

## VENTING APPLICATION GUIDE

### Natural Gas or Propane Modulating & Condensing Boilers and Water Heaters

Applies to the following models:

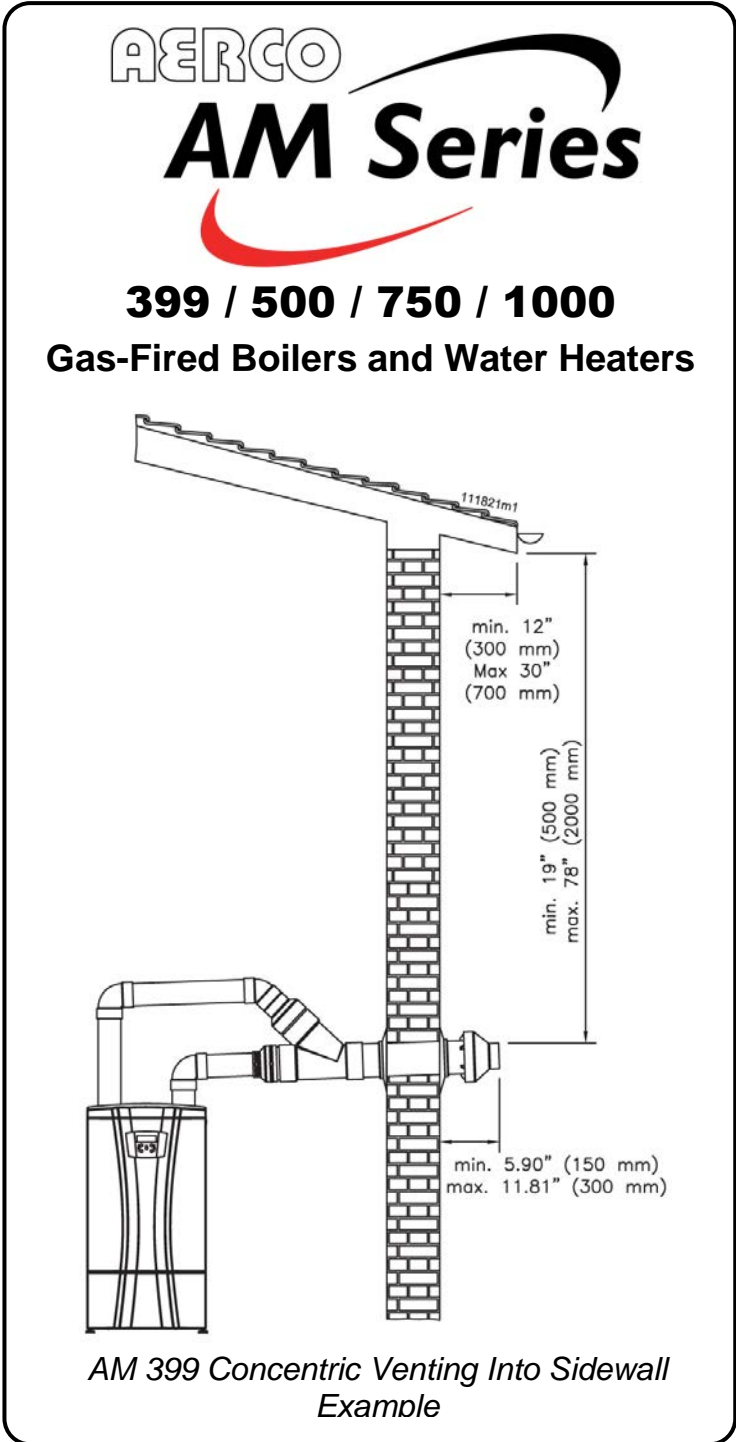
#### Boilers

- AM 399B
- AM 500B
- AM 750B
- AM 1000B



#### Water Heaters

- AM 399W
- AM 500W
- AM 750W
- AM 1000W



04/08/2014

**DISCLAIMER**

The information contained in this manual is subject to change without notice from AERCO International, Inc. AERCO makes no warranty of any kind with respect to this material, including, but not limited to, implied warranties of merchantability and fitness for a particular application. AERCO International is not liable for errors appearing in this manual, nor for incidental or consequential damages occurring in connection with the furnishing, performance, or use of these materials.



**AERCO Technical Support:**  
 (Mon–Fri, 8am-5pm EST)  
**1 (800) 526-0288**

**AERCO Document Conventions**

In this document, some types of information are presented as shown in the following examples:

Message Type	Example and Description
Notes	<p style="text-align: center;"><b>NOTE</b></p> <p><b>NOTE</b> messages indicate specific information related to the surrounding contextual information, and highlighted for special attention.</p>
Cautions	<p style="text-align: center;"><b>CAUTION!</b></p> <p><b>CAUTION</b> messages inform of potential problems relating to the functioning of equipment, safety to persons, harm to the environment, and/or damage to property or equipment.</p>
Warnings	<p style="text-align: center;"><b>WARNING!</b></p> <p><b>WARNING</b> messages warn of potential dangerous situations that may result in serious injury and/or death to persons or animals. Text is red within a red box.</p>
Instructions	<p style="text-align: center;"><b><u>How Instructions are Presented</u></b></p> <ol style="list-style-type: none"> <li>1. Instructions are shown in a blue box with an underlined title.</li> <li>2. All text, excepting in accompanying illustrations, is colored blue.</li> <li>3. All procedures are listed in steps starting with “1.” and using letters [a), b), c), etc.] indicating sub=steps.</li> <li>4. Steps that are continued on the next page have a “(Cont.)” appended to the instruction title.</li> </ol>

**Table of Contents**

**Table of Contents ..... 3**

**1. CODES, SAFETY, AND VENTING SYSTEMS ..... 4**

    1.1. APPLICABLE FEDERAL CODES ..... 4

    1.2. GAS VENT CATAGORIES ..... 5

    1.3. CERTIFIED VENTING MATERIALS FOR FLUE PIPE SYSTEMS..... 5

        1.3.1. OPTION 1: AL29-4C Stainless Steel ..... 5

        1.3.2. OPTION 2: VP1738A Stainless Steel..... 5

        1.3.3. OPTION 3: Polypropylene..... 5

        1.3.4. OPTION 4: PVC/CPVC (Use Schedule 40 or thicker, Single-Wall, Uninsulated Pipes) 6

    1.4. FACTORY SUPPLIED INLET AND VENT CONNECTION COMPONENTS.... 6

        1.4.1. Flue Exhaust Piping Starter Pieces .....Error! Bookmark not defined.

**2. COMBUSTION AIR SYSTEM..... 7**

    2.1. COMBUSTION AIR REQUIREMENTS..... 7

    2.2. COMBUSTION AIR PIPE SIZING ..... 10

    2.3. COMMON COMBUSTION AIR PIPE SIZING ..... 11

**3. VENT SYSTEM..... 13**

    3.1. VENT INSTALLATION ..... 13

    3.2. INSTALLATION PROCEDURE FOR VENTING SYSTEM THROUGH WALLS15

    3.3. INSTALLATION PROCEDURE FOR VERTICAL VENTING ..... 17

    3.4. VENT PIPING SIZE..... 18

    3.5. COMMON VENT PIPING SIZE..... 19

## 1. CODES, SAFETY, AND VENTING SYSTEMS

### 1.1. APPLICABLE FEDERAL CODES

<b><u>United States:</u></b>	
NFPA 54/ANSI Z223.1:	National Fuel Gas Code
NFPA/ANSI 211:	Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances
<b><u>Canada:</u></b>	
CAN1-B149.1:	Installation Codes for Gas-Burning Equipment
B149.2:	Installation Codes for Gas-Burning Equipment

