



Series 2
Wall Mount
Gas-Fired Water Boilers
70/110/155

Manual Addendum

This Addendum needs to be used in conjunction with the ECO Boiler Manual P/N 550-142-190_1018

ATTENTION to installers and homeowners of ECO boilers.

KEEP THIS ADDENDUM WITH BOILER MANUAL

Direct Exhaust Vent Systems Kit

Direct Exhaust Kit 383-500-778, See page 2, for changes to Page 113 of Boiler Manual

The ECO boiler has been designed and tested to work as a direct exhaust unit. Inlet air comes from the room and is exhausted either vertically or horizontally. The following pages describe the methods and materials for operating the boiler in the direct exhaust mode.

Rating Note Change

See page 3, for changes to Note 4, on Page 125 of Boiler Manual

Vent Material Change

See page 4, for changes to allow ABS piping (Intake Air only), on page 24 of boiler manual

Additional Direct Vent Termination

The ECO boiler has been designed and tested for Direct Vent Vertical exhaust sidewall air termination. The following pages describe the methods and materials for operating the boiler in this mode.

⚠ WARNING This addendum must only be used by a qualified heating installer/service technician. Read all instructions, including the Evergreen 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.

Replacement parts *(continued)*

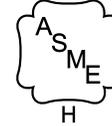
Figure 116 Miscellaneous parts and kits

Description	Part Number	Description	Part Number
CHEMICALS			
Antifreeze, Sentinel X500, 1 Gallon	592-900-029	Sidewall separate pipes vent/air termination kits (includes two cover plates)	
Corrosion inhibitor, Sentinel X100	592-900-002	Kit for 2" PVC vent and air pipes	383-700-171
Sentinel X100 Quick Test Kit.	592-900-005	Kit for 3" PVC vent and air pipes	383-500-100
Cleaner, Sentinel X400.	592-900-003	Kit for 3" AL29-4C SS vent pipe and PVC air pipe	383-700-172
BOILER ACCESSORIES		PVC concentric vent kit — horizontal or vertical (includes components for concentric assembly)	
ECO 70 maintenance kit — igniter, igniter gasket, venturi gasket, cover plate gasket, venturi-gas valve o-ring, refractory, silicone, inhibitor test kit, and clips	383-700-165	Kit for 2" PVC vent and air pipes	383-700-167
ECO 110 maintenance kit — igniter, igniter gasket, venturi gasket, cover plate gasket, venturi-gas valve o-ring, refractory, silicone, inhibitor test kit, and clips	383-700-243	Kit for 3" PVC vent and air pipes	383-500-350
ECO 155 maintenance kit — igniter, igniter gasket, venturi gasket, cover plate gasket, venturi-gas valve o-ring, refractory, silicone, inhibitor test kit, and clips	383-700-200	Bird screens (1 screen each)	
Wall-mount kit (supplied with boiler) — wall mount bracket and hardware	383-800-218	For 2" PVC vent and air pipes	560-907-728
ECO Floor stand kit	383-800-101	For 3" PVC vent and air pipes	383-500-105
Condensate trap kit (supplied with boiler) — condensate trap assembly and flexible line	560-907-722	VENT/AIR PARTS AND KITS (POLYPROPYLENE PIPE) available from M&G Simpson-Duravent ONLY	
Low-water cutoff with test button, kit	511-100-005	M&G Simpson-Duravent PolyPro SIDEWALL concentric vent/air kit (color: white)	
CONDENSATE HANDLING ACCESSORIES		2" polypropylene pipe	2PPS-HK
Condensate neutralizer kit	383-500-631	3" polypropylene pipe	3PPS-HK
VENT/AIR PARTS AND KITS (PVC or STAINLESS STEEL) available from Weil-McLain		M&G Simpson-Duravent PolyPro VERTICAL concentric vent/air kit; color = black (part number shown) or terra cotta (add -TC suffix)	
Weil-McLain Direct Exhaust Venting Kit Includes interior/exterior intake/exhaust plates, 2" & 3" vent screens, templates and mounting hardware.	383-500-778	2" polypropylene pipe	2PPS-VK
Weil-McLain sidewall vent/air cap termination kit for PVC vent and air pipes	383-500-397	3" polypropylene pipe	3PPS-VK
Includes sidewall vent/air termination cap, inside and outside cover plates, and mounting hardware; openings are sized for 3" PVC pipe (requires field-installed 3 x 2 adapter if using 2" vent/air pipes)		M&G Simpson-Duravent PolyPro SIDEWALL separate air and vent pipes	
Weil-McLain sidewall vent/air cap termination kit for AL29-4C vent pipe and PVC air pipe	382-200-430	2" polypropylene pipe	2PPS-HTP
Includes sidewall vent/air termination cap, inside and outside cover plates, and mounting hardware; openings are sized for 3" SS vent pipe and 3" PVC air pipe (requires field-installed 3 x 2 adapter if using 2" vent/air pipes)		3" polypropylene pipe	3PPS-HTP
		M&G Simpson-Duravent PolyPro Polypropylene pipe appliance adapter 3"	3PPS-03PVCM-3PPF
		VENT/AIR PARTS AND KITS (POLYPROPYLENE PIPE) available from Centrotherm Eco Systems ONLY	
		Centrotherm INNOFLUE SIDEWALL concentric vent/air kit	
		3" polypropylene pipe	ICWT352
		2" stainless steel/pp pipe	ICWS2413
		3" stainless steel/pp pipe	ICWS3513
		Centrotherm INNOFLUE VERTICAL concentric vent/air kit	
		2" polypropylene pipe	ICRT2439
		3" polypropylene pipe	ICRT3539
		Centrotherm INNOFLUE Polypropylene pipe appliance adapter 3"	ISAAAL0303



Ratings — ECO Series 2 boilers

Figure 129 Ratings and engineering data — ECO 70/110/155 Series 2 boilers



AHRI Certified Ratings

Boiler Model ECO	CSA Input	Heating Capacity	Seasonal Efficiency	Net rating (water)	Boiler Water Content	Vent/ Comb. Air Connection Diameter	% Input derate vs vent length (Values shown are at MAX vent/air pipe length — See Note 6) Direct Vent Venting ONLY			
							Natural gas		Propane	
							2" Vent/air piping	3" Vent/air piping	2" Vent/air piping	3" Vent/air piping
70	70,000	65,000	95.2	57	2.54	3" PVC	12 %	5 %	12 %	5 %
110	110,000	101,000	95.0	88	2.54	3" PVC	N/A	5 %	N/A	5 %
155	155,000	143,000	95.1	124	3.22	3" PVC	N/A	5 %	N/A	5 %

Notes

- As an Energy Star Partner, Weil-McLain has determined that ECO boilers meet the Energy Star guidelines for energy efficiency. NOTE: Adjusting boiler firing rate will affect AFUE rating.
- Based on standard test procedures prescribed by the United States Department of Energy. Ratings also referred to as CSA Output. NOTE that only DOE Heating Capacity and AFUE are certified by AHRI. AFUE is also known as Annual Fuel Utilization Efficiency or Seasonal Efficiency.
- Net AHRI ratings are based on net installed radiation of sufficient quantity
- ECO boilers are designed to be direct-vented. ECO boilers require special venting, consistent with Category IV boiler. Use only the vent materials and methods specified in this manual. ECO boilers may be direct exhaust vented. ECO 70 vent/air pipes can be either 2" or 3". ECO 110/155 vent/air pipes must be 3".
- Ratings shown are for sea level applications only. For altitudes from sea level to 5,500 feet above sea level, the ECO boiler requires no modifications and automatically derates itself by approximately 4% per 1000 feet above sea level.
- All of the boilers will automatically de-rate as vent/air pipe length increases, due to the pressure loss through the piping. For vent/air pipe lengths less than the maximum, the derate equals the value above (% Input derate vs. vent length) times vent length ÷ 100.

THE OUTDOOR SENSOR SUPPLIED WITH THE BOILER MUST BE INSTALLED UNLESS EXEMPTED BELOW:

IMPORTANT

In accordance with **Section 303 of the 2007 Energy Act**, this boiler is equipped with a feature that saves energy by reducing the boiler water temperature as the heating load decreases. This feature is equipped with an override which is provided primarily to permit the use of an external energy management system that serves the same function.

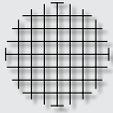
THIS OVERRIDE MUST NOT BE USED UNLESS AT LEAST ONE OF THE FOLLOWING CONDITIONS IS TRUE:

- An external energy management system is installed that reduces the boiler water temperature as the heating load decreases.
- This boiler is not used for any space heating.
- This boiler is part of a modular or multiple boiler system having a total input of 300,000 BTU/hr or greater.
- This boiler is equipped with a tankless coil (not applicable to ECO).



Venting & air — general *(continued)*

Figure 23 Vent and air piping materials — Use only the materials listed below, ensuring that all materials meet local codes (see Figure 116, page 113 for part/kit numbers)

Item	Material	Standards for installations in:		
		United States	Canada (Note 2)	
Plastic piping materials		Vent or air piping	Vent piping	Air piping
Vent or air pipe & fittings	PVC schedule 40	ANSI/ASTM D1785	ULC S636	PVC, PVC-DWV, CPVC or polypropylene
	PVC-DWV schedule 40 (Note 1)	ANSI/ASTM D2665	N/A	
	CPVC schedule 40 (Note 1)	ANSI/ASTM F441	ULC S636	
	ABS-DWV schedule 40 (intake only)	ANSI/ASTM D2665	ULC S636	
PVC & ABS pipe cement & primer	PVC	ANSI/ASTM D2564/F656	ULC S636	Use only cement and primer suitable for piping material used
	CPVC (Note 1)	ANSI/ASTM F493	ULC S636	
	ABS (Note 1)	ANSI/ASTM D2564/F656	ULC S636	
Polypropylene vent pipe, fittings, terminations and cement	Simpson-Duravent — Obtain all materials from M&G Simpson-Duravent Centrotherm Eco Systems InnoFlue® Single-wall — Obtain all materials from Centrotherm Note: See page 2 for correct appliance adapters to be used.	See manufacturer's literature for detailed information MUST USE LOCKING COLLAR ON EVERY JOINT	ULC S636	PVC, PVC-DWV, CPVC or polypropylene
AL29-4C® stainless steel piping materials				
Vent pipe AL29-4C® stainless steel	Heat Fab, Inc. — Saf-T-Vent® Z-Flex, Inc. — Z-Vent II Dura-Vent — FasNSeal™ Metal-Fab, Inc. — CORR/GUARD Centrotherm Eco Systems — InnoFlue®	Certified for Category IV and direct vent appliance venting	Certified for Category IV and direct vent appliance venting	
Weil-McLain stainless steel bird screens, 2" or 3" (purchase separately) — see Figure 116, page 113 for part numbers				
Note 1:	Weil-McLain concentric vent kits are made from PVC pipe and fittings.	⚠ WARNING ADAPTERS — AL29-4C piping — Install a PVC-to-stainless adapter supplied by the AL29-4C stainless pipe manufacturer at the 3" PVC boiler vent connection and at the termination (if using Weil-McLain plate or concentric PVC termination). ADAPTERS — Polypropylene piping — Provide adapters from polypropylene pipe to the 3" PVC connections at the boiler and at terminations, if required (Weil-McLain sidewall plate, for example). ADAPTERS — If using 2" piping, where approved for the application, provide adapters for the 3" PVC boiler connections and at the terminations, if required (Weil-McLain sidewall plate, for example)		
Note 2:	System 636 PVC concentric terminations utilize PVC pipe/fittings certified to ULC S636. If ULC S636 compliance is required, use only System 636 pipe, fittings and cement.			
⚠ WARNING	DO NOT mix piping from different pipe manufacturers unless using adapters specifically designed for the purpose by the manufacturer.			
⚠ WARNING	Every joint on polypropylene vent piping must include a locking collar.			
⚠ WARNING	DO NOT use cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenolsulfone) in venting systems.			
⚠ WARNING	DO NOT cover non-metallic vent pipe and fittings with thermal insulation.			
		⚠ WARNING	USE SWEEP ELBOWS FOR ALL VENT AND AIR PIPING — DO NOT use short radius elbows for vent or air piping. Boiler performance could be affected.	
	⚠ WARNING	ALL vent and air pipes require a BIRD SCREEN at each termination . Most kits do not include the bird screens. Purchase bird screens separately from Weil-McLain or vent kit supplier if not included. [Note — bird screening is integral to the 3" PVC Weil-McLain sidewall vent cap, available for purchase from Weil-McLain. No additional screening is required.]		



Venting & air — general *(continued)*

Figure 22 ECO venting and air piping — DIRECT VENT ONLY — OPTIONS and PIPING LIMITS

NOTICE The table below lists the acceptable vent/air pipe terminations described in this manual. Follow all instructions provided to install the vent/air system. **NOT SHOWN** below, but also approved, are the polypropylene piping and terminations listed in Figure 23, page 24. For these applications, use **ONLY** the manufacturers' parts listed and follow all instructions provided by the pipe manufacturer.

ECO Model	Maximum vent and air pipe length = 100 feet for all applications										USE SWEEP ELBOWS ONLY	
	(Minimum length for all applications is 2 feet)											
	(All applications include allowance for the termination fittings plus one elbow in air piping and one elbow in vent piping).											
	See Figure 23, page 24 for material specifications See Figure 116, page 113 for part/kit numbers											
	Vent and air pipe sizes:											
	Maximum vent lengths apply for either 2" or 3" vent and air pipe.											
	If using 2" pipe, provide 3"x 2" tapered reducers at boiler connections and at Weil-McLain vent/air cap or at concentric terminations.											
	Boilers will derate as vent/air pipe length increases — see rating data on Figure 129, page 125 for derate amounts.											
	SIDEWALL termination					VERTICAL termination						
	Separate pipes [Note 1]		PVC or PP Concentric [Note 1]		3" Weil-McLain PVC vent/air cap [Note 1]		Separate pipes [Note 1]		PVC or PP Concentric [Note 1]			Vertical Vent, Side Air [Note 1]
See page 28		See page 30		See page 32		See page 34		See page 36		See page 39		
Size, inches	Materials Fig. 23, page 24	Size, inches	Materials Fig. 23, page 24	Size, inches	Materials Fig. 23, page 24	Size, inches	Materials Fig. 23, page 24	Size, inches	Materials Fig. 23, page 24	Size, inches	Materials Fig. 23, page 24	
70	2	PVC/PVC-DWV CPVC, PP, SS	2	PVC/PVC-DWV CPVC, PP, SS	2	PVC/PVC-DWV CPVC, PP, SS	2	PVC/PVC-DWV CPVC, PP, SS	2	PVC/PVC-DWV CPVC, PP, SS	2	PVC/PVC-DWV CPVC, PP, SS
	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS
110	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC Concentric only	-	-	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS
155	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, SS, PP**	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, PP, SS	3	PVC/PVC-DWV CPVC, SS,	3	PVC/PVC-DWV CPVC, PP, SS
	** Model 155 may be concentric sidewall vented using Centrotherm polypropylene pipe (Eco Systems InnoFlue® Single-wall) ONLY if using Centrotherm stainless steel concentric termination kit, part number ICWS3513.											

WARNING All elbows in vent and air piping must be sweep elbows **ONLY**. **DO NOT** use short-radius elbows. When transitioning to 3" to 2", use tapered reducer with 3" PVC nipple (Length ≥ 6"). Do not use 3" to 2" bushing. Bushings will not seal in boiler adapters.

Equivalent feet for elbows (USE SWEEP ELBOWS ONLY) — deduct from max. equivalent length of piping (does not apply to termination fittings).
 • 7 feet per for each additional 90° sweep elbow or 45° elbow — If piping contains more than 1 elbow in air or vent piping, other than termination fittings.

Note 1: Material abbreviations: PP = polypropylene, SS = AL29-4C stainless steel
 If using polypropylene or stainless pipe, provide adapters to for 3" boiler connections and for terminations, if required
 IPEX 3" PVC concentric vent kits can be used with standard PVC pipe, fittings and cement (ANSI/ASTM D1785) except if ULC S636 compliance is required. For ULC S636 compliance, all pipe, fittings and cement must be IPEX System 636. If using IPEX kits, use only IPEX product code 196006 for 3" venting.
 Contact Weil-McLain for ordering information and availability of Weil-McLain venting kits.

Note 2: Use only Weil-McLain approved termination kits listed in Figure 116, page 113



DIRECT VENT — Vertical vent / sidewall air

Allowable vent/air pipe materials & lengths

WARNING Use only the vent materials and kits listed in Figure 23, page 24. Provide pipe adapters if specified.

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 22, page 23.

Polypropylene For polypropylene applications, comply with any additional requirements in the vent system manufacturer's instructions. Provide 3" PVC-to-PP transition pieces at the boiler vent and air connections. PP adapter must have smooth, straight section of pipe to insert in to the boiler vent and air connections and must fit and seal tightly. PP adapters with their own seal which would interfere with the internal seal of the boiler vent or air connections must not be used. Refer to page 113 for a list of compliant adapters. Install a locking collar at every joint.

AL29-4C S.S. For AL29-4C vent pipe applications, comply with any additional requirements in the vent system manufacturer's instructions. Provide a 3" PVC transition piece at the boiler vent connection. The air piping must be PVC or CPVC.

2. For 3" to 2" transitions, must use appropriate vent material. For polypropylene or stainless steel must use approved suppliers transitions.

Prepare roof penetration

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.
 - 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.

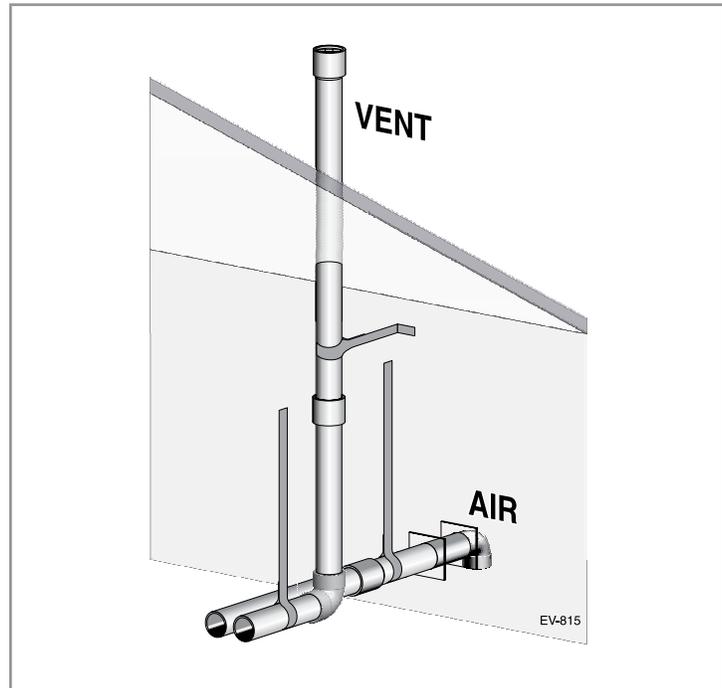
Vent termination and fittings

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.
2. Maintain the required dimensions of the finished termination piping as shown in Figure 6.

Multiple vent terminations

1. When terminating multiple ECO 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 Natural Gas and Propane Installation CAN/CSA B149.1 or B149.2 Installation Code.

Figure 5 INSTALLATION SEQUENCE — Vertical vent/sidewall air



- Step 1** Read and follow all instructions in this manual. **DO NOT proceed with vent/air installation until you have read page 22 through page 27.** **Polypropylene AL29-4C S.S.** See notices at left.
- Step 2** Install the boiler in a location that allows proper routing of all vent and air piping to the selected locations.
- Step 3** Make sure the selected vertical termination location complies with Figure 24, page 26.
- Step 4** Use only the vent materials listed in Figure 23, page 24. Provide pipe adapters where required. Vent piping and air piping lengths must not exceed the values shown in Figure 22, page 23.
- Step 5** Prepare the vertical penetration (vent) and sidewall penetration (air) and secure penetration components as instructed in this section.
- Step 6** The air piping must terminate in a 90-degree **down-turned elbow** as shown above. The vent piping must terminate in a **coupling pointed upward** as shown above.
- Step 7** Install vent and air piping between the boiler and the air and vent terminations. Slope horizontal piping downward toward the boiler at least 1/4 inch per foot. 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. See page 39 for general guidelines. Also comply with vent pipe manufacturer's instructions. **Polypropylene AL29-4C S.S.** See notices at left.
- Step 8** Insert the vent and air piping through the penetrations and secure the termination fittings.
- Step 9** Maintain clearances shown in this section. Vent and air terminations must be fitted with bird screens as shown.



WARNING **USE SWEEP ELBOWS FOR ALL VENT AND AIR PIPING** — DO NOT use short radius elbows for vent or air piping. Boiler performance could be affected.

DIRECT VENT — Vertical vent / sidewall air *(continued)*

Determine location for air inlet elbow

1. The air inlet of an ECO 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 7.
 - a. Apply the configuration on the left side of Figure 7 unless the terminations would fail to meet minimum clearance to grade or snow line.
 - b. Apply the configuration on the right side of Figure 7 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.

Multiple air terminations

1. When terminating multiple ECO 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 ECO boilers at least 6 inches apart.
4. For Canadian installations, provide clearances required by Natural Gas and Propane Installation CAN/CSA B149.1 or B149.2 Installation Code.
5. Combustion air (NOT vent piping) can be manifolded as shown in the ECO Advanced 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 7) 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 using the method shown in Figure 28, page 29.

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.

Figure 6 Vent termination (through the roof) for direct vent: vertical vent / sidewall air

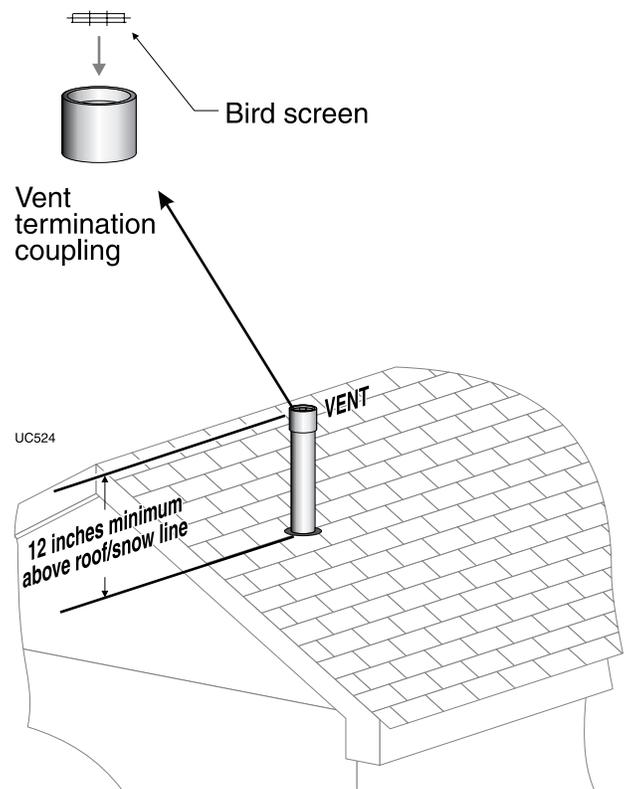


Figure 7 Sidewall air inlet (termination) for direct vent: vertical vent / sidewall air

