

All Radiant Tube Heater Models

Venting Regulations Update



Effective January 1, 2019: Changes to the ANSI Z83.20-2016/CSA 2.34-2016 Standard that governs Radiant Tube Heaters specify the following appliance CATEGORIES and VENTING systems. This document is the revised venting section of our user manuals for all tube heater models



Inadequate venting of a heater may result in asphyxiation, carbon monoxide poisoning, injury or death. This heater may use a vent connection or indirect venting system to remove products of combustion from the space. Seal all vent connections with high temperature sealant. Venting must be in accordance with all local, state, provincial, and national codes (ANSI Z223.1/NFPA 54 in USA; B149.1 in Canada) and as indicated below in this manual.



9. FLUE VENTING - RADIANT TUBE HEATER



IMPORTANT

Effective January 1, 2019: Changes to the ANSI/CSA standard that governs Radiant Tube Heaters specify the following appliance CATEGORIES and VENTING:

- **Vertical Vent Through Roof (Category I):** For vertical vent, this tube heater series operates with a negative static vent pressure and a vent temperature that does not result in excessive condensate in the vent and is defined as a Category I appliance. Refer to details below.
- **Horizontal Vent Through Wall (Category III):** For horizontal vent, this tube heater series operates with a positive static vent pressure and a vent temperature that does not result in excessive condensate in the vent and is considered a Category III appliance. Refer to details below.



WARNING

Inadequate venting of a heater may result in asphyxiation, carbon monoxide poisoning, injury or death. This heater may use a vent connection or indirect venting system to remove products of combustion from the space. Seal all vent connections with high temperature sealant. Venting must be in accordance with all local, state, provincial, and national codes (ANSI Z223.1/NFPA 54 in USA; B149.1 in Canada) and as indicated below in this manual.



THIS TUBE HEATER IS CERTIFIED FOR VENTING DIRECTLY TO THE OUTSIDE OR UNVENTED (INDIRECT VENTING) APPLICATIONS.

UNVENTED (INDIRECT MECHANICAL VENTING SYSTEM)

USA: Natural or mechanical means shall be provided to supply and exhaust at least 4ft³/min/1000Btuh (0.38m³/min/kW) input of installed heaters. Some local codes may require an electrical interlock to a dedicated exhaust fan. Exhaust must be located as high as practicable in the structure above the level of the heater(s). Consult your local code and ANSI Z223.1 latest edition for all venting requirements and practices.

Canada: It is required that the heater(s) be electrically interlocked to dedicated exhaust fan(s) by means of an Air Proving Switch. Exhaust fan(s) must be sized to create 300 cfm (8.5 cu m/min) exhaust for every 100,000 Btuh (30 kW) or any fraction thereof of total input of installed equipment. Exhaust must be located as high as practicable in the structure above the level of the heater(s). Sufficient supply air must be provided. Consult the latest edition of CSA.B149.1 Section 8 for venting system and air supply requirements.

VENTED TO THE OUTSIDE - GENERAL REQUIREMENTS

It is the responsibility of the installer to adhere to these instructions and all current local codes and/or ANSI Z223.1 (NFPA 54) or CSA.B149.1 latest editions for all venting requirements, and practices. All vent pipe will be certified to meet Category I (vertical vent) or Category III (horizontal vent) appliance requirements, depending on the vent configuration of a particular installation.

It is a normal condition that during heat-up and cool-down a tube heater will expand and contract. Allowances for heater expansion must be made in the venting and combustion air ducting. Improper installation can result in property damage, injury or death.

- When vented: The system must not be operated in a negative air condition unless combustion air is ducted from outside to the burner. If negative pressure is experienced or anticipated, the open port (barb) on each of the blocked flue and proving air switches must be Tee'd together and connected directly to outside air using a field supplied 1/4" plastic hose from the tee between the switches to outside of building.

All approved vent pipe, connectors, and adapters are supplied locally by others according to

appliance Category, and specifications below.

