



# Ultra

## Gas-fired water boilers – Series 3



Featuring **UControl**<sup>®</sup>  
Flexibility

# Manual addendum – Venting

Supplementary instructions for:

- **Additional concentric vent/air termination kits, including IPEX System 636 in 3-inch and 4-inch sizes**  
*(for information on IPEX, go to [www.ipexinc.com](http://www.ipexinc.com))*
- **Direct exhaust venting** *(requires combustion air openings to boiler room/building per this addendum).*
- **Direct vent with Roof exhaust and Sidewall air intake**

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This addendum must only be used by a qualified heating installer/service technician. Read all instructions, including the Ultra boiler manual and all other information shipped with the boiler, before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.



# Venting & air — general

REPLACES MANUAL PAGE 16

**⚠ DANGER** Do not install the Ultra boiler into a common vent with any other appliance. This will cause flue gas spillage or appliance malfunction, resulting in possible severe personal injury, death or substantial property damage.

**⚠ WARNING** Existing common vent systems may be too large for the appliances remaining connected after the existing boiler is removed.

**⚠ WARNING** Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

## When removing a boiler from an existing common vent system

**The Ultra boiler cannot be common vented with any other appliance.** When an existing boiler is replaced with an Ultra boiler, the Ultra boiler CANNOT use the existing common vent. The Ultra boiler requires its own vent and air piping, as specified in this manual. This may cause a problem for the appliances that remain on the old common vent, because the vent may be too large. The following test is intended to check for proper operation of the appliances remaining on the old common vent system.

### Vent system verification

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. Seal any unused openings in the common venting system.

### Existing vent test procedure

*(The following is intended to test whether the appliances remaining on an existing vent system will operate satisfactorily.)*

1. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.
2. Test vent system — Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
3. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
4. Test for spillage at 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.
5. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined herein, return doors, windows, exhaust fans, fireplace dampers, and any other gas-burning appliance to their previous conditions of use.

Any improper operation of common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1 — latest edition. Correct by re-sizing to approach the minimum size as determined using the appropriate tables in Part 11 of that code. Canadian installations must comply with B149.1 or B149.2 Installation Code.

**⚠ WARNING** You must provide combustion air.

**Direct vent** — Install air inlet piping for the Ultra boiler as described in the Boiler manual and this addendum. The air termination fitting must be installed with the clearances and geometry relative to the vent outlet depicted in this manual to ensure that flue products do not enter the air intake.

**Direct exhaust** — Provide combustion air openings to boiler room/building as specified in this addendum and as required by all applicable codes.

**Ensure that the combustion air will not contain any of the contaminants in Figure 1. DO NOT** place combustion air supply opening or intake near a swimming pool, for example. Avoid areas subject to exhaust fumes from laundry facilities. These areas will always contain contaminants.

Contaminated combustion air will damage the boiler, resulting in possible severe personal injury, death or substantial property damage.

Figure 1 Corrosive contaminants and sources

Products to avoid
Spray cans containing chloro/fluorocarbons
Permanent wave solutions
Chlorinated waxes/cleaners
Chlorine-based swimming pool chemicals
Calcium chloride used for thawing
Sodium chloride used for water softening
Refrigerant leaks
Paint or varnish removers
Hydrochloric acid/muriatic acid
Cements and glues
Antistatic fabric softeners used in clothes dryers
Chlorine-type bleaches, detergents, and cleaning solvents found in household laundry rooms
Adhesives used to fasten building products and other similar products
Excessive dust and dirt
Areas likely to have contaminants
Dry cleaning/laundry areas and establishments
Swimming pools
Metal fabrication plants
Beauty shops
Refrigeration repair shops
Photo processing plants
Auto body shops
Plastic manufacturing plants
Furniture refinishing areas and establishments
New building construction
Remodeling areas
Garages with workshops



# Venting & air — general *(cont.)*

REPLACES MANUAL PAGE 17

**⚠ DANGER** Ultra Boilers must be vented and supplied with combustion and ventilation air using piping and methods described in this manual.

**Every boiler must have its own vent. DO NOT** common vent with any other appliance. See page A-2.

Inspect finished vent and air piping thoroughly to ensure all are airtight and comply with the instructions provided and with all requirements of applicable codes.

Failure to provide a properly-installed vent and air system will cause severe personal injury or death.

**NOTICE** If the vent/air piping configurations covered in the Ultra boiler manual and this addendum cannot be applied for a particular installation, contact Weil-McLain for assistance. Other configurations may be available.

**⚠ WARNING** Where vent piping is routed through an unheated space, apply minimum 1 inch of foil-faced fiberglass insulation on the length of the vent pipe in the unheated space.

**⚠ WARNING** Installations must comply with local requirements and with the National Fuel Gas Code, ANSI Z223.1 for U.S. installations or CSA B149.1 or B149.2 for Canadian installations.

**⚠ WARNING** Use only the materials listed in the Boiler manual and this addendum for vent and air pipe and fittings. See Figure 5, page A-7. Failure to comply could result in severe personal injury, death or substantial property damage.

**⚠ WARNING** If used, a masonry chimney can **ONLY** be used as a PIPE CHASE for vent and air pipes — The vent and air piping must be installed as instructed in this manual and all joints must be sealed. The chimney must be used only for Ultra boilers. NO OTHER appliance or fire-place can be connected to the chimney.

The chimney must be straight, with no offsets, and the vent and air piping materials must comply with this instruction manual. The chimney must be fitted with a sealed access opening, through which the interior of the chimney can be inspected. The chimney (and liner, if installed) must be inspected at least once annually to verify condition.

Failure to comply could result in severe personal injury, death or substantial property damage.

## Vent piping

1. Boiler flue gases must be piped from the boiler to outside, following the instructions in the Boiler manual and this addendum, and compliant with all applicable codes. The vent pipe must terminate either through the sidewall or through the roof, located with the correct separation from the air termination.
2. See Figure 2, page A-4 for location of instructions for the vent/air system being used.
3. Each Ultra boiler requires a separate vent. **Do not common vent.**

## Combustion air piping (direct vent installations)

1. For direct venting, combustion air must be piped from outside to the boiler, following the instructions in the Boiler manual and this addendum, and compliant with all applicable codes. **Read the warning in Figure 1, page A-2, and ensure the air intake will not be likely to draw in contaminated air.**
2. Combustion air can be piped individually for each boiler, or it can be manifolded as shown in Boiler manual, page 55. Air piping must always terminate on the same side (or roof ) of the building as the vent, except for direct vent: vertical vent/sidewall air installations.

## Combustion and ventilation air openings (direct exhaust installations)

1. Combustion and ventilation air are provided from the boiler room on direct exhaust installations. Follow all instructions in the Boiler manual and this addendum, plus all applicable codes, to provide required air openings.

## Vent and air pipe termination options

1. Vent and air piping must terminate out the sidewall or through the roof of the building, using only one of the methods described in the Boiler manual and this addendum.
2. See Figure 2, page A-4 for options.

## Vent and air pipe diameters

1. Vent and air pipe diameters can be as specified in Figure 2, page A-4.

## Vent and air pipe maximum length

1. Do not exceed vent and air piping MAXIMUM lengths given in Figure 2, page A-4.

## Vent and air pipe minimum length

1. Direct vent — vent pipe and air pipe must each be **at least 2 feet long**, with 2 elbows if sidewall venting or 1 elbow if vertical venting.
2. Direct exhaust — no minimum.



# Venting & air — general *(cont.)*


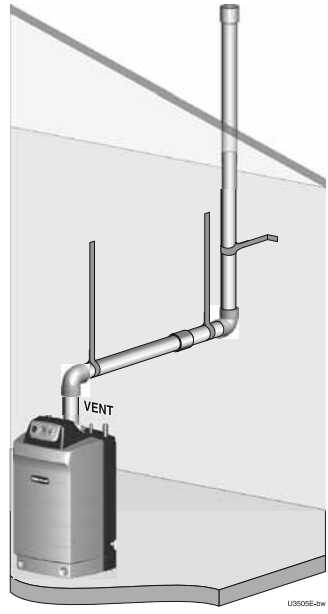
Figure 2 **DIRECT VENT APPLICATIONS** — Vent and air termination options

<b>DIRECT VENT SIDEWALL termination</b>		<b>DIRECT VENT VERTICAL termination</b>		<b>DIRECT VENT VERTICAL vent and SIDEWALL air</b>		
<p>Weil-McLain sidewall termination plate</p> <p>(See Boiler manual page 18)</p>		<p>3" or 4" PVC concentric termination</p> <p>(See addendum page A-8)</p>		<p>Vertical vent termination  and  Sidewall air termination</p> <p>(See addendum page A-15)</p>		
<p>3" or 4" PVC concentric termination</p> <p>(See addendum page A-8)</p>			<p>Vertical termination with separate vent and air pipes</p> <p>(See Boiler manual page 73)</p>			
<p>Sidewall termination with separate vent and air pipes</p> <p>(See Boiler manual page 66)</p>						
<p><b>Direct vent installation sequence</b></p>	<p><b>Step 1</b> Install the boiler.</p> <p><b>Step 2</b> Determine the termination method — sidewall or vertical, concentric or separate pipes, etc.</p> <p><b>Step 3</b> Determine proper location for wall or roof penetration for each termination.</p> <p><b>Step 4</b> Install termination assembly as described in this manual.</p> <p><b>Step 5</b> Install air and vent piping from boiler to termination.</p> <p><b>Step 6</b> Install pipe supports and brackets as required.</p>					



# Venting & air — general *(cont.)*

Figure 3 **DIRECT EXHAUST APPLICATIONS** — Vent termination options (combustion air from room)

<b>DIRECT EXHAUST Sidewall termination</b>		<b>DIRECT EXHAUST Vertical termination</b>	
<p><b>Sidewall vent termination</b> (See addendum page A-19)</p>	 <p style="text-align: right; font-size: small;">U5509E-4w</p>	<p><b>Vertical vent termination</b> (See addendum page A-19)</p>	 <p style="text-align: right; font-size: small;">U5509E-4w</p>
<p><b>Direct exhaust installation sequence</b></p>	<p><b>Step 1</b> Install the boiler.</p> <p><b>Step 2</b> Determine the proper location for roof or wall penetration for each termination.</p> <ul style="list-style-type: none"> <li>• Prepare roof penetrations before installing vent piping.</li> <li>• Finish by attaching external pipe and fittings as shown in the termination instructions.</li> <li>• Vertical terminations only — Install terminations as described in this addendum.</li> <li>• Support vertical runs on the outside of the building with brackets as shown in the termination instructions.</li> </ul> <p><b>Step 3</b> Install vent piping from boiler to termination.</p> <ul style="list-style-type: none"> <li>• Install a hanger support within 6 inches of any upturn in the piping.</li> <li>• Slope horizontal piping downward toward the boiler at least 1/4 inch per foot.</li> </ul> <p><b>Step 4</b> Connect the vent piping at the boiler per manual instructions.</p>		



# Venting & air — general *(cont.)*

**Figure 4 Vent and air pipe options and maximum allowable piping lengths**

Ultra model		Vent or air pipe size		• Maximum equivalent feet of piping • Number of elbows allowed at these lengths <i>(All applications include allowance for the terminations.)</i>											
				Direct vent Sidewall with Weil-McLain vent/air cap		Direct vent Sidewall with separate pipes — or — <b>Direct exhaust</b> (sidewall or vertical)		3" PVC Concentric Sidewall or Vertical (Use only PVC pipe DO NOT use CPVC or ABS) [Note 1]		4" PVC Concentric Sidewall or Vertical (Use only PVC pipe DO NOT use CPVC or ABS) [Note 1]		Direct vent Vertical with separate pipes		Direct vent Vertical exhaust Sidewall air	
				Direct vent only		Direct vent or Direct exhaust		Direct vent only		Direct vent only		Direct vent only		Direct vent only	
		Length	Ells	Length	Ells	Length	Ells	Length	Ells	Length	Ells	Length	Ells		
<b>80/105</b>	2"*	100 <b>(ab)</b>	2	100 <b>(a)</b>	2	100 <b>(ab)</b>	1	NA		100 <b>(a)</b>	1	100 <b>(a)</b>	1		
	3"	100	2	100	2	100	1	NA		100	1	100	1		
<b>155</b>	3"	100	2	100	2	100	1	NA		100	1	100	1		
<b>230</b>	3"	30 <b>(c)</b>	2	30 <b>(c)</b>	2	30 <b>(c)</b>	1	30 <b>(c)(d)</b>	1	30 <b>(c)</b>	1	30 <b>(c)</b>	1		
	4"	100 <b>(d)</b>	2	100	2	70 <b>(d)</b>	1	100	1	100	1	100	1		
<b>299</b>	4"	100	2	100	2	70 <b>(d)</b>	1	100	1	100	1	100	1		
<b>310</b>	4"	100	2	100	2	70 <b>(d)</b>	1	100	1	100	1	100	1		
<b>399</b>	4"	100	2	100	2	NA		100	1	100	1	100	1		
Note 1:	IPEX 3" and 4" PVC concentric vent kits can be used with standard PVC pipe, fittings and cement (ANSI/ASTM D1785) except where ULC S636 compliance is required. For ULC S636 compliance, all pipe, fittings and cement must be IPEX System 636. When using IPEX kits, use only IPEX product code 196006 for 3" venting or IPEX product code 196021 for 4" venting. Contact Weil-McLain for ordering information and availability of Weil-McLain venting kits.														
Additional notes	<b>a</b> — Use 3"x2" reducer at boiler <b>b</b> — Use 3"x2" reducers at termination							<b>c</b> — Use 4"x3" reducer at boiler <b>d</b> — Use 4"x3" reducers at termination							
	* Ultra-80 and 105 boilers installed with 2-inch vent piping automatically derate due to the pressure loss in the vent and air piping. The derate ranges up to 10% for the Ultra-80 at 100 feet or 15% for the Ultra-105 at 100 feet.														
<b>Equivalent feet for elbows</b> — deduct from maximum equivalent length of piping: • 7 feet per for each 4-inch elbow & 2 or 3-inch 90° long-radius or 45° elbow • 16 feet for each 2- or 3-inch short-radius elbow								<b>Stainless (AL29-4C) vent pipe</b> install an adapter at the boiler for all applications. Also install an adapter at the termination unless using separate-pipe termination.							