The above listed codes contain information for gas vented appliances requiring Category II, III and IV, vent sizing, location, air space clearances to combustibles and safe installation practices. The gas vent installer must be familiar with the above codes, as well as Local Codes and Regulations.

**WARNING!**

All installations of boilers and venting should be done only by qualified venting systems personnel and in accordance with the manufacturer's recommendations. Installing or venting a boiler or any other gas appliance with improper methods or materials may result in serious injury or death due to fire or to asphyxiation from poisonous gases (carbon monoxide is odorless and invisible).

**WARNING!**

- For correct installation of vent system, read all of these instructions and refer to the vent pipe manufacturer's instructions.
- Failure to use the venting system described in this document will void the manufacturer's warranty and may result in rapid deterioration of the venting system, creating a potential health hazard.
- Faulty vent installation can allow toxic fumes to be released into living areas. This may cause serious bodily injury or property damage. Improper assembly may also affect vent performance.

Install separate vents for forced exhaust appliances and natural draft appliances. A common vent between natural draft and forced exhaust appliances may cause toxic gases to exhaust through the natural draft appliance rather than to outside air. Breathing exhaust gases will cause serious personal injury or death.

## 1.2. GAS VENT CATEGORIES

The AM Series is approved for a Category IV vent configuration as well as for sealed combustion installations. Make provisions for combustion and ventilation air in accordance with Section 5.3, (Air for Combustion and Ventilation) of the National Fuel Gas Code - ANSI Z223.1, or Sections 7.2, 7.3, or 7.4 of CAN/CGA B149, Installation Codes, or applicable provisions of the local building codes.

Federal Codes have categorized gas appliances by the vented flue gas pressure and temperature:

- **Category I**, being a gas appliance that operates with a *non-positive* vent (or natural drafted vent) connector with a flue gas pressure and temperature *at least* 140°F (60°C) above its dew point.
- **Category II**, being a gas appliance that operates with a *non-positive* vent (or natural drafted vent) connector with a flue gas pressure and temperature *less than* 140°F (60°C) above its dew point.
- **Category III**, being a gas appliance that operates with a *positive* vent (fan forced vent) connector with a flue gas pressure and temperature *at least* 140°F (60°C) above its dew point.
- **Category IV**, being a gas appliance that operates with a *positive* vent (fan forced vent) connector with a flue gas pressure and temperature *less than* 140°F (60°C) above its dew point.
- **Direct Vent**, a gas appliance is constructed and installed so that all air for combustion is derived directly from the outdoors and all flue gases are discharged to the outdoors.

## 1.3. CERTIFIED VENTING MATERIALS FOR FLUE PIPE SYSTEMS

Acceptable materials and manufacturers for flue vent pipe systems are listed in Sections 1.3.1 to 1.3.4 (Option #1 to Option #4).

The Vent Pipe Systems in the following section are used for venting gas burning Category IV appliances. Do not use these vent pipe systems for venting appliances burning fuels such as wood, coal, oil or kerosene.

Maintain clearances from combustible construction for boiler, vent connector, and steam and hot-water pipes.

Do not use these vent pipe systems for incinerators of any kind.

Do not vent AM Series systems using the same vent piping as being used for other boiler types, such as, but not limited to, Benchmark or Modulex boiler systems.

### 1.3.1. OPTION 1: AL29-4C Stainless Steel

- Security Chimneys International, Secure Seal, SS, SSD, and SSID (available through AERCO)
- Flex-L International Inc., StaR 34 Vent
- Heat-Fab Inc., Saf-T Vent
- Protech System Inc., Fas N Seal Vent
- Metal-Fab Inc., Corr/Guard Vent
- Z-Flex Z-Vent

### 1.3.2. OPTION 2: VP1738A Stainless Steel

- Van-Packer Company, Inc., Model CS Special Gas Vent

### 1.3.3. OPTION 3: Polypropylene

- Centrotherm ECO Systems, InnoFlue Single Wall Commercial
- DuraVent, Polypro Commercial

### **1.3.4. OPTION 4: PVC/CPVC (Use Schedule 40 or thicker, Single-Wall, Uninsulated Pipes)**

When using Non-Metallic (Plastic) vent systems for Canadian installations, per CSA B149.1, use vent systems that are certified to the Standard for Type BH Gas Venting Systems, ULC-S636. The plastic components, primers and glues of the certified vent system must be from a single system manufacturer and not inter-mixed with other manufacturers vent system parts.

#### **1. PVC**

- ASTM F891
- ASTM D2665
- ASTM D1785
- ASTM D2241

#### **2. CPVC**

- ASTM D2846
- ASTM F441
- ASTM F442

### **1.4. FACTORY SUPPLIED INLET AND VENT CONNECTION COMPONENTS**

All units are supplied with the appropriately sized PVC starter piece for venting. For starter pieces intended for polypropylene or AL29-4C venting, contact the vent manufacturer directly.

**2. COMBUSTION AIR SYSTEM**

Air openings to combustion area must not be obstructed. Using Table 3, air openings may be specified so that adequate combustion air can be maintained.

**2.1. COMBUSTION AIR REQUIREMENTS**

- Non-Motorized louvers and grilles must be fixed in an open position.
- Minimum screens mesh size shall not be smaller than 1/4" mesh.

