

COMMON VENT KIT (PVC AND DURAVENT)



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Servicing should only be performed by a Qualified Service TECHNICIAN

INTRODUCTION

These instructions cover how to install the 100 - 145, 150 to 250, 251 to 500 models of water heaters in a common direct vent kit. You may not combine water heaters from different groups. This kit may be used as part of a common vent installation of up to three of any combination of the models in the 100 - 145, 150 to 250, 251 to 500 group listed in **Models Covered** (page 2) in a direct vent configuration.

Check local code requirements regarding common venting of plastic pipe. In Canada, all plastic pipe must be listed to **ULC S636**.

MODELS COVERED

100 TO 145 MODELS, SERIES 200/201/300/301/350/400/401/450/451

- A. O. SMITH MODELS:
 - BTH 100(A)
 - BTH 120(A)
 - BTH 145(A)
- American Models:
 - (A)HCG3 60T100 3 (N),(P)
 - (A)HCG3 60T120 3 (N),(P)
 - (A)HCG3 60T145 3 (N),(P)
- State Models:
 - SUF 60100(N,P)E(A)
 - SUF 60120(N,P)E(A)
 - SUF 60145(N,P)E(A)

150 TO 250 MODELS, SERIES 200/201/300/301/350/400/401/450/451

- A. O. SMITH MODELS:
 - BTH 150(A)
 - BTH 199(A)
 - BTH 250(A)
 - BTHL 150 (A)
 - BTHL 199 (A)
 - BTHL 250 (A)
- American Models:
 - (A)HCG3100T 150
 - (A)HCG3100T 199
 - (A)HCG3100T 250

- State Models:
 - SUF 100150(N,P)E(A)
 - SUF 100199(N,P)E(A)
 - SUF 100250(N,P)E(A)
 - SUFL 250150(N,P)A
 - SUFL 250199(N,P)A
 - SUFL 250250(N,P)A
- Reliance Models:
 - RUF 100199(N,P)E

251 TO 500 MODELS, SERIES 200/201/300/301/350/400/401/450/451

- A. O. SMITH MODELS:
 - BTH 251(N)A
 - BTH 300 (A)
 - BTH 400 (A)
 - BTH 500 (A)
 - BTHL 300A
 - BTHL 400A
 - BTHL 500A
- American Models:
 - (A)HCG3119T 251
 - (A)HCG3119T 300
 - (A)HCG3119T 400
 - (A)HCG3119T 500
- State Models:
 - SUF 119251(N)EA
 - SUF 119300(N,P)E(A)
 - SUF 119400(N,P)E(A)
 - SUF 119500(N,P)E(A)
 - SUFL 220300(N,P)EA
 - SUFL 220400(N,P)VA
 - SUFL 220500(N,P)EA

Note: These instructions are included with a kit that connects one water heater to a common vent system. Study this instruction to determine how many kits you may need for your installation.

ADDITIONAL INFORMATION

This kit instruction is a supplement to the Instruction Manual that is supplied with the water heater. The multiple heater installation must satisfy all the requirements of the Instruction Manual as well as the requirements of this kit instruction. The installer may also consult with installation instructions from the vent manufacturer. In the event of any conflict between the documents, these instructions take precedence.

Installations must comply with applicable national, state, and local codes. Check local code requirements regarding the use of PVC pipe. In Canada, all plastic pipe must be listed to **ULC S636**.

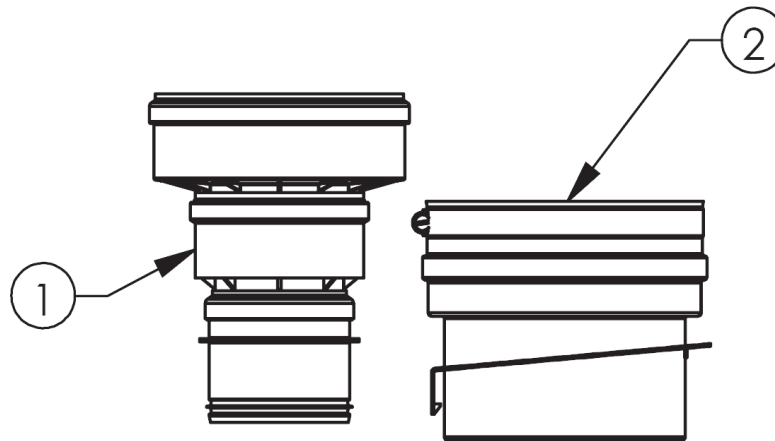
NOTE: The use of cellular core PVC (**ASTM F891**), cellular core CPVC, or Radel® (polyphenolsulfone) in non-metallic venting system is prohibited. Covering non-metallic vent pipe and fittings with thermal insulation is prohibited.

PVC COMMON VENT KIT INSTRUCTIONS (100227396 OR 100223775)

PVC PARTS LIST

Each kit contains the adapters needed to connect the vent and air intake system to one heater. Additional parts are needed to create the connectors, common sections and vent terminations. A list of additional parts is included below for your convenience.

For example, to install a common vent for two heaters requires two common vent kits (see **Table 1** and **Table 2**), the additional parts listed in **Table 3** or **Table 4**, and the necessary PVC parts selected to fit the installation.



