

**TABLE 5
OUTDOOR TERMINATION KITS USAGE**

SLP98DF UNIT	VENT PIPE DIA. (in.)	STANDARD						CONCENTRIC		
		Outdoor Exhaust Accelerator (Dia. X Length)	Outdoor Exhaust Accelerator (Dia. X Length)	2" Wall Plate Kit	3" Wall Plate Kit	2" Wall Ring Kit	Flush-Mount Kit	1-1/2" Concentric Kit	2" Concentric Kit	3" Concentric Kit
		1-1/2" X 12"	2" X 12"	22G44 or 30G28†	44J40 or 81J20†	15F74	51W11**	71M80 or ‡44W92‡‡	69M29 or ‡44W92‡‡	60L46 or 44W93‡
070	2	YES		YES	YES*	YES	YES	YES		
	2-1/2	YES		YES	YES*	YES	YES	YES		
	3	YES		YES	YES*	YES	YES	YES		
090	2		YES		YES	YES	YES		YES	YES
	2-1/2		YES		YES	YES	YES		YES	YES
	3		YES		YES	YES	YES		YES	YES
110	2		YES		YES	YES	YES		YES	YES
	2-1/2		YES		YES		YES		YES	YES
	3		YES		YES		YES		YES	YES

*Requires field-provided and installed 1-1/2" exhaust accelerator.

** Kit 51W11 includes a 1-1/2" accelerator which must be used for all SLP98DFV-070 and -090 installations.

† Termination kits 44W92, 44W93, 30G28 and 81J20 approved for use in Canadian installations.

‡‡ The 44W92 concentric kit includes a 1-1/2" accelerator which must be installed on the exhaust outlet when this kit is used with the SLP98DF070V36B furnaces.

Joint Cementing Procedure

All cementing of joints should be done according to the specifications outlined in ASTM D 2855.

NOTE - A sheet metal screw may be used to secure the intake pipe to the connector, if desired. Use a drill or self tapping screw to make a pilot hole.

DANGER

DANGER OF EXPLOSION!

Fumes from PVC glue may ignite during system check. Allow fumes to dissipate for at least 5 minutes before placing unit into operation.

- 1 - Measure and cut vent pipe to desired length.
- 2 - Debur and chamfer end of pipe, removing any ridges or rough edges. If end is not chamfered, edge of pipe may remove cement from fitting socket and result in a leaking joint.
- 3 - Clean and dry surfaces to be joined.
NOTE - Check the inside of vent pipe thoroughly for any obstruction that may alter furnace operation.
- 4 - Test fit joint and mark depth of fitting on outside of pipe.

- 5 - Uniformly apply a liberal coat of PVC primer for PVC or use a clean dry cloth for ABS to clean inside socket surface of fitting and male end of pipe to depth of fitting socket.

- 6 - Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement should be applied lightly but uniformly to inside of socket. Take care to keep excess cement out of socket. Apply second coat to end of pipe.

NOTE - Time is critical at this stage. Do not allow primer to dry before applying cement.

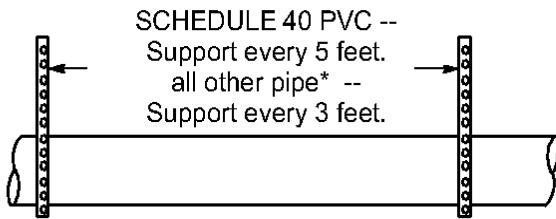
- 7 - Immediately after applying last coat of cement to pipe, and while both inside socket surface and end of pipe are wet with cement, forcefully insert end of pipe into socket until it bottoms out. Turn PVC pipe 1/4 turn during assembly (but not after pipe is fully inserted) to distribute cement evenly. DO NOT turn ABS or cellular core pipe.

NOTE - Assembly should be completed within 20 seconds after last application of cement. Hammer blows should not be used when inserting pipe.

- 8 - After assembly, wipe excess cement from pipe at end of fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient solvent.
- 9 - Handle joints carefully until completely set.

Venting Practices

Piping Suspension Guidelines



* See table 4 for allowable pipe.

NOTE - Isolate piping at the point where it exits the outside wall or roof in order to prevent transmission of vibration to the structure.

Wall Thickness Guidelines

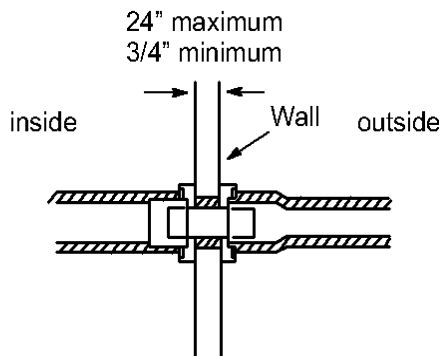
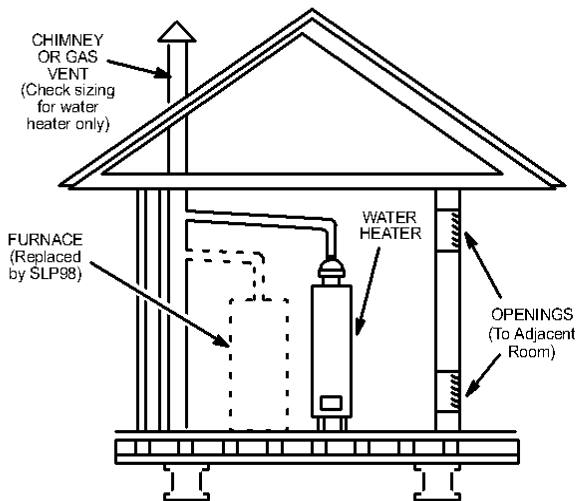


FIGURE 13

REPLACING FURNACE THAT WAS PART OF A COMMON VENT SYSTEM



If an SLP98 furnace replaces a furnace which was commonly vented with another gas appliance, the size of the existing vent pipe for that gas appliance must be checked. Without the heat of the original furnace flue products, the existing vent pipe is probably oversized for the single water heater or other appliance. The vent should be checked for proper draw with the remaining appliance.

FIGURE 14

- 1 - In areas where piping penetrates joists or interior walls, hole must be large enough to allow clearance on all sides of pipe through center of hole using a hanger.
- 2 - When furnace is installed in a residence where unit is shut down for an extended period of time, such as a vacation home, make provisions for draining condensate collection trap and lines.

Exhaust Piping (Figure 16)

Route piping to outside of structure. Continue with installation following instructions given in piping termination section.

CAUTION

Do not discharge exhaust into an existing stack or stack that also serves another gas appliance. If vertical discharge through an existing unused stack is required, insert PVC pipe inside the stack until the end is even with the top or outlet end of the metal stack.

CAUTION

The exhaust vent pipe operates under positive pressure and must be completely sealed to prevent leakage of combustion products into the living space.

Vent Piping Guidelines

The SLP98DFV is installed only as a Direct Vent gas central furnace.

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors.

Intake and exhaust pipe sizing -- Size pipe according to tables 6 and 7. Table 6 lists the *minimum* vent pipe lengths permitted. Table 7 lists the *maximum* pipe lengths permitted.