- All venting must meet requirements of Local Codes or, in the absence of local codes, with the *National Fuel Gas Code*, ANSI Z223.1/NFPA 54; or the *Natural Gas and Propane Installation Code* CSA B149.1.
- A vent connector shall comply with local codes and be firmly attached to the flue collar by 3 x 1/2" sheet metal screws. Seal penetrations and connections with high temperature RTV silicone sealant.
- Install a minimum 12" [305 mm] straight vent connector before any Tee or 90° Elbow.
- The connection of vent components must be secured as specified in the installation instructions by the vent manufacturer.
- For vertical vent, any horizontal vent section will slope upwards away from the heater not less than 1/4 inch rise per foot of run.
- For horizontal vent, slope downward away from heater a maximum of 1/4 inch down per foot of run.
- When the vent pipe passes through a cold or unheated area where the ambient temperature is likely to produce condensation of the flue gases, the vent pipe will be insulated with a suitable material as certified and specified by the insulation manufacturer to withstand temperature up to 460°F (238°C).
- The vent system must **always** be adequately supported to prevent sagging.
- The vent configuration will allow for expansion and contraction in length of the tube heater.
- As an Option for vertical vent, two heaters may be vented through an approved common 4" x 4" x 6" Vent Tee (10 x 10 x 15 cm), supplied by the manufacturer, or by using approved components as indicated in local codes. Vent pipe from each heater is not required to be equidistant to the vent Tee, but must comply with local code requirements. A common thermostat or "ON/OFF" switch must control commonly vented heaters. **Common vent is not allowed for Category III horizontal vent application.**

Vent Length

- Refer to Product's user manual for maximum allowable venting length

COMMON VENTING

For vertical vent only, two heaters can be commonly vented using 4"x 6"x 4" Vent Tee JA- 0514-XX. Both heaters must be operated using one common thermostat. Common vent is 6 inch [150 mm] diameter.

Category III (horizontal vent) heaters cannot be common vented.

HEATER EXPANSION AND VENT CONFIGURATION

A radiant tube heater will expand and contract as it heats and cools. Configuration of the vent must allow for heater expansion.

VERTICAL VENT: Orientation of the vent at 90° to heater will allow for heater expansion and contraction.

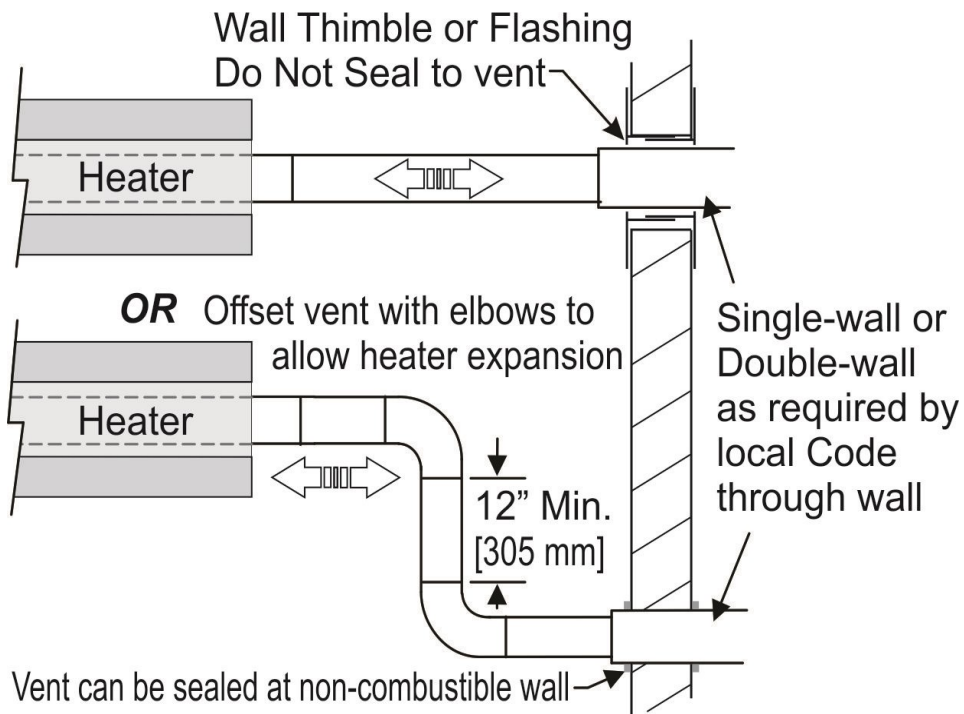
HORIZONTAL VENT: (See FIG. 1)

- Wall Thimble or flashing at wall that allows movement of the vent through the opening. Do not seal the vent to the thimble or flashing with caulking.