**Figure 1. PVC COMMON VENT KIT (100 TO 250 MODELS)
(ONE KIT NEEDED FOR EACH HEATER)**

Table 1. PVC Common Vent Kit Parts List (100 To 250 Models)			
Item No.	Kit No.	Description	Kit Supplied
1	100227396	VENT ADAPTER,OUTLET,6",PP,DURAVENT	1
2		VENT ADAPTER,PP/PVC,STAINLESS,DURAVENT	1
3		INSTRUCTION,COMMON VENT KIT	1

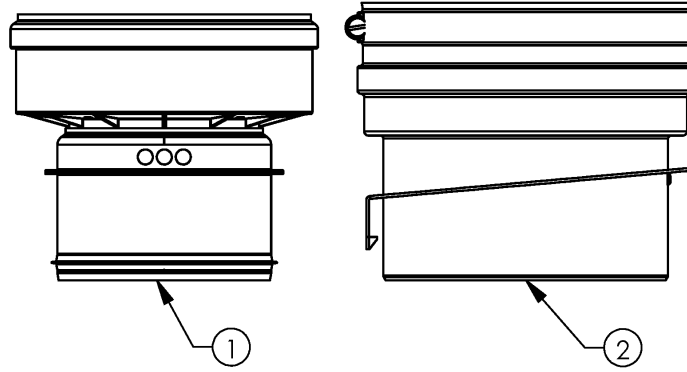


Figure 2. PVC COMMON VENT KIT (251 TO 500 MODELS) (ONE KIT NEEDED FOR EACH HEATER)

Table 2. PVC Common Vent Kit Parts List (251 To 500 Models)			
Item No.	Kit No.	Description	Kit Supplied
1	100223775	BACKFLOW PREVENTER, 251-500, DURAVENT	1
2		VENT ADAPTER, 251-500, SS, DURAVENT	1

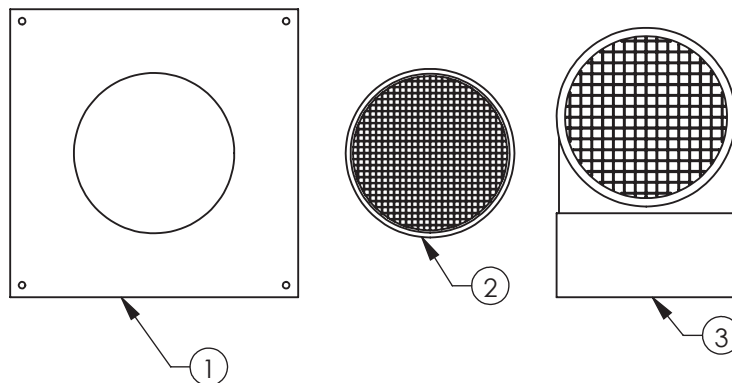


Figure 3. Additional Parts Required - PVC (FOR US ONLY)

Table 3. Field Supplied Parts - PVC (For Us Only)			
Item No.	Kit No.	Description	Additional Required
1	100110441	PLATE,WALL COVER,0.052", GALV,STEEL	4
2	100226846	VENT SCREEN COUPLING ASSEMBLY,6"	1
3	100078784	AIR INTAKE TERMINAL	1

Table 4. Field Supplied Parts - ULC S636 PVC (for Canada)		
Kit No.	Description	Additional Required
100110441	PLATE,WALL COVER,0.052",GALV,STEEL	4
IPEX 196142 (PVC) or IPEX 197141 (CPVC)	COUPLING FOR VENT OUTLET	1
IPEX 196140 (PVC) or IPEX 197203 (CPVC)	ELBOW FOR AIR INLET	1
100041999	SCREEN	2

SUPPORTS

You will need enough supports so that you can install one every 3 feet of horizontal run and every 5 feet of vertical run for both the inlet and vent pipe. Supports may be field supplied metal strapping or equivalent.

CONDENSATE DRAIN

Each water heater must have a separate condensate drain line running to an open drain. Follow the directions in the water heater's instruction manual. Do not use a common condensate drain line for multiple heaters.

INSTRUCTIONS

PHYSICAL LAYOUT - GENERAL

This kit may be used as part of a common vent installation of up to 3 of any combination of the models in the 100 - 145, 150 to 250, 251 to 500 groups listed in **Models Covered** (page 2) in a direct vent configuration. You may not mix water heaters from the different groups. Check local code requirements regarding common venting of plastic pipe. In Canada, all plastic pipe must be listed to **ULC S636**.

NOTE: Do not use these parts to combine these water heaters with any other heater or gas appliance.

This kit is meant to common vent water heaters that are physically close to each other and facing the same direction. Additional limits of this kit are:

- All heaters are on the same floor.
- Through the wall vent and air inlet terminations.
- All heaters are in the same room (pressure zone).
- No change to the system layout, as shown in **Figure 4** (page 8), except as explained in these instructions.
- The adapters shown in **Figure 1** (page 5) and **Figure 2** (page 6) must not be modified.

The system layout must be planned to minimize the linear length and number of fittings in the system. The kit is meant to accommodate heaters that maintain the recommended 24" clearance between the water heaters, (52" on center for the 100 to 250 models, 57" on center for the 251 to 500 models, and 66" on center for the BTHL and SUFL models). Consult the water heater's installation instructions for proper clearances for service. Consult the water heater's instruction manual and see **Figure 6** (page 10) for requirements for locating the air intake and vent terminals.

The common vent is the section of the vent and air inlet piping where the gases from all of the heaters flow together, See **Figure 4**. The maximum equivalent length straight pipe and elbows of the common sections is 50 feet. The minimum equivalent length of the common sections is 3 feet. Each 90° elbow is equal to 5 feet and a 45° elbow is equal to 2½ feet. The maximum number of elbows is three. The air intake terminal (90° elbow) is not included in the equivalent length.