Regardless of the diameter of pipe used, the standard roof and wall terminations described in section *Exhaust Piping Terminations* should be used. Exhaust vent termination pipe is sized to optimize the velocity of the exhaust gas as it exits the termination. Refer to table 9.

In some applications which permit the use of several different sizes of vent pipe, a combination vent pipe may be used. Contact Lennox' Application Department for assistance in sizing vent pipe in these applications.

TABLE 6
MINIMUM VENT PIPE LENGTHS

SLP98DF MODEL	MIN. EQUIV. VENT LENGTH	EXAMPLE
070, 090, 110	15 ft.*	5 ft. plus 2 elbows of 2", 2-1/2" or 3" diameter pipe

*Any approved termination may be added to the minimum equivalent length listed.

NOTE - It is acceptable to use any pipe size which fits within the guidelines allowed in table 7.

NOTE - The exhaust collar on all models is sized to accommodate 2" Schedule 40 vent pipe. Contact the Application Department for more information concerning sizing of vent systems which include multiple pipe sizes.

NOTE - All horizontal runs of exhaust pipe must slope back toward unit. A minimum of 1/4" (6mm) drop for each 12" (305mm) of horizontal run is mandatory for drainage.

NOTE - Exhaust pipe **MUST** be glued to furnace exhaust fittings.

NOTE - Exhaust piping should be checked carefully to make sure there are no sags or low spots.

Use the following steps to correctly size vent pipe diameter.

! IMPORTANT

Do not use screens or perforated metal in exhaust or intake terminations. Doing so will cause freeze-ups and may block the terminations.

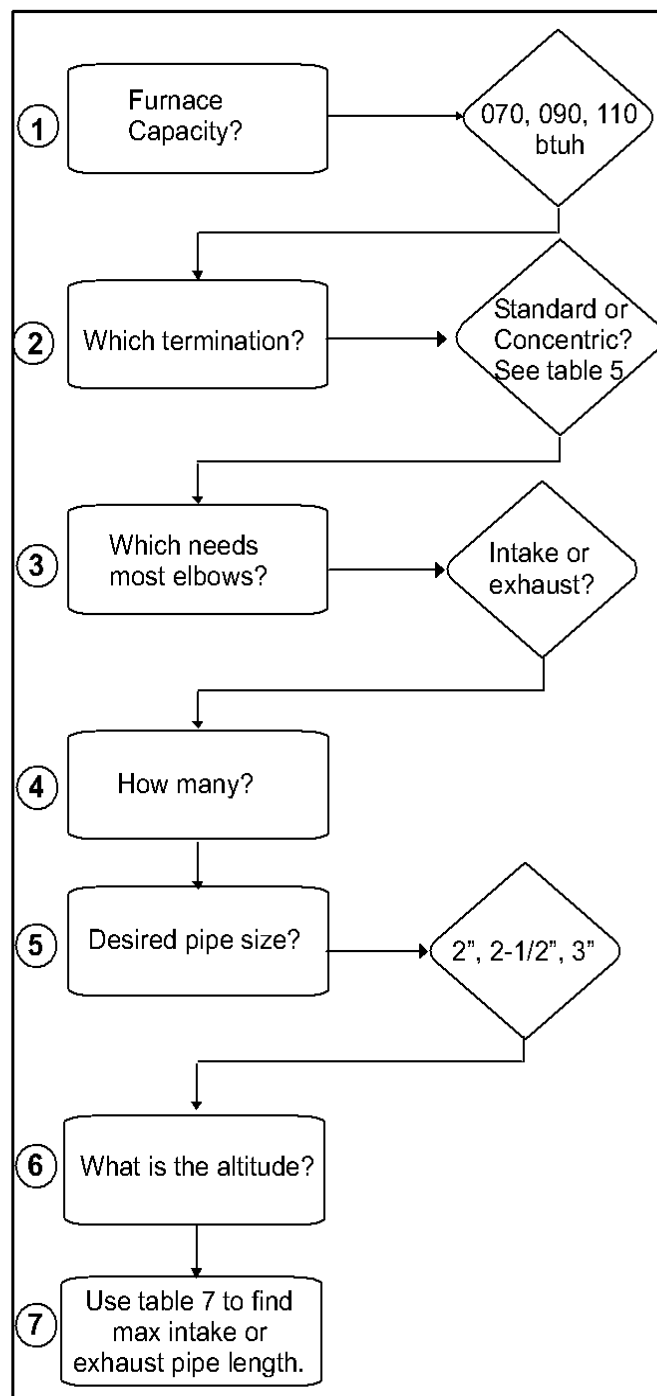


FIGURE 15

TABLE 7
Maximum Allowable Intake or Exhaust Vent Length in Feet

**Size intake and exhaust pipe length separately. Values in table are for Intake OR Exhaust, not combined total. Both Intake and Exhaust must be same pipe size.*

Standard Termination at Elevation 0 - 4500'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	91	69	14	140	93	43	162	143	118	
2	86	64	9	135	88	38	157	138	113	
3	81	59	n/a	130	83	33	152	133	108	
4	76	54		125	78	28	147	128	103	
5	71	49		120	73	23	142	123	98	
6	66	44		115	68	18	137	118	93	
7	61	39		110	63	13	132	113	88	
8	56	34		105	58	n/a	127	108	83	
9	51	29		100	53		122	103	78	
10	46	24		95	48		117	98	73	
Standard Termination Elevation 4501' - 7500'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	66	69	14	115	93	43	137	143	118	
2	61	64	9	110	88	38	132	138	113	
3	56	59	n/a	105	83	33	127	133	108	
4	51	54		100	78	28	122	128	103	
5	46	49		95	73	23	117	123	98	
6	41	44		90	68	18	112	118	93	
7	36	39		85	63	13	107	113	88	
8	31	34		80	58	n/a	102	108	83	
9	26	29		75	53		97	103	78	
10	21	24		70	48		92	98	73	
Standard Termination at Elevation 7501' - 10,000'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	41	44	n/a	90	68	n/a	112	118	93	
2	36	39		85	63		107	113	88	
3	31	34		80	58		102	108	83	
4	26	29		75	53		97	103	78	
5	21	24		70	48		92	98	73	
6	16	19		65	43		87	93	68	
7	11	14		60	38		82	88	63	
8	n/a	n/a		55	33		77	83	58	
9				50	28		72	78	53	
10				45	23		67	73	48	

NOTE - Table 7 continued on next page with concentric terminations.

TABLE 7**Maximum Allowable Intake or Exhaust Vent Length in Feet**

*Size intake and exhaust pipe length separately. Values in table are for Intake OR Exhaust, not combined total. Both Intake and Exhaust must be same pipe size.