# Venting & air — general *(cont.)*

**Figure 5 Vent and air piping materials** — Use only the materials listed below, ensuring that all materials meet local codes

Item	Material	Standards for installations in:	
		United States	Canada
<b>Plastic piping materials</b>			
<b>Vent or air pipe &amp; fittings</b>	PVC schedule 40	ANSI/ASTM D1785	Plastic vent pipe must be certified to ULC S636 when required. (Note 2)  Air pipe can be any of those listed at left if acceptable for local codes.
	PVC-DWV (Note 1)	ANSI/ASTM D2665	
	CPVC schedule 40 (Note 1)	ANSI/ASTM F441	
	ABS-DWV schedule 40 (Note 1)	ANSI/ASTM D2661	
<b>PVC &amp; ABS pipe cement &amp; primer</b>	PVC	ANSI/ASTM D2564	
	CPVC (Note 1)	ANSI/ASTM F493	
	ABS (Note 1)	ANSI/ASTM D2235	
<b>AL29-4C piping materials</b>			
<b>Vent pipe AL29-4C stainless steel</b>	Heat Fab, Inc. — Saf-T-Vent® Z-Flex, Inc. — Z-Vent II Simpson Dura-Vent — FasNSeal™	Certified for Category IV and direct vent appliance venting	Certified for Category IV and direct vent appliance venting
<b>Weil-McLain bird screens <i>(purchase separately)</i></b>			
<b>Weil-McLain bird screens</b>	For 2" or 3" vent or air termination (cut to size if necessary) 3" vent screen: W-M part number 383-500-105	For 3" or 4" vent or air termination (cut to size if necessary) 4" vent screen: W-M part number 383-500-110	
Note 1:	DO NOT use DWV, CPVC or ABS when using concentric vent termination. Use ONLY PVC schedule 40.		
Note 2:	IPEX PVC concentric terminations utilize PVC pipe/fittings certified to ULC S636. Where ULC S636 compliance is required, use only IPEX System 636 pipe, fittings and cement.		
<b>WARNING</b>	AL29-4C vent piping — Install a PVC-to-stainless adapter supplied by the vent pipe manufacturer at the boiler vent connection and at the termination (when using Weil-McLain plate or concentric PVC termination). DO NOT mix piping from different vent pipe manufacturers unless using adapters specifically designed for the purpose by the manufacturer.		
<b>WARNING</b>	Plastic piping — Do not attempt to connect different types of plastic piping together.		
<b>WARNING</b>	DO NOT use cellular core pipe.		
<b>WARNING</b>	All vent and air pipes require a <b>bird screen at each termination</b> where specified in the manual or vent supplement. Purchase bird screens separately from Weil-McLain or vent kit supplier. Note that most kits do not include the screens.		



## Sidewall vent/air termination: 3" or 4" concentric

### Termination kit — 3" or 4" PVC concentric termination

1. The 3" or 4" PVC concentric termination kit must be purchased separately. See below.

**WARNING** Use only the vent materials and kits listed in Figure 2, page A-4 and Figure 4, page A-6 for concentric venting. Provide pipe adapters as specified in Figure 4, page A-6.

#### Commonwealth of Massachusetts

When the boiler is installed within the Commonwealth of Massachusetts:

- This product must be installed by a licensed plumber or gas fitter.
- See instruction in the Boiler manual.

### Allowable vent/air pipe materials

**WARNING** Use only the materials listed in Figure 5, page A-7.

### Maximum piping length

1. Locate the termination such that the total air piping and vent piping from the boiler to the termination will not exceed the maximum length given in Figure 4, page A-6.
2. Maximum lengths listed in Figure 4, page A-6 allow for 1 elbow. Additional elbows required a reduction in maximum length as explained in the table notes.

### Connecting from termination to boiler

1. Install the termination as instructed in the following.
2. Then proceed to page A-18 to complete the air and vent piping between the termination and the boiler.
3. The center lines between the air and vent are wider at the concentric termination connections than at the boiler. See Figure 15, page A-13 for suggestions on adjusting the spacing when required. In addition to the method given there, you can rotate the Y-fitting slightly, which will cause the air pipe to be slightly higher or lower than the vent, but the center lines will match those at the boiler vent and air connections.

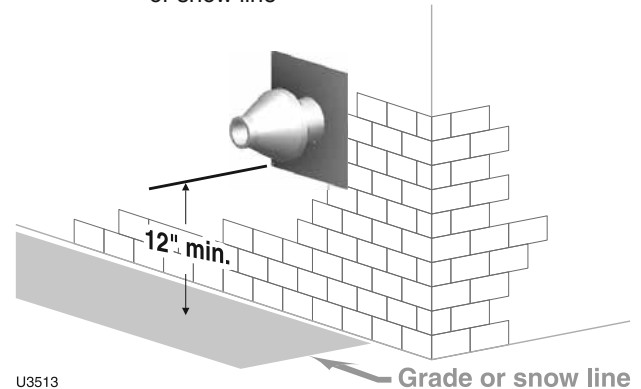
### Determine locations for terminations

**WARNING** A gas vent extending through an exterior wall shall not terminate adjacent to the wall or below building extensions such as eaves, parapets, balconies or decks. Failure to comply could result in severe personal injury, death or substantial property damage.

Locate the vent/air terminations using the following guidelines.

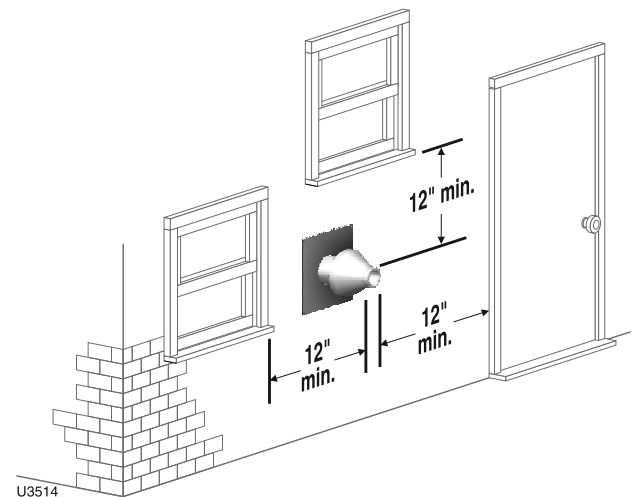
1. You must consider the surroundings when terminating the vent and air:
  - a. Position the vent termination where vapors will not damage nearby shrubs, plants or air conditioning equipment or be objectionable.

**Figure 6** Termination location — 3" or 4" PVC concentric termination — height above grade or snow line



U3513

**Figure 7** Termination location — 3" or 4" PVC concentric termination — clearances to openings



U3514

**WARNING** All vent and air pipes require a **bird screen at each termination**. Most kits do not include the screens. Purchase separately from Weil-McLain or vent kit supplier if not included.





## Sidewall vent/air termination: 3" or 4" concentric (cont.)

- b. The flue products will form a noticeable plume as they condense in cold air. Avoid areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of condensate and water/ice buildup where flue products impinge on building surfaces or plants.
  - d. Avoid possibility of accidental contact of flue products with people or pets.
  - e. Do not locate the terminations where wind eddies could affect performance or cause recirculation, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - f. Do not terminate above any door or window or under a deck. Condensate can freeze, causing ice formations.
  - g. Locate or guard vent to prevent condensate damage to exterior finishes.
2. Maintain clearances as shown in Figure 6, Figure 7, Figure 8 and Figure 9. Also maintain the following:
    - a. Vent must terminate:
      - At least 6 feet from adjacent walls.
      - No closer than 5 feet below roof overhang.
      - At least 7 feet above any public walkway.
      - At least 3 feet above any forced air intake within 10 feet.
      - No closer than 12 inches below or horizontally from any door or window or any other gravity air inlet.
    - b. Air inlet must terminate at least 12" above grade or snow line.
    - c. Do not terminate closer than 4 feet horizontally (above or below) from any electric meter, gas meter, regulator, relief valve or other equipment.
  3. Locate terminations so they are not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.

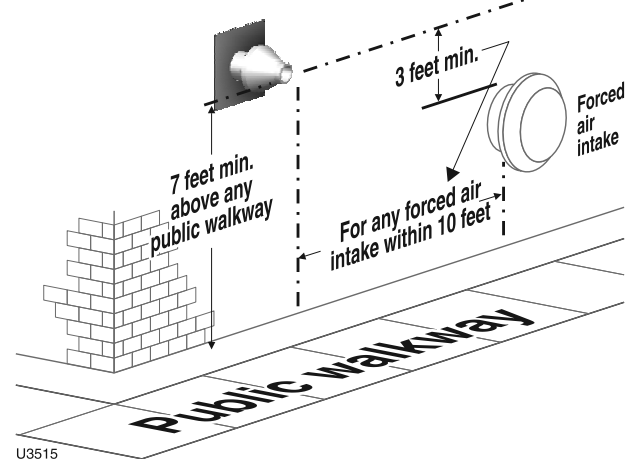
### Multiple vent/air terminations

1. When terminating multiple Ultra boilers, terminate each vent/air connection as described in this addendum.

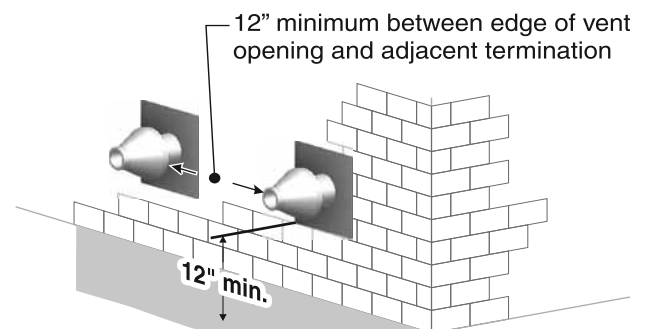
**⚠ WARNING** All vent pipes and air inlets must terminate at the same height to avoid possibility of severe personal injury, death or substantial property damage.

2. Place wall penetrations to obtain minimum clearance as shown in Figure 9 for U. S. installations. For Canadian installations, provide clearances required by CSA B149.1 or B149.2 Installation Code.
3. The air inlet of an Ultra boiler is part of a direct vent connection. It is not classified as a forced air intake with regard to spacing from adjacent boiler vents.
4. Combustion air (NOT vent piping) can be manifolded as shown in Boiler manual, page 55.

**Figure 8** Termination location — 3" or 4" PVC concentric termination — clearances to public walkway or forced air intake



**Figure 9** Termination location — 3" or 4" PVC concentric termination — multiple boilers — clearance from vent of one to air intake of the next





# Sidewall vent/air termination: 3" or 4" concentric (cont.)

## Install terminations — concentric pipes

1. Assemble the vent termination as described for vertical concentric terminations, beginning on page A-12.

**⚠ WARNING** If necessary, you can shorten the lengths of the inner and outer pipes for a shorter finished assembly. But you must ensure the pipes butt correctly at both ends. Failure to properly assemble the concentric termination can result in flue gas recirculation, causing possible severe personal injury or death.

