

**City of Portland, Maine - Building or Use Permit Application**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

|                       |             |                     |
|-----------------------|-------------|---------------------|
| Permit No:<br>09-1297 | Issue Date: | CBL:<br>039 G010B01 |
|-----------------------|-------------|---------------------|

|   |                                   |  |                     |
|---|-----------------------------------|--|---------------------|
| Location of Construction:<br>72 HIGH ST | Owner Name:<br>HEY CHRISTINE M    | Owner Address:<br>74 HIGH ST                             | Phone:              |
| Business Name:                          | Contractor Name:<br>Caron & Waltz | Contractor Address:<br>321 Lincoln Street South Portland | Phone<br>2077992228 |
| Lessee/Buyer's Name                     | Phone:                            | Permit Type:<br>HVAC                                     | Zone:<br>R-2        |

|  |  |   |                              |   |
|--|--|---|------------------------------|---|
| Past Use:<br>Residential Condo Unit# B-1   | Proposed Use:<br>Residential Condo Unit# B-1 -<br>install a Knight KBN285 Boiler | Permit Fee:<br>\$210.00   | Cost of Work:<br>\$19,000.00 | CEO District:<br>2  |
| Proposed Project Description:<br>install a Knight KBN285 Boiler<br><br><i>LEGAL use: total # of res. condos = 17</i> |  | FIRE DEPT: <input type="checkbox"/> Approved <input type="checkbox"/> Denied  |                              | INSPECTION:<br>Use Group: R3 Type SB<br>IRC 2003<br>ST ME GAS Regs<br>Signature: <i>Jm 11/23/09</i> |
|  |  | PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)<br>Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied<br>Signature: _____ Date: _____ |                              |   |

|                             |                                 |                        |  |  |
|-----------------------------|---------------------------------|------------------------|--|--|
| Permit Taken By:<br>Ldobson | Date Applied For:<br>11/13/2009 | <b>Zoning Approval</b> |  |  |
|-----------------------------|---------------------------------|------------------------|--|--|

|  |   |   |   |
|--|---|---|---|
| 1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.<br><br>2. Building permits do not include plumbing, septic or electrical work.<br><br>3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work.. | Special Zone or Reviews<br><input type="checkbox"/> Shoreland<br><input type="checkbox"/> Wetland<br><input type="checkbox"/> Flood Zone<br><input type="checkbox"/> Subdivision<br><input type="checkbox"/> Site Plan<br><br>Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> | Zoning Appeal<br><input type="checkbox"/> Variance<br><input type="checkbox"/> Miscellaneous<br><input type="checkbox"/> Conditional Use<br><input type="checkbox"/> Interpretation<br><input type="checkbox"/> Approved<br><input type="checkbox"/> Denied | Historic Preservation<br><input type="checkbox"/> Not in District or Landmark<br><input type="checkbox"/> Does Not Require Review<br><input type="checkbox"/> Requires Review<br><input type="checkbox"/> Approved<br><input type="checkbox"/> Approved w/Conditions<br><input type="checkbox"/> Denied |
|  | Date: <i>11/17/09</i>   | Date: _____   | Date: _____   |

**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

**PERMIT ISSUED**

|   |         |      |                  |       |
|---|---------|------|------------------|-------|
| SIGNATURE OF APPLICANT                      | ADDRESS | DATE | NOV 23 2009      | PHONE |
| RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE |         | DATE | City of Portland | PHONE |



# CITY OF PORTLAND, MAINE

Department of Building Inspections

## Original Receipt

Received from 11 R. 20 09

Location of Work Corn South  
14 11 11 St.

Cost of Construction \$ \_\_\_\_\_ Building Fee: \_\_\_\_\_

Permit Fee \$ \_\_\_\_\_ Site Fee: \_\_\_\_\_

Certificate of Occupancy Fee: \_\_\_\_\_

Total: 210

Building (I1) \_\_\_\_\_ Plumbing (I5) \_\_\_\_\_ Electrical (I2) \_\_\_\_\_ Site Plan (U2) \_\_\_\_\_

Other HDA

CBL: 39-5010201

Check #: 23 102 Total Collected \$ 210

**No work is to be started until permit issued.  
Please keep original receipt for your records.**

Taken by: \_\_\_\_\_

WHITE - Applicant's Copy  
YELLOW - Office Copy  
PINK - Permit Copy

**City of Portland, Maine - Building or Use Permit**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

|                              |  |                            |
|------------------------------|--|----------------------------|
| <b>Permit No:</b><br>09-1297 | <b>Date Applied For:</b><br>11/13/2009 | <b>CBL:</b><br>039 G010B01 |
|------------------------------|--|----------------------------|

|  |  |   |                                 |
|--|--|---|---------------------------------|
| <b>Location of Construction:</b><br>72 HIGH ST | <b>Owner Name:</b><br>HEY CHRISTINE M    | <b>Owner Address:</b><br>74 HIGH ST                             | <b>Phone:</b>                   |
| <b>Business Name:</b>                          | <b>Contractor Name:</b><br>Caron & Waltz | <b>Contractor Address:</b><br>321 Lincoln Street South Portland | <b>Phone:</b><br>(207) 799-2228 |
| <b>Lessee/Buyer's Name</b>                     | <b>Phone:</b>                            | <b>Permit Type:</b><br>HVAC                                     |                                 |

|  |  |
|--|--|
| <b>Proposed Use:</b><br>Residential Condo Unit# B-1 - install a Knight KBN285 Boiler | <b>Proposed Project Description:</b><br>install a Knight KBN285 Boiler |
|--|--|

**Dept:** Zoning      **Status:** Approved with Conditions      **Reviewer:** Marge Schmuckal      **Approval Date:** 11/17/2009**Note:** **Ok to Issue:** 

- 1) ANY exterior work requires a separate review and approval thru Historic Preservation. This property is located within an Historic District.
- 2) This is NOT an approval for an additional dwelling unit. You SHALL NOT add any additional kitchen equipment including, but not limited to items such as stoves, microwaves, refrigerators, or kitchen sinks, etc. Without special approvals.
- 3) This property shall remain a total of 17 residential condominiums in all of the buildings within the described condominium. Any change of use shall require a separate permit application for review and approval.