Concentric Termination at Elevation 0 - 4500'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	83	67	12	130	89	39	146	139	114	
2	78	62	7	125	84	34	141	134	109	
3	73	57	n/a	120	79	29	136	129	104	
4	68	52		115	74	24	131	124	99	
5	63	47		110	69	19	126	119	94	
6	58	42		105	64	14	121	114	89	
7	53	37		100	59	n/a	116	109	84	
8	48	32		95	54		111	104	79	
9	43	27		90	49		106	99	74	
10	38	22		85	44		101	94	69	
Concentric Termination Elevation 4501' - 7500'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	58	67	12	105	89	39	121	114	114	
2	53	62	7	100	84	34	116	109	109	
3	48	57	n/a	95	79	29	111	104	104	
4	43	52		90	74	24	106	99	99	
5	38	47		85	69	19	101	94	94	
6	33	42		80	64	14	96	89	89	
7	28	37		75	59	n/a	91	84	84	
8	23	32		70	54		86	79	79	
9	18	27		65	49		81	74	74	
10	13	22		60	44		76	69	69	
Concentric Termination at Elevation 7501' - 10,000'										
Number Of 90° Elbows Used	2" Pipe			2-1/2" Pipe			3" Pipe			
	Model			Model			Model			
	070	090	110	070	090	110	070	090	110	
1	33	42	n/a	80	64	n/a	96	114	89	
2	28	37		75	59		91	109	84	
3	23	32		70	54		86	104	79	
4	18	27		65	49		81	99	74	
5	13	22		60	44		76	94	69	
6	n/a	17		55	39		71	89	64	
7		12		50	34		66	84	59	
8		n/a		45	29		61	79	54	
9				40	24		56	74	49	
10	35			19	51		69	44		