OR

- Offset vent with two x 90° elbows. Install minimum 12 inch [305 mm] length of straight vent between elbows. Vent can be sealed with caulking at non-combustible wall.
- Other means of slip fit installation of the vent are acceptable providing there is adequate allowance for free expansion and contraction of the system, and free flow of vent gases.

FIGURE 1: ALLOW FOR HEATER EXPANSION - HORIZONTAL VENT - TOP VIEW

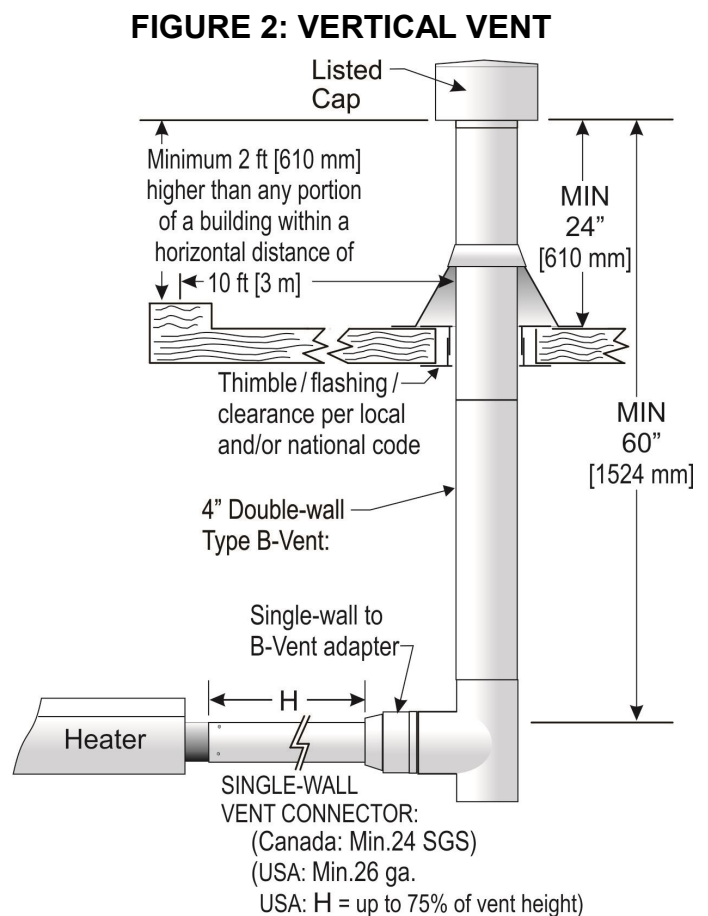


VERTICAL VENT THROUGH THE ROOF (CATEGORY I):

It is the sole responsibility of the installer to adhere to all current local codes and/or ANSI Z223.1 / CSA.B149.1 latest editions for all venting requirements, and practices. Also adhere to instructions below, and the instructions of the vent manufacturer. Use vent materials certified for Category I.

All models of this series heater are certified Category I for vertical venting. See FIG. 2.