**Dept:** Building      **Status:** Approved with Conditions      **Reviewer:** Tom Markley      **Approval Date:** 11/23/2009**Note:** **Ok to Issue:** 

- 1) The installation must comply with the State of Maine Gas Regulations.
- 2) Application approval based upon information provided by applicant. Any deviation from approved plans requires separate review and approval prior to work.

PERMIT ISSUED

NOV 23 2009

City of Portland



FILL IN AND SIGN WITH INK

# APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT

PERMIT ISSUED

NOV 23 2009

City of Portland

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 74 - 1 High Street 396010B01 Use of Building \_\_\_\_\_ Date 11/13/09

Name and address of owner of appliance CHRISTINE HEY/ROBERT THEBERGE  
Same

Installer's name and address CANON + WALTZ, 321 LINCOLN STREET, SO. PORTLAND,  
(JOB # 82846) ME 04106 Telephone 799-2228

### Location of appliance:

- Basement
- Attic
- Floor
- Roof

### Type of Fuel:

- Gas
- Oil
- Solid

Appliance Name: LOCHINVAR KNIGHT KBM285

U.L. Approved  Yes  No

Will appliance be installed in accordance with the manufacture's installation instructions?  Yes  No

IF NO Explain: \_\_\_\_\_

### The Type of License of Installer:

- Master Plumber # \_\_\_\_\_
- Solid Fuel # \_\_\_\_\_
- Oil # \_\_\_\_\_
- Gas # PNT1619
- Other \_\_\_\_\_

### Type of Chimney:

- Masonry Lined  
Factory built \_\_\_\_\_

- Metal  
Factory Built U.L. Listing # \_\_\_\_\_

Direct Vent  
Type PVC UL# \_\_\_\_\_

### Type of Fuel Tank

- Oil
- Gas

Size of Tank NA \_\_\_\_\_

Number of Tanks NA \_\_\_\_\_

Distance from Tank to Center of Flame NA feet.

Cost of Work: \$ 19,000

Permit Fee: \$ \_\_\_\_\_

**RECEIVED**  
NOV 13 2009  
NA  
Dept. of Building Inspections  
City of Portland Maine

### Approved

### Approved with Conditions

Fire: \_\_\_\_\_

Ele.: \_\_\_\_\_

Bldg.: \_\_\_\_\_

See attached letter or requirement

Inspector's Signature

Date Approved

Signature of Installer [Signature]

## Ratings



DOE



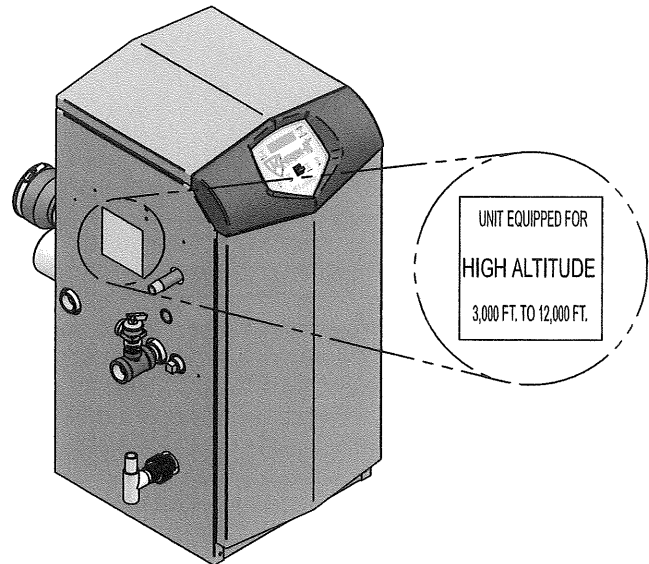
| Knight Boiler<br>I=B=R Rating   |                                      |     |   |   | Other Specifications         |                   |                 |          |                                      |
|---|--------------------------------------|-----|---|---|------------------------------|-------------------|-----------------|----------|--------------------------------------|
| Model Number<br><small>Note: Change "N" to "L" for L.P. gas models.</small> | Input MBH<br><small>(Note 5)</small> |     | Gross Output MBH<br><small>(Note 2,7)</small> | Net I=B=R Ratings Water, MBH<br><small>(Note 3,7)</small> | Boiler Water Content Gallons | Water Connections | Gas Connections | Air Size | Vent Size<br><small>(Note 4)</small> |
|   | Min                                  | Max |   |   |                              |                   |                 |          |                                      |
| KBN080  | 16                                   | 80  | 72  | 63  | 0.6                          | 1"                | 1/2"            | 3"       | 3"                                   |
| KBN105  | 21                                   | 105 | 94  | 82  | 0.7                          | 1"                | 1/2"            | 3"       | 3"                                   |
| KBN150  | 30                                   | 150 | 135   | 117   | 1.3                          | 1"                | 1/2"            | 3"       | 3"                                   |
| KBN210  | 42                                   | 210 | 190   | 165   | 1.7                          | 1"                | 1/2"            | 3"       | 3"                                   |
| KBN285  | 57                                   | 285 | 260   | 226   | 2.4                          | 1-1/4"            | 3/4"            | 4"       | 4"                                   |

**NOTICE**

Maximum allowed working pressure is located on the rating plate.

**Notes:**

- As an Energy Star Partner, Lochinvar has determined that Knight boilers meet the Energy Star guidelines for energy efficiency.
- The ratings are based on standard test procedures prescribed by the United States Department of Energy.
- Net I=B=R ratings are based on net installed radiation of sufficient quantity for the requirements of the building and nothing need be added for normal piping and pickup. Ratings are based on a piping and pickup allowance of 1.15.
- Knight boilers require special gas venting. Use only the vent materials and methods specified in the Knight Installation and Operation Manual.
- Standard Knight boilers are equipped to operate from sea level to 4,500 feet **only** with no adjustments. The boiler will de-rate by 4% for each 1,000 feet above sea level up to 4,500 feet.
- High altitude Knight boilers are equipped to operate from 3,000 to 12,000 feet **only** with no field adjustments. The boiler will de-rate by 2% for each 1,000 feet above 3,000 feet. High altitude models are manufactured with a different control module for altitude operation, but the operation given in this manual remains the same as the standard boilers. A high altitude label (as shown in FIG. A) is also affixed to the unit.
- Ratings have been confirmed by the Hydronics Institute, Section of AHRI.