2. Wall penetration:
  - a. 3" termination: Preferably, use a thimble with a 4½-inch hole. If not using a thimble, carefully use a hole saw to cut a hole not larger than 4¾ inches in diameter through the wall. The finished hole must provide a solid stop for the rain cap ribs, as shown in the inset to Figure 10.
  - b. 4" termination: Preferably, use a thimble with a 6-inch hole. If not using a thimble, carefully use a hole saw to cut a hole not larger than 6¼ inches in diameter through the wall. The finished hole must provide a solid stop for the rain cap ribs, as shown in the inset to Figure 10.
3. Secure the termination in place so the rain cap will butt against the outside wall or outer thimble plate as shown in Figure 10.
4. Before beginning vent and air piping from the boiler to the concentric termination, mount and secure the concentric termination as shown in Figure 10 and Figure 11.

**⚠ WARNING** The vent and air piping must be securely supported, and must not rest its weight on the boiler fittings. Failure to properly support the vent and air piping could result in vent piping damage, resulting in possible severe personal injury, death or substantial property damage.

The supports/bracing used must support the termination assembly to prevent slippage or movement.

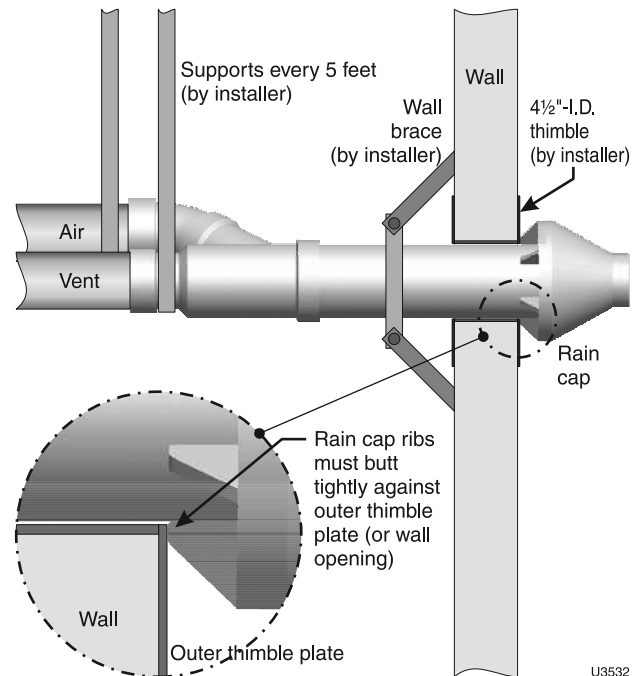
The clamps used on the outside of the termination pipe must not cut into the pipe or contain sharp edges that could cause a crack to form.

**⚠ WARNING** When inserting the partially-assembled termination kit through the roof penetration, wrap plastic or other protection over the end of the exposed assembly to prevent debris from entering the pipes. If the air passages become blocked, the boiler will not operate. Once the rain cap has been cemented to the assembly, there is no way to correct the problem. The assembly would have to be replaced if it were cut to be removed and cleaned. Altering the assembly in any way could result in severe personal injury or death due to toxic flue product emissions.

**⚠ WARNING** When using AL294C stainless vent pipe, use the vent pipe manufacturer's PVC adapter when connecting to the concentric vent attachment.

5. After the assembly has been positioned in the opening and all supports have been attached, install a bird screen (purchased separately if not included with the kit) and rain cap as follows:
  - a. Place the bird screen on the end of the inner pipe as in Figure 17, page A-14.
  - b. Cement the rain cap in place as shown.

**Figure 10** Installing and supporting the concentric sidewall vent assembly



**⚠ WARNING** Ensure that the wall material is strong enough to prevent the rain cap from being pushed inward if struck or pushed from the outside.

**Figure 11** Concentric termination requirements

	<p><b>Concentric termination</b> (installing termination — see page A-8)</p> <ul style="list-style-type: none"> <li>• Install pipe supports every 5 feet on both the horizontal and vertical runs.</li> <li>• Install a hanger support within 6 inches of any upturn in the piping.</li> <li>• <b>The concentric termination assembly must be installed before piping from the boiler to the termination.</b></li> <li>• Support the termination at the wall as shown in the termination instructions.</li> <li>• Slope horizontal piping downward toward the boiler at least 1/4 inch per foot.</li> <li>• Rotate the concentric termination Y-fitting about 30° to result in pipe centers the same as at the boiler.</li> </ul>
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# Vertical vent/air termination: 3" or 4" concentric

## Termination kit — 3" or 4" PVC concentric termination

1. The 3" or 4" PVC concentric termination kit must be purchased separately. See below.

**WARNING** Use only the vent materials and kits listed in Figure 2, page A-4 and Figure 4, page A-6 for concentric venting. Provide pipe adapters as specified in Figure 4, page A-6.

## Allowable vent/air pipe materials

**WARNING** Use only the materials listed in Figure 5, page A-7.

## Maximum piping length

1. Locate the termination such that the total air piping and vent piping from the boiler to the termination will not exceed the maximum length given in Figure 4, page A-6.
2. Maximum lengths listed in Figure 4, page A-6 allow for 1 elbow. Additional elbows required a reduction in maximum length as explained in the table notes.

## Connecting from termination to boiler

1. Install the termination as instructed in the following. Then proceed to page A-18 to complete the piping between the termination and the boiler.

## Determine location

Locate the concentric vent/air termination using the following guidelines:

1. The concentric vent/air assembly must terminate as shown in Figure 12.
2. The vent and air piping connected to the termination assembly must comply with the instructions in this supplement.
3. You must consider the surroundings when terminating the vent and air:
  - a. Position the termination where vent vapors will not damage nearby shrubs, plants or air conditioning equipment or be objectionable.
  - b. The flue products will form a noticeable plume as they condense in cold air. Avoid areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of condensate and water/ice buildup where flue products impinge on building surfaces or plants.
  - d. Avoid possibility of accidental contact of flue products with people or pets.
  - e. Do not locate the termination where wind eddies could affect performance or cause recirculation, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - f. Locate or guard vent outlet to prevent condensate damage to exterior finishes.

Figure 12 Vertical termination — 3" or 4" PVC concentric

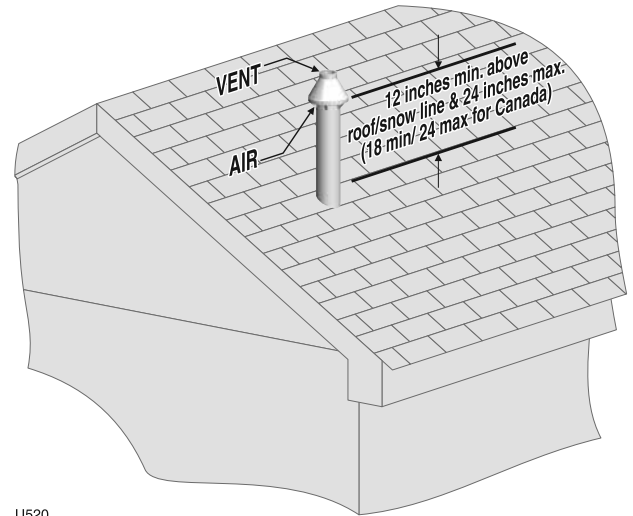
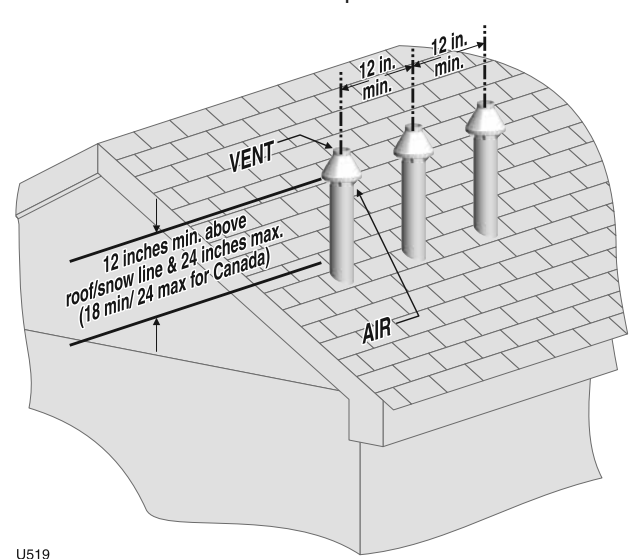


Figure 13 Vertical termination — 3" or 4" PVC concentric — multiple boilers



**WARNING**

All vent and air pipes require a **bird screen at each termination**. Most kits do not include the screens. Purchase separately from Weil-McLain or vent kit supplier if not included.



## Vertical vent/air termination: 3" or 4" concentric (cont.)

4. Maintain clearances to termination as given below:
  - a. Vent outlet must be located:
    - At least 6 feet from adjacent walls.
    - No closer than 5 feet below roof overhang.
    - At least 7 feet above any public walkway.
    - At least 3 feet above any forced air intake within 10 feet.
    - No closer than 12 inches below or horizontally from any door or window or any other gravity air inlet.
  - b. Air inlet must terminate at least 12 inches above the roof or snow line as shown in Figure 12, page A-11. (For Canada, the minimum is 18 inches.)
  - c. Do not terminate closer than 4 feet horizontally from any electric meter, gas meter, regulator, relief valve or other equipment. Never terminate above or below any of these within 4 feet horizontally.
5. Locate termination so it is not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.
6. Do not connect any other appliance to the vent pipe or multiple boilers to a common vent pipe.

### Multiple vent/air terminations

1. When terminating multiple Ultra boilers, install the concentric vent/air termination assemblies as described in this addendum.

**WARNING** All vent outlets must terminate at the same height to avoid possibility of severe personal injury, death or substantial property damage.

2. Place roof penetrations to obtain minimum of 12 inches between centers of adjacent vent pipe of another boiler for U. S. installations (see Figure 13, page A-11).
3. For Canadian installations, provide clearances required by CSA B149.1 or B149.2 Installation Code.
4. The air inlet of an Ultra boiler is part of a direct vent connection. It is not classified as a forced air intake with regard to spacing from adjacent boiler vents.

### Prepare roof penetrations

1. Roof penetration hole:
  - a. 3" termination: Cut a 5-inch diameter hole to clear the 4½-inch termination outside diameter.
  - b. 4" termination: Cut a 6.5-inch diameter hole to clear the 6-inch termination outside diameter.
  - c. Insert a galvanized metal thimble in the vent pipe hole.
2. Follow all local codes for isolation of vent pipe when passing through floors, ceilings and roofs.
3. Provide flashing and sealing boots sized for the concentric termination outside diameter.
4. Mount the termination as shown in Figure 15, page A-13.

### Assembling the concentric termination

1. See Figure 18, page A-14 for the dimensions and details of the termination assembly.
2. Prepare the bird screen (purchased separately if not included with the kit). Cut the bird screen to size if required. If the bird screen must be trimmed, cut the bird screen to fit the outside diameter of the PVC inner pipe supplied with the termination kit.

3. Partially assemble the vent termination kit in the sequence shown in Figure 17, page A-14.

**WARNING** **DO NOT** install the rain cap and bird screen until the assembly has been inserted through the roof and all supports have been installed. Follow instructions to cover the end of the assembly with plastic before inserting through the roof penetration to prevent debris from blocking the air passages.

4. Use the following procedures to prepare termination components and cement together.
5. Deburr inside and outside of pipe ends.
6. Chamfer outside of each pipe end to ensure even cement distribution when joining.
7. Clean all pipe ends and fittings.
8. Dry thoroughly.
9. Dry assemble entire vent or air piping to ensure proper fit before assembling any joint.
10. For each joint:
  - a. Handle fittings and pipes carefully to prevent contamination of surfaces.
  - b. Apply primer liberally to both joint surfaces — pipe end and fitting socket.
  - c. While primer is still damp, lightly apply approved cement to both surfaces in a uniform coating.
  - d. Apply a second coat to both surfaces. Avoid using too much cement on sockets to prevent cement buildup inside.
  - e. With cement still wet, insert pipe into fitting, twisting ¼ turn. Make sure pipe is fully inserted.

**WARNING** If necessary, you can shorten the lengths of the inner and outer pipes for a shorter finished assembly. But you must ensure the pipes butt correctly at both ends. Failure to properly assemble the concentric termination can result in flue gas recirculation, causing possible severe personal injury or death.

### Mount concentric termination

1. Before beginning vent and air piping from boiler, mount and secure the concentric termination as shown in Figure 14, page A-13, and Figure 15, page A-13.

**WARNING** The vent and air piping must be securely supported, and must not rest its weight on the boiler fittings. **DO NOT** drill or screw into either the vent pipe or air pipe. Failure to properly support the vent and air piping could result in vent piping damage, resulting in possible severe personal injury, death or substantial property damage.



## Vertical vent/air termination: 3" or 4" concentric (cont.)

**WARNING** When inserting the partially-assembled termination kit through the roof penetration, wrap plastic or other protection over the end of the exposed assembly to prevent debris from entering the pipes. If the air passages become blocked, the boiler will not operate. Once the rain cap has been cemented to the assembly, there is no way to correct the problem. The assembly would have to be replaced if it were cut to be removed and cleaned. Altering the assembly in any way could result in severe personal injury or death due to toxic flue product emissions.

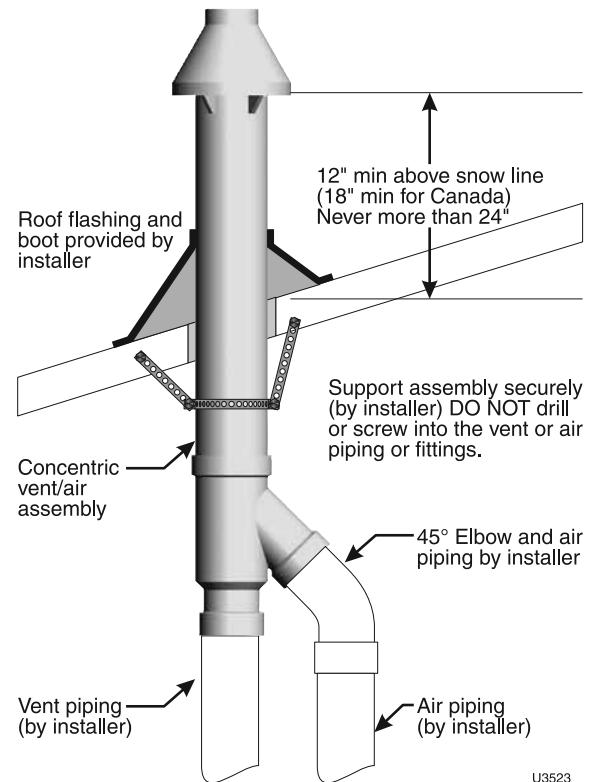
**WARNING** When using AL294C stainless vent pipe, use the vent pipe manufacturer's PVC adapter when connecting to the concentric vent attachment.

2. After the assembly has been positioned in the roof opening and all supports have been attached, install a bird screen (purchased separately if not included with the kit) and rain cap as follows:
  - a. Place the bird screen on the end of the inner pipe as in Figure 17, page A-14.
  - b. Cement the rain cap in place as shown.

### Vent termination support

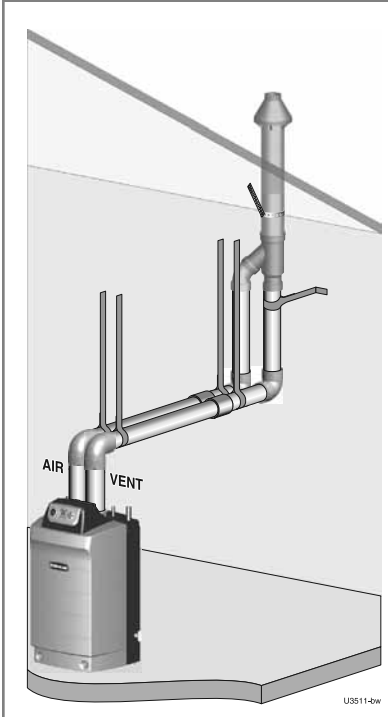
1. Support the concentric vent/air termination at the roof penetration as shown in Figure 15.
  - The supports/bracing used must support the termination assembly to prevent vertical slippage or sideways movement.
  - The clamps used on the outside of the termination pipe must not cut into the pipe or contain sharp edges that could cause a crack to form.

**Figure 15** 3" or 4" PVC concentric termination supports



U3523

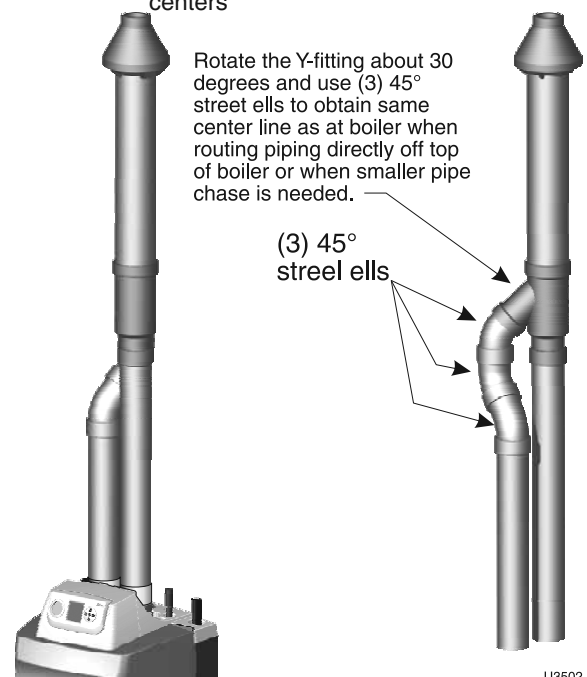
**Figure 14** Concentric termination requirements



**Concentric termination**  
(installing termination — see page A-11)

- Install pipe supports every 5 feet on both the horizontal and vertical runs.
- Install a hanger support within 6 inches of any upturn in the piping.
- **The concentric termination assembly must be installed before piping from the boiler to the termination.**
- Support the termination at the ceiling and above the roof as shown in the termination instructions.
- Slope horizontal piping downward toward the boiler at least 1/4 inch per foot.
- Use long-radius elbows for air piping when using 2" or 3" pipe to reduce pressure drop.
- Rotate the concentric termination Y-fitting about 30° to result in pipe centers the same as at the boiler.

**Figure 16** Alternate piping configuration, using (3) 45-degree elbows to obtain closer pipe centers

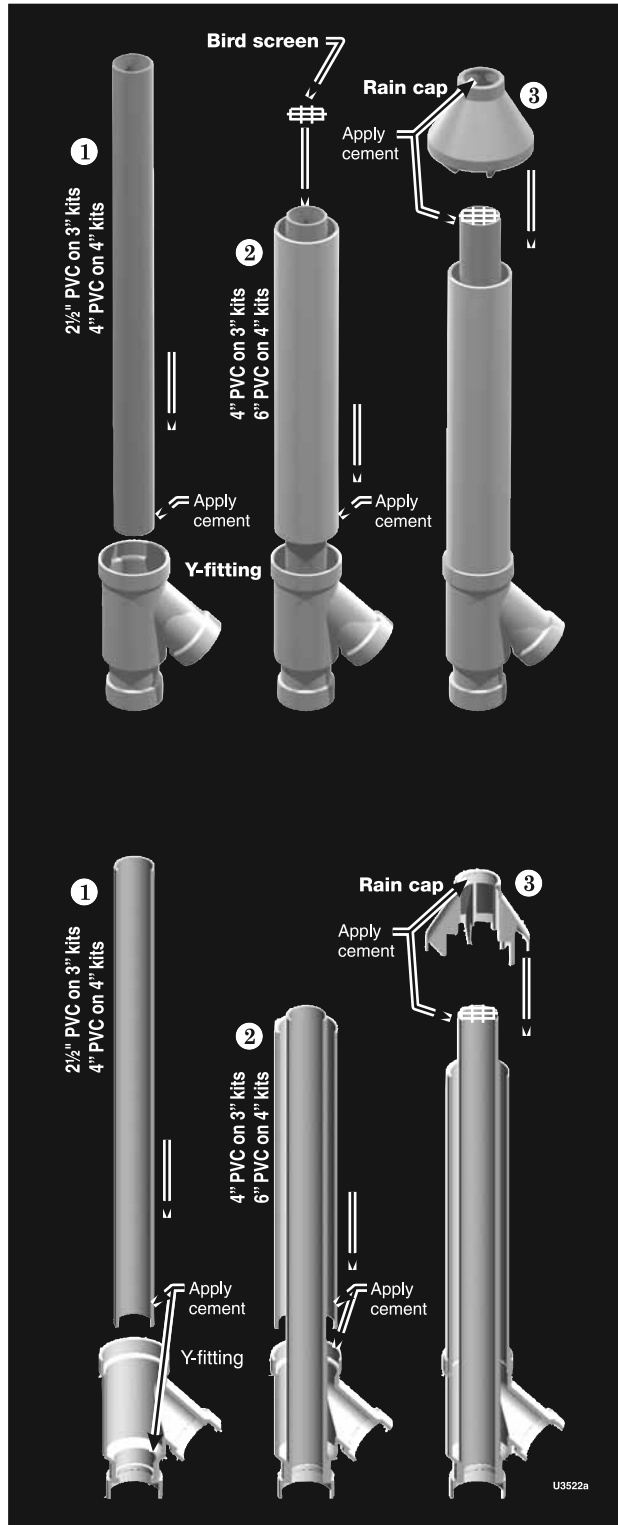


U3502

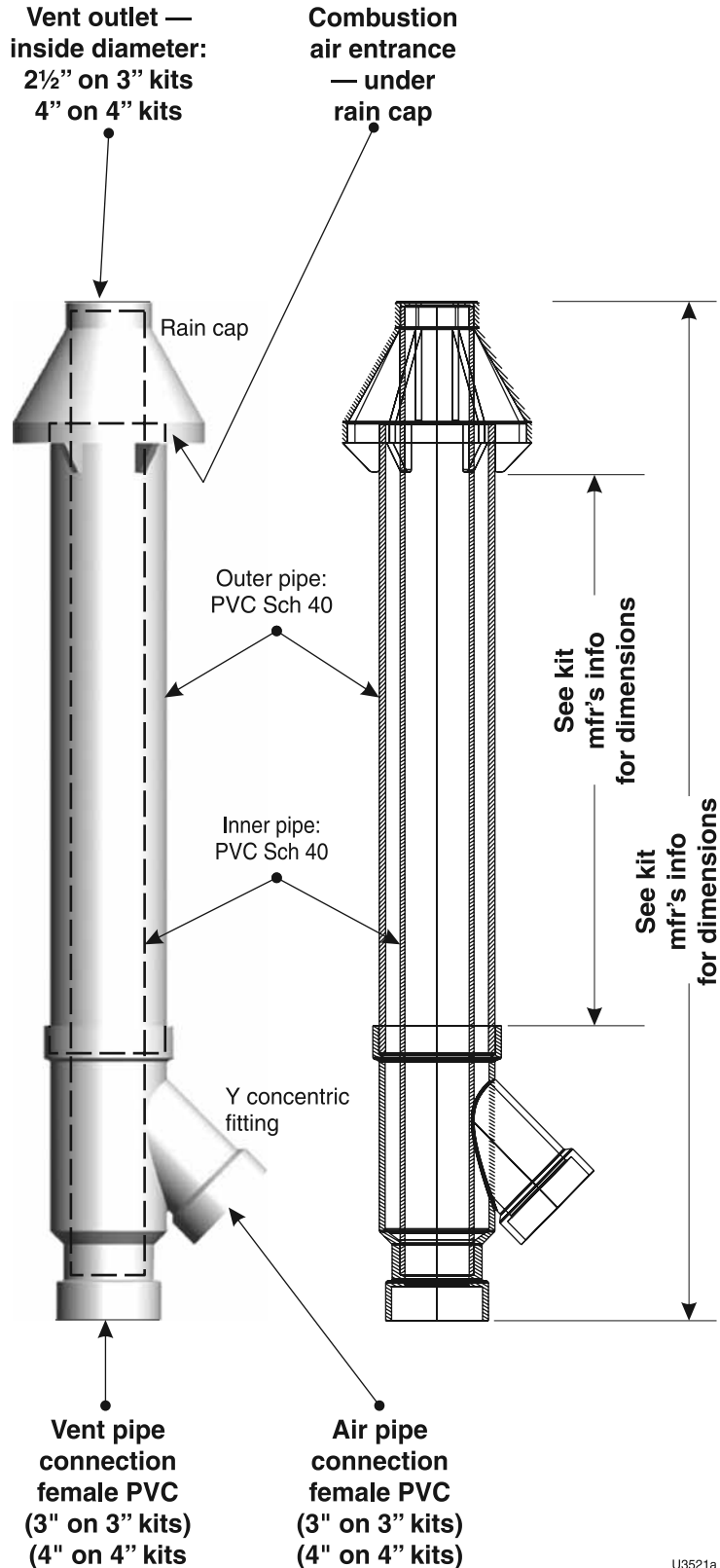


# Concentric vent/air termination assembly

**Figure 17** 3" or 4" PVC concentric termination assembly — DO NOT attach the rain cap until the termination has been inserted through the roof or wall and all supports have been installed.



**Figure 18** 3" or 4" PVC concentric termination assembly (see kit manufacturer's instructions for details)





## DIRECT VENT: Vertical vent / sidewall air

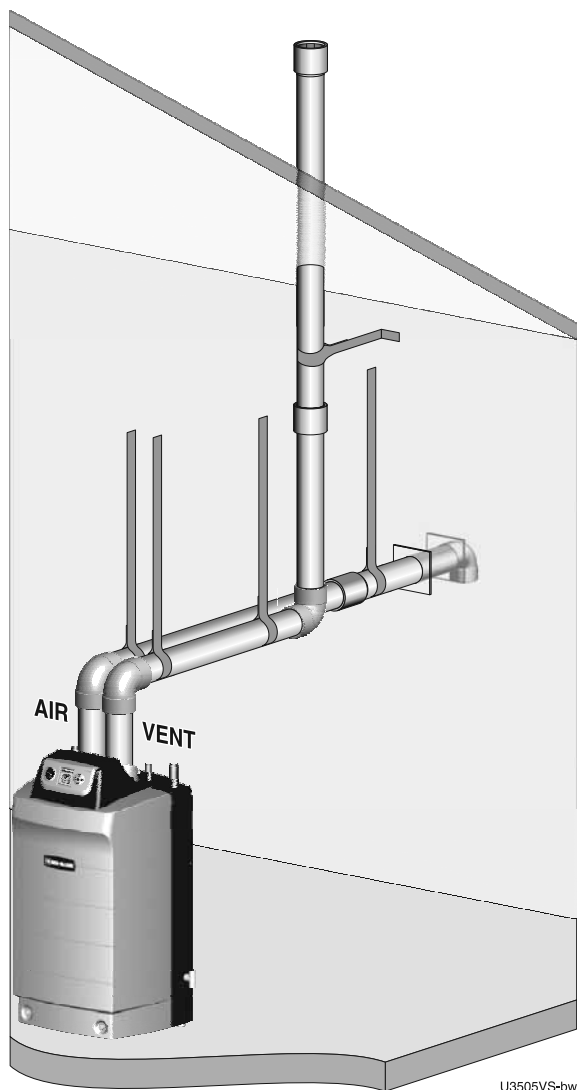
### Allowable vent/air pipe materials

1. Use only the materials listed in Figure 5, page A-7.
2. Purchase bird screens for vent and air terminations separately. See the parts list at the end of this manual.

### Maximum piping lengths

1. Locate the terminations such that the total air piping and vent piping from the boiler to the termination will not exceed the maximum length given in Figure 4, page A-6.
2. Maximum lengths listed in Figure 4, page A-6 allow for 1 elbow in the air piping and 1 elbow in the vent piping. Additional elbows required a reduction in maximum length as explained in the table notes.

**Figure 19** Direct vent: Vertical vent / sidewall air



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### Determine location

1. Locate the vent termination using the following guidelines:
2. The vent piping must terminate in an up-turned coupling as shown in Figure 20, page A-16. The top of the coupling must be at least 1 foot above the air intake.
3. You must consider the surroundings when terminating the vent and air:
  - a. Position the vent termination where vapors will not damage nearby shrubs, plants or air conditioning equipment or be objectionable.
  - b. The flue products will form a noticeable plume as they condense in cold air. Avoid areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of condensate and water/ice buildup where flue products impinge on building surfaces or plants.
  - d. Avoid possibility of accidental contact of flue products with people or pets.
  - e. Do not locate the terminations where wind eddies could affect performance or cause recirculation into building or appliance air intakes, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - f. Do not terminate above any door or window. Condensate can freeze, causing ice formations.
  - g. Locate or guard vent to prevent condensate damage to exterior finishes.
4. Maintain clearances to vent termination as given below:
  - a. Vent must terminate:
    - At least 6 feet from adjacent walls.
    - No closer than 5 feet below roof overhang.
    - At least 3 feet above any forced air intake within 10 feet.
    - No closer than 12 inches below or horizontally from any door or window or any other gravity air inlet.
  - b. Do not terminate vent closer than 4 feet horizontally from any electric meter, gas meter, regulator, relief valve or other equipment. Never terminate above or below any of these within 4 feet horizontally.
5. Locate terminations so they are not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.
6. Do not connect any other appliance to the vent pipe. Do not connect multiple boilers to a common vent pipe.

### Prepare roof penetrations

1. Vent pipe penetration:
  - a. Cut a hole for the vent pipe. For either combustible or noncombustible construction, size the vent pipe hole at least 0.4" larger than the vent pipe diameter:
    - 2¾" hole for 2" PVC
    - 4" hole for 3" PVC
    - 5" hole for 4" PVC
  - b. Insert a galvanized metal thimble in the vent pipe hole.
2. Follow all local codes for isolation of vent pipe when passing through floors, ceilings and roofs.
3. Provide flashing and sealing boots sized for the vent pipe and air pipe.



# DIRECT VENT: Vertical vent / sidewall air *(continued)*

## Termination and fittings

1. Prepare the vent termination coupling by inserting a bird screen. Bird screens must be purchased separately. See the parts list at the end of this manual for part numbers.
  - a. If using 3-inch piping for an Ultra-230, cut a 4-inch bird screen by placing 3-inch fitting on screen and cutting around it as a template.
2. Maintain the required dimensions of the finished termination piping as shown in Figure 20.

## Multiple vent terminations

1. When terminating multiple Ultra boilers, terminate each vent/air connection as described in this section.
2. Place adjacent terminations at least 6 inches apart.
3. For Canadian installations, provide clearances required by CSA B149.1 or B149.2 Installation Code.

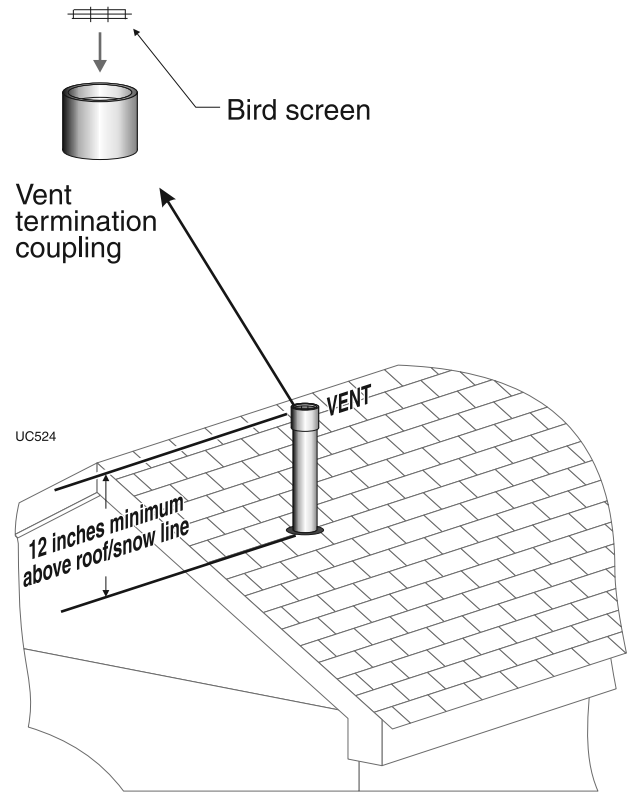
## Connecting from vent termination to boiler

1. Install the termination penetration as instructed in the preceding. Then proceed to page 18 to complete the piping between the termination and the boiler.

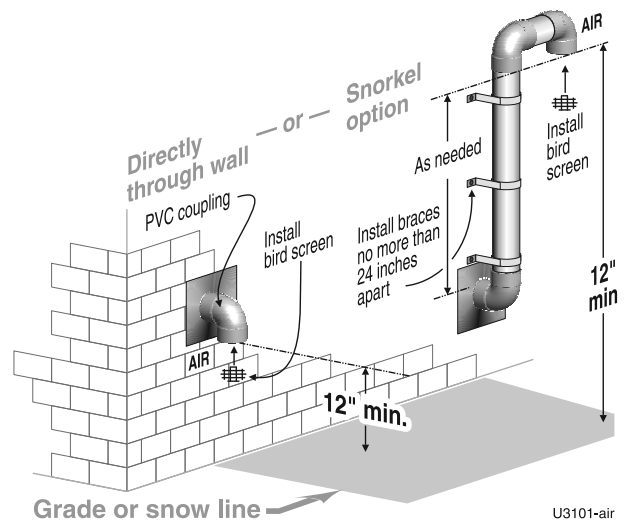
## Determine location for air inlet elbow

1. The air inlet of an Ultra boiler is part of a direct vent connection. It is not classified as a forced air intake with regard to spacing from adjacent appliance terminations.
2. Locate the air inlet elbow (termination) using the following guidelines.
3. The air piping must terminate in a down-turned elbow as shown in Figure 21.
  - a. Apply the configuration on the left side of Figure 21 unless the terminations would fail to meet minimum clearance to grade or snow line.
  - b. Apply the configuration on the right side of Figure 21 when the terminations need to be raised higher to meet clearance to grade or snow line.
  - c. The air pipe may run up the side of the building, as shown. The vent and air pipes must be secured with braces, and all clearances and lengths must be maintained. Space braces no further than 24 inches apart.
4. You must consider the surroundings when terminating the air connection:
  - a. Make sure there are no obstructions for air flow. DO NOT locate the termination where plants could grow and cause obstruction to air flow.
  - b. Do not locate the terminations where wind eddies could affect performance or cause recirculation with exhaust from other appliances, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - c. Locate the air inlet termination at least 12 inches below and 12 inches horizontally from any appliance or building vent outlet.
5. Locate terminations so they are not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.

**Figure 20** Vent termination (through the roof) for direct vent: vertical vent / sidewall air



**Figure 21** Sidewall air inlet (termination) for direct vent: vertical vent / sidewall air







# DIRECT VENT: Vertical vent / sidewall air *(continued)*

## Multiple air terminations

1. When terminating multiple Ultra boiler air connections, terminate each air connection as described in this manual.
2. Place wall penetrations to obtain minimum clearances as instructed in this manual.
3. Place adjacent air inlets for multiple Ultra boilers at least 6 inches apart.
4. For Canadian installations, provide clearances required by CSA B149.1 or B149.2 Installation Code.
5. Combustion air (NOT vent piping) can be manifolded as shown in the Ultra boiler manual.

## Prepare wall penetrations

1. Air pipe penetration:
  - a. Cut a hole for the air pipe. Size the air pipe hole as close as desired to the air pipe outside diameter.
2. Seal exterior openings thoroughly with exterior caulk.

## Termination and fittings

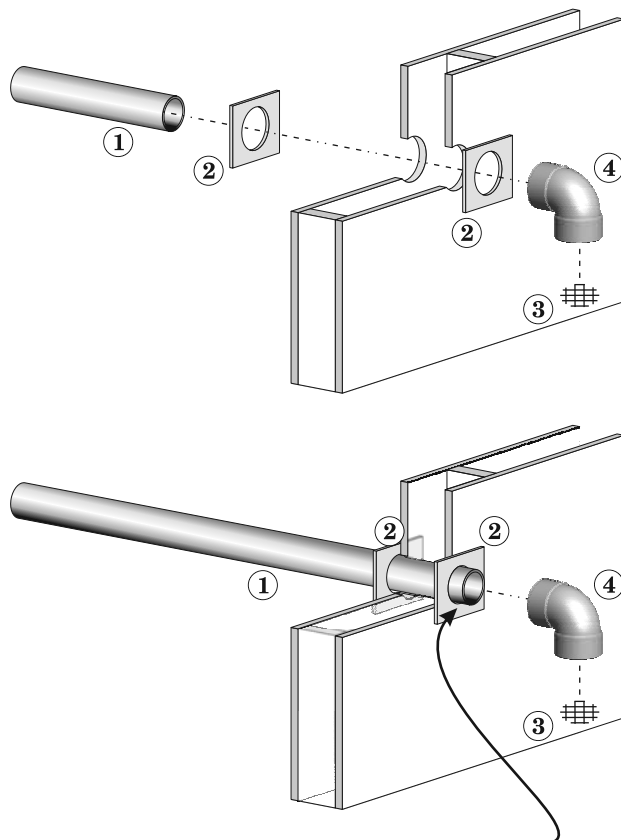
1. Prepare the air termination elbow (Figure 21) by inserting a bird screen. Bird screens must be purchased separately. See the parts list at the end of this manual for part numbers.
2. Use metal plates (by installer) at inside and outside penetrations as shown in Figure 22.

**NOTICE** If extending the air pipe out from the wall, install a coupling on each pipe. Mount the piping with the coupling flush with the outer plate.

## Connecting from air termination to boiler

1. Install the terminations as instructed in the following. Then proceed to page 18 to complete the air and vent piping between the termination and the boiler.

**Figure 22** Sidewall air inlet installation for direct vent: vertical vent / sidewall air



Extend air pipe through outside plate enough to attach termination coupling (or elbow when snorkeled).

U106-air

1 Air piping	3 Bird screen (air), by installer
2 Sidewall plates, by installer	4 Air inlet elbow

# Install vent/air piping — boiler to termination

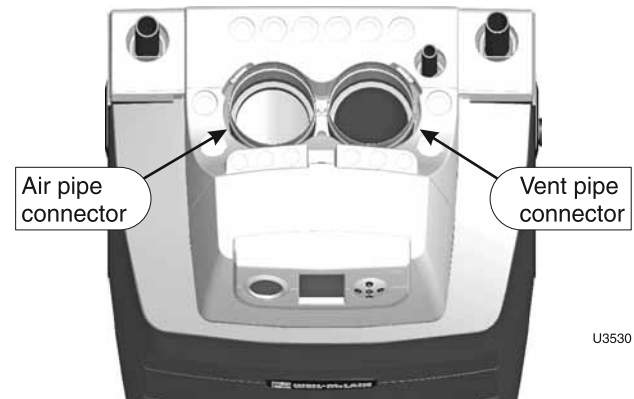
## Complete termination preparation

1. Install vent and air terminations before proceeding. See previous pages for instructions.

## Installing vent and air piping

1. For reference in the following see:
  - a. Sidewall terminations: see Figure 11, page A-10.
  - b. Vertical terminations: see Figure 14, page A-13.
2. Work from the boiler to vent or air termination. Do not exceed the lengths given in the previous pages for either the air or vent piping.
  - a. As shown in the maximum length tables, the Ultra-80 or Ultra-105 may be installed with either 2-inch or 3-inch vent and air piping.
  - b. As shown in the maximum length tables, the Ultra-230 may be installed with either 3-inch or 4-inch vent and air piping.
  - c. You must install appropriate pipe reducers, where required, at both the boiler and at the termination assembly.
3. See Figure 23 for attaching vent and air pipes at the boiler.
4. Cut pipe to required lengths.
5. Deburr inside and outside of pipe ends.
6. Chamfer outside of each pipe end to ensure even cement distribution when joining.
7. Clean all pipe ends and fittings. Dry thoroughly.
8. Dry assemble entire vent or air piping to ensure proper fit before assembling any joint.
9. For each joint:
  - a. Handle fittings and pipes carefully to prevent contamination of surfaces.
  - b. Apply primer liberally to both joint surfaces — pipe end and fitting socket.
  - c. While primer is still damp, lightly apply approved cement to both surfaces in a uniform coating.
  - d. Apply a second coat to both surfaces. Avoid using too much cement on sockets to prevent cement buildup inside.
  - e. With cement still wet, insert pipe into fitting, twisting  $\frac{1}{4}$  turn. Make sure pipe is fully inserted.
  - f. Wipe excess cement from joint. Check joint to be sure a smooth bead of cement shows around the entire joint.
10. Install pipe supports as shown in Figure 11, page A-10 or Figure 14, page A-13.
11. Slope vent and air piping continuously toward boiler, with at least  $\frac{1}{4}$  inch drop per foot of run. Do not allow sags at any point.
12. Maintain minimum clearance of  $\frac{3}{16}$  inch between vent pipe and any combustible wall or material.
13. Seal wall or floor penetration openings following local code requirements.

Figure 23 Boiler vent and air connections



## Inserting/securing vent or air pipe into boiler connectors

**WARNING** AL294C vent pipe — If using AL294C stainless vent pipe, you must install a PVC-to-vent pipe adapter at the boiler vent connection (and at the termination if using the Weil-McLain plate or the concentric termination). Use only the adapter made by the vent pipe manufacturer.

1. PVC/ABS pipe — Clean and chamfer insertion end of pipe. Deburr inside of insertion end. Clean and deburr inside and outside of other end of pipe.

**WARNING** The pipe end must be smooth and chamfered to prevent possible damage to sealing gasket in vent or air pipe adapter. Failure to comply could result in leakage, causing possible severe personal injury or death.

2. Inspect vent or air adapter (above) — verify no obstructions or foreign objects inside.
3. Loosen clamp screw.
4. Measure  $3\frac{1}{2}$  inches from end of pipe and make a mark with felt-tip pen.
5. Loosen adapter clamp screw.
6. Apply small amount of silicon grease to end of pipe to ease insertion.
7. Insert pipe into adapter.
8. Slide pipe down until the  $3\frac{1}{2}$ -inch mark is reached.

**WARNING** Do not apply excessive force or bend the adapter or flue/air pipe when inserting. The adapter or seal could be damaged.

9. Secure vent or air pipe by tightening the adapter clamp securely. Do not overtighten. The seal is accomplished with the internal gasket. The clamp is only to hold the pipe in place.

## DIRECT EXHAUST venting — general

### Vent and air piping materials

- See Figure 5, page A-7 for approved vent and air piping materials, for both **direct exhaust** and **direct vent**.

**WARNING** Use the same vent or air piping material throughout. — Do not connect different types of piping together.

### Vent piping

- Boiler flue gases must be piped from the boiler to outside, following the instructions in this manual, and compliant with all applicable codes. The vent pipe must terminate either through the sidewall or through the roof, located with the correct separation from the air termination. See the associated instructions in the following pages.
- Each Ultra boiler requires a separate vent. **DO NOT** common vent.

### Combustion air openings for direct exhaust

**WARNING** Provide combustion air openings to boiler room and building. Combustion and ventilation air for direct exhaust boilers is provided from the boiler room. Follow all instructions in the Boiler manual and this addendum plus all applicable codes, providing combustion air openings as specified. Failure to comply could result in severe personal injury, death or substantial property damage.

- Combustion air must be supplied through openings into the boiler room, following the instructions in this manual, and compliant with all applicable codes. Read the warning in Figure 1, page A-2, and ensure the air and boiler room will not contain contaminated air.
- Where the Ultra boiler shares a space with other appliances, the combustion air openings must be sized to handle the combined requirements of all appliances in the space.

### SIDEWALL direct exhaust option

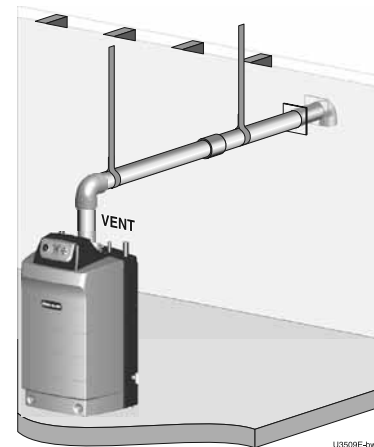
- Read and follow instructions in Boiler manual, including page 61 for Massachusetts installations when applicable.
- Read and follow instructions in Venting addendum page A-2 through page A-7.
- Then go to Venting addendum page A-22.

### VERTICAL direct exhaust option

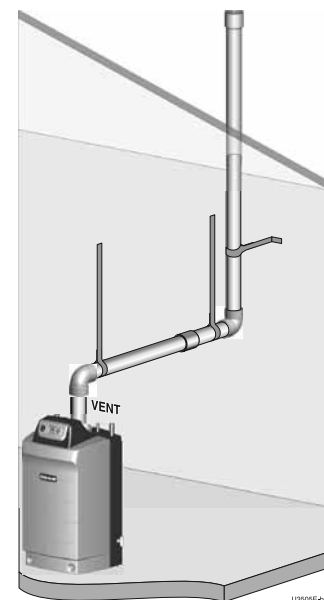
- Read and follow instructions in Boiler manual, including page 61 for Massachusetts installations when applicable.
- Read and follow instructions in Venting addendum page A-2 through page A-7.
- Then go to Venting addendum page A-25.

**WARNING** Every vent pipe requires a **bird screen at its termination**. Bird screens are not supplied with the Ultra boiler. Purchase separately from Weil-McLain.

### SIDEWALL DIRECT EXHAUST



### VERTICAL DIRECT EXHAUST





# DIRECT EXHAUST — Boiler room air openings

## Combustion air provision

The Ultra boiler can use inside air if no contaminants are present in the boiler space. (If contaminants are likely to be present, install the boiler as a direct vent appliance, using the appropriate vent instructions in this manual.)

The boiler room must be fitted with combustion air openings large enough to provide air for all appliances in the room. Use the following information to size the openings. Ensure the installation complies with all applicable codes and standards.

## Sizing combustion air openings

Air openings provide for ventilation (as well as combustion air) to prevent overheating of the boiler controls and boiler space. Air is also needed for other appliances located in the same space.

Use Figure 24, page A-21, selecting the appropriate installation conditions.

**⚠ WARNING** Air openings must be sized to handle all appliances and air movers (exhaust fans, etc.) using the air supply.

The sizing given in Figure 24, page A-21 is based on the National Fuel Gas Code, ANSI Z223.1, allowing adequate air openings for gravity-vented gas appliances (Category I) in addition to that needed for the Ultra boiler.

The air openings recommended in Figure 24, page A-21 will allow adequate ventilation and combustion air provided the boiler room is not subjected to negative pressure due to exhaust fans or other mechanical ventilation devices.

Refer to the National Fuel Gas Code for dealing with other conditions.

## Free area — louver allowance

The free area of openings means the area **after reduction for any installed louvers or grilles**. Be sure to consider this reduction when sizing the air openings.

## Special considerations

### Tight construction

ANSI Z223.1 defines unusually tight construction where:

1. Walls and ceilings exposed to the outside atmosphere have a continuous water vapor retarder with a rating of 1 perm or less with openings gasketed, and . . .
2. Weather-stripping has been added on openable windows and doors, and . . .
3. Caulking or sealants are applied to areas such as joints around windows and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels, at penetrations for plumbing, electrical, and gas lines, and in other openings.

For buildings with such construction, provide air openings into the building from outside, sized per the appropriate case in Figure 24, page 21 if appliances are to use inside air for combustion and ventilation.

### Exhaust fans and air movers

The appliance space must never be under a negative pressure unless all appliances are installed as direct vent. Always provide air openings sized not only to the dimensions required for the firing rate of all appliances, but also to handle the air movement rate of the exhaust fans or air movers using air from the building or space.

### Motorized air dampers

If the air openings are fitted with motorized dampers, electrically interlock the damper to:

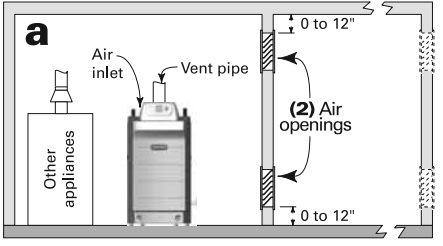
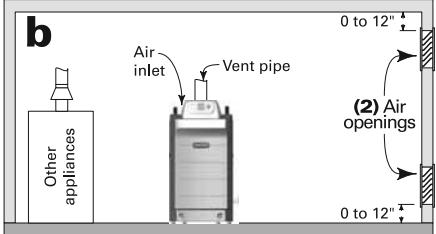
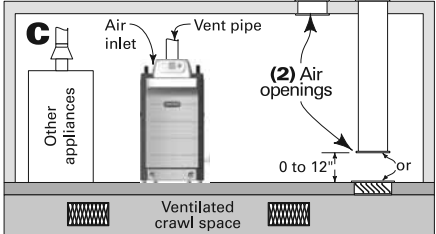
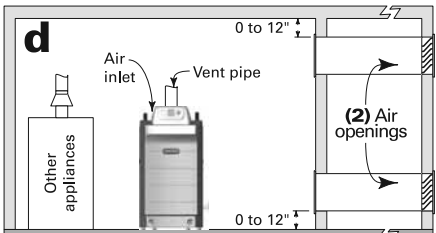
- Prevent the boiler from firing if the damper is not fully open.
- Shut the boiler down should the damper close during boiler operation.

To accomplish this interlock, wire an **isolated contact** (proving the damper open) in series with the thermostat input to the boiler. The boiler will not start if this contact is open, and will shut down should it open during operation.



# DIRECT EXHAUST — Boiler room air openings *(continued)*

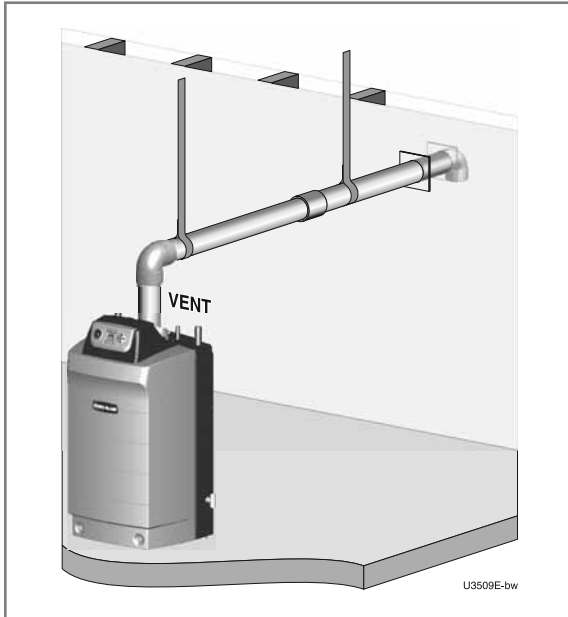
**Figure 24** MINIMUM combustion air openings for direct exhaust applications — ALL OPENING SIZES ARE FREE AREA

<p style="text-align: center;"><b>Air openings</b></p> <p>The required air opening sizes below are FREE AREA, after reduction for louver obstruction. Note the exception below for large spaces.</p>	<p style="text-align: center;"><b>Ultra boiler WITH other appliances in room</b></p>	<p style="text-align: center;"><b>Ultra boiler WITHOUT other appliances in room</b></p>
 <p><b>a</b></p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>1,000</b> Btuh of all appliances in the room</p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room</p>
 <p><b>b</b></p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>
 <p><b>c</b></p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>2,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>
 <p><b>d</b></p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>	<p><b>TWO</b> openings, each at least: <b>1</b> square inch per <b>4,000</b> Btuh of all appliances in the room — OR — <b>ONE</b> opening **, each at least: <b>1</b> square inch per <b>3,000</b> Btuh of all appliances in the room</p>
<p><b>** NOTICE:</b> <b>Requirements for using the SINGLE air opening option.</b></p>	<p>A single combustion air opening can be used for cases <b>b</b>, <b>c</b> or <b>d</b> above, sized as listed, provided that:</p> <ul style="list-style-type: none"> <li>• The single opening must communicate directly to the outdoors or to a space that communicates directly with outdoors (NOT to an interior space).</li> <li>• The top of the opening must be within 12 inches of the ceiling.</li> <li>• The free area of the opening must be at least equal to the sum of the areas of all equipment vent connectors in the space.</li> </ul>	
<p><b>SPECIAL EXCEPTION FOR LARGE SPACES:</b></p>	<p>NO combustion air openings are needed when the boiler (and other appliances) are installed in a space with a volume NO LESS than 50 cubic feet per 1,000 Btuh of all appliances in the space. That is, total the input of all appliances in MBH (1,000's of Btuh), then multiply this total times 50. The building MUST NOT be of tight construction.</p> <p>Example: For a total input of 1500 MBH (1,500,000 Btuh) and an 8-foot ceiling height, the minimum volume would be 50 x 1500 x 8 = 60,000 cubic feet.</p>	



## DIRECT EXHAUST — Sidewall

Figure 25 DIRECT EXHAUST — Sidewall termination



### DIRECT EXHAUST — Sidewall termination — installation sequence overview

**Step 1** Install the boiler.

**Step 2** Determine the proper location for wall penetration for each termination.

- Prepare wall penetrations before installing vent piping.
- Finish by attaching external pipe and fittings as shown in the termination instructions.
- Support vertical runs on the outside of the building with brackets as shown in the termination instructions.

**Step 3** Install vent piping from boiler to termination.

- Install a hanger support within 6 inches of any upturn in the piping.
- Install pipe supports every 5 feet on both the horizontal and vertical runs.
- Slope horizontal piping downward toward the boiler at least 1/4 inch per foot.

**Step 4** Connect the vent piping at the boiler per instructions in this addendum.

### Allowable vent pipe materials

1. Use only the materials listed in Figure 5, page A-7.
2. Install a bird screen in each vent pipe termination (coupling or elbow). Bird screens are not supplied with the Ultra boiler. Purchase separately from Weil-McLain.

### Maximum piping length

1. Locate the termination such that the total vent piping from the boiler to the termination will not exceed the maximum length given in Figure 4, page A-6.
2. Maximum lengths listed in Figure 4, page A-6 allow for 2 elbows. Additional elbows require a reduction in maximum length as explained in the table notes.

### Determine location for sidewall termination

**WARNING** A gas vent extending through an exterior wall shall not terminate adjacent to the wall or below building extensions such as eaves, parapets, balconies or decks, except as otherwise instructed in this manual or local codes. Failure to comply could result in severe personal injury, death or substantial property damage.

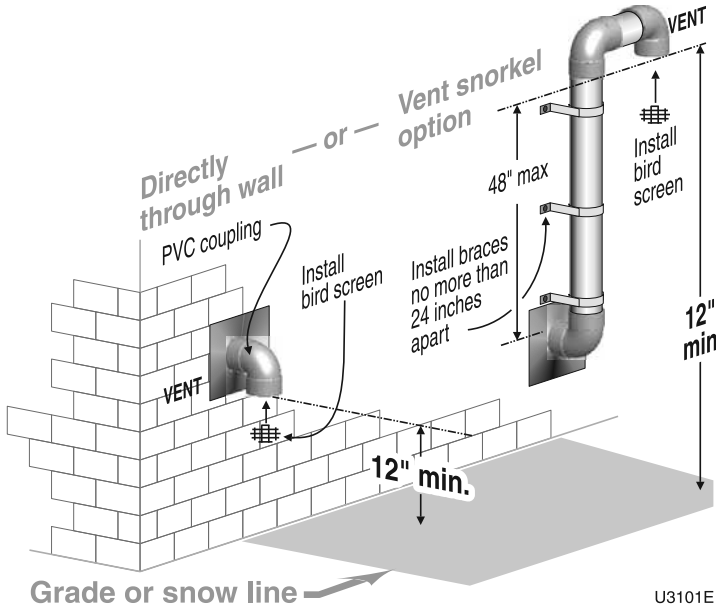
Place the vent terminations using the following guidelines.

3. Terminate the vent piping with a down-turned elbow as shown in Figure 26, page 23. The elbow must butt against the outside wall plate. If vent piping is extended outside, install an elbow at the outer plate and continue vent piping from the elbow when snorkeling as in Figure 26, page 23 right side.
  - a. Apply the configuration on the left side of Figure 26 unless the termination would fail to meet minimum clearance to grade or snow line.
  - b. Apply the configuration on the right side of Figure 26 when the termination needs to be raised higher to meet clearance to grade or snow line.
  - c. The vent pipe may run up as high as 4 feet, as shown in Figure 26 right side, with no enclosure. The vent pipe must be secured with braces, and maintain all required clearances.
  - d. Space braces no further than 24 inches apart. (See WARNING below for extremely cold climates.)
  - e. External venting greater than 4 feet requires an enclosure around the vent pipe. The vent termination must exit through the enclosure as shown in Figure 26, maintaining all required clearances.

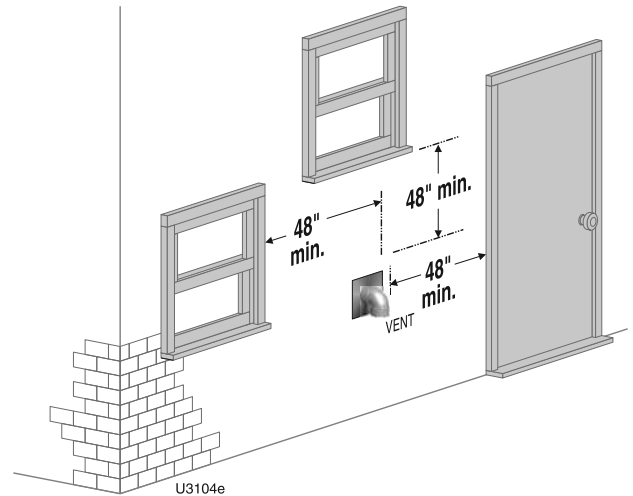
**WARNING** Do not exceed the maximum length of the outside vent piping shown in Figure 26. Excessive length exposed to the outside could cause freezing of condensate in the vent pipe, resulting in potential boiler shutdown. In extremely cold climates, install an insulated chase around the vent piping, particularly when using longer lengths. The chase must allow for inspection of the vent pipe, and insulation must be protected from water.

# DIRECT EXHAUST — Sidewall *(continued)*

**Figure 26** DIRECT EXHAUST — Sidewall — configuration options and minimum clearances

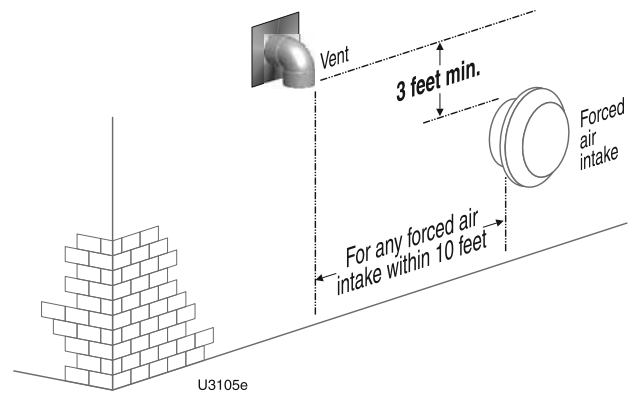


**Figure 27** DIRECT EXHAUST — Sidewall — clearances to openings



4. Consider the surroundings when terminating the vent:
  - a. Position the vent termination where vapors will not damage nearby shrubs, plants or air conditioning equipment or be objectionable.
  - b. The flue products will form a noticeable plume as they condense in cold air. Avoid areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of condensate and water/ice buildup where flue products impinge on building surfaces or plants.
  - d. Avoid possibility of accidental contact of flue products with people or pets.
  - e. Do not locate the terminations where wind eddies could affect performance, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - f. Do not terminate above any door or window or under a deck. Condensate can freeze, causing ice formations.
  - g. Locate or guard vent to prevent condensate damage to exterior finishes.
5. Maintain clearances as shown in the illustrations in this manual section. Also maintain the following:
  - a. Vent must terminate:
    - At least 6 feet from adjacent walls.
    - No closer than 5 feet below roof overhang.
    - At least 3 feet above any forced air intake within 10 feet.
    - No closer than 48 inches below or horizontally from any door or window or any other gravity air inlet.
  - b. Do not terminate closer than 4 feet horizontally from any electric meter, gas meter, regulator, relief valve or other equipment.

**Figure 28** DIRECT EXHAUST — Sidewall — clearances from vent exit to forced air intake



6. Because Ultra boilers are Category IV appliances, the National Fuel Gas Code, ANSI Z223.1, requires that the vent must not terminate over a public walkway or over an area where condensate or vapor could create a nuisance or hazard, or could be detrimental to the operation of regulators, relief valves, or other equipment.
7. Where the vent penetrates an outside wall, the annular space around the penetration must be permanently sealed using approved materials to prevent entry of combustion products into the building.



## DIRECT EXHAUST — Sidewall *(continued)*

8. Locate termination so it is not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.
9. Do not connect any other appliance to the vent pipe. Do not connect multiple boilers to a common vent pipe.

### Completing the vent piping

1. Install vent penetration as explained in the following before installing vent piping from the boiler to the termination.
2. Insert piping from boiler vent connections, then attach exterior termination piping.
3. Follow instructions beginning on page A-27 to complete piping from boiler to termination.

### Multiple vent terminations

1. When terminating multiple direct exhaust Ultra boilers, terminate each vent connection as described in this manual for individual vents. Space terminations as required for best installation practices and required maintenance.

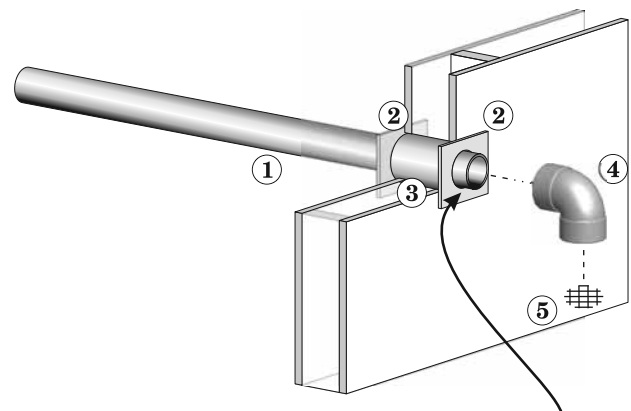
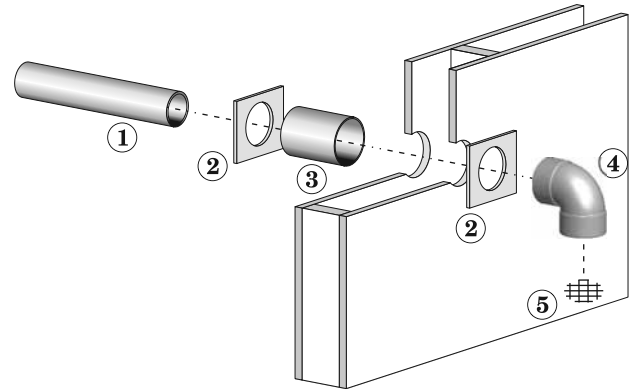
### Prepare wall penetrations

1. Wall penetration:
  - a. Cut a rough opening large enough to clear the diameter of the metal thimble used.
  - b. Provide metal cover plates (item 2, Figure 29). The outer plate MUST provide a stop to prevent the vent elbow from being pushed inward. (See NOTICE at right.) Hole diameters in the metal plates must be:
    - 2-inch PVC, CPVC or ABS — 2½" hole diameter.
    - 3-inch PVC, CPVC or ABS — 3⅝" hole diameter.
    - 4-inch PVC, CPVC or ABS — 4⅝" hole diameter.
    - AL29-4C vent pipe and elbow — size hole large enough to clear vent pipe, but small enough to prevent the elbow from being pushed through.
  - c. Insert the galvanized metal thimble (by installer) in the vent pipe hole as shown in Figure 29.
2. Follow all local codes for isolation of vent pipe when passing through floors or walls.

### Termination and fittings

1. Prepare the vent termination elbow (Figure 26, page A-23) by inserting a bird screen. Bird screens are not supplied with the Ultra boiler. Purchase separately from Weil-McLain.
2. You can install the vent termination using either of the configurations shown in Figure 26, page A-23.
3. Maintain the required dimensions of the finished termination piping as shown in Figure 26, page A-23.
4. Seal exterior openings thoroughly with exterior caulk.
5. Do not extend exposed vent pipe outside of the building more than shown in this document. Condensate could freeze and block vent pipe.

**Figure 29** DIRECT EXHAUST — Sidewall — termination assembly — all parts by installer



Extend vent pipe through outside plate enough to attach termination coupling (or elbow when snorkeled).

U106e

1 Vent piping	4 Vent termination elbow
2 Cover plates	5 Bird screen
3 Galvanized thimble	

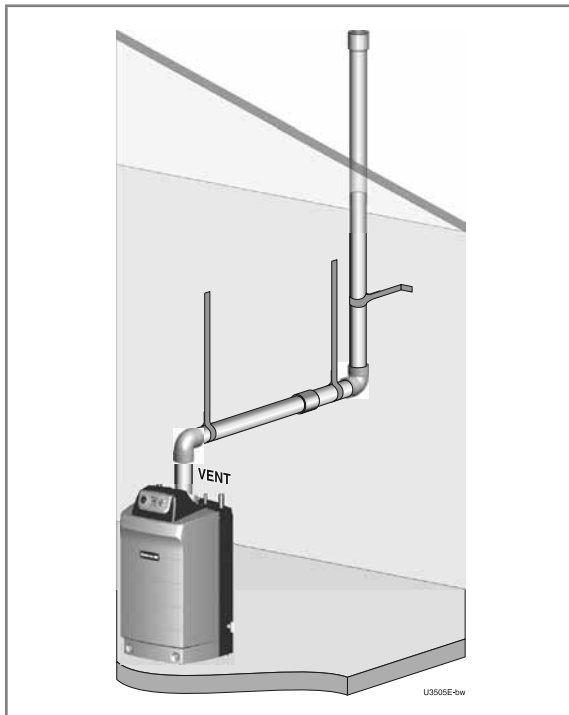
**NOTICE** The Weil-McLain sidewall termination kit supplied with each boiler includes metal plates with two openings. These plates can be trimmed and used for direct exhaust vent termination cover plates when the vent diameter used matches the hole size in the plates provided with the boiler.





## DIRECT EXHAUST — Vertical

Figure 30 DIRECT EXHAUST vertical termination



### DIRECT EXHAUST — Vertical termination — installation sequence overview

**Step 1** Install the boiler.

**Step 2** Determine the proper location for wall penetration for each termination.

- Prepare roof penetrations before installing vent piping.
- Finish by attaching external pipe and fittings as shown in the termination instructions.
- Install terminations as described in this manual.
- Support vertical runs on the outside of the building with brackets as shown in the termination instructions.

**Step 3** Install vent piping from boiler to termination.

- Install a hanger support within 6 inches of any upturn in the piping.
- Install pipe supports every 5 feet on both the horizontal and vertical runs.
- Slope horizontal piping downward toward the boiler at least 1/4 inch per foot.

**Step 4** Connect the vent piping at the boiler per manual instructions.

### Allowable vent pipe materials

1. Use only the materials listed in Figure 5, page A-7.
2. Install a bird screen in each vent pipe termination (coupling or elbow). Bird screens are not supplied with the Ultra boiler. Purchase separately from Weil-McLain.

### Maximum piping length

1. Locate the termination such that the total vent piping from the boiler to the termination will not exceed the maximum length given in Figure 4, page A-6.
2. Maximum lengths listed in Figure 4, page A-6 allow for 2 elbows. Additional elbows require a reduction in maximum length as explained in the table notes.

### Determine location for vertical termination

1. Locate the vent termination using the following guidelines:
2. The vent piping must terminate in a coupling as shown in Figure 31, page 26.
3. Consider the surroundings when terminating the vent:
  - a. Position the vent termination where vapors will not damage nearby shrubs, plants or air conditioning equipment or be objectionable.
  - b. The flue products will form a noticeable plume as they condense in cold air. Avoid areas where the plume could obstruct window views.
  - c. Prevailing winds could cause freezing of condensate and water/ice buildup where flue products impinge on building surfaces or plants.
  - d. Avoid possibility of accidental contact of flue products with people or pets.
  - e. Do not locate the termination where wind eddies could affect performance or cause recirculation, such as inside building corners, near adjacent buildings or surfaces, window wells, stairwells, alcoves, courtyards or other recessed areas.
  - f. Locate or guard vent to prevent condensate damage to exterior finishes.
4. Maintain clearances as shown in the illustrations in this manual section. Also maintain the following:
  - a. Vent must terminate:
    - At least 12 inches above roof or snow line as shown in Figure 31.
    - At least 6 feet from adjacent walls.
    - No closer than 5 feet below roof overhang.
    - At least 3 feet above any forced air intake within 10 feet.
    - No closer than 48 inches below or horizontally from any door or window or any other gravity air inlet.
  - b. Do not terminate closer than 4 feet horizontally from any electric meter, gas meter, regulator, relief valve or other equipment.
5. Where the vent penetrates the roof, the annular space around the penetration must be permanently sealed using approved materials to prevent entry of combustion products into the building.
6. Locate terminations so they are not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.
7. Do not connect any other appliance to the vent pipe. Do not connect multiple boilers to a common vent pipe.

## DIRECT EXHAUST — Vertical *(continued)*

### Prepare roof penetration

- Vent pipe penetration:
  - Cut a hole for the vent pipe. For either combustible or noncombustible construction, size the vent pipe hole at least 0.5" larger than the vent pipe diameter:
    - 3" hole for 2" PVC.
    - 4" hole for 3" PVC.
    - 5" hole for 4" PVC.
  - Insert a galvanized metal thimble in the vent pipe hole.
- Follow all local codes for isolation of vent pipe when passing through floors, ceilings and roofs.
- Provide flashing and sealing boots sized for the vent pipe and air pipe.

### Termination and fittings

- Prepare the vent termination coupling (Figure 31) by inserting a bird screen. Bird screens are not supplied with the Ultra boiler. Purchase separately from Weil-McLain.
- The vent piping must terminate in a coupling as shown in Figure 31.
- Maintain the required dimensions of the finished termination piping as shown in Figure 31.
- Do not extend exposed vent pipe outside of building more than shown in this document. Condensate could freeze and block vent pipe.

### Multiple vent terminations

- When terminating multiple Ultra boilers, terminate each vent connection as described in this section. Space terminations as required for best installation practices and required maintenance.

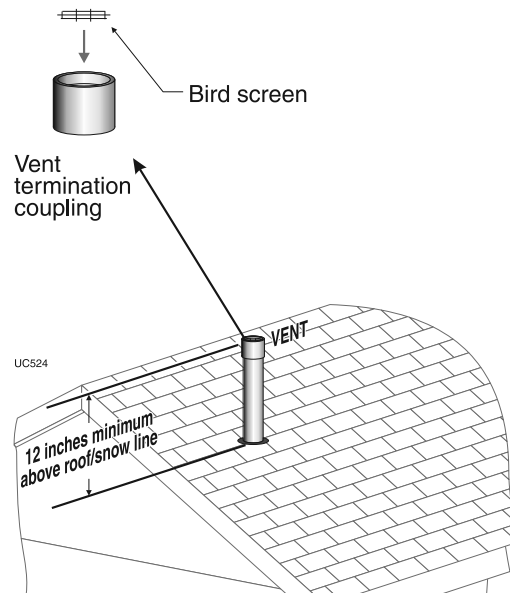
### Complete termination preparation

- Install vent terminations before proceeding. See previous pages for instructions.

### Installing direct exhaust vent piping

- For reference in the following see:
  - Sidewall terminations: see Figure 25, page A-22.
  - Vertical terminations: see Figure 30, page A-25.
- Work from the boiler to vent or air termination. Do not exceed the lengths given in the previous pages for either the air or vent piping.
  - As shown in the maximum length tables, the Ultra-80 or Ultra-105 may be installed with either 2-inch or 3-inch vent piping.
  - As shown in the maximum length tables, the Ultra-230 may be installed with either 3-inch or 4-inch vent piping.
  - You must install appropriate pipe reducers, where required, at the boiler vent connection.

**Figure 31** DIRECT EXHAUST — Vertical termination



- See Figure 32 for attaching vent and air pipes at the boiler.
- Cut pipe to required lengths.

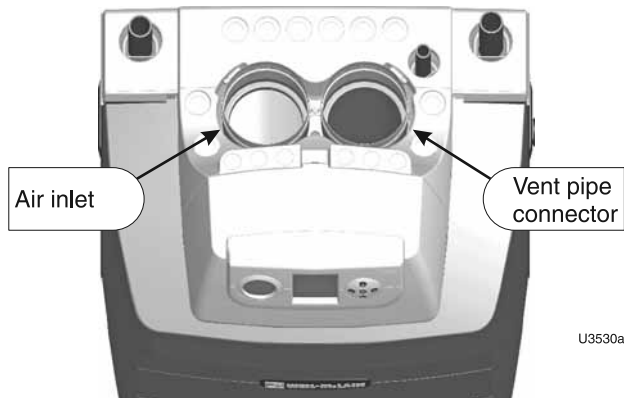


**WARNING Sidewall terminations:** The vent pipe must extend through the outer cover plate only enough to install the termination elbow. The plate must provide a stop to prevent the vent elbow from being pushed inward.

- Deburr inside and outside of pipe ends.
- Chamfer outside of each pipe end to ensure even cement distribution when joining.
- Clean all pipe ends and fittings. Dry thoroughly.
- Dry assemble entire vent or air piping to ensure proper fit before assembling any joint.
- For each joint:
  - Handle fittings and pipes carefully to prevent contamination of surfaces.
  - Apply primer liberally to both joint surfaces — pipe end and fitting socket.
  - While primer is still damp, lightly apply approved cement to both surfaces in a uniform coating.
  - Apply a second coat to both surfaces. Avoid using too much cement on sockets to prevent cement buildup inside.
  - With cement still wet, insert pipe into fitting, twisting ¼ turn. Make sure pipe is fully inserted.
  - Wipe excess cement from joint. Check joint to be sure a smooth bead of cement shows around the entire joint.
- Install pipe supports as shown in Figure 11, page A-10 or Figure 14, page A-13.
- Slope vent and air piping continuously toward boiler, with at least 1/4 inch drop per foot of run. Do not allow sags at any point.
- Maintain minimum clearance of 3/16 inch between vent pipe and any combustible wall or material.
- Seal wall or floor penetration openings following local code requirements.

## Install vent — from boiler to termination *(continued)*

**Figure 32** Boiler vent and air connections



**⚠ WARNING** **Air inlet opening protection:** Obtain a bird screen (sized for air inlet opening) the from Weil-McLain. Insert the bird screen into the air inlet opening to prevent foreign objects from falling into the opening.

### Inserting/securing vent or air pipe into boiler connectors

**⚠ WARNING** AL294C vent pipe — If using AL294C stainless vent pipe, you must install a PVC-to-vent pipe adapter at the boiler vent connection (and at the termination if using the Weil-McLain plate or the concentric termination). Use only the adapter made by the vent pipe manufacturer.

1. PVC/ABS pipe — Clean and chamfer insertion end of pipe. Deburr inside of insertion end. Clean and deburr inside and outside of other end of pipe.

**⚠ WARNING** The pipe end must be smooth and chamfered to prevent possible damage to sealing gasket in vent or air pipe adapter. Failure to comply could result in leakage, causing possible severe personal injury or death.

2. Inspect vent or air adapter (above) — verify no obstructions or foreign objects inside.
3. Loosen clamp screw.
4. Measure 3½ inches from end of pipe and make a mark with felt-tip pen.
5. Loosen adapter clamp screw.
6. Apply small amount of silicon grease to end of pipe to ease insertion.
7. Insert pipe into adapter.
8. Slide pipe down until the 3½-inch mark is reached.

**⚠ WARNING** Do not apply excessive force or bend the adapter or flue/air pipe when inserting. The adapter or seal could be damaged.

9. Secure vent or air pipe by tightening the adapter clamp securely. Do not overtighten. The seal is accomplished with the internal gasket. The clamp is only to hold the pipe in place.