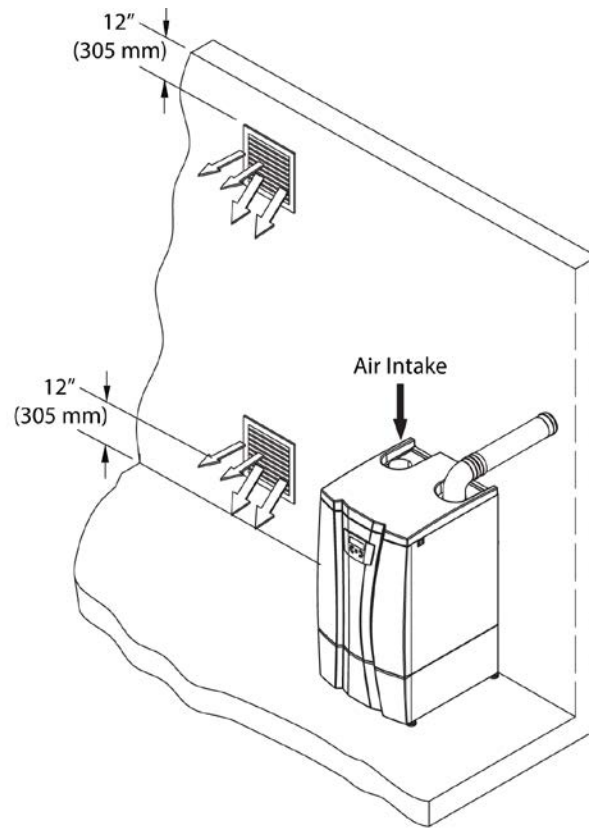
Table 3 shows the minimum required air openings in square inches freely communicating with the outdoors for boiler room combustion and ventilation air for each boiler. For multiple boiler installations, sum the openings for the specific boiler sizes.

**Table 3: Minimum Required Air Openings Freely Communicating With the Outdoors for Boiler Room Combustion & Ventilation Air**

Model No.	Two Sealed Combustion or Vertical Ducts <u>Each</u> having an opening in sq. in. (sq.cm) of:	Two Horizontal Ducts <u>Each</u> having an opening in square inches of	Single Permanent Opening
<b>Boilers and Water Heaters</b>			
<b>AM 399</b>	100 in <sup>2</sup>	200 in <sup>2</sup>	133 in <sup>2</sup>
<b>AM 500</b>	125 in <sup>2</sup>	250 in <sup>2</sup>	167 in <sup>2</sup>
<b>AM 750</b>	188 in <sup>2</sup>	375 in <sup>2</sup>	250 in <sup>2</sup>
<b>AM 1000</b>	250 in <sup>2</sup>	500 in <sup>2</sup>	333 in <sup>2</sup>

- The combustion air must be free of chlorine, halogenated hydrocarbons or other chemicals that can become hazardous when used in gas-fired equipment. Common sources of these compounds are swimming pools, degreasing compounds, plastic processing, and refrigerants. Whenever the environment contains these types of chemicals, combustion air **MUST** be supplied from a clean area outdoors for the protection and longevity of the equipment and warranty validation.
- Ventilation of the boiler room must be adequate enough to provide sufficient air to properly support combustion.
- When combustion air is brought from outside the building, the boiler room shall be provided with two permanent openings, one commencing 12 inches from the top and one commencing within 12 inches from the bottom of the room (see Figure 2). The openings shall communicate directly, or by ducts, freely with the outdoors. One of the following methods must be made to provide adequate air for ventilation and combustion.
  - When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the room.
  - When communicating with the outdoors by means of vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per total input rating of all appliances in the room.

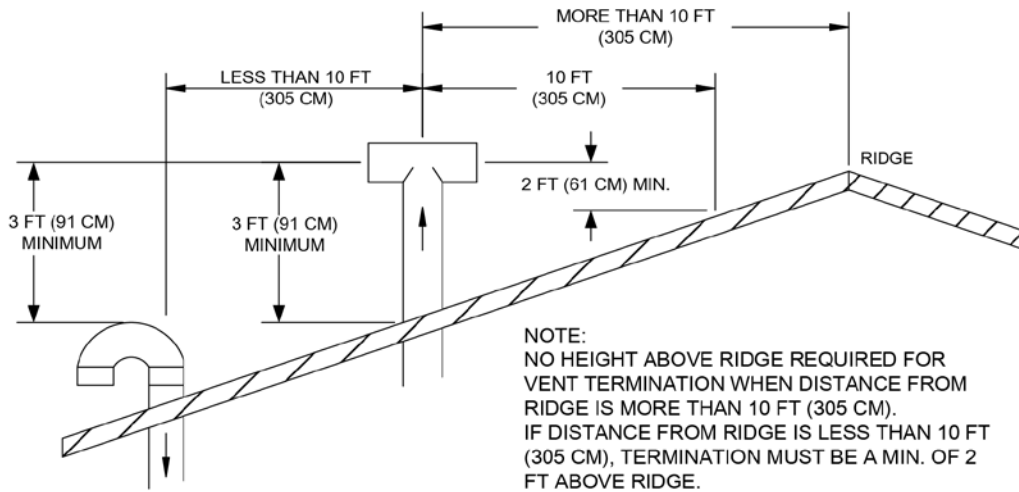
- If horizontal ducts are used, each opening and duct shall have a minimum free area of 1 square inch per 2,000 BTU per hour of total input rating of all appliances in the room.



**Figure 2: Combustion-Air Makeup-Air Vent Location**

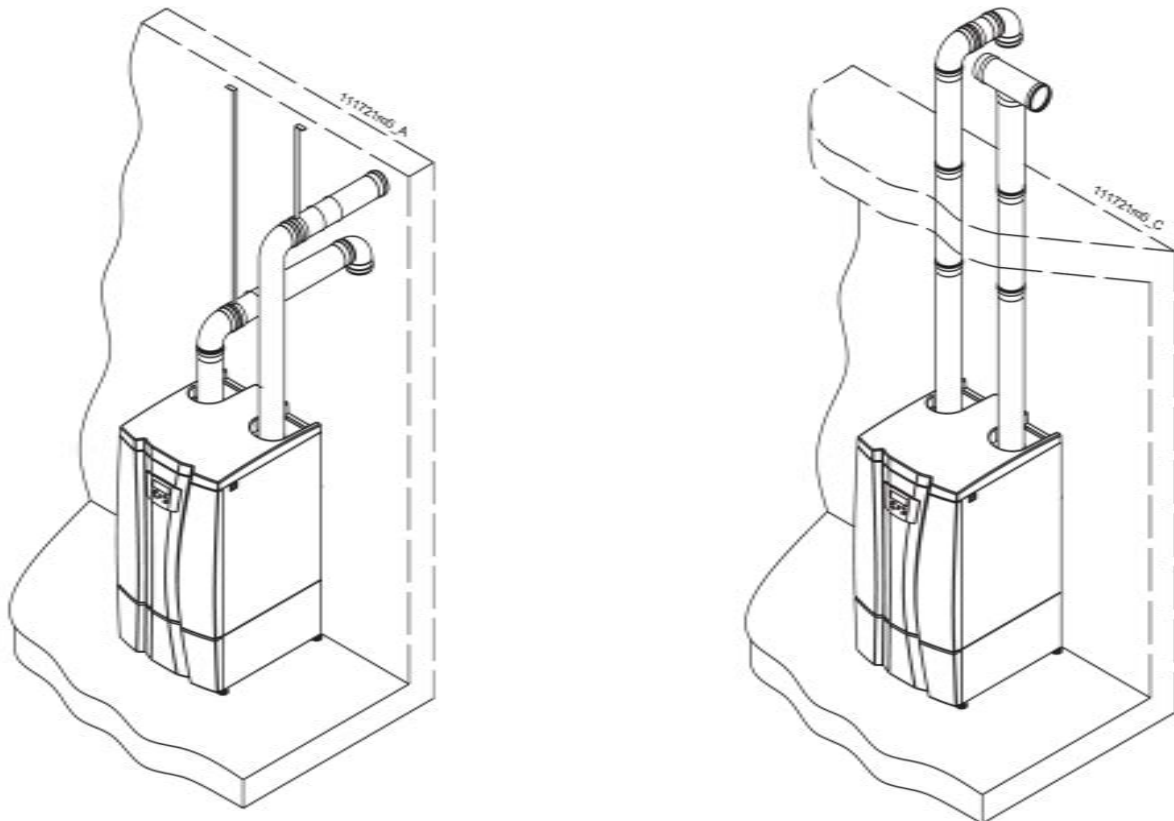
- When calculating free area using louvers and grilles, the required size of the openings for combustion, ventilation, and dilution air shall be based on the total free area of each opening.
- If the free area through a designed louver or grille is known, it shall be used in calculating the size of the opening required to provide the free area specified.
- If the louver and grille design free areas are not known, the following will be assumed for wooden louvers a 25 percent free area, and for metal louvers and grilles a 75 percent free area opening.
- When terminating the combustion air through the roof:
  - Combustion air inlet must be 3 ft. below any vent outlet within 10 ft. See Figure 3.
  - Combustion air inlet must also face away from the vent outlet. See Figure 3.