**Figure A High Altitude Label Location**

# 1 Determine boiler location

## Installation must comply with:

- Local, state, provincial, and national codes, laws, regulations, and ordinances.
- National Fuel Gas Code, ANSI Z223.1 – latest edition.
- Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, when required.
- National Electrical Code.
- For Canada only: B149.1 Installation Code, CSA C22.1 Canadian Electrical Code Part 1 and any local codes.

### NOTICE

The Knight boiler gas manifold and controls met safe lighting and other performance criteria when the boiler underwent tests specified in ANSI Z21.13 – latest edition.

## Before locating the boiler, check:

1. Check for nearby connection to:
  - System water piping
  - Venting connections
  - Gas supply piping
  - Electrical power
2. Locate the appliance so that if water connections should leak, water damage will not occur. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance. The pan must not restrict combustion air flow. Under no circumstances is the manufacturer to be held responsible for water damage in connection with this appliance, or any of its components.
3. Check area around the boiler. Remove any combustible materials, gasoline and other flammable liquids.

### WARNING

Failure to keep boiler area clear and free of combustible materials, gasoline, and other flammable liquids and vapors can result in severe personal injury, death, or substantial property damage.

4. The Knight boiler must be installed so that gas control system components are protected from dripping or spraying water or rain during operation or service.
5. If a new boiler will replace an existing boiler, check for and correct system problems, such as:
  - System leaks causing oxygen corrosion or heat exchanger cracks from hard water deposits.
  - Incorrectly-sized expansion tank.
  - Lack of freeze protection in boiler water causing system and boiler to freeze and leak.

### WARNING

This appliance is certified as an indoor appliance. Do not install the appliance outdoors or locate where the appliance will be exposed to freezing temperatures or to temperatures that exceed 100°F.

Failure to install the appliance indoors could result in severe personal injury, death, or substantial property damage.

### WARNING

This appliance requires a special venting system. The vent connection to the appliance must be made with the starter CPVC pipe section provided with the appliance. The field provided vent fittings must be cemented to the CPVC pipe section. Use only the vent materials, primer and cement specified in this manual to make the vent connections. Failure to follow this warning could result in fire, personal injury, or death.

## Closet and alcove installations

A closet is any room the boiler is installed in which is less than 67 cubic feet for KBN080 and KBN105 models, 86 cubic feet for KBN150 models, 107 cubic feet for KBN210 models, and 120 cubic feet for KBN285 models.

An alcove is any room which meets the criteria for a closet with the exception that it does not have a door.

**Example:** Room dimensions = 4 feet long, 4 feet wide, and 9 foot ceiling = 4 x 4 x 9 = 144 cubic feet. This would be considered a closet for a Knight Boiler.

### WARNING

For closet and alcove installations as shown in FIG.'s 1-1 and 1-2, CPVC vent material must be used inside the structure. The ventilating air openings shown in FIG.'s 1-1 and 1-2 are required for this arrangement. Failure to follow this warning could result in fire, personal injury, or death.

## Provide clearances:

### Clearances from combustible materials

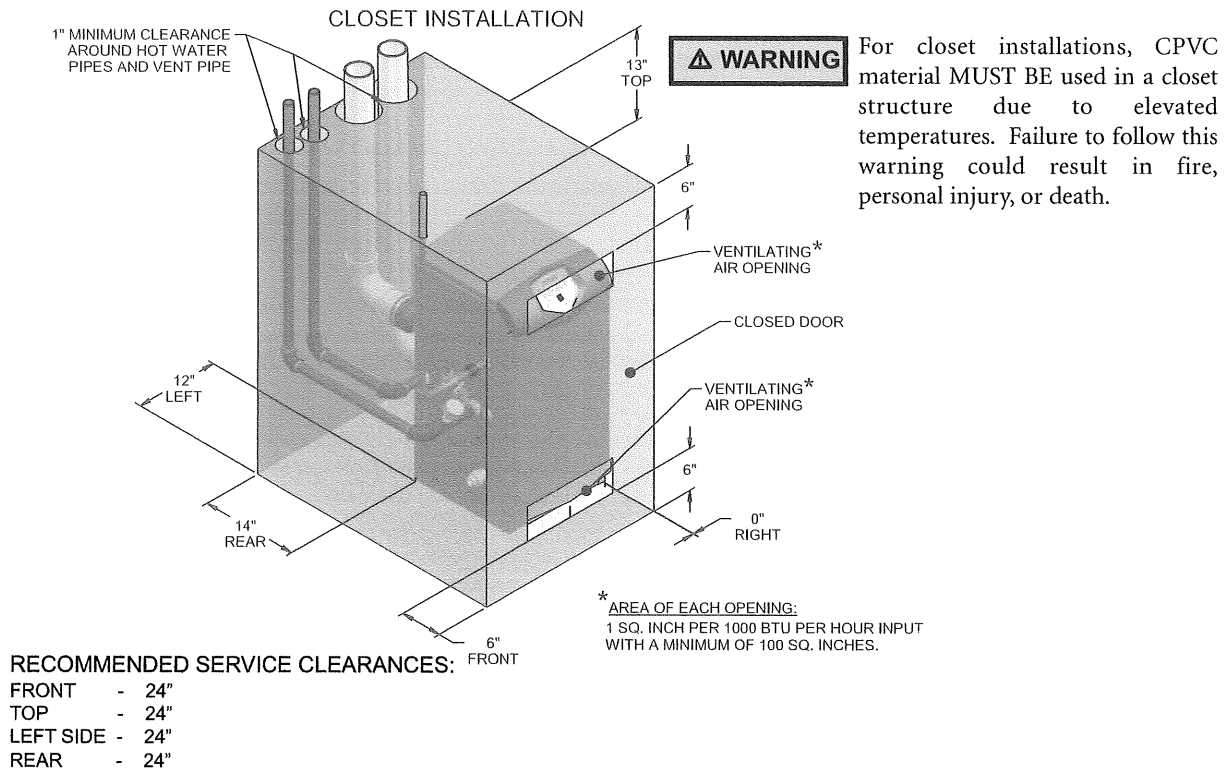
1. Hot water pipes—at least 1" from combustible materials.
2. Vent pipe – at least 1" from combustible materials.
3. See FIG.'s 1-1 and 1-2 on page 9 for other clearance minimums.

