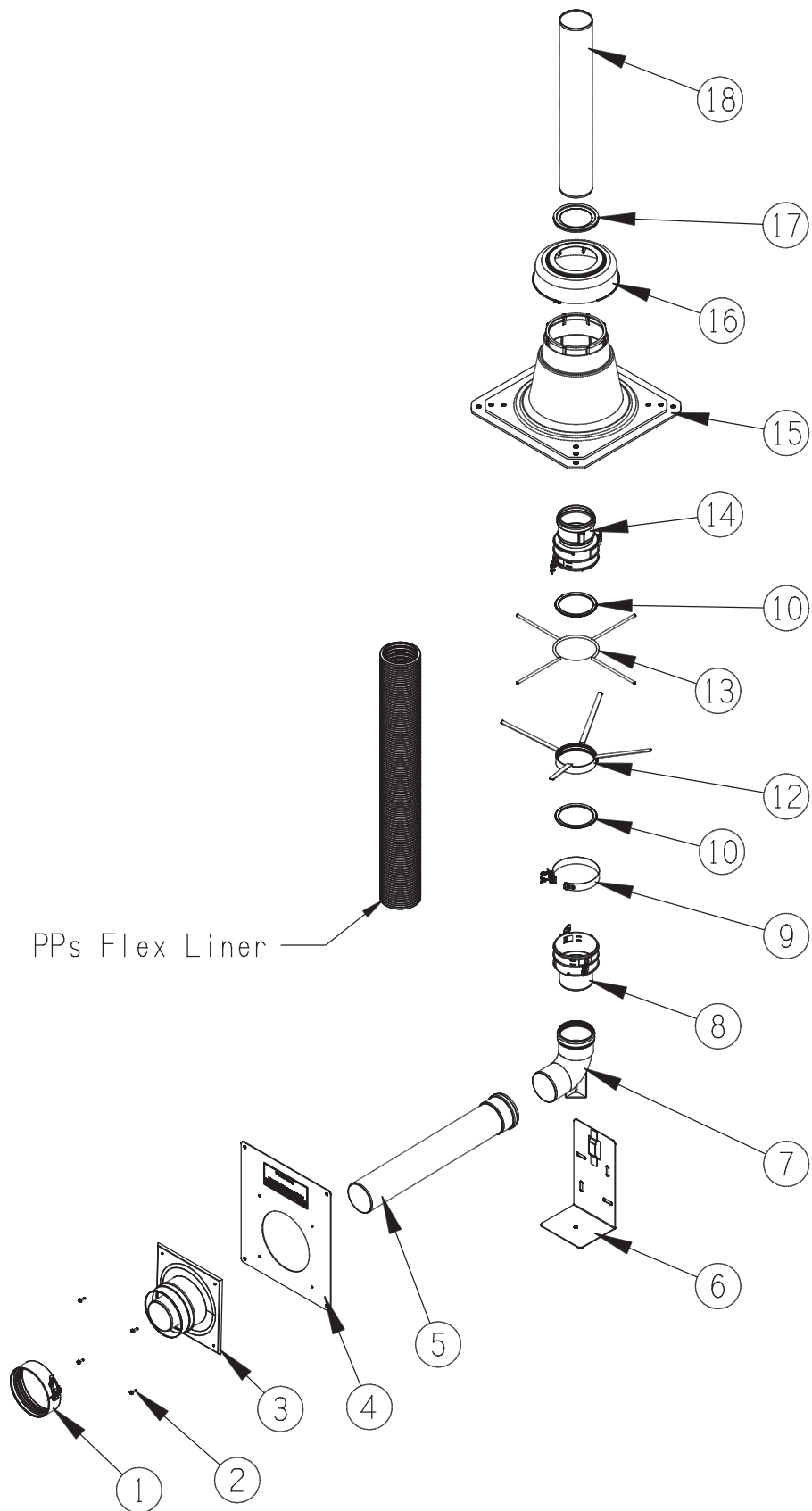
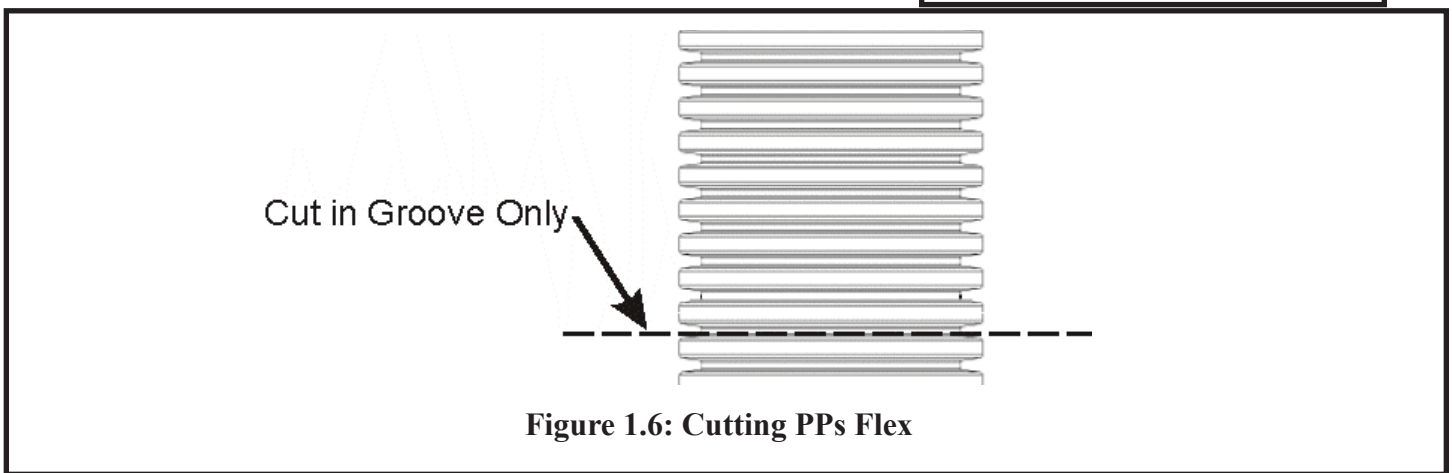
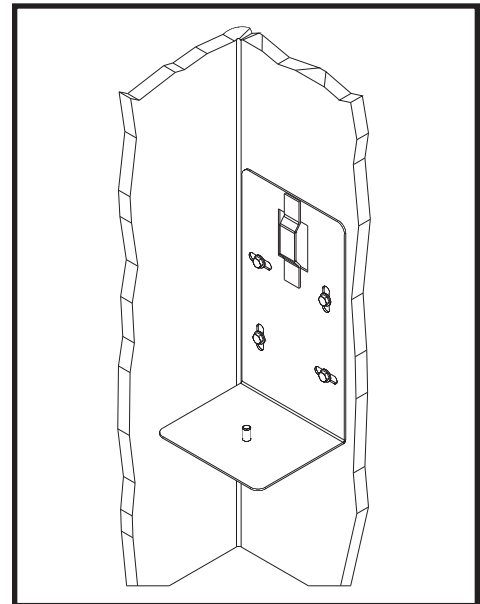


Figure 1.4: PPs Flex System Components

Figure 1.5: Elbow Support Bracket Installation



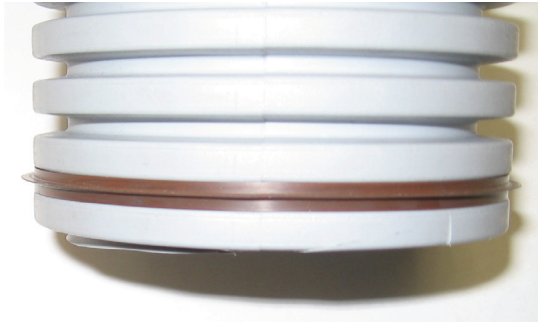
- 4) Prepare the bottom end of the PPs Flex Liner:
- a) Make sure that the bottom end is cut squarely and is undamaged. If the bottom end must be cut to ensure this, cut it in a groove using a sharp utility knife as shown in Figure 1.6.
 - b) Slip a gasket into the first groove above the cut as shown in Figure 1.7(A).
 - c) Open the locking tabs on the Male adaptor as shown in Figure 1.7(B). Insert the bottom end of the PPs Flex Liner fully into the Male Adaptor and close the tabs. Tabs should engage the grooves in the PPs Flex Liner and snap closed. If they do not, find and correct the cause before proceeding (Figure 1.7).
- 5) PPs Flex Liner is pulled down the chimney from the top. Two people are required to do this; one guiding the PPs Flex Liner into the top of the chimney, and a second pulling the liner from the bottom of the chimney using a rope. The following pull tools can be used to pull the PPs Flex down the chimney:

- 80mm: Crown Part # 230960
- 100mm: Crown Part # 230961

In the absence of these tools insert the end of the male adaptor into a burlap bag, or provide similar protection to prevent the Male Adaptor from being scratched as it is pulled down the chimney. Tie a rope around the PPs Flex Liner just above the male adaptor.

As the PPs Flex Liner is pulled down the chase, install a Spacer at increments not exceeding 6ft-6in. Note: Spacers provided are suitable for use with both 80mm and 100mm PPs Flex Liners. When used with an 80mm Flex Liner, they must be cut at the location marked “DN80” that is molded into the spacer (Figure 1.8). Spacer is wrapped around pipe and secured with integral “zip tie”.

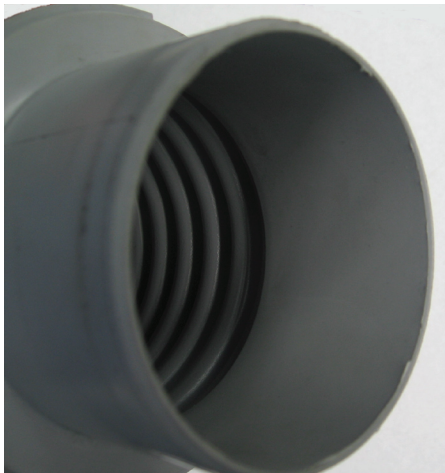
Carefully pull the PPs Flex Liner down the chimney until the bottom end is at the approximate level of the opening at the bottom of the chimney.



A: Install PP's Flex Liner Gasket in Closest Complete Groove to End of Flex



B: Open Locking Tabs on PP's Flex Adaptors



C: Liner Bottomed Out in Adaptor



D: Grooves Lined Up with Tabs



E: Tabs Locked Closed

Figure 1.7: PP's Flex Liner Adaptor Installation (Male Adaptor Shown)

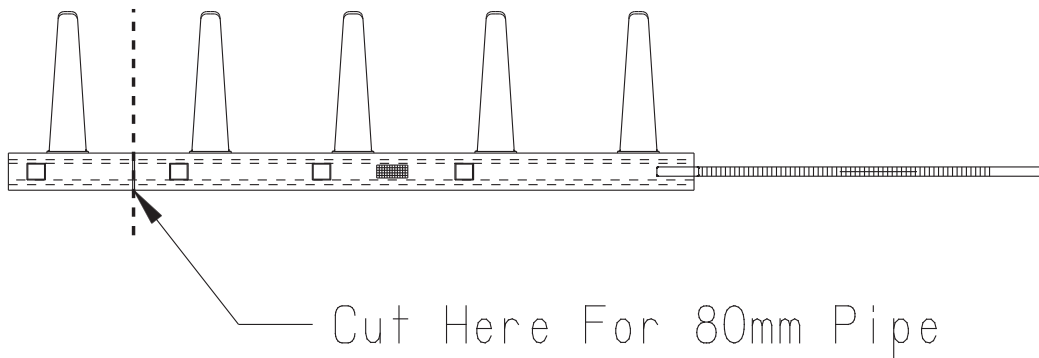


Figure 1.8: Cutting Spacer for 80mm Pipe

- 6) Remove the rope or pull tool from the end of the vent.
- 7) Verify that the Male Adaptor is undamaged. Lubricate the brown gasket in the female end of the Elbow with a few drops of water and insert the Male Adaptor fully into the Elbow.
- 8) Mount the bottom end of the PPs Flex Liner with the Elbow onto the Elbow Support Bracket installed in Step #2 using the Male Adapter Clamp as shown in Figure 1.9.
- 9) The cap provided with this kit is designed for installation over chimney crowns with round openings up to 12" and square openings having inside dimensions up to 8-1/2". If the opening in the crown is larger than this, the installer must provide a weather tight crown with an opening below these limits. The minimum diameter of the opening in this crown must be 6" for the 80mm PPs Flex Liner and 7" for 100mm PPs Flex Liner. Make such modifications to the crown in accordance with standard practice before proceeding further.
- 10) Cut the top end of the PPs Flex Liner so that it protrudes between 1-3/4" and 2-1/4" above the top surface of the crown (Figure 2.0). Cut the pipe in one of the grooves using a sharp utility knife.
- 11) Install the Female Adaptor on the top end of the PPs Flex Liner using the same technique used to attach the Male Adaptor (Figure 1.7). Allow the Female Adaptor to rest on Support Cross.
- 12) Apply a bead of weather resistant caulk or mortar to the crown and set the Lower Vent Cap flange on the crown so that the joint between the Lower Vent Cap flange and the crown is completely air and water tight. Anchor the Lower Vent Cap Flange to the crown using an appropriate fastener through the knock-out in each corner.
- 13) Moisten the brown gasket in top of the Female Adaptor with a small amount of water and fully insert the Stainless Termination Pipe.
- 14) Slide the Upper Vent Cap over the Stainless Termination Pipe and snap in place on the Lower Cap.
- 15) Provide a thimble for the penetration into the bottom of the chimney chase. This can be a section of smoke pipe, duct or ceramic chimney tile. It must be installed so that the following requirements are met (Figure 2.1):
 - The inside dimensions of this thimble must meet the minimum chase ID requirements shown in Table 1.1.
 - The thimble must be located so that a 5/8" in per ft. pitch can be maintained in the Vent Stub between the Elbow and Concentric Adaptor.
 - The thimble must be sealed to both the chimney flue and the exterior surface of the chimney using mortar or other suitable sealant having a service temperature rating of at least 210F.
 - The thimble must not protrude into the original chimney flue.
- 16) Lubricate the gasket in the female end of the Vent Stub with a few drops of water and push it onto the Elbow.
- 17) Mount the Exterior Wall Plate so that the Vent Stub will pass through the center of the opening in this plate when properly pitched. Anchor the Exterior Wall Plate to the wall using four masonry anchors, or other appropriate fasteners, capable of supporting at least 40lbs each. Note: Exterior Wall plate must completely cover the thimble. Exterior Wall Plate can be cut down as long as this condition is met. If the flange on the Concentric Adaptor is large enough to cover the thimble, the exterior wall plate may be omitted completely. If the Exterior Wall Plate is too small to cover the thimble, a larger plate may be fabricated in the field using 18GA (or heavier) galvanized steel. If the exterior wall plate is cut down or replaced, the Usage Warning Label on the plate must be saved and attached to the base of the chimney near the concentric adaptor.
- 18) Seal the Exterior Wall Plate (if used) to the outer wall of the chimney using a suitable sealant having a service temperature rating of at least 210F.
- 19) Mark the Vent stub at a point 1" beyond where it exits the Exterior Wall Plate (Figure 2.1). Cut the Vent Stub squarely at this point with a fine tooth hacksaw or PVC saw. De-burr the cut end with a file, razor blade, or fine sandpaper.

**Figure 1.9: Elbow/Male Adaptor
Installed on Support Bracket**

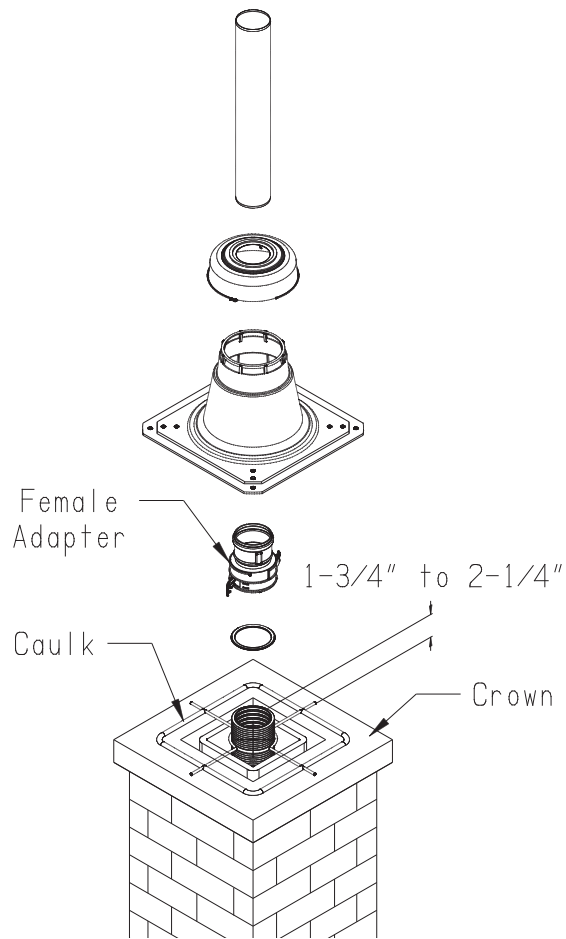
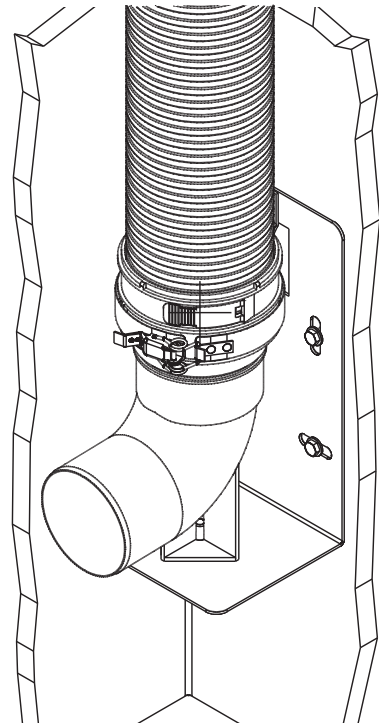


Figure 2.0: Cap Assembly

- 20) Lubricate the gasket in the female side of the Concentric Adaptor with a few drops of water. Apply a bead of sealant to the Concentric Adaptor flange and secure to the Exterior Wall Plate using the four #6 stainless steel sheet metal screws provided. If the Exterior Wall Plate is omitted as described in Step 17, secure the Concentric Adaptor directly to the exterior wall using four masonry anchors, or other appropriate fasteners, capable of supporting at least 40lbs each.
- 21) If there is a cleanout at the base of the chimney, seal it.
- 22) Assemble the concentric vent system between the boiler and the base of the chimney in accordance with the instructions in the appropriate BWC installation manual.

C. PPs Flex Maintenance

In addition to the maintenance steps described in the boiler installation manual, the use of the PPs Flex Liner system requires that the following steps be performed by a service technician as part of the annual maintenance procedure:

- 1) Disconnect the concentric venting from the Concentric Vent Adaptor at the base of the chimney. Use a flashlight and mirror to inspect as much of the chase and PPs vent system as possible through the openings in this adaptor. Look for:
 - Loose mortar or other debris in the chase (old chimney). If any is found, clean it out.
 - Damage or deterioration to visible portions of the PPs Flex system itself.
 - Obstructions inside the PPs Flex system itself
- 2) Visually inspect all exposed portions of the chimney inside and outside of the building that can be accessed without the use of ladders. Look for:
 - Deterioration of the masonry chimney including possible leaks at mortar joints.
 - Damage, deterioration, or blockage of the Cap assembly
 - Signs that water may be entering the chase
- 3) If the above inspections suggest that further action is needed in order to assure that the chimney chase is still in compliance with Part B of this manual, perform additional inspections and repairs as necessary.
- 4) Reassemble the concentric vent system between the base of the chimney and the boiler. Verify that it is properly supported.
- 5) Inspect the Exterior Wall plate and Concentric Adaptor to be sure that they are firmly attached to the base of the chimney and are sealed.

Warning

Failure to maintain the vent system, and boiler in accordance with these maintenance instructions, and those in the boiler installation and operating manual could cause unreliable operation, severe property damage, personal injury, or loss of life.

Important

Failure to document the annual boiler and vent system maintenance described above may void the boiler warranty.

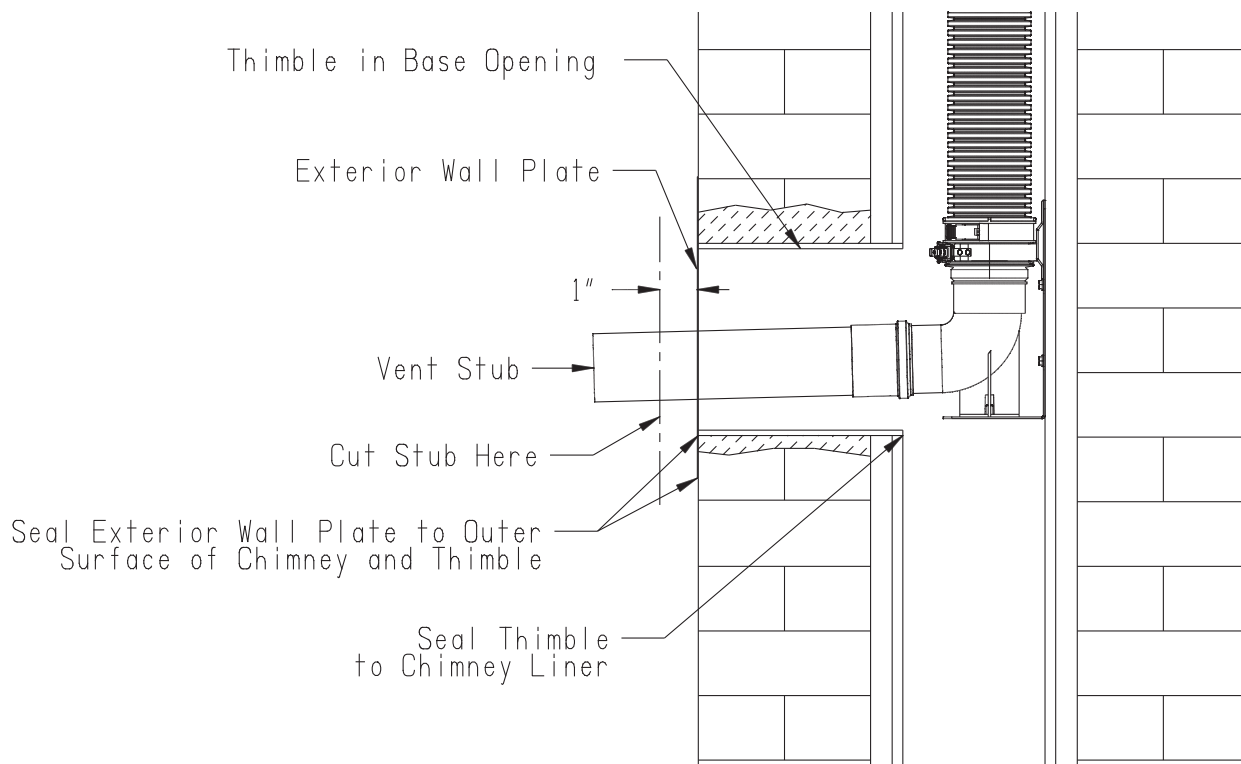
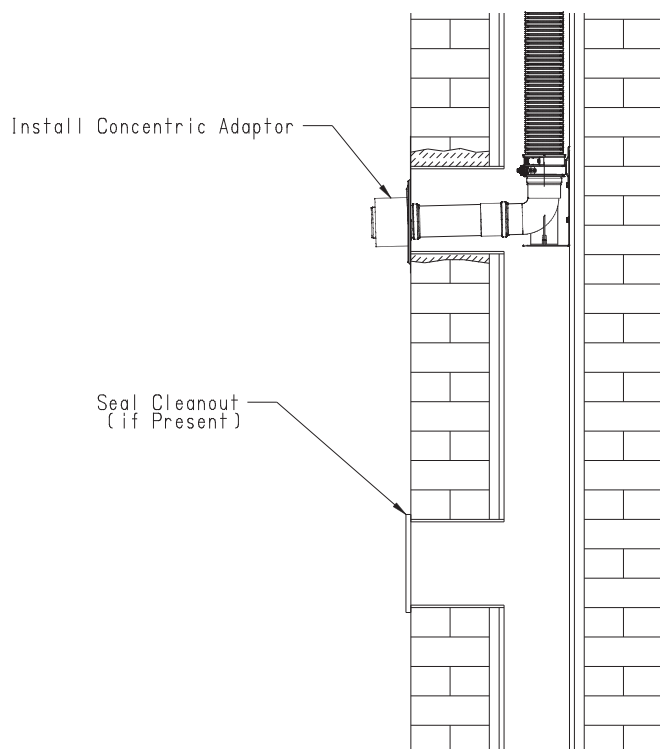


Figure 2.1: Chimney Base Detail



**Figure 2.2: Completing Flex Liner Installation
(See Boiler Installation Manual for Concentric Vent Installation)**



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