**Figure 3: Combustion Air Roof Termination Locations**

- All inlet air ducts must be sealed air tight.
- When using sealed combustion, the combustion air inlet and vent outlet must be located on the same surface (same wall, roof, etc.). See Figures 4. This is required so that equal pressure zones are acting on both the air inlet and vent outlet. This makes the installation a balanced vent system, which helps maintain stable combustion characteristics.



**Figure 4: Sealed Combustion Air Inlet and Vent Outlet Locations (Wall & Roof)**

## 2.2. COMBUSTION AIR PIPE SIZING

The maximum length is the combined length of straight horizontal and vertical runs, and the equivalent straight length of fittings. The required lengths for each boiler are shown in Tables 4 and 5, below.

**Table 4: Required and Maximum Combustion Air Run Lengths**

	<b>AM 399</b>	<b>AM 500</b>	<b>AM 750</b>	<b>AM 1000</b>
<b>Number of Modules</b>	2	2	3	4
<b>Combustion Air Diameter</b>	4"		6"	
<b>Maximum Combustion Air Equivalent Feet (Meters)</b>	60 ft.			

**Table 5: Maximum Combustion Air Run Lengths**

<b>Model No.</b>	<b>Pipe Diameter</b>	<b>Equivalent Pipe Lengths Examples</b>			<b>Maximum Length Equivalent Ft (m)</b>
		<b>Sharp 90° Elbow Equiv. Ft (m)</b>	<b>Sweep 90° Elbow Equiv. Ft (m)</b>	<b>45° Elbow Equiv. Ft (m)</b>	
<b>AM 399 AM 500</b>	4" (102 mm)	10 ft. (3.05 m)	5 ft. (1.5 m)	5 ft. (1.5 m)	60 ft. (30.5 m)
<b>AM 750 AM 1000</b>	6" (152 mm)	10 ft. (3.05 m)	5 ft. (1.5 m)	5 ft. (1.5 m)	60 ft. (30.5 m)

The maximum pressure drop of the vent is also 60 equivalent feet (30.5 m). See Section 3.4. Note that this does **NOT** mean the allowed combined pressure drop between the vent and combustion air is 120 equivalent feet (61 m). That is, the vent cannot go above 60 equivalent feet (30.5 m), even if the combustion air is less than 60 equivalent feet, and vice versa.

**Examples:**

1. **Acceptable:**

A 30 foot length of combustion air pipe and 1 sharp 90° elbow plus two termination 90° elbows add up to 30 ft. + 10 ft. + (2 x 10 ft.) = 60 equivalent ft.

2. **NOT Acceptable:**

A 30 foot length of combustion air pipe and 2 sharp 90° elbows plus two termination 90° elbows add up to 30 ft. + (2 x 10 ft.) + (2 x 10 ft.) = 70 equivalent ft. (excessive length).

### 2.3. COMMON COMBUSTION AIR PIPE SIZING

Refer to Figures 6 and 7 for typical common combustion air inlet installation. The maximum length is the sum of the equivalent straight length of horizontal runs, vertical runs, and fittings of the individual combustion air connector and the common combustion air pipe. The required diameter lengths for a given total BTU/hr. Inputs are shown in Tables 6 and 7, below.

**Table 6: Typical Common Combustion Air Run Lengths**

Total BTU/hr. Input (up to and including)	800,000	1,000,000	1,500,000	2,000,000	2,500,000	3,000,000	4,000,000
Common Vent Diameter	6"	6"	8"	8"	8"	10"	12"
Maximum Vent → Individual Connector <u>plus</u> Common Vent Equivalent Feet (M)	60 feet						

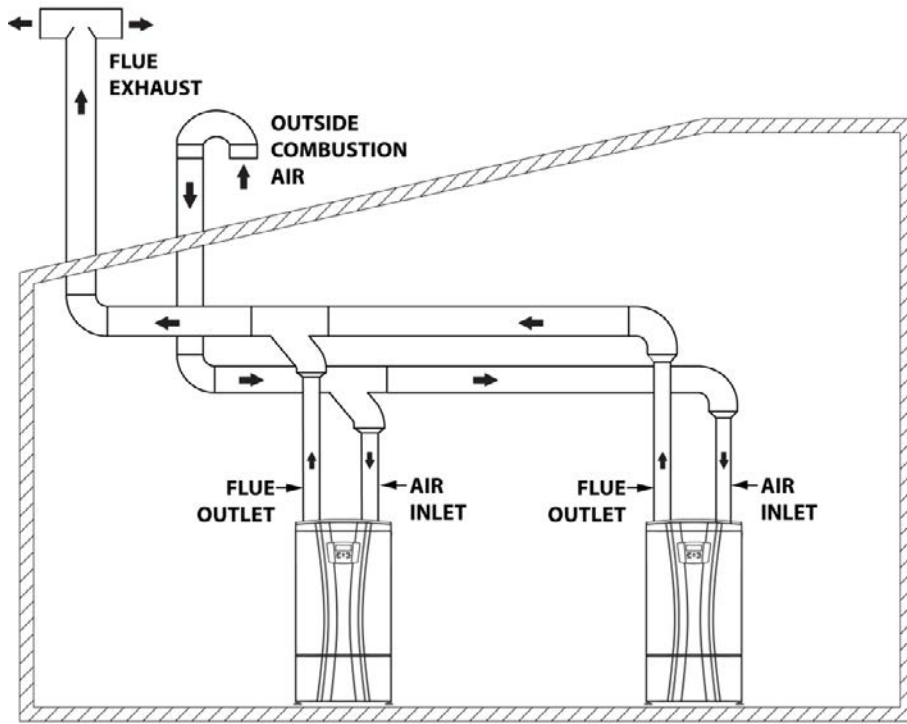
**Table 7: Typical Common Combustion Air Run Lengths**