### Clearances for service access

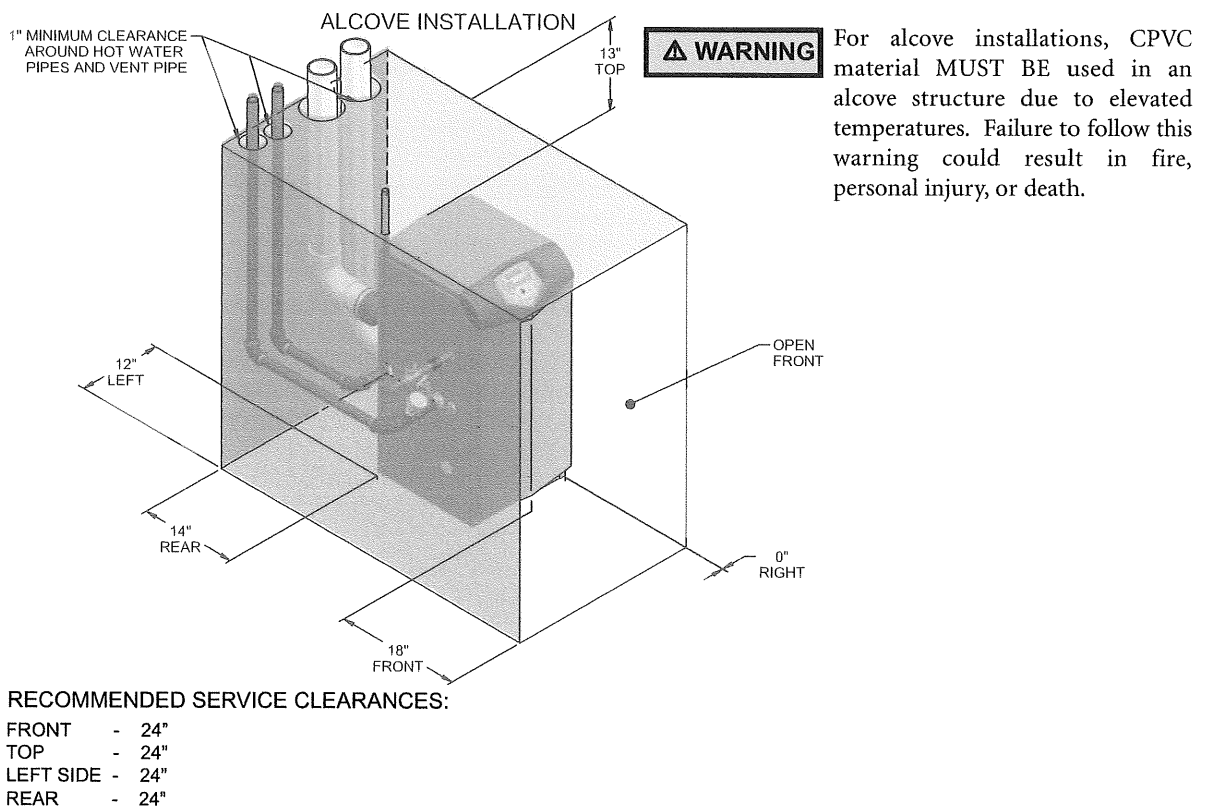
1. See FIG.'s 1-1 and 1-2 on page 9 for recommended service clearances. If you do not provide the minimum clearances shown, it may not be possible to service the boiler without removing it from the space.

# 1 Determine boiler location *(continued)*

**Figure 1-1 Closet Installation - Minimum Required Clearances**

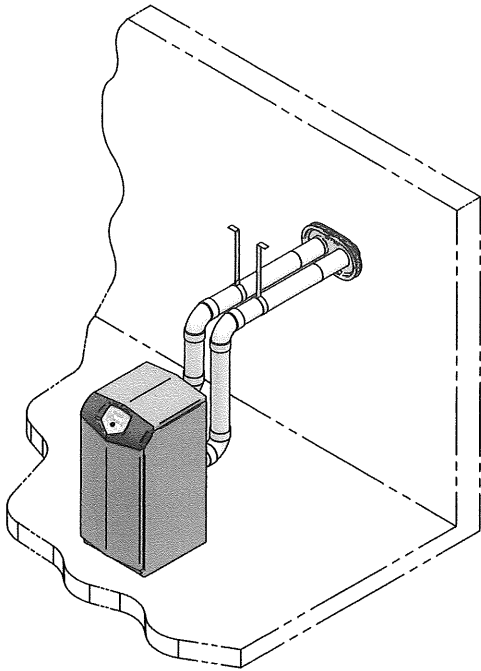


**Figure 1-2 Alcove Installation - Minimum Required Clearances**

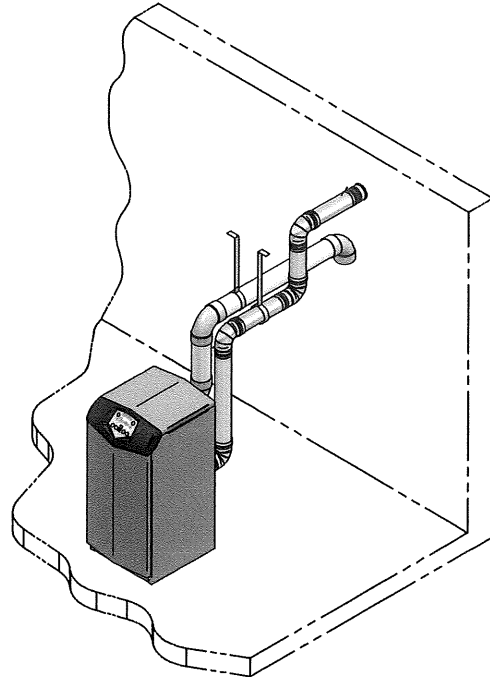


### 3 General venting

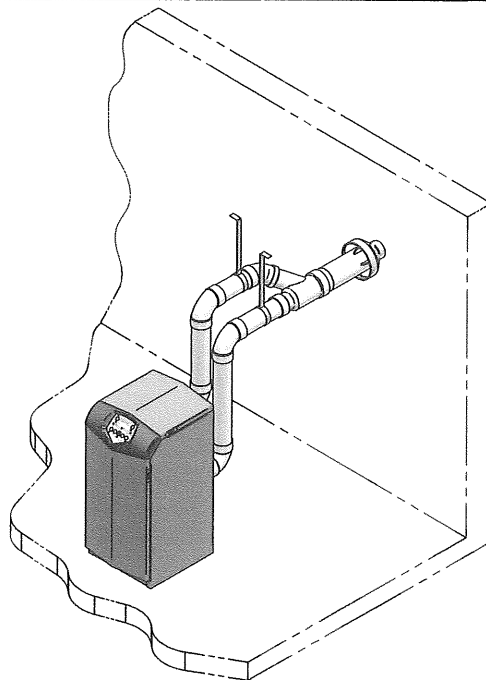
#### Direct venting options - Sidewall Vent