TYPICAL EXHAUST PIPE CONNECTIONS AND CONDENSATE TRAP INSTALLATION

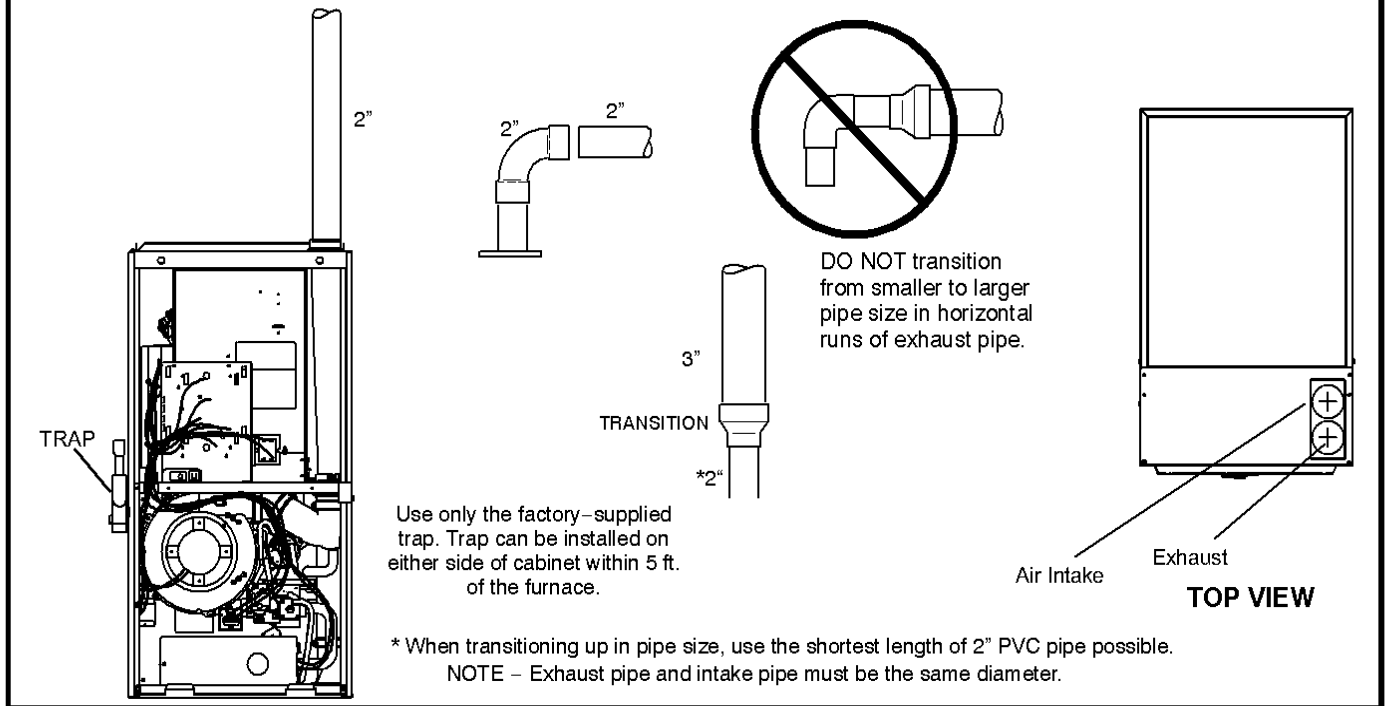


FIGURE 16

TYPICAL AIR INTAKE PIPE CONNECTIONS

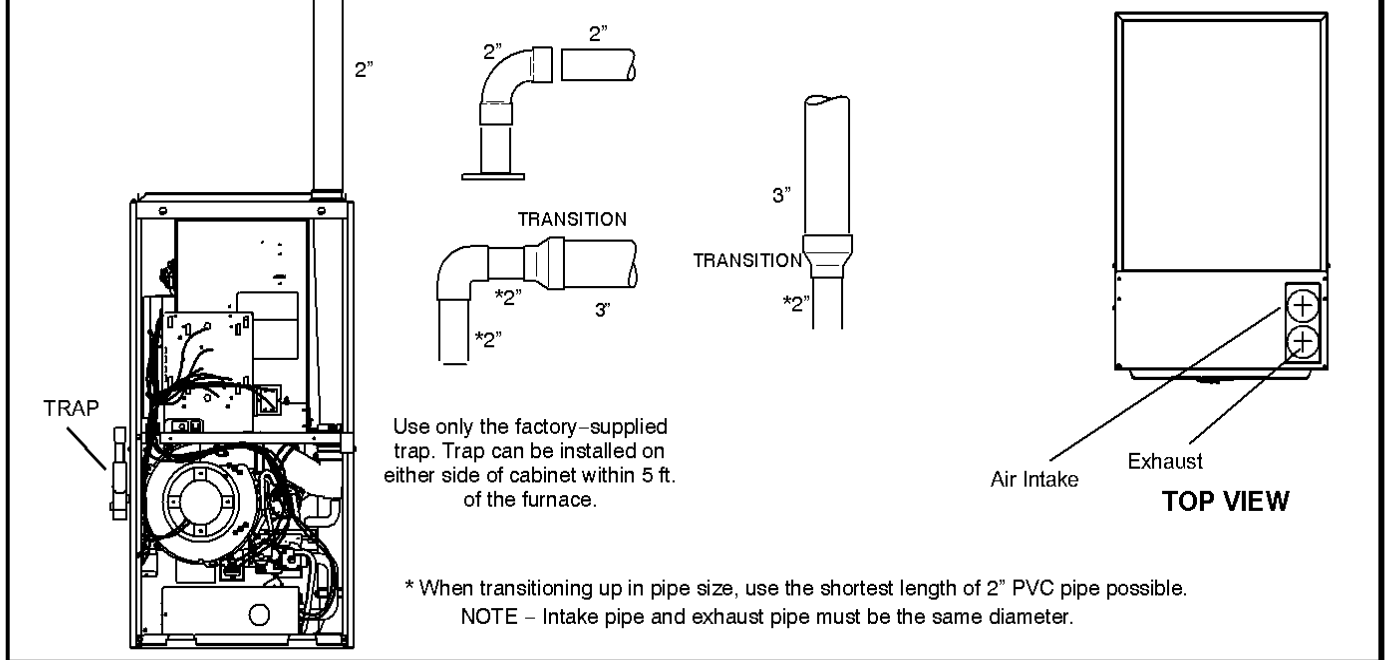
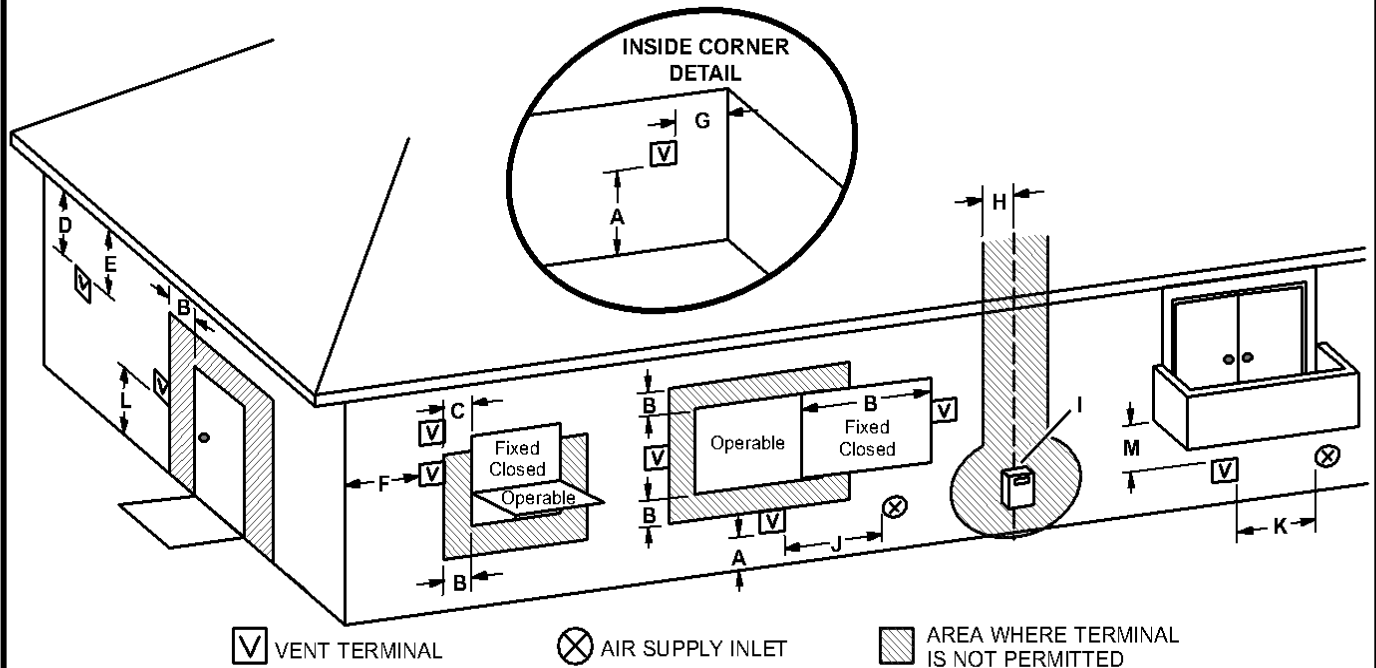


FIGURE 17

VENT TERMINATION CLEARANCES FOR DIRECT VENT INSTALLATIONS IN THE USA AND CANADA



		US Installations ¹	Canadian Installations ²
A =	Clearance above grade, veranda, porch, deck or balcony	12 inches (305mm) or 12 in. 305mm above average snow accumulation.	12 inches (305mm) or 12 in. 305mm above average snow accumulation.
B =	Clearance to window or door that may be opened	6 inches (152mm) for appliances <10,000 Btuh (3kw), 9 inches (mm) for appliances > 10,000 Btuh (3kw) and <50,000 Btuh (15 kw), 12 inches (305mm) for appliances > 50,000 Btuh (15kw)	6 inches (152mm) for appliances <10,000 Btuh (3kw), 12 inches (305mm) for appliances > 10,000 Btuh (3kw) and <100,000 Btuh (30kw), 36 inches (.9m) for appliances > 100,000 Btuh (30kw)
C =	Clearance to permanently closed window	* 12"	* 12"
D =	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (mm) from the center line of the terminal	* Equal to or greater than soffit depth	* Equal to or greater than soffit depth
E =	Clearance to unventilated soffit	* Equal to or greater than soffit depth	* Equal to or greater than soffit depth
F =	Clearance to outside corner	* No minimum to outside corner	* No minimum to outside corner
G =	Clearance to inside corner	*	*
H =	Clearance to each side of center line extended above meter / regulator assembly	3 feet (.9m) within a height 15 feet (4.5m) above the meter / regulator assembly	3 feet (.9m) within a height 15 feet (4.5m) above the meter / regulator assembly
I =	Clearance to service regulator vent outlet	* 3 feet (.9m)	3 feet (.9m)
J =	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	6 inches (152mm) for appliances <10,000 Btuh (3kw), 9 inches (mm) for appliances > 10,000 Btuh (3kw) and <50,000 Btuh (15 kw), 12 inches (305mm) for appliances > 50,000 Btuh (15kw)	6 inches (152mm) for appliances <10,000 Btuh (3kw), 12 inches (305mm) for appliances > 10,000 Btuh (3kw) and <100,000 Btuh (30kw), 36 inches (.9m) for appliances > 100,000 Btuh (30kw)
K =	Clearance to mechanical air supply inlet	3 feet (.9m) above if within 10 feet (3m) horizontally	6 feet (1.8m)
L =	Clearance above paved sidewalk or paved driveway located on public property	* 7 feet (2.1m)	7 feet (2.1m)†
M =	Clearance under veranda, porch, deck or balcony	*12 inches (305mm)‡	12 inches (305mm)‡

¹ In accordance with the current ANSI Z223.1/NFPA 54 Natural Fuel Gas Code

² In accordance with the current CSA B149.1, Natural Gas and Propane Installation Code

† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

‡ Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor. Lennox recommends avoiding this location if possible.

*For clearances not specified in ANSI Z223.1/NFPA 54 or CSA B149.1, clearance will be in accordance with local installation codes and the requirements of the gas supplier and these installation instructions."

FIGURE 18

Details of Intake and Exhaust Piping Terminations for Direct Vent Installations

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged to outdoors.

NOTE - Flue gas may be slightly acidic and may adversely affect some building materials. If any vent termination is used and the flue gasses may impinge on the building material, a corrosion-resistant shield (minimum 24 inches square) should be used to protect the wall surface. If the optional tee is used, the protective shield is recommended. The shield should be constructed using wood, plastic, sheet metal or other suitable material. All seams, joints, cracks, etc. in the affected area should be sealed using an appropriate sealant. See figure 21.

Intake and exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 19 through 28 show typical terminations.