Total BTU/hr Input (up to and including)	Common Vent Diameter	Equivalent Common Vent Lengths Examples				Maximum Length → Individual Connector <u>plus</u> Common Vent Equivalent Ft (m)
		Sharp 90° Elbow Equiv. Ft (m)	Sweep 90° Elbow Equiv. Ft (m)	45° Elbow Equiv. Ft (m)	WYE or Termination Tee or Rain Cap Equiv. Ft (m)	
800,000	6"	10 feet	5 feet	5 feet	5 feet	60 feet
1,000,000	6"	10 feet	n/a	5 feet	5 feet	60 feet
1,500,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
2,000,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
2,500,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
3,000,000	10"	10 feet	n/a	5 feet	5 feet	60 feet
4,000,000	12"	10 feet	n/a	5 feet	5 feet	60 feet

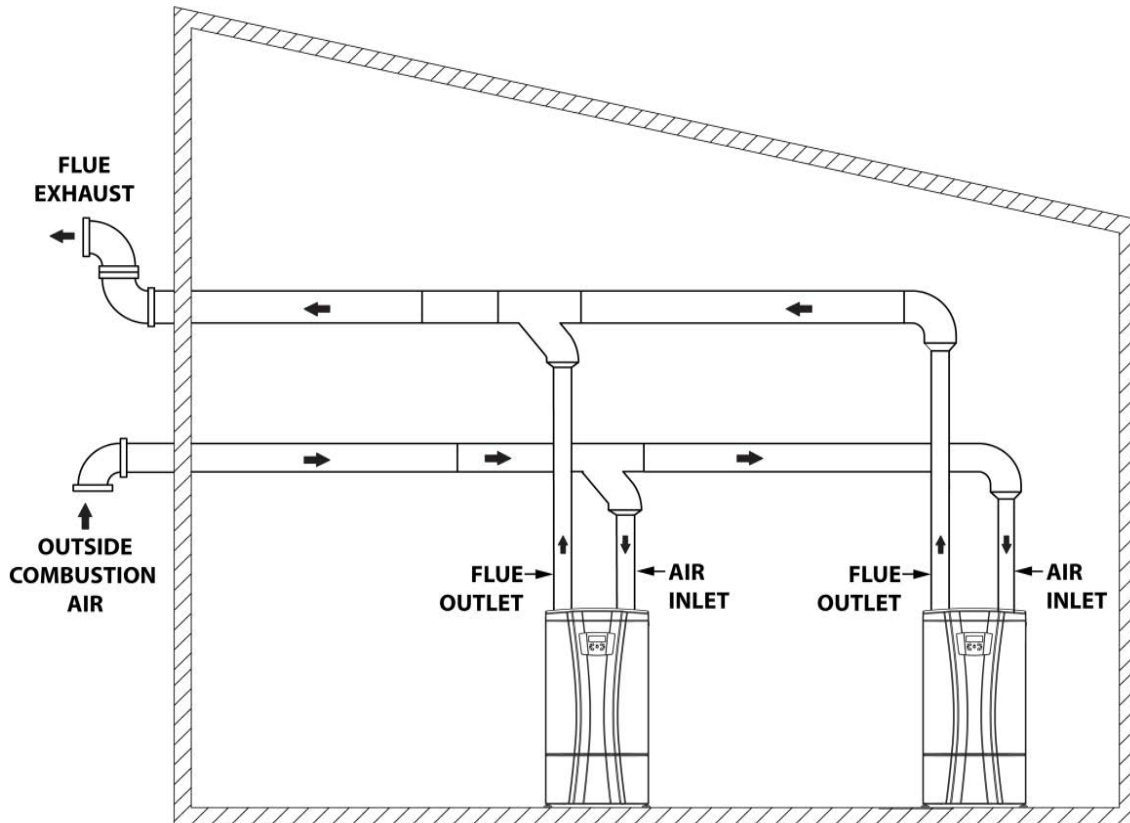
The chart above shows equivalent pipe lengths of the fittings for the common combustion air pipe. See section 2.2 for equivalent lengths for fittings for the individual boiler connector.

The maximum equivalent length shown is the sum of the equivalent length of the longest individual connector plus the equivalent length of the common combustion air pipe. If the maximum equivalent length exceeds 60 equivalent feet, contact your AERCO sales representative or AERCO International for design assistance and approval. It is important to use a WYE as a means to connect the individual combustion air pipe into the common combustion air pipe. This will ensure the least amount of pressure drop. Do NOT use a TEE, 90°, or 45° elbow.

The maximum pressure drop of the vent is also 60 equivalent feet. Note that this does NOT mean that the allowed combined pressure drop between the vent and combustion air is 120 equivalent feet. That is, the vent cannot go above 60 equivalent feet, even if the combustion air is less than 60 equivalent feet, and vice versa.



**Figure 5: Typical Common Combustion Air Inlet installation Through Roof**



**Figure 6: Typical Common Combustion Air Inlet installation Through Wall**

### 3. VENT SYSTEM

Correct boiler venting is crucial for proper operation. Being a condensing boiler, combustion gases are discharged at a very low temperature. It is therefore necessary for the venting system to be impermeable to combustion products and condensate and to be made of corrosion resistant materials. Typical Category IV venting and sealed combustion illustrations are shown in Figures 5 and 6. The various funnel joints shall be well sealed and/or equipped with suitable gaskets, in order to avoid any condensate drain and/or air intake. Ensure that the boiler vent's section and height conform to national and local regulations (see Section 1.1 in this guide).

For boilers designed for connection to gas vents or chimneys, vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply for Appliances, of the CAN/CGA B149, Installation Codes, or applicable provisions of the local building codes.