- The vertical Type B-vent must extend at least 5 feet [1524 mm] above the flue collar of the highest connected heater.
- USA: Horizontal run of single wall vent or vent connector ("H" in FIG. 2) must not exceed 75% of the vertical height of the vent. If it does, then the vent system must be for Category III.
- Single wall vent connector material must be corrosion-resistant galvanized steel with a minimum thickness specified in local code.
- A vent connector must be secured to the flue collar using quantity 3 x #8 x 1/2" sheet metal screws. Seal penetrations and connections with high temperature RTV silicone sealant.
- A horizontal vent connector shall be installed and supported without any dips or sags and shall slope upward toward the vent or chimney at least 1/4 in./ft (20 mm/m).
- Use a certified termination cap as supplied by the manufacturer of the vent.
- When vent and combustion air are taken through the roof, the exhaust vent should always terminate higher than the combustion air intake, to prevent recycling the products of combustion back into the heater.
- The vent must extend at least 2 feet [610 mm] above the highest point where it passes through a roof. The vent must also extend at least two feet higher than any portion of a building within a horizontal distance of 10 feet [3 m].
- Keep vent connector runs as short as possible with a minimum number of elbows. Refer to the current edition of ANSI Z223.1 (NFPA 54) or CSA-B149 installation codes for maximum length of horizontal vent and vent connector.
- A single-wall vent connector shall not be insulated.
- For single-wall vent clearance to combustibles is 6" [152mm] except where a listed clearance thimble is used. Clearance to combustible material for Type B-Vent or factory-built vent per the vent manufacturer's instructions.
- When an existing Category I heater is removed or replaced, the original venting system may no longer be sized to properly vent the attached appliances. Improperly sized venting systems can result in vent gas leakage or condensation.



HORIZONTAL VENT THROUGH THE SIDEWALL (CATEGORY III):

All vent must be installed in accordance with local codes or, in the absence of local codes, with the *National Fuel Gas Code* in the USA, ANSI Z223.1/NFPA 54; or the *Natural Gas and Propane Installation Code* CSA B149.1 in Canada.

When installed with a horizontal vent through a sidewall, this heater is a Category III appliance, and the vent system must be approved for Category III application in accordance with UL-1738 or ULC-S636. Do not use PVC or plastic vent pipe.

- Use either a certified Category III venting system, or single wall vent pipe with all of the joints and seams sealed with a heat-resistant pliable sealant.
- The vent system must be installed in accordance with these instructions, and the instructions of the vent manufacturer.
- A single wall vent system may use a single continuous 36 inch section of double wall vent pipe to pass through an exterior wall:
 - Single wall galvanized vent pipe (C-Vent): Minimum 24 SGS Canada; Minimum 26 ga. USA.
 - Single Wall to Double Wall Adapter: Duravent 4PVP-AD Adapter or equivalent.
 - 36 Inch Double wall vent through outside wall: Duravent PelletVent Pro (PVP) or equivalent:
- Single-wall vent: Seal all joints and seams in the pipe, and the adapter with high temperature Red RTV sealant for temperatures up to 600°F [315°C]. The sealant must remain pliable when in use. Follow the instructions of the vent manufacturer for sealing vent pipe connections.
- All vent sections and vent connector must be secured using quantity 3 x #8 x 1/2" sheet metal screws. Seal penetrations and connections with high temperature RTV silicone sealant.
- Any horizontal portion of the flue vent system must slope downwards away from the heater a minimum of 1/4" per foot run [63 mm/ 300 mm] toward the vent terminal.
- Horizontally vented Category III heaters must be individually vented and cannot use a common vent.
- Use approved 4" [102 mm] (JA-0528-XX) horizontal wall vent terminal or an approved high-wind termination cap.
- Installation of the vent must prevent blockage by snow and protect building materials from degradation by flue gases.
- Install termination cap a minimum of 18 inches (45 cm) from the outside wall to the inside edge of terminal opening to alleviate back pressure caused by turbulent wind conditions (See Fig. 8). This also ensures flue gases are directed away from the structure to protect building materials from degradation by the exhausted flue gases.
- At most two 90° elbows can be installed in a horizontal vent.
- All seams and joints must be checked for gas tightness after installation. With the heater in operation, conduct a leak test on all vent connections, joints, and seams using a soap solution.
- A horizontal flue vent will not terminate less than 1 ft [30 cm] above grade level, unless its location is adjacent to a public walkway, then it must not terminate less than 7 ft [2.1m] above the walkway.
- Clearance above vent terminal under a combustible overhang or soffit:
 - As indicated in FIG. 3 for approved terminations: 4" [100 mm] JA-0528-XX.
 - For other approved terminations: Will terminate 3 ft [915 mm] or more below a combustible soffit or overhang.
- A horizontal vent termination must be a minimum of 6 feet [1830 mm] from an inside corner formed by two exterior walls.
- All vent pipe, adapters, thimbles, supplied locally by others.

Specific requirements for horizontal vent in the USA and Canada are on the next page.