- 1 - Exhaust and intake exits must be in same pressure zone. Do not exit one through the roof and one on the side. Also, do not exit the intake on one side and the exhaust on another side of the house or structure.
- 2 - Intake and exhaust pipes should be placed as close together as possible at termination end (refer to illustrations). Maximum separation is 3" (76mm) on roof terminations and 6" (152mm) on side wall terminations.
- 3 - On roof terminations, the intake piping should terminate straight down using two 90° elbows (See figure 19).
- 4 - Exhaust piping must terminate straight out or up as shown. A reducer may be required on the exhaust piping at the point where it exits the structure to improve the velocity of exhaust away from the intake piping. See table 9.

NOTE - Care must be taken to avoid recirculation of exhaust back into intake pipe.

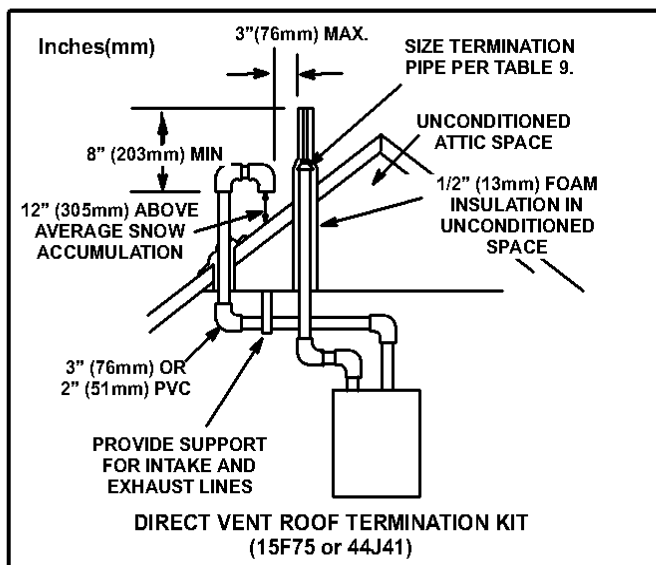
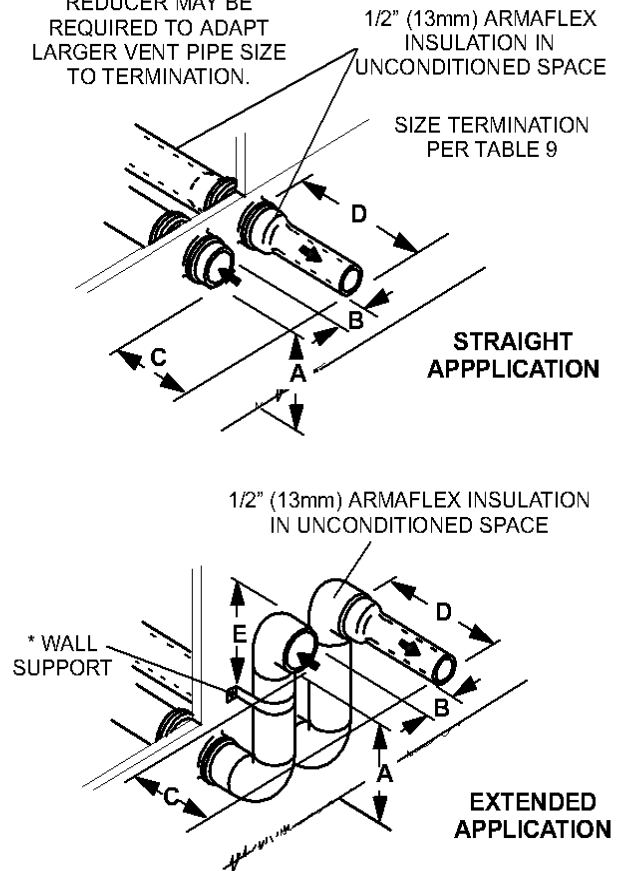


FIGURE 19

FIELD-SUPPLIED WALL TERMINATION OR (15F74) WALL RING TERMINATION KIT

NOTE - FIELD-PROVIDED REDUCER MAY BE REQUIRED TO ADAPT LARGER VENT PIPE SIZE TO TERMINATION.



See venting table 7 for maximum venting lengths with this arrangement.

* Use wall support every 24" (610 mm). Use two wall supports if extension is greater than 24" (610 mm) but less than 48" (1219 mm). NOTE - One wall support must be 6" (152 mm) from top of each pipe (intake and exhaust).

	2" (51mm) Vent Pipe	3" (76mm) Vent Pipe
A-Minimum clearance above grade or average snow accumulation	12" (508MM)	12" (508MM)
B-Maximum horizontal separation between intake and exhaust	6" (152MM)	6" (152MM)
C-Minimum from end of exhaust to inlet of intake	8" (203MM)	8" (203MM)
D-Maximum exhaust pipe length	12" (305MM)	20" (508MM)
E-Maximum wall support distance from top of each pipe (intake/exhaust)	6" (152MM)	6" (152MM)

FIGURE 20

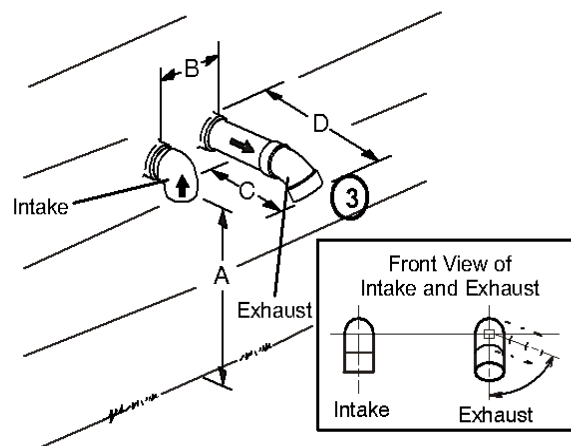
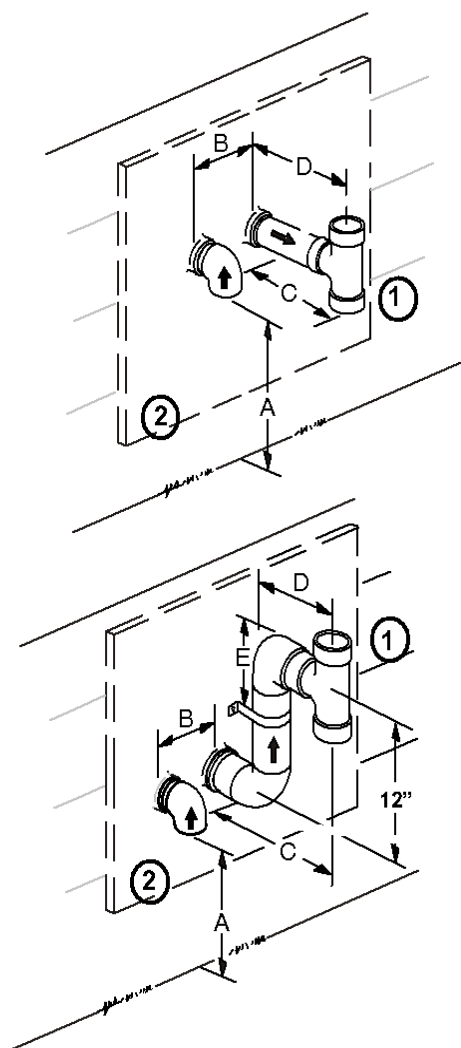


TABLE 8

	2" (51mm) Vent Pipe	3" (76mm) Vent Pipe
A - Clearance above grade or average snow accumulation	12" (508MM) Min.	12" (508MM) Min.
B -Horizontal separation between intake and exhaust	6" (152MM) Min. 24" (610 MM) Max	6" (152MM) Min. 24" (610 MM) Max
C -Minimum from end of exhaust to inlet of intake	9" (227MM) Min.	9" (227MM) Min.
D -Exhaust pipe length	12" (305MM) Min. 16" (405 MM) Max.	12" (305MM) Min. 20" (508MM) Max.
E -Wall support distance from top of each pipe (intake/exhaust)	6" (152MM) Max.	6" (152MM) Max.