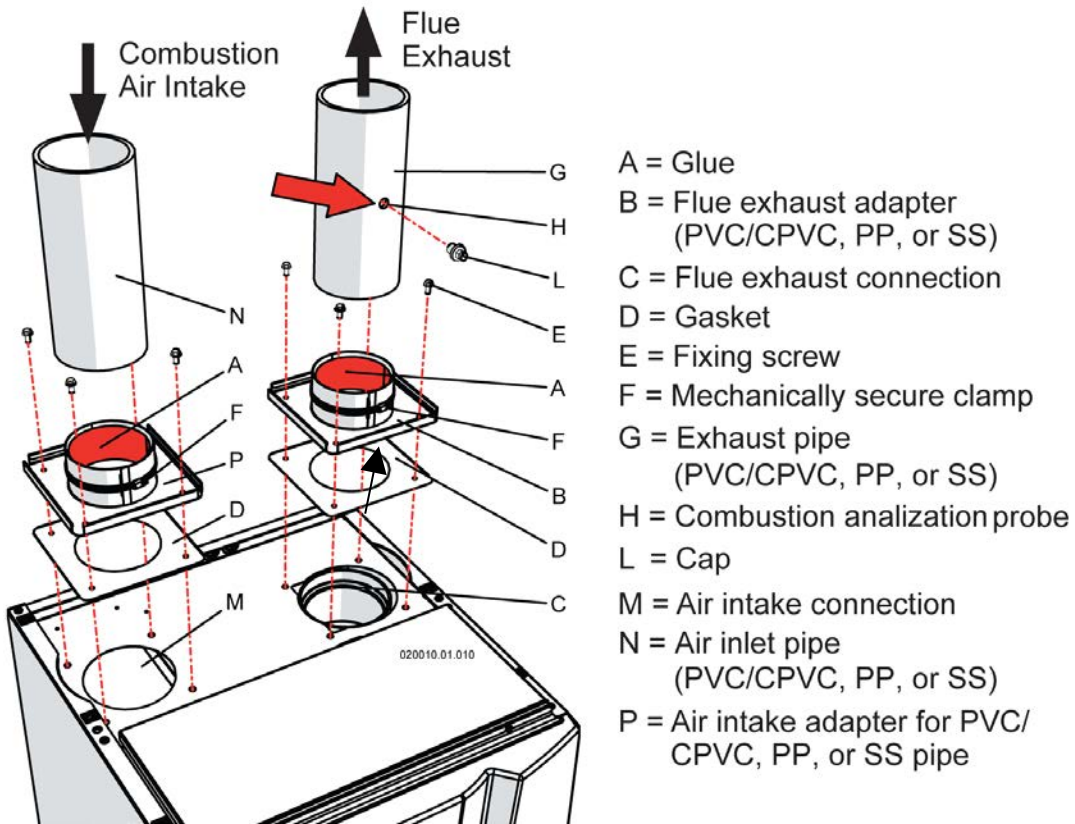
The vent system for the AM Series must be installed in accordance with AERCO's installation instructions described in this guide.

#### **CAUTION!**

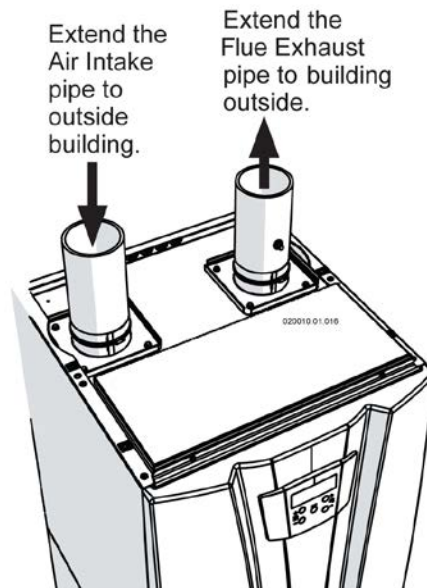
For Category IV Boilers, the vents must be installed to prevent accumulation of condensate, and have means provided for drainage of condensate.

#### 3.1. VENT INSTALLATION

- The boilers covered in this section are design-certified as Category IV for venting, only when they are installed with manufacturer specified vent system components and installation practices.
- Install supplied vent pipe starter piece at the boiler vent connector and work toward the vent cap.
- Vent pipe fittings and connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft systems operating under positive pressure.
- Horizontal runs shall be sloping upwards not less than 1/4 inch per foot (21 mm/m) from the boiler to the vent termination.
- Horizontal portions of the venting system shall be supported to prevent dips or sags where condensate could collect.
- Rigidly support vent pipe every 5 feet and at the elbows. Plumber straps may be used.
- ALL vent pipe and fittings must be installed with appropriate air space clearances to combustibles. These air space clearances apply to indoor or outdoor vents, whether they are open, enclosed, horizontal or vertical or pass through floors, walls, roofs, or framed spaces. The appropriate air space clearances should be observed between joists, studs, sub floors, plywood, drywall, or plaster enclosures, insulated sheathing, rafters, roofing, and any other combustible material. The minimum air space clearance also applies to electrical wires and any kind of building insulation. For horizontal runs, keep 4 inch and 6 inch vent piping from any contact with any combustible material, electric wires, and building materials.



**Figure 7: Connection of Exhaust Manifold to Flue Exhaust Outlet**



**Figure 8: Properly Installed Flue and Intake Piping Starter Piece**

**WARNING!**

Do not insulate or otherwise wrap vent pipe or fittings.

Specific installation regulations for side-wall and vertical terminations, respectively, are described in the following two sections (Sections 3.2 and 3.3).