MAXIMUM EQUIVALENT LENGTHS

The maximum equivalent lengths of the system are:

- Common section: 50 feet
- Connector height: 110"
- Heater spacing: 24" clearance (see above)

If it is necessary to modify the connectors or heater spacing, the equivalent length of additional vent connector, heater spacing or elbows must be deducted from the 50 equivalent feet of the common vent or common air intake sections.

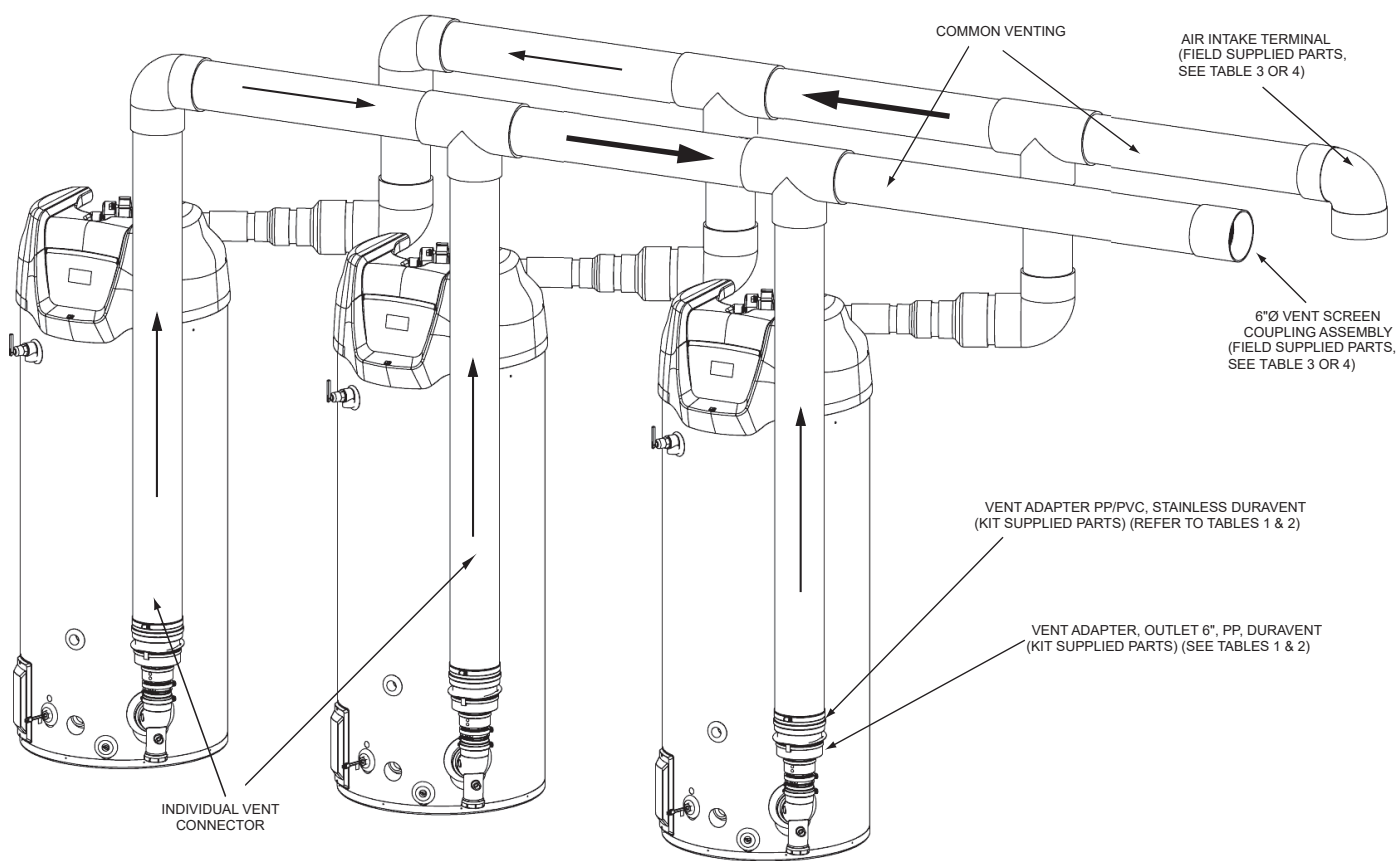


Figure 4. Definition of System Sections - PVC

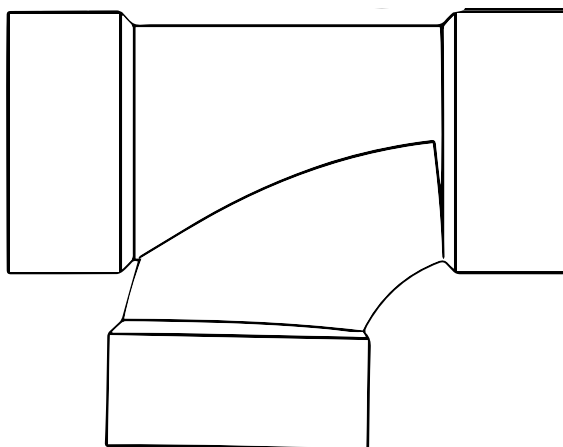


Figure 5. Sanitary TEE

Figure 4 shows the system constructed with straight tees. However, you can also use sanitary tees, shown in *Figure 5*, as an acceptable substitute, provided they are arranged so that the flows are in the directions indicated in *Figure 5*.