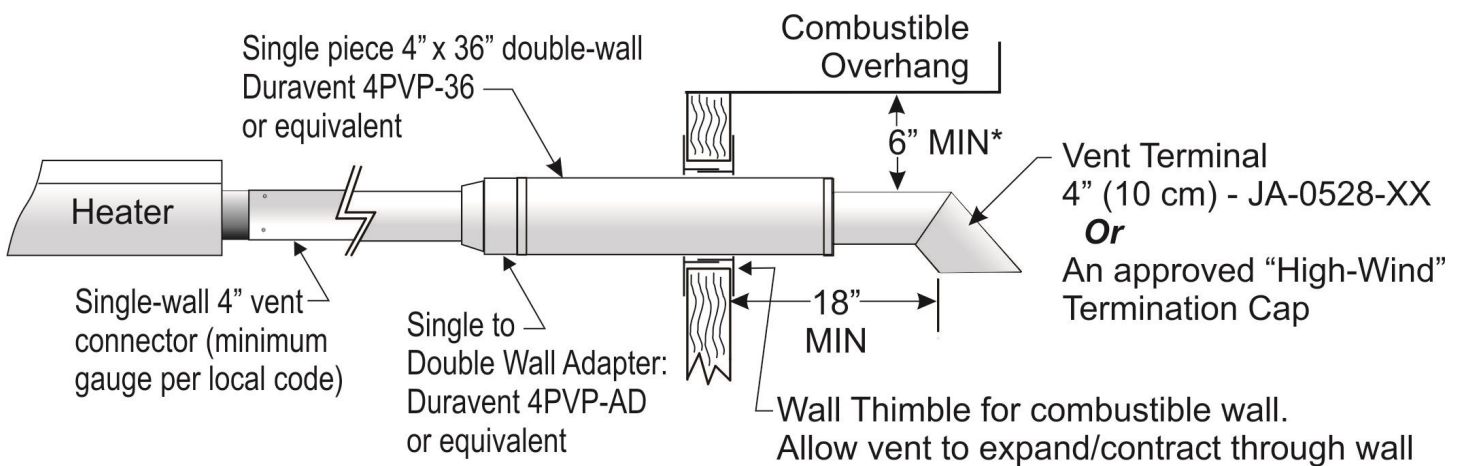
USA specific horizontal vent requirements:

- The vent terminal of an appliance with an input up to 50,000 Btu/hr (14.7kW) shall be installed with a 9 inch [230mm] vent termination clearance from any air opening into a building, and an appliance with an input over 50,000 Btu/hr (14.7kW) shall have at least a 12 inch [305 mm] vent termination clearance. The bottom of the vent terminal and the air intake shall be located at least 12 inches [305 mm] above grade.
- A horizontal vent will not terminate:
 - Less than 3 ft [915 mm] above a mechanical air inlet located within 10 ft [3 m].
 - Less than 4 ft [1219 mm] below, 4 ft [1219 mm] horizontally from, and 1 ft [102 mm] above any window or door that opens, or gravity air inlet to a building.
 - Less than 4 ft [1219 mm] horizontal clearance from gas and electric meters, regulators and relief equipment.

CANADA specific horizontal vent requirements:

- A horizontal vent will not terminate:
 - Within 6 ft [1830 mm] of a mechanical air supply inlet to any building.
 - Above a gas utility meter and regulator assembly within 3 ft [915 mm] horizontally of the vertical centerline of the regulator vent outlet to a maximum vertical distance of 15 ft [4.5 m].
 - Within 3 ft [915 mm] of any gas pressure regulator vent outlet.
 - Within the following distances of a window or door that can be opened in any building, of any non-mechanical air-supply inlet to any building, or of the combustion air inlet of any other appliance:
 - 12 inches [305 mm] for inputs up to and including 100,000 Btuh (30 kW).
 - 3 ft [915 mm] for inputs exceeding 100,000 Btuh (30 kW).

FIGURE 3: HORIZONTAL VENT THROUGH WALL



* 6" Clearance above optional Vent Terminal JA-0528-XX - 4" (10 cm). Use of alternate High-Wind terminal may require higher clearance. Refer to Vent Cap manufacturer's instructions.