### **3.2. INSTALLATION PROCEDURE FOR VENTING SYSTEM THROUGH WALLS**

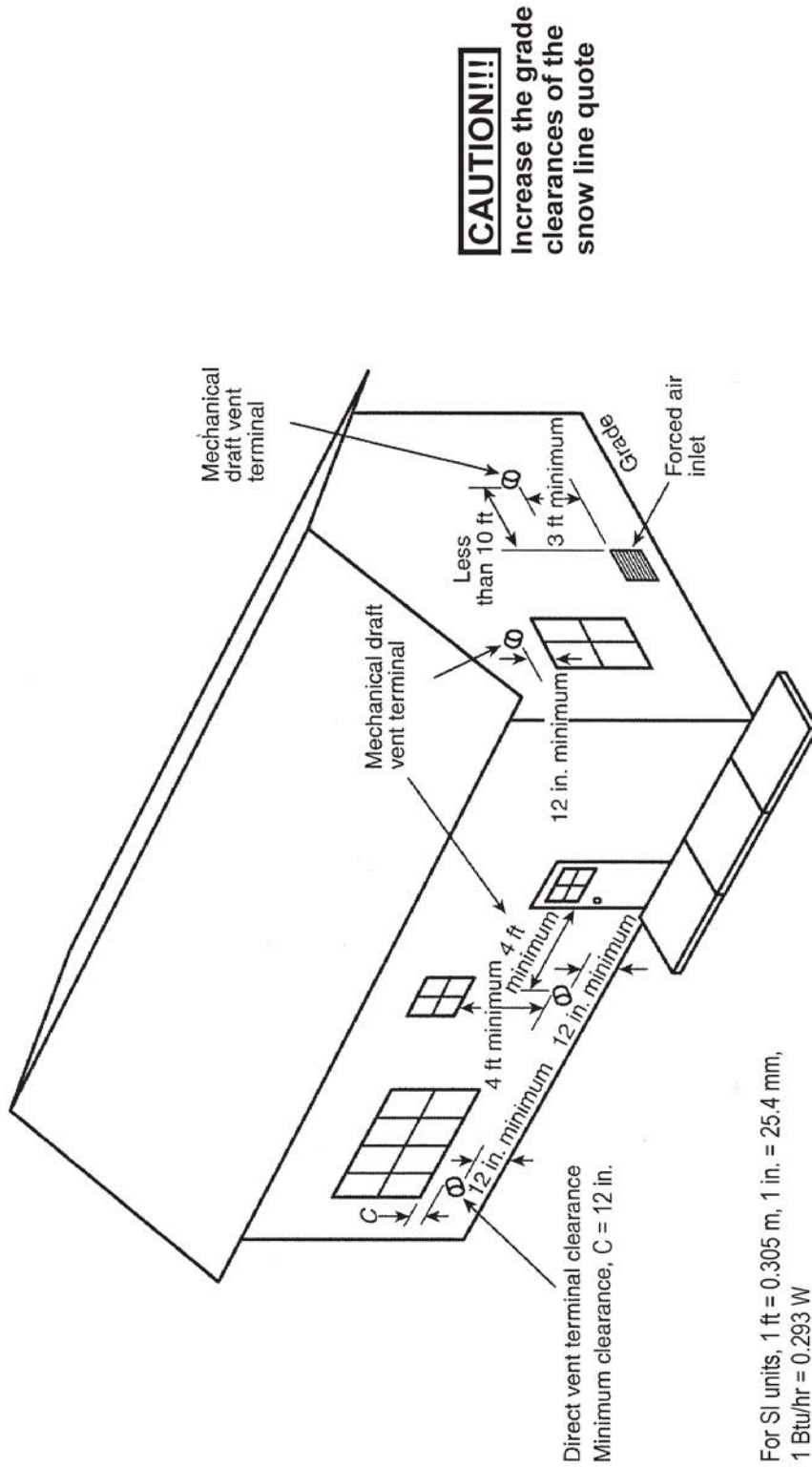
The minimum distances from adjacent public walkways, adjacent buildings, operable windows and building openings shall not be less than those values specified in the National Fuel Gas Code, ANSI Z223.1 and/or CAN/CGA B149, Installation Codes.

Minimum clearance of 4 feet horizontally from, and in no case above or below, unless a 4-foot (1.22 m) horizontal distance is maintained, from electric meters, gas meters, regulators and relief equipment.

Refer to the notes below and Figure 9, when determining the location of the vent outlet.

- a) At least 12 inches above finished grade, or at least 12 inches above the normally expected snow accumulation level in geographical areas where snow accumulates. With a vent termination clearance of at least 4 feet from any air openings into a building.
- b) In Massachusetts, when side-wall venting is used, the vent termination must be located a minimum of 4 feet above grade.
- c) At least 3 feet (92 cm) above any forced air inlet located within 10 feet.
- d) At least 4 feet horizontally from electric meters, gas meters, regulators and relief equipment.
- e) For horizontal runs, keep vent pipes away from any combustible material, electric wires, and building insulation.
- f) Do not terminate vent over public walkways 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.
- g) Do not locate the vent termination too close to shrubbery as flue products may stunt growth or kill them.
- h) Some building materials may be affected by flue products expelled near unprotected surfaces. Sealing or shielding of exposed surfaces with a corrosion resistant material (such as aluminum sheet) may be required to prevent staining or deterioration.

See the National or Canadian Codes listed at the beginning of these instructions for additional information on termination location.



**Vent position of a Direct vent appliance and of a Mechanical draft appliance (not sealed).**  
**“Clearances in accordance with local installation codes and the requirements of the gas supplier.”**

**Figure 9: Determining Location of Vent Outlet**



### 3.3. INSTALLATION PROCEDURE FOR VERTICAL VENTING

**WARNING!**

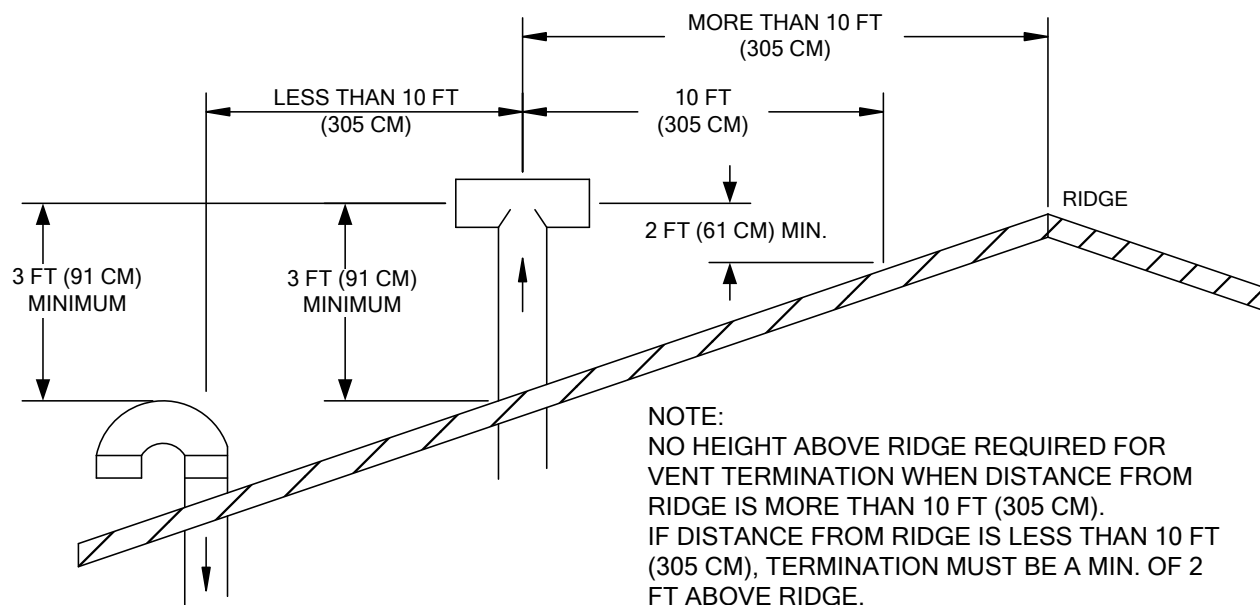
Do not insulate or otherwise wrap vent pipe or fittings. Follow the vent pipe manufacturer's installation instructions for vertical venting.

