Proper Venting of Condensing Gas Furnaces

Single-Pipe vs. Two-