NOTE - See unit installation instructions for proper exhaust pipe termination size reduction.

¹ The exhaust termination tee should be connected to the 2" or 3" PVC flue pipe as shown in the illustration. Do not use an accelerator in applications that include an exhaust termination tee. The accelerator is not required.

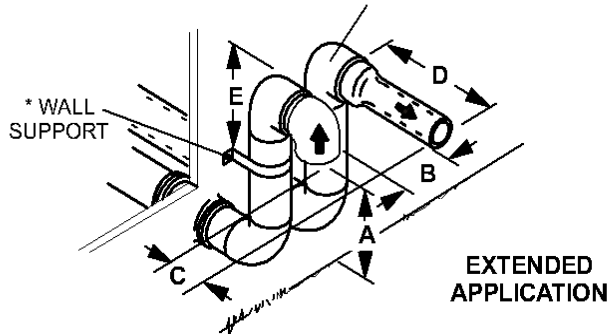
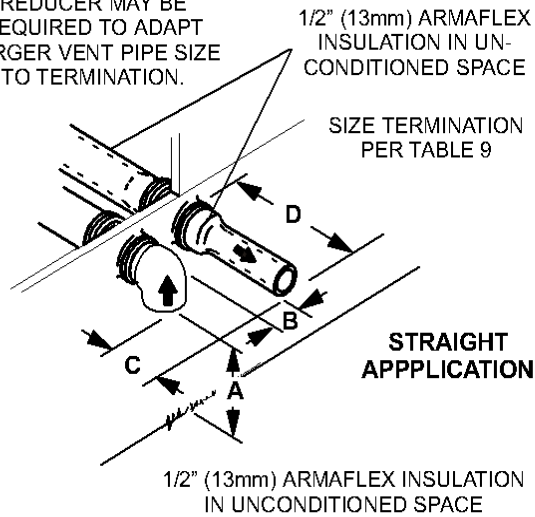
² As required. Flue gas may be acidic and may adversely affect some building materials. If a side wall vent termination is used and flue gases will impinge on the building materials, a corrosion-resistant shield (24 inches square) should be used to protect the wall surface. If optional tee is used, the protective shield is recommended. The shield should be constructed using wood, sheet metal or other suitable material. All seams, joints, cracks, etc. in affected area, should be sealed using an appropriate sealant.

³ Exhaust pipe 45° elbow can be rotated to the side away from the combustion air inlet to direct exhaust away from adjacent property. The exhaust must never be directed toward the combustion air inlet.

FIGURE 21

**FIELD-SUPPLIED WALL TERMINATION OR
(15F74) WALL RING TERMINATION KIT
With INTAKE ELBOW**

NOTE - FIELD-PROVIDED REDUCER MAY BE REQUIRED TO ADAPT LARGER VENT PIPE SIZE TO TERMINATION.



See venting table 7 for maximum venting lengths with this arrangement.

* Use wall support every 24" (610 mm). Use two wall supports if extension is greater than 24" (610 mm) but less than 48" (1219 mm). NOTE - One wall support must be 6" (152 mm) from top of each pipe (intake and exhaust).

	2" (51mm) Vent Pipe	3" (76mm) Vent Pipe
A -Minimum clearance above grade or average snow accumulation	12" (508MM)	12" (508MM)
B -Maximum horizontal separation between intake and exhaust	6" (152MM)	6" (152MM)
C -Minimum from end of exhaust to inlet of intake	6" (152MM)	6" (152MM)
D -Maximum exhaust pipe length	12" (305MM)	20" (508MM)
E -Maximum wall support distance from top of each pipe (intake/exhaust)	6" (152MM)	6" (152MM)

FIGURE 22

**TABLE 9
EXHAUST PIPE TERMINATION SIZE REDUCTION**

SLP98DFV MODEL	Exhaust Pipe Size	Termination Pipe Size
*070	2", 2-1/2" or 3"	1-1/2"
*090	2", 2-1/2" or 3"	2"
110	2", 2-1/2" or 3"	2"

*SLP98DF -070 and -090 units with the flush-mount termination must use the 1-1/2" accelerator supplied with the kit.

- On field-supplied terminations for side wall exit, exhaust piping may extend a maximum of 12 inches (305mm) for 2" PVC and 20 inches (508mm) for 3" (76mm) PVC beyond the outside wall. Intake piping should be as short as possible. See figures 20 and 22.
- On field-supplied terminations, a minimum distance between the end of the exhaust pipe and the end of the intake pipe without a termination elbow is 8" and a minimum distance of 6" with a termination elbow. See figures 20 and 22.
- If intake and exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported every 24" (610mm) as shown in figures 20 and 22. In addition, close-coupled wall termination kits must be extended for use in this application. See figures 30 and 31. When exhaust and intake piping must be run up an outside wall, the exhaust piping must be terminated with pipe sized per table 9. The intake piping may be equipped with a 90° turndown elbow. Using a turn-down elbow will add 5 feet (1.5m) to the equivalent length of the pipe.
- Based on the recommendation of the manufacturer, a multiple-furnace installation may use a group of up to four terminations assembled together horizontally, as shown in figure 25.