**WARNING!**

- Non-motorized louvers and grilles must be fixed in an open position.
- Minimum screens mesh size shall not be smaller than ¼ inch mesh.

The Vent Termination Must Be Located As Follows:

- Unit is certified for zero clearance to combustible materials.
- Combustion air inlet must be 3 feet below any vent outlet that is within 10 feet. See Figure 10.
- Vertical terminations shall extend at least 3 feet (0.9 m) above the highest point where it passes through a roof of a building and at least 2 feet (0.6 m) higher than any portion of the building within a horizontal distance of 10 feet (3 m). Terminations that extend more than 2 feet above the roof must be laterally supported.
- Combustion air inlet must also face away from the vent outlet. See Figure 10.
- Use vent pipe manufacturers vent cap, fire stop, support collar, roof flushing, and storm collar.



**Figure 10: Vent Termination Locations**

### 3.4. VENT PIPING SIZE

The maximum length is the combined length of straight horizontal and vertical runs, and the equivalent straight length of fittings. The required lengths for each boiler are as shown on Tables 9 and 10.

**Table 9: Required and Maximum Combustion Air Run Lengths**

	<b>AM 399</b>	<b>AM 500</b>	<b>AM 750</b>	<b>AM 1000</b>
<b>Number of Modules</b>	2	2	3	4
<b>Combustion Air Diameter</b>	4"		6"	
<b>Maximum Combustion Air Equivalent Feet (Meters)</b>	60 ft.			

**Table 10: Maximum Combustion Air Run Lengths**

<b>Model No.</b>	<b>Pipe Diameter</b>	<b>Equivalent Pipe Lengths Examples</b>			<b>Maximum Length Equivalent Ft (m)</b>
		<b>Sharp 90° Elbow Equiv. Ft (m)</b>	<b>Sweep 90° Elbow Equiv. Ft (m)</b>	<b>45° Elbow Equiv. Ft (m)</b>	
<b>AM 399</b> <b>AM 500</b>	4" (102 mm)	10 ft. (3.05 m)	5 ft. (1.5 m)	5 ft. (1.5 m)	60 ft. (30.5 m)
<b>AM 750</b> <b>AM 1000</b>	6" (152 mm)	10 ft. (3.05 m)	5 ft. (1.5 m)	5 ft. (1.5 m)	60 ft. (30.5 m)

The maximum pressure drop of the combustion air piping is also 60 equivalent feet. See Section 2.2. Note that this does NOT mean the allowed combined pressure drop between the vent and combustion air is 120 equivalent feet. That is, the vent cannot go above 60 equivalent feet, even if the combustion air is less than 60 equivalent feet, and vice versa.

**EXAMPLES:**

1. A 40 foot length of vent pipe and 1 sharp 90° elbow plus a termination rain cap add up to 40 ft. + 10 ft. + 10 ft. = 60 equivalent ft.
2. A 30 foot length of vent pipe and 2 sharp 90° elbows plus a termination rain add up to 30 ft. + (2 x 10 ft.) + 10 ft. = 50 equivalent ft.

### 3.5. COMMON VENT PIPING SIZE

Refer to Figures 2, 3, 5, and 6 in Section 2 for typical common vent installations. The maximum length is the sum of the equivalent straight length of horizontal runs, vertical runs, and fittings of the individual vent connector and the common vent pipe. The maximum length is the combined length of straight horizontal and vertical runs, and the equivalent straight length of fittings. The required diameters for a given AM Series total BTU/hr. input are shown in Tables 11 and 12.

**Table 11: Typical Common Combustion Air Run Lengths**

Total BTU/hr. Input (up to and including)	800,000	1,000,000	1,500,000	2,000,000	2,500,000	3,000,000	4,000,000
Common Vent Diameter	6"	6"	8"	8"	8"	10"	12"
Maximum Vent → Individual Connector <u>plus</u> Common Vent Equivalent Feet (M)	60 feet						

**Table 12: Typical Common Combustion Air Run Lengths**

Total BTU/hr Input (up to and including)	Common Vent Diameter	Equivalent Common Vent Lengths Examples				Maximum Length → Individual Connector <u>plus</u> Common Vent Equivalent Ft (m)
		Sharp 90° Elbow Equiv. Ft (m)	Sweep 90° Elbow Equiv. Ft (m)	45° Elbow Equiv. Ft (m)	WYE or Termination Tee or Rain Cap Equiv. Ft (m)	
800,000	6"	10 feet	5 feet	5 feet	5 feet	60 feet
1,000,000	6"	10 feet	n/a	5 feet	5 feet	60 feet
1,500,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
2,000,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
2,500,000	8"	10 feet	n/a	5 feet	5 feet	60 feet
3,000,000	10"	10 feet	n/a	5 feet	5 feet	60 feet
4,000,000	12"	10 feet	n/a	5 feet	5 feet	60 feet

**NOTES:**

- The chart above shows equivalent pipe lengths of the fittings for the common vent pipe. See section 3.4 for equivalent lengths for fittings for the individual boiler connector.
- The maximum equivalent length shown is the sum of the equivalent length of the longest individual connector plus the equivalent length of the common vent pipe. **If the maximum equivalent length exceeds 60 equivalent ft., contact your AERCO sales representative or AERCO International for design assistance and approval.**
- It is important to use a WYE as a means to connect the individual vent into the common vent pipe. This will ensure the least amount of pressure drop. Do NOT use a TEE, 90°, or 45° elbow.

The maximum pressure drop of the combustion air piping is also 60 equivalent feet (30.5 m). See Section 2.3. Note that this does **NOT** mean that the allowed combined pressure drop between the vent and combustion air is 120 equivalent feet. That is, the vent cannot go above 60 equivalent feet, even if the combustion air is less than 60 equivalent feet, and vice versa.

**Example:**

The vent system of two AM 1000 boilers (2 x 1,000,000 BTU/hr. = 2,000,000 BTU/hr.) consists of 30 foot length of vent pipe and 2 sharp 90° elbows. A termination cap is also installed. Each individual vent connector consists of 5 ft. straight run and one WYE.

- Common Vent pipe: 30 ft. + (2 x 10ft) + 5 ft. = 50 equivalent ft. (15.2 m)
- Individual vent connector: 5 ft. + 5 ft. = 10 equivalent ft. (3.0 m)
- Total Vent equivalent length: 50 ft. + 10 ft. = 60 (18.2 m)

**60 equivalent ft.: OK to use 8" Common vent piping and 6" individual connectors.**

**Change Log:**

Date	Description	Changed By
04/08/2014	Rev-B: Corrected per AM.	Curtis Harvey



© AERCO International, Inc., 2014

[www.aerco.com](http://www.aerco.com)