**Figure 3-1** PVC/CPVC Two-Pipe Sidewall Termination - See page 21 for more details



**Figure 3-2** Stainless Steel Two-Pipe - See page 22 for more details

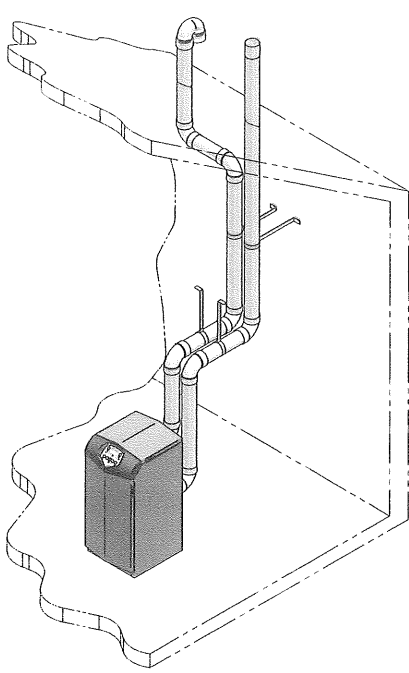


**Figure 3-3** PVC/CPVC Concentric Sidewall Termination - See page 25 for more details

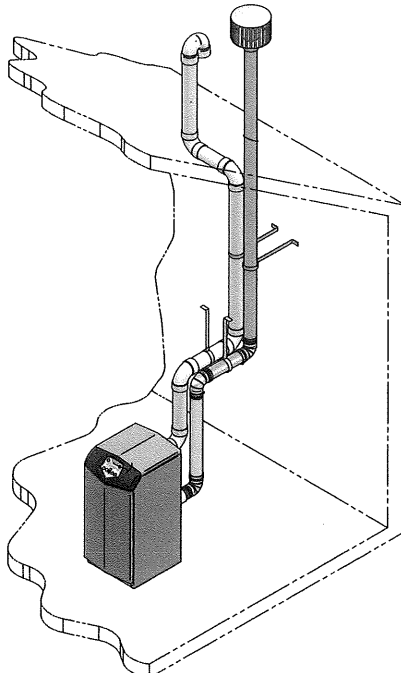


### 3 General venting *(continued)*

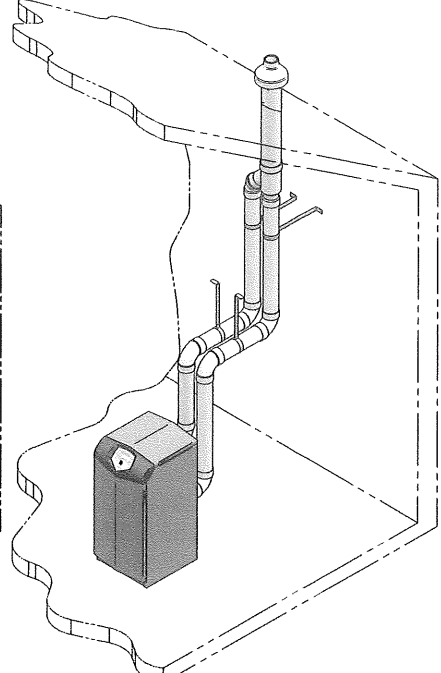
#### Direct venting options - Vertical Vent



**Figure 3-4** PVC/CPVC Two-Pipe Vertical Termination - See page 28 for more details

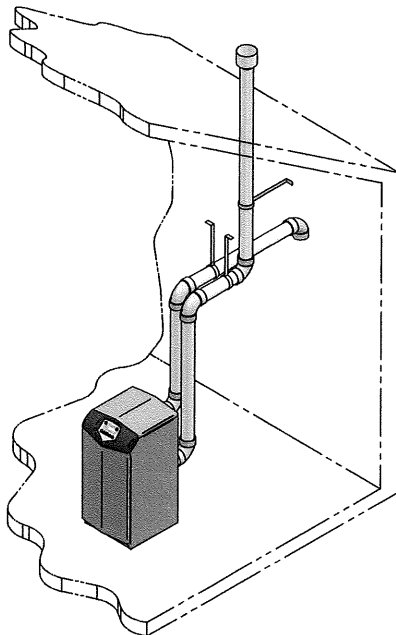


**Figure 3-5** Stainless Steel Two-Pipe Vertical Termination - See page 28 for more details

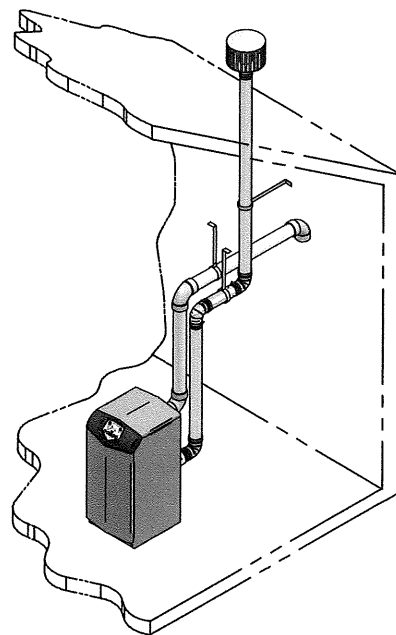


**Figure 3-6** PVC/CPVC Concentric Vertical Termination - See page 30 for more details

#### Direct venting options - Vertical Vent, Sidewall Air



**Figure 3-7** PVC/CPVC Vertical Vent, Sidewall Air - See page 20 for more details



**Figure 3-8** Stainless Steel Vertical Vent, Sidewall Air - See page 20 for more details

**NOTICE**

Stainless steel vent/air design and terminations will vary slightly by manufacturer.