The individual vent connectors attach the heaters to the common vent. The exhaust vent connectors are attached to the water heater with the parts in the kit. The air inlet connectors are attached with PVC reducing fittings to the heater's PVC coupling. As shown in *Figure 4*, the individual vent connectors consist of vertical and horizontal sections that connect the heater outlets to the common vent. Using different lengths of pipes, the height of the horizontal sections may be adjusted to be from 80" to 110" from the bottom of the heater to the center-line of the horizontal section. The combustion air and exhaust vent sides of the system may be different heights, but each must meet the 80" to 110" height requirement.

SUPPORT

DO NOT SUPPORT WEIGHT OF VENT SYSTEM ON THE HEATER. Supports must be installed every 3 feet of horizontal run and 5 feet of vertical run for both the inlet and vent pipe. Supports may be made of field supplied metal strapping or equivalent. The common vent outlet piping must be sloped upwards toward the vent terminal at least 1/4" per foot.

TERMINATIONS

See *Figure 6* (page 10) for location requirements of horizontal vent and intake terminations. You must use the terminations found in the additional required parts list. The air inlet terminal is a 90° elbow pointing down and the vent outlet is the end of a straight pipe section, facing horizontally.

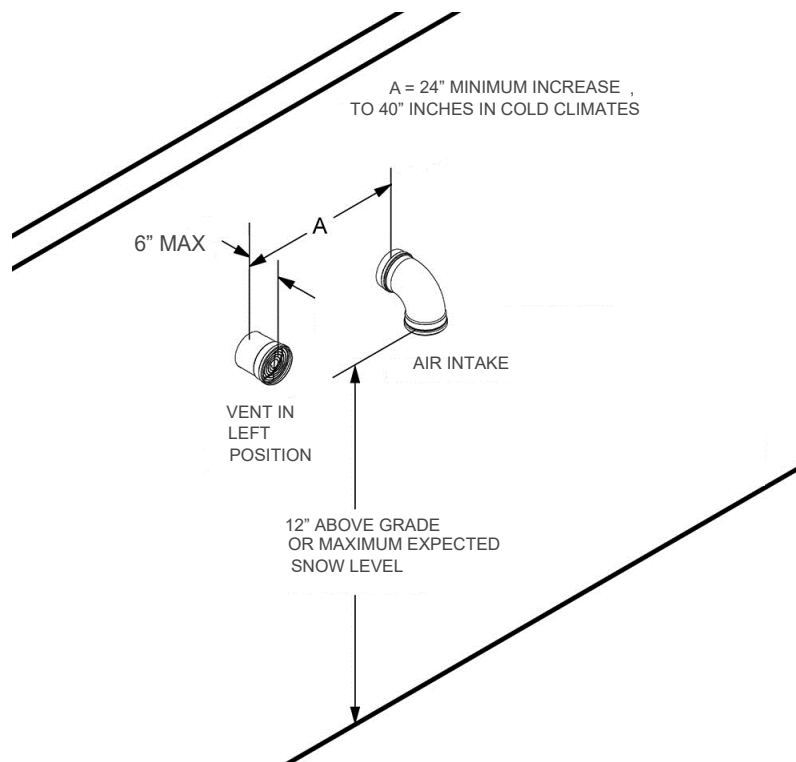


Figure 6. Wall Terminations

ASSEMBLY

All joints that are PVC to PVC should be attached using approved solvent glue. See the water heater's Instruction Manual for additional details. Start the assembly at the wall termination and proceed towards the middle of the common system. Next, start assembly at the appliances. This will allow small adjustments near the tees over the heaters.

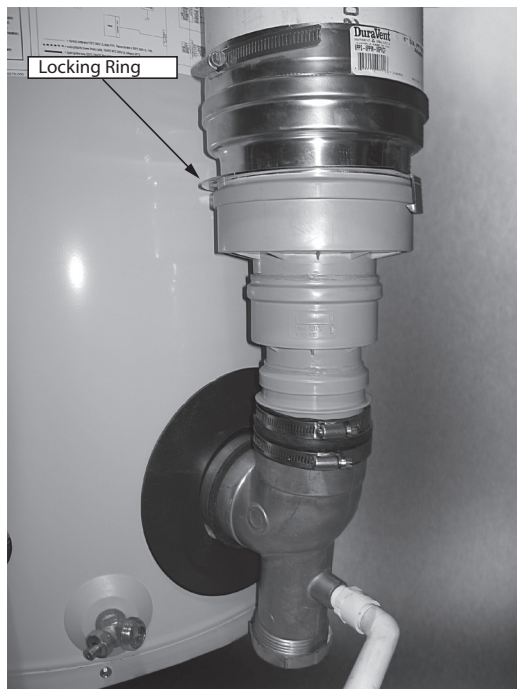
Wall Penetration - The general instructions for penetrating the side wall are found in the Side Wall Terminations section of the water heater's instruction manual. The common vent system may not be used with the concentric or low profile vent terminals as described in the instruction manual supplied with the water heater.

For each penetration, cut a 7" diameter hole through the structure. First, attach the final terminations for the exhaust outlet and air intake to their final, straight pipes. Outside the building, insert the last straight pipe sections through the wall plates and then, through the penetration. Run a bead of field-supplied silicone sealant around the wall plate and press it in place. Inside the building, place a second wall plate over each of the pipes and seal the plates to the wall with silicone sealant. After the vent system is completely set up, finish the penetrations by sealing the gap between the pipe and wall plates with a bead of silicone sealant.