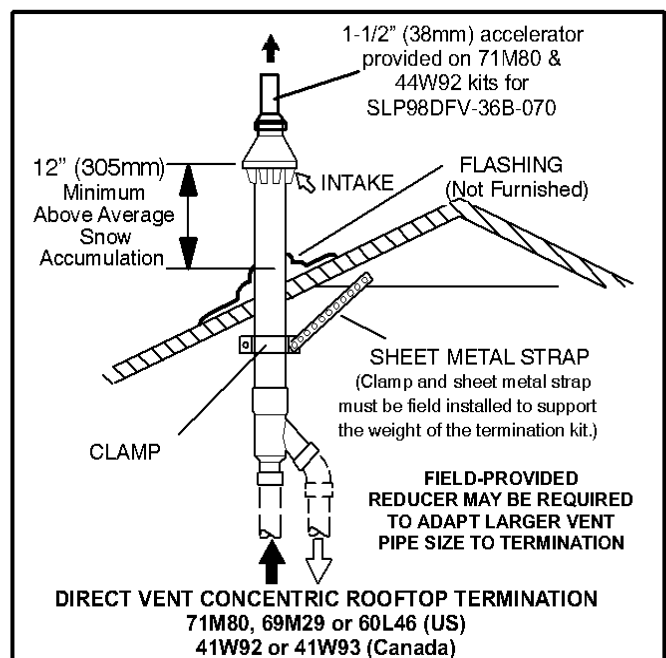


FIGURE 23

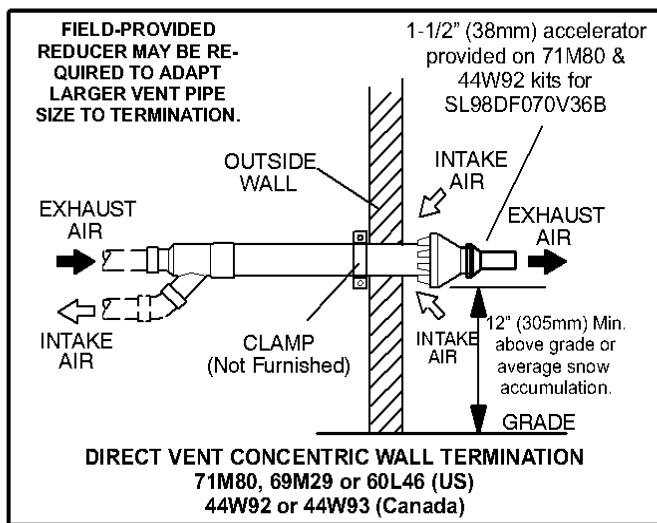


FIGURE 24

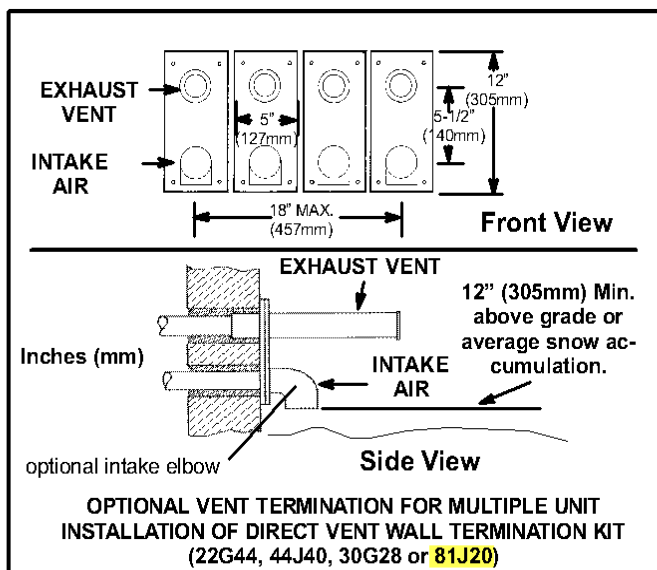


FIGURE 25

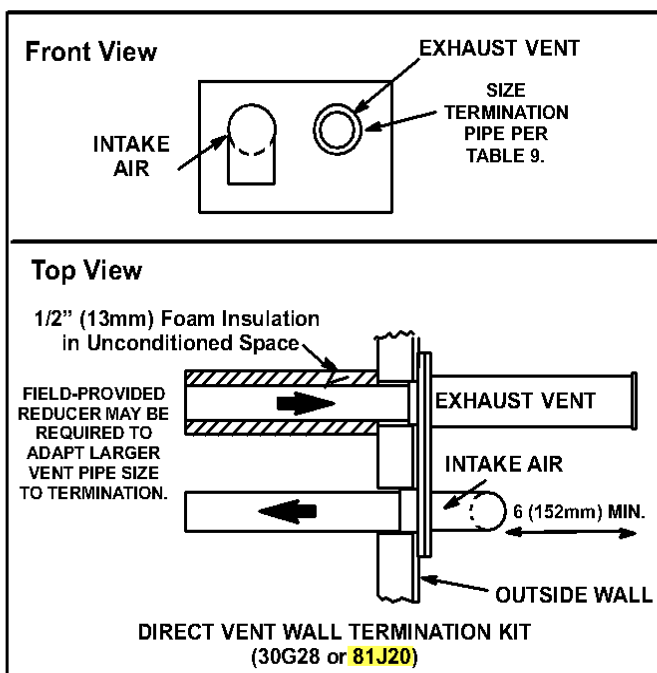


FIGURE 26

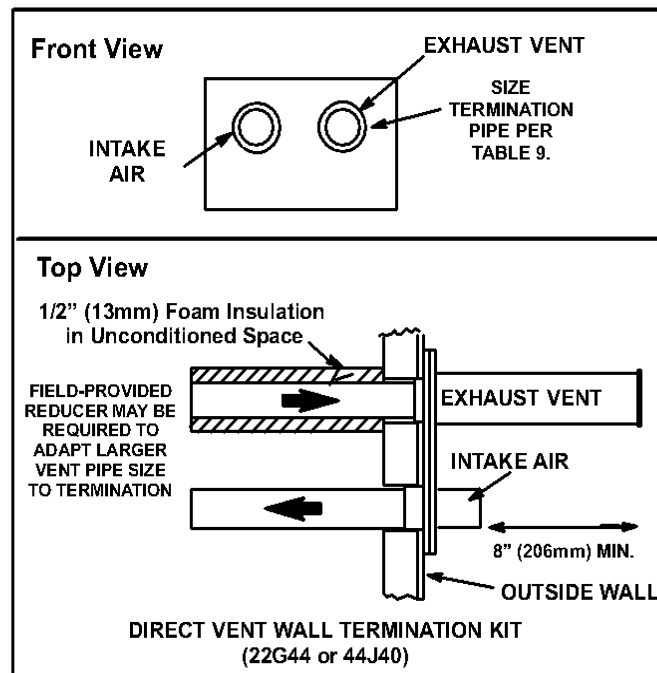


FIGURE 27

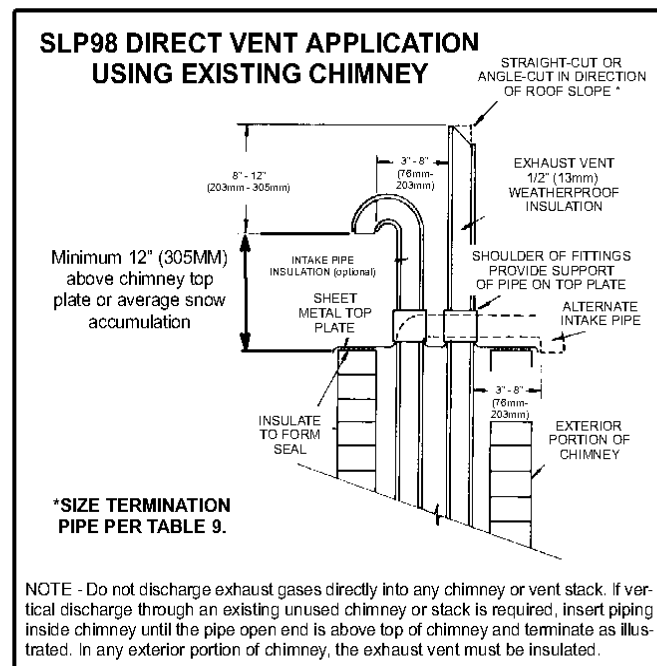


FIGURE 28

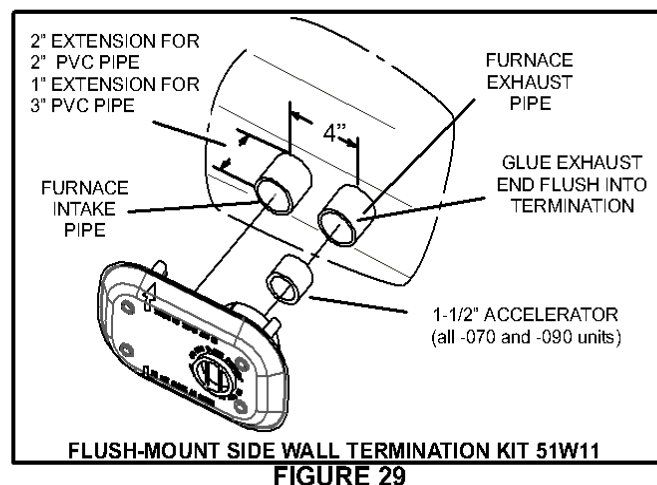


FIGURE 29

**WALL TERMINATION KITS (CLOSE-COUPLE)
EXTENDED VENT FOR GRADE CLEARANCE
2 inch (51 mm) 22G44 (US)
3 inch (76 mm) 44J40 (US)**

If intake and exhaust pipe is less than 12 in. (305 mm) above snow accumulation or other obstructions, field-fabricated piping must be installed.

**FIELD-PROVIDED
REDUCER MAY BE REQUIRED TO ADAPT
LARGER VENT PIPE SIZE TO TERMINATION**

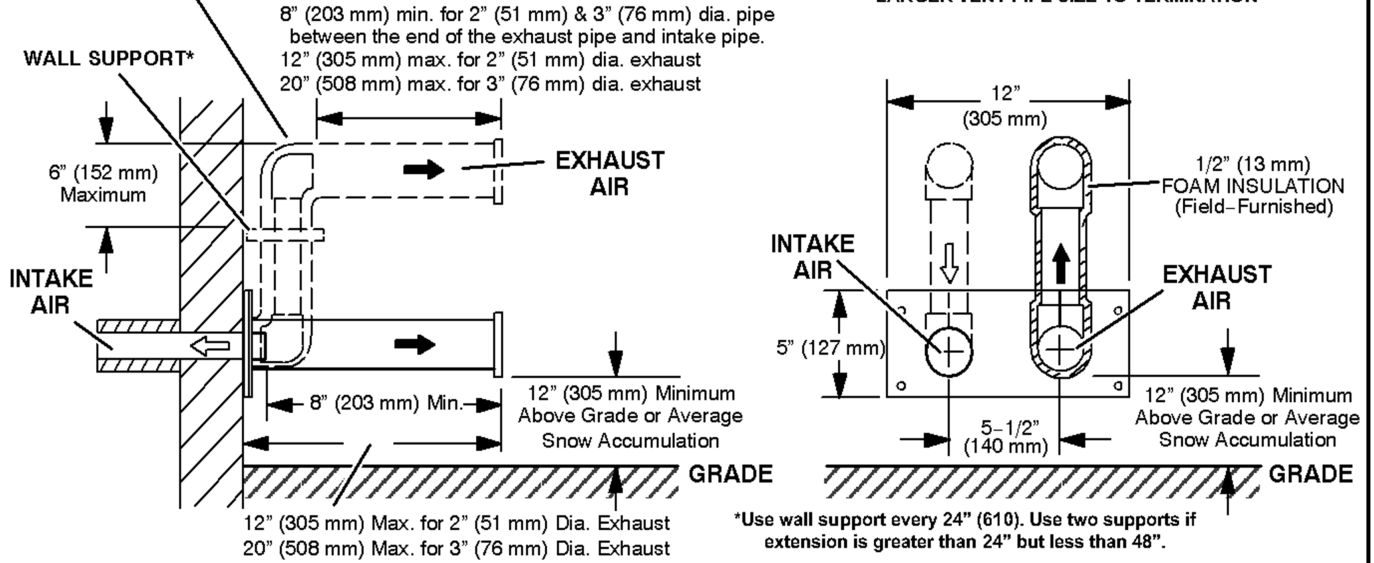


FIGURE 30

**WALL TERMINATION KITS (CLOSE-COUPLE)
EXTENDED VENT FOR GRADE CLEARANCE
2 inch (51 mm) 30G28 (WTK Canada)
3 inch (76 mm) 81J20 (WTK Canada)**

See installation instructions for additional information.

If intake and exhaust pipe is less than 12 in. (305 mm) above snow accumulation or other obstructions, field-fabricated piping must be installed.

**FIELD-PROVIDED
REDUCER MAY BE REQUIRED TO ADAPT
LARGER VENT PIPE SIZE TO TERMINATION**

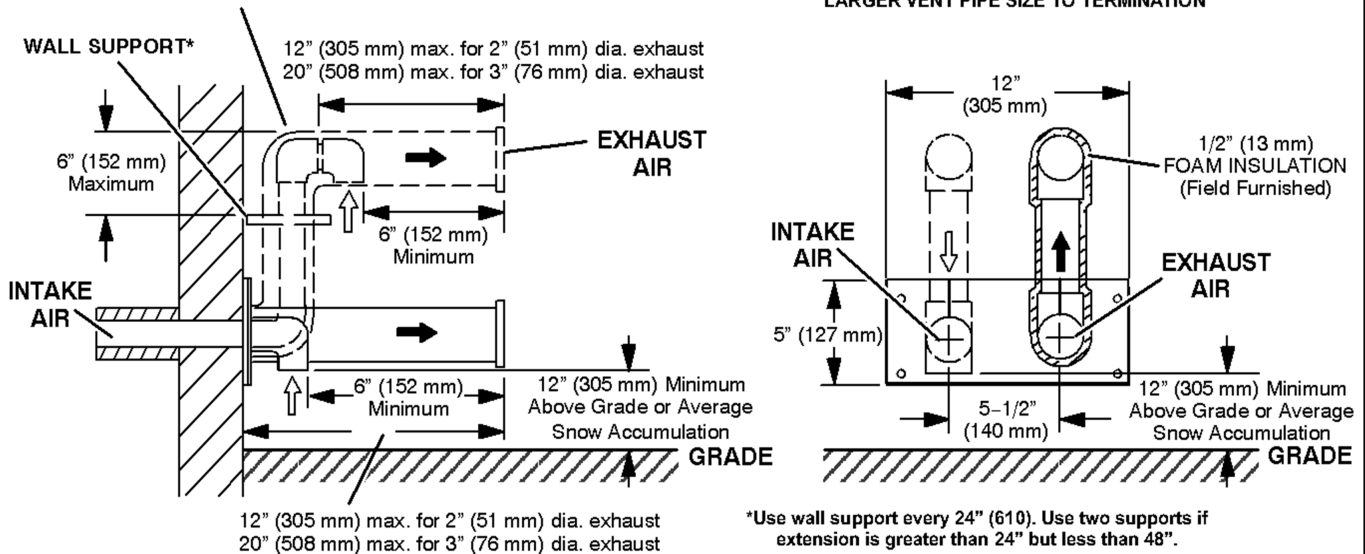


FIGURE 31