## 3 General venting

### Install vent and combustion air piping

**⚠ DANGER** The Knight boiler must be vented and supplied with combustion and ventilation air as described in this section. Ensure the vent and air piping and the combustion air supply comply with these instructions regarding vent system, air system, and combustion air quality. See also Section 1 of this manual.

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.

#### PVC/CPVC vent piping materials

**⚠ WARNING** Use only the materials listed in Table 3A for vent pipe, and fittings. Failure to comply could result in severe personal injury, death, or substantial property damage.

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

**⚠ WARNING** For closet and alcove installations, CPVC material **MUST BE** used in a closet/alcove structure. Failure to follow this warning could result in fire, personal injury, or death.

**NOTICE** All PVC vent pipes must be glued, properly supported, and the exhaust must be pitched a minimum of a 1/4 inch per foot back to the boiler (to allow drainage of condensate).

**⚠ WARNING** This appliance requires a special venting system. The vent connection to the appliance must be made with the starter CPVC pipe section provided with the appliance if PVC/CPVC vent is to be used. For stainless steel venting use an adapter from Table 3B (pg. 19) that corresponds with the intended vent manufacturer to be used and discard the CPVC starter piece. The field provided vent fittings must be cemented to the CPVC pipe section using an "All Purpose Cement" suitable for PVC and CPVC pipe. Use only the vent materials, primer, and cement specified in this manual to make the vent connections. Failure to follow this warning could result in fire, personal injury, or death.

#### Requirements for installation in Canada

1. Installations must be made with a vent pipe system certified to ULC-S636.  
IPEX is an approved vent manufacturer in Canada supplying vent material listed to ULC-S636.
2. The first three (3) feet of plastic vent pipe from the appliance flue outlet must be readily accessible for visual inspection.
3. The components of the certified vent system must not be interchanged with other vent systems or unlisted pipe/fittings. For concentric vent installations, the inner vent tube must be replaced with field supplied certified vent material to comply with this requirement.
4. The 3" Concentric Vent Kit available from Lochinvar (see Section 4 – *Sidewall Termination – Optional Concentric Vent*) and the 3" Concentric Vent Kit available from IPEX are both approved for use on the Knight boiler. Both kits are listed to the ULC-S636 standard for use in Canada.

**⚠ CAUTION** Improper installation of PVC or CPVC systems may result in injury or death.

#### Installing vent and air piping

**NOTICE** Use only cleaners, primers, and solvents that are approved for the materials which are joined together.

1. Work from the boiler to vent or air termination. Do not exceed the lengths given in this manual for the air or vent piping.
2. Cut pipe to the required lengths and deburr the inside and outside of the pipe ends.
3. Chamfer outside of each pipe end to ensure even cement distribution when joining.
4. Clean all pipe ends and fittings using a clean dry rag. (Moisture will retard curing and dirt or grease will prevent adhesion.)
5. Dry fit vent or air piping to ensure proper fit up before assembling any joint. The pipe should go a third to two-thirds into the fitting to ensure proper sealing after cement is applied.

### 3 General venting *(continued)*

6. Priming and Cementing:
  - a. Handle fittings and pipes carefully to prevent contamination of surfaces.
  - b. Apply a liberal even coat of primer to the fitting socket.
  - c. Apply a liberal even coat of primer to the pipe end to approximately 1/2" beyond the socket depth.
  - d. Apply a second primer coat to the fitting socket.
  - e. While primer is still wet, apply an even coat of approved cement to the pipe equal to the depth of the fitting socket.
  - f. While primer is still wet, apply an even coat of approved cement to the fitting socket.
  - g. Apply a second coat of cement to the pipe.
  - h. While the cement is still wet, insert the pipe into the fitting, if possible twist the pipe a 1/4 turn as you insert it. **NOTE:** If voids are present, sufficient cement was not applied and joint could be defective.
  - i. Wipe excess cement from the joint removing ring or beads as it will needlessly soften the pipe.

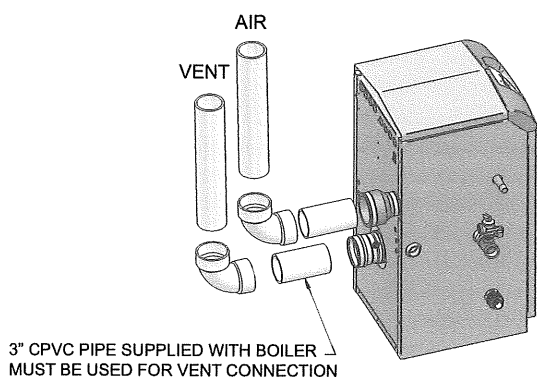
**Table 3A** Vent Pipe, and Fittings

| All vent pipe materials and fittings must comply with the following: |                  |                                |   |
|--|------------------|--------------------------------|---|
| Item   | Material         | Standards for installation in: |   |
|  |                  | United States                  | Canada  |
| Vent pipe and fittings   | PVC schedule 40  | ANSI/ASTM D1785                | CPVC and PVC venting must be ULC-S636 Certified. IPEX is an approved manufacturer in Canada supplying vent material listed to ULC-S636. |
|  | PVC-DWV          | ANSI/ASTM D2665                |   |
|  | CPVC schedule 40 | ANSI/ASTM F441                 |   |
|  | AL29-4C          | UL1738                         |   |
| Pipe cement/primer   | PVC              | ANSI/ASTM D2564                | IPEX System 636 Cements & Primers   |
|  | CPVC             | ANSI/ASTM F493                 |   |
| <b>NOTICE: DO NOT USE CELLULAR (FOAM) CORE PIPE</b>                  |                  |                                |   |
| <b>Approved Stainless Steel Vent Manufacturers</b>                   |                  |                                |   |
| <b>Make</b>  |                  | <b>Model</b>                   |   |
| ProTech Systems (Simpson Dura-Vent Co.)                              |                  | FasNSeal Vent                  |   |
| Z-Flex (Nova Flex Group)   |                  | Z-Vent                         |   |
| Heat Fab (Selkirk Corporation)                                       |                  | Saf-T Vent                     |   |