VENT

The exhaust vent is connected to the heater by two adapters. The vent outlet adapter/ backflow preventer is connected to the aluminum exhaust vent elbow by inserting the male end of the vent outlet adapter into the outlet and securing it with the rubber boot and hose clamps (supplied with the water heater as shown in *Figure 7*). Next, the Polypropylene/ PVC adapter is inserted into the outlet of the backflow preventer and secured with the attached locking ring. After that, the remainder of the exhaust vent side of the common system is composed of field-supplied **Schedule-40** PVC pipe and fittings.

Straight pipe to tee - Use field-supplied straight pipe sections to reach the horizontal part of the system that runs above the heaters. The total height from the bottom of the heater to the center line of the horizontal must be from 80" to 110".



100 - 250 Models

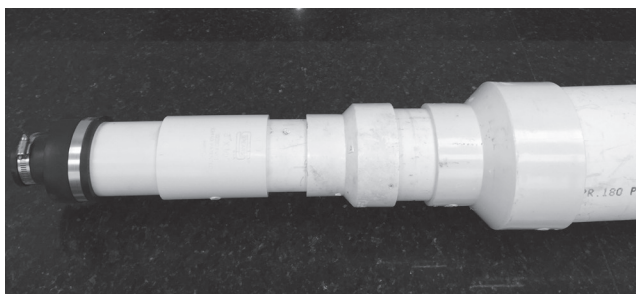


251 - 500 Models

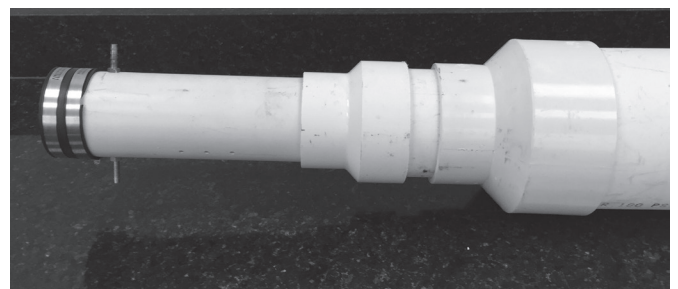
Figure 7. Outlet Vent Adapter to PVC

INLET AIR SIDE

Attaching to the inlet - The water heater's air inlet is either a 3" or 4" PVC fitting (*Figure 8*). For the 100 to 250 models, attach a 3" to 4" reducing adapter and then, a 4" to 6" reducing adapter to begin the 6" vent connector. The 251 to 500 models require only a 4" to 6" reducing adapter. A 90° elbow is then attached to turn the connector vertical, towards the remainder of the system.



100 - 250 Models



251 - 500 Models

Figure 8. PVC Air Inlet

Straight pipe to tee - A straight pipe section is used to run from the elbow to the bottom of the tee. The length may be adjusted so that the height to the center line of the horizontal run is 80" to 110" from the base of the heater. A straight section is not required – you may insert the base of the tee into the female end of the elbow.

COMMON SECTIONS

The common sections are the pipes that carry the vent gas or intake air to and from the outside. Each pipe must extend from the tee over the heaters to the outside/ outdoors etc. It is preferred to run the air and vent sections next to each other, over a similar path as shown in **Figure 4** (page 8). However, differences may be needed in the field. The requirements for both the air intake and vent common sections are:

- The equivalent length of straight pipe and elbows of each common section will be limited to between 3 feet and 50 feet. Each 90° elbow is equivalent to 5 feet pipe and a 45° elbow is equivalent to 2½ feet of pipe. The maximum number of elbows is three. The terminal elbows are not considered in calculating maximum or minimum equivalent lengths;
- Each common section may include vertical sections, but the final terminations must be horizontal through the wall. Vertical section lengths must be included in the total equivalent length.
- The horizontal vent section must be sloped upward at least 1/4" per foot towards the vent terminal and
- Each section must be supported as detailed in the above procedure.

TERMINATIONS

The placement of the vent and air terminals must follow the guidelines for terminal location found in the water heater's Instruction Manual. All required clearances to building features are the same as found in the water heater's Instruction Manual. The combustion vent terminal is a coupling with a screen that finishes the end of the pipe. The air inlet terminal must use the 90° elbow pointed down as shown in **Figure 6** (page 10). Clearances to the ground and to anticipated snow level must be as shown in **Figure 6**. The ends of both terminals must be protected with the bird screens supplied with the terminations.

POLYPROPYLENE COMMON VENT KIT INSTRUCTIONS (100227395 OR 100223774)

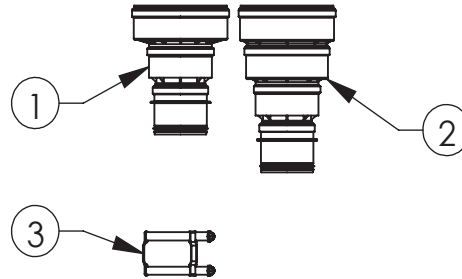
This kit instruction is a supplement to the Instruction Manual that is supplied with the water heater. The multiple heater installation must satisfy all the requirements of the Instruction Manual as well as the requirements of this kit instruction. The installer may also consult with installation instructions from the vent manufacturer. In the event of any conflict between the documents, these instructions take precedence. The kit is meant to accommodate heaters that maintain the recommended 24" clearance between the water heaters, (52" on center for the 100 - 145 models, 57" on center for the 150 to 250 models, and 66" on center for the 251 to 500 BTHL and SUFL models).