#### PVC/CPVC air intake/vent connections

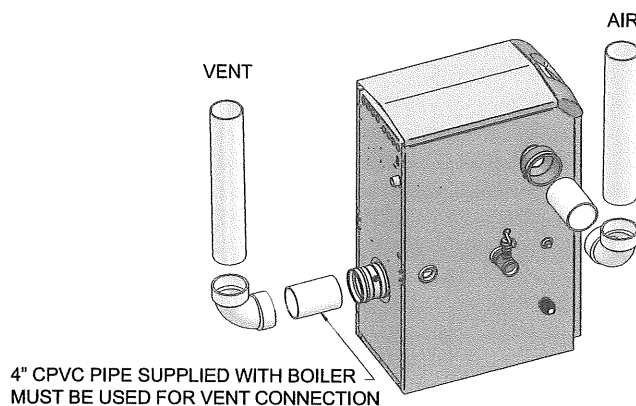
1. **Combustion Air Intake Connector** (FIG.'s 3-9 and 3-10) - Used to provide combustion air directly to the unit from outdoors. A fitting is provided on the unit for final connection. Combustion air piping must be supported per guidelines listed in the National Mechanical Code, Section 305, Table 305.4 or as local codes dictate.
2. **Vent Connector** (FIG.'s 3-9 and 3-10) - Used to provide a passageway for conveying combustion gases to the outside. A transition fitting is provided on the unit for final connection. Vent piping must be supported per the National Building Code, Section 305, Table 305.4 or as local codes dictate.

**Figure 3-9** Near Boiler PVC/CPVC Venting Models 80 - 210



NOTE: CPVC VENT PIPE AND VENT FITTINGS MUST BE USED IN CLOSET AND ALCOVE INSTALLATIONS.

**Figure 3-10** Near Boiler PVC/CPVC Venting Model 285



NOTE: CPVC VENT PIPE AND VENT FITTINGS MUST BE USED IN CLOSET AND ALCOVE INSTALLATIONS.

### 3 General venting

#### Air inlet pipe materials:

The air inlet pipe(s) must be sealed. Choose acceptable combustion air inlet pipe materials from the following list:

- PVC, CPVC or ABS
- Dryer Vent or Sealed Flexible Duct (not recommended for rooftop air inlet)
- Galvanized steel vent pipe with joints and seams sealed as specified in this section.
- Type “B” double-wall vent with joints and seams sealed as specified in this section.
- AL29-4C, stainless steel material to be sealed to specification of its manufacturer.

\*Plastic pipe may require an adapter (not provided) to transition between the air inlet connection on the appliance and the plastic air inlet pipe.

**⚠ WARNING** Using vent or air intake materials other than those specified, failure to properly seal all seams and joints or failure to follow vent pipe manufacturer’s instructions can result in personal injury, death or property damage. Mixing of venting materials will void the warranty and certification of the appliance.

**NOTICE** The use of double-wall vent or insulated material for the combustion air inlet pipe is recommended in cold climates to prevent the condensation of airborne moisture in the incoming combustion air.

Sealing of Type “B” double-wall vent material or galvanized vent pipe material used for air inlet piping on a sidewall or vertical rooftop Combustion Air Supply System:

- a. Seal all joints and seams of the air inlet pipe using either Aluminum Foil Duct Tape meeting UL Standard 723 or 181A-P or a high quality UL Listed silicone sealant such as those manufactured by Dow Corning or General Electric.
- b. Do not install seams of vent pipe on the bottom of horizontal runs.
- c. Secure all joints with a minimum of three sheet metal screws or pop rivets. Apply Aluminum Foil Duct Tape or silicone sealant to all screws or rivets installed in the vent pipe.
- d. Ensure that the air inlet pipes are properly supported.

The PVC, CPVC, or ABS air inlet pipe should be cleaned and sealed with the pipe manufacturer’s recommended solvents and standard commercial pipe cement for the material used. The PVC, CPVC, ABS, Dryer Vent or Flex Duct air inlet pipe should use a silicone sealant to ensure a proper seal at the appliance connection and the air inlet cap connection. Dryer vent or flex duct should use a screw type clamp to seal the vent to the appliance air inlet and the air inlet cap. Proper sealing of the air inlet pipe ensures that combustion air will be free of contaminants and supplied in proper volume.

When a sidewall or vertical rooftop combustion air supply system is disconnected for any reason, the air inlet pipe must be resealed to ensure that combustion air will be free of contaminants and supplied in proper volume.

**⚠ DANGER** Failure to properly seal all joints and seams as required in the air inlet piping may result in flue gas recirculation, spillage of flue products and carbon monoxide emissions causing severe personal injury or death.

#### Stainless steel vent

This product has been approved for use with stainless steel using the manufacturers listed in Table 3A.

**⚠ WARNING** Use only the materials, vent systems, and terminations listed in Table 3B. DO NOT mix vent systems of different types or manufacturers, unless listed in this manual. Failure to comply could result in severe personal injury, death, or substantial property damage.

**NOTICE** Installations must comply with applicable national, state, and local codes. Stainless steel vent systems must be listed as a UL-1738 approved system for the United States and a ULC-S636 approved system for Canada.

**NOTICE** Installation of a stainless steel vent system should adhere to the stainless steel vent manufacturer’s installation instructions supplied with the vent system.

**NOTICE** The installer must use a specific vent starter adapter at the flue collar connection, supplied by the vent manufacturer to adapt to its vent system. See Table 3B for approved vent adapters. Discard CPVC starter piece.

### 3 General venting *(continued)*

#### Stainless steel air intake/vent connections

1. **Combustion Air Intake Connector** (FIG. 3-11) - Used to provide combustion air directly to the unit from outdoors. A fitting is provided on the unit for final connection. Combustion air piping must be supported per guidelines listed in the National Mechanical Code, Section 305, Table 305.4 or as local codes dictate.
2. **Vent Connector** (FIG. 3-11) - Used to provide a passageway for conveying combustion gases to the outside. A transition fitting is provided on the unit for final connection. Vent piping must be supported per the National Building Code, Section 305, Table 305.4 or as local codes dictate.