The heaters listed previously may also be common vented using a Polypropylene system manufactured by M&G Duravent. This is a system listed to **UL 1738** and **ULC S636** and may be required in some localities.

POLYPROPYLENE PARTS LIST

Each kit contains the adapters needed to connect the vent and air intake system to one heater. Additional parts are needed to create the connectors, common sections and vent terminations. A list of additional parts is included below for your convenience.

For example, to install a common vent for two heaters requires two common vent kits shown in **Figure 9**, the additional parts listed in **Table 7**, and the necessary polypropylene parts needed to extend the pipe systems between the heaters and the terminations.



**Figure 9. Polypropylene Common Vent Kit
(100 - 250 Models) (One Kit Needed for Each Heater)**

Table 5. Polypropylene Common Vent Kit (100 - 250 Models)			
Item No.	Part No.	Description	Kit Supplied
1	100227395	VENT ADAPTER,OUTLET,6",PP,DURAVENT	1
2		VENT ADAPTER,INLET,6",PP,DURAVENT	1
3		VENT ADAPTER CONNECTOR,DURAVENT	1

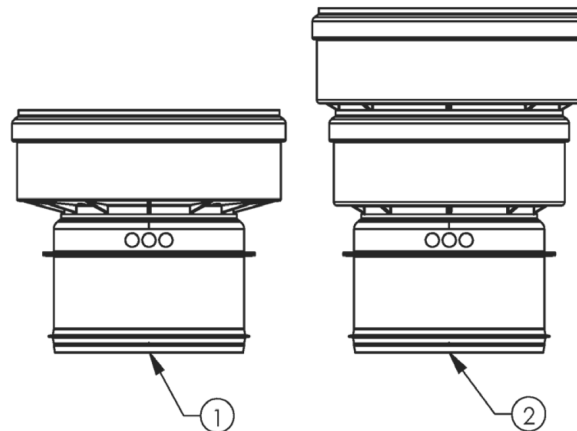


Figure 10. Polypropylene Common Vent Kit (251 - 500 Models) (One Kit Needed for Each Heater)

Table 6. Polypropylene Common Vent Kit (251 -500 Models)			
Item No.	Part No.	Description	Kit Supplied
1	100223774	BACK-FLOW PREVENTER, 251-500, DURAVENT	1
2		APPLIANCE-INCREASER, 251-500, DURAVENT	1

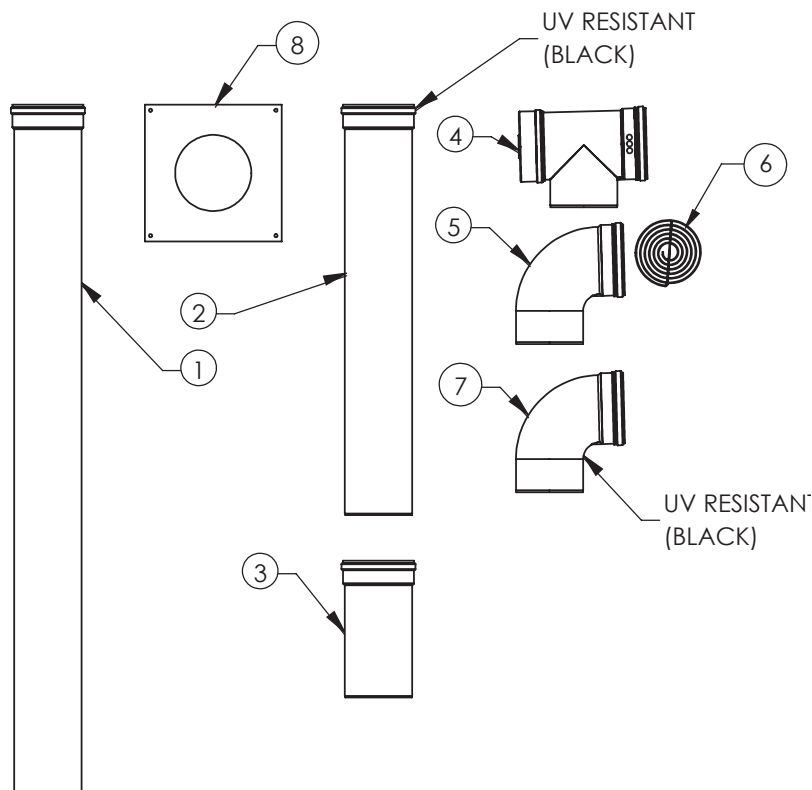


Figure 11. ADDITIONAL REQUIRED PARTS - POLYPROPYLENE

Table 7. Additional Required Parts - Polypropylene Parts List			
Item No.	Part No.	Duravent Stock No.	Description
1	N/A	810009776	VENT PIPE,6",72",PP,DURAVENT
2	N/A	810009774	VENT PIPE,6",36",PP,UV,DURAVENT
3	N/A	810009772	VENT PIPE,6",12",PP,DURAVENT
4	N/A	810009787	VENT TEE W/CAP,90,6",PP,DURAVENT
5	N/A	810009783	ELBOW,90,6",PP,UV,DURAVENT
6	N/A	810004276	BIRD SCREEN,6",DURAVENT
7	N/A	810009782	ELBOW,90,6",PP,DURAVENT
8	100110441	N/A	PLATE,WALL COVER,0.052",GALV,STEEL
Notes:			
1. Items 1 through 7 are field-supplied only.			
2. Locking rings are preinstalled on pipes, tees, and elbows			

SUPPORTS

You will need enough supports so that you can install one every 3 feet of horizontal run and every 5 feet of vertical run for both the inlet and vent pipe. Supports may be field supplied metal strapping or equivalent.