Figure 3-11 Near Boiler Stainless Steel Venting Model 285

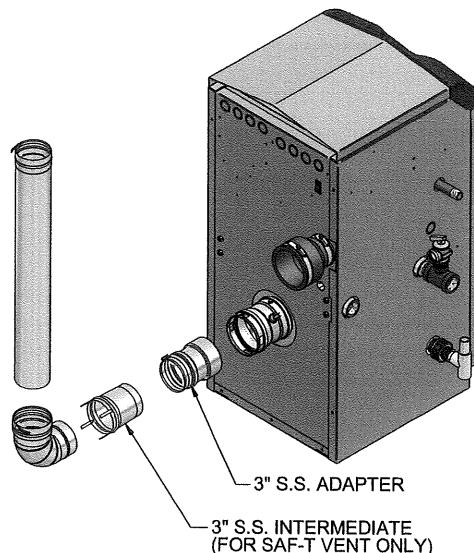


Table 3B Approved Stainless Steel Terminations and Adapters

| Model    | ProTech        |                      |                        | Heat Fab       |                      |                  |                        | Z Flex         |                       |                        |
|----------|----------------|----------------------|------------------------|----------------|----------------------|------------------|------------------------|----------------|-----------------------|------------------------|
|          | FasNSeal       |                      |                        | Saf-T Vent     |                      |                  |                        | Z-Vent         |                       |                        |
|          | Boiler Adapter | Flue Termination     | Intake Air Termination | Boiler Adapter | Intermediate Adapter | Flue Termination | Intake Air Termination | Boiler Adapter | Flue Termination      | Intake Air Termination |
| 80 - 210 | 300715         | FSBS3<br>FSRC3(R.C)  | 303889                 | KB80210        | 9353BUREZ-1*         | 9392<br>5300CI   | 9314TERM               | 2SVSLA03       | 2SVSTP03<br>2SVSRCX03 | 2SVSTEX0390            |
| 285      | F303759        | FSBS4<br>FSRC4(R.C.) | FSAIH04<br>303888      | KB285600       | 9454BUREZ-1*         | 9492<br>5400CI   | 9414TERM               | 2SVSLA04       | 2SVSTP04<br>2SVSRCX04 | 2SVSTEX0490            |

\* = This adapter must be used in addition to the boiler adapter for Saf-T vent pipe as shown in FIG. 3-11, unless approved vent other than standard diameter is used. Consult a Heat Fab representative for questions.

The Knight boiler uses model specific combustion air intake and vent piping sizes as detailed in Table 3C below.

Table 3C Air Intake/Vent Piping Sizes

| Model    | Air Intake | Vent     |
|----------|------------|----------|
| 80 - 210 | 3 inches   | 3 inches |
| 285      | 4 inches   | 4 inches |

**NOTICE**

Increasing or decreasing combustion air or vent piping is not authorized.

**Minimum / Maximum allowable combustion air and vent piping lengths are as follows:**

**Combustion Air** = 12 equivalent feet minimum / 100 equivalent feet maximum

**Vent** = 12 equivalent feet minimum / 100 equivalent feet maximum

When determining equivalent combustion air and vent length, add 5 feet for each 90° elbow and 3 feet for each 45° elbow.

**EXAMPLE:** 20 feet of PVC pipe + (4) 90° elbows + (2) 45° elbows + (1) concentric vent kit (CVK3003) = 49 equivalent feet of piping.

**NOTICE**

The appliance output rating will reduce by up to 1.5% for each 25 feet of vent length.

### 3 General venting

**Table 3D Concentric Vent Kit Equivalent Vent Lengths**

| Model    | Kit Number | Equivalent Vent Length |
|----------|------------|------------------------|
| 80 - 210 | CVK3003    | 3 feet                 |
| 285      | CVK3007    | 3 feet                 |

#### Removing from existing vent

Follow the instructions in Section 1, page 12 of this manual when removing a boiler from an existing vent system.

#### Vent and air piping

##### Vent and air system:

#### NOTICE

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

You must also install air piping from outside to the boiler air intake adapter. The resultant installation is direct vent (sealed combustion).

You may use any of the vent/air piping methods covered in this manual. Do not attempt to install the Knight boiler using any other means.

#### WARNING

DO NOT mix components from different systems. The vent system could fail, causing leakage of flue products into the living space. Use only approved stainless steel, PVC or CPVC pipe and fittings. For PVC/CPVC use with primer and cement specifically designed for the material used.

#### Vent, air piping and termination:

The Knight boiler vent and air piping can be installed through the roof or through a sidewall. Follow the procedures in this manual for the method chosen. Refer to the information in this manual to determine acceptable vent and air piping length.

#### Optional room air

#### NOTICE

Optional room air is intended for commercial applications. Combustion air piping to the outside is recommended for residential applications.

Commercial applications utilizing the Knight boiler may be installed with a single pipe carrying the flue products to the outside while using combustion air from the equipment room. In order to use the room air venting option the following conditions and considerations must be followed.

- The unit **MUST** be installed with the appropriate room air kit (Table 3E).
- The equipment room **MUST** be provided with properly sized openings to assure adequate combustion air. Please refer to instructions provided with the room air kit.

- There will be a noticeable increase in the noise level during normal operation from the inlet air opening.
- Using the room air kit makes the unit vulnerable to combustion air contamination from within the building. Please review Section 1, Prevent Combustion Air Contamination, to ensure proper installation.
- Vent system and terminations must comply with the standard venting instructions set forth in this manual.

#### WARNING

When utilizing the single pipe method, provisions for combustion and ventilation air must be in accordance with Air for Combustion and Ventilation, of the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CGA Standard B149 Installation Code for Gas Burning Appliances and Equipment, or applicable provisions of the local building codes.

**Table 3E Optional Room Air Kit**

| Model    | Kit Number |
|----------|------------|
| 80 - 210 | KIT30052   |
| 285      | KIT30053   |

#### Air contamination

Pool and laundry products and common household and hobby products often contain fluorine or chlorine compounds. When these chemicals pass through the boiler, they can form strong acids. The acid can eat through the boiler wall, causing serious damage and presenting a possible threat of flue gas spillage or boiler water leakage into the building.

Please read the information given in Table 1A, page 11, listing contaminants and areas likely to contain them. If contaminating chemicals will be present near the location of the boiler combustion air inlet, have your installer pipe the boiler combustion air and vent to another location, per this manual.

#### WARNING

If the boiler combustion air inlet is located in a laundry room or pool facility, for example, these areas will always contain hazardous contaminants.

#### WARNING

To prevent the potential of severe personal injury or death, check for areas and products listed in Table 1A, page 11 before installing the boiler or air inlet piping.

If contaminants are found, you **MUST**:

- Remove contaminants permanently.
- OR—
- Relocate air inlet and vent terminations to other areas.