CONDENSATE DRAIN

Each water heater must have a separate condensate drain line running to an open drain. Follow the directions in the water heater's Instruction Manual. Do not use a common condensate drain line for multiple heaters.

INSTRUCTIONS

PHYSICAL LAYOUT - GENERAL

The requirements for the layout of the Polypropylene common vent system, required lengths and terminal locations are the same as for the PVC vent. The overall layout is shown in **Figure 12**. Consult the previous instructions for additional requirements.

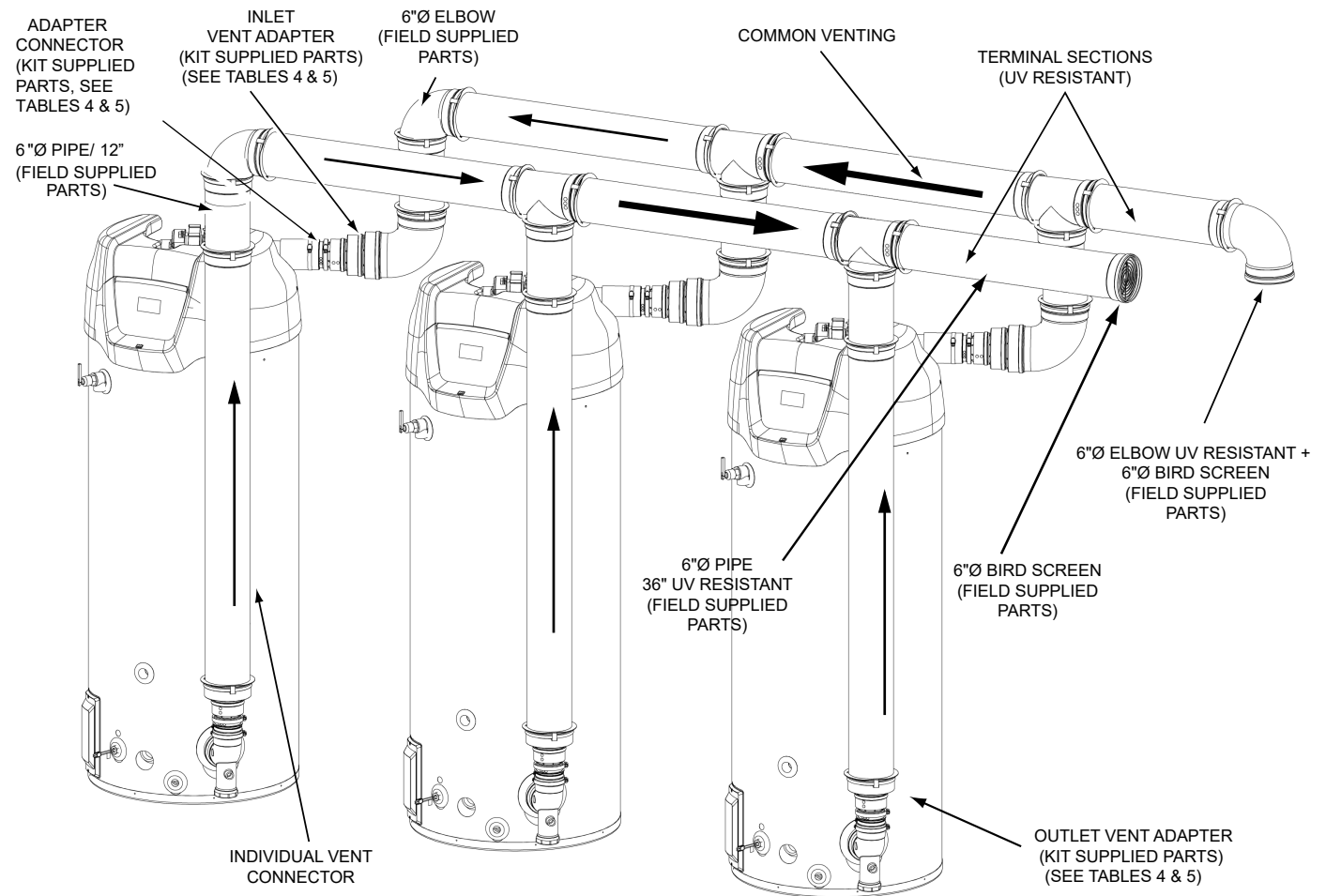


Figure 12. Definition of System Sections - Polypropylene

NOTE: In both the air inlet and vent outlet sides, the female end of the pipe or fitting is always towards the terminations.

The general instructions for penetrating the side wall are found in the Side Wall Terminations sections of the water heater's Instruction Manual. The common vent system may not be used with concentric or low profile vent terminals. All pipe and terminations that are outside the structure should be UV protected (black) parts.

SUPPORT

DO NOT SUPPORT WEIGHT OF VENT SYSTEM ON THE HEATER. Supports must be installed every 3 feet of horizontal run and 5 feet of vertical run for both the inlet and vent pipe. Supports may be made of field supplied metal strapping or equivalent. The common vent outlet piping must be sloped upwards toward the vent terminal at least 1/4" per foot.

TERMINATIONS

See *Figure 6* (page 10) for location requirements of horizontal vent and intake terminations. You must use the terminations found in the additional required parts list. The air inlet terminal is a 90° elbow pointing down and the vent outlet is the end of a straight pipe section, facing horizontally.

ASSEMBLY

For each penetration, cut a 7" diameter hole through the structure. First, attach the final termination for the air intake to its final straight pipe. Outside the building, insert the male end of the last straight pipe section through the wall plate and then, through the penetration. This last section should be the UV protected pipe. Run a bead of field-supplied silicone sealant around the wall plate and press it in place. Inside the building, place a second wall plate over the male end and seal the plate to the wall with silicone sealant. After the vent system is completely set up, finish the penetration by sealing the gap between the pipe and wall plates with a bead of silicone sealant. Remove the rubber gasket at the end of the inlet and outlet and insert the bird screen into the groove that is now available.

VENT

The vent adapter and back-flow preventer (*Figure 13*) is connected to the aluminum heater outlet and condensate trap by inserting the male end of the vent outlet adapter into the outlet and securing it with the rubber boot and hose clamps (supplied with the water heater).

Straight pipe to tee - Use field-supplied straight vent sections to reach the horizontal part of the system that runs above the heaters. Note that the flow in a polypropylene vent pipe is always out of the female end. The total height from the bottom of the heater to the center line of the horizontal must be from 80" to 110".



100-250 Models



251-500 Models

Figure 13. Outlet Vent adapter to Polypropylene

INLET AIR SIDE

Adapter to inlet - The male end of the air inlet adapter (*Figure 14*) is inserted into the water heater air inlet (a PVC fitting). It is held in place with the connector adapter supplied in this kit. A 90° elbow is inserted into the female end adapter to turn the system in a vertical direction.

Straight pipe to tee - A straight pipe section is used to run from the elbow to the bottom of the tee. The length may be adjusted so that the height to the center line of the horizontal run is 80" to 110" from the base of the heater. A straight section is not required – you may insert the base of the tee into the female end of the elbow.

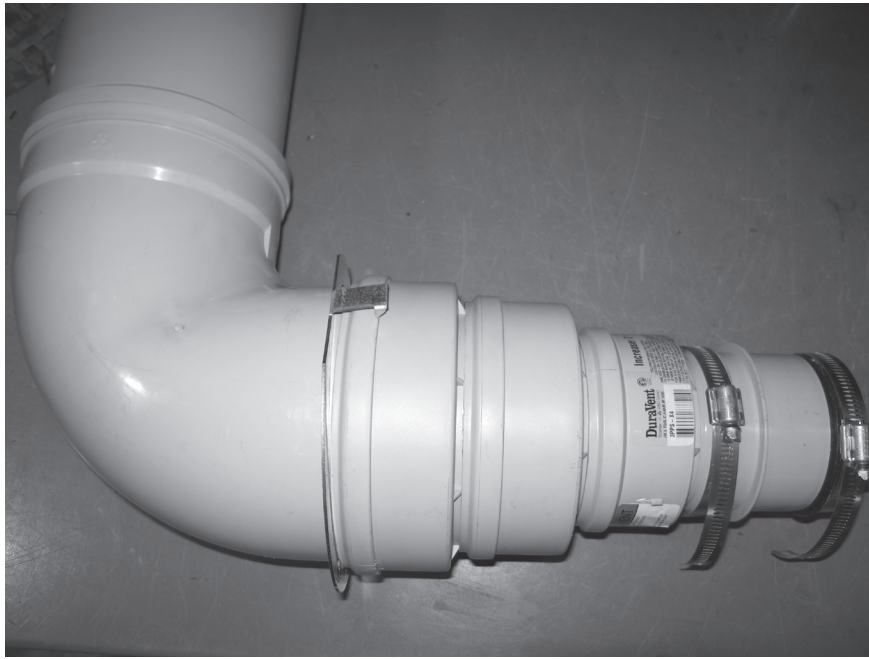


Figure 14. Air Inlet Adapter

COMMON SECTIONS

The common sections are the pipes that carry the vent gas or intake air from multiple units to and from the outside. Each pipe must extend from the tee over the heaters to the outside/ outdoors etc. It is preferred to run the air and vent sections next to each other, over a similar path as shown in **Figure 12** (page 15). However, differences may be needed in the field. The requirements for both the air intake and vent common sections are:

- The equivalent length of straight pipe and elbows of each common section will be limited to between 3 feet and 50 feet. Each 90° elbow is equivalent to 5 feet pipe and a 45° elbow is equivalent to 2½ feet of pipe. The maximum number of elbows is three. The terminal elbows are not considered in calculating maximum or minimum equivalent lengths.
- Each common section may include vertical sections, but the final terminations must be horizontal through the wall. Vertical section lengths must be included in the total equivalent length.
- The horizontal vent section must be sloped upward at least 1/4" per foot towards the vent terminal.
- Each section must be supported as detailed in the above procedure.

TERMINATIONS

The placement of the vent and air terminals must follow the guidelines for terminal location found in the water heater's Instruction Manual. All required clearances to building features are the same as found in the water heater's Instruction Manual. The combustion vent terminal is a coupling with a screen that finishes the end of the pipe. The air inlet terminal must use the 90° elbow pointed down as shown in **Figure 6** (page 10). Clearances to the ground and to anticipated snow level must be as shown in **Figure 6**. The ends of both terminals must be protected with the bird screens supplied with the terminations.

NOTES

For additional information contact:

1-800-527-1953

www.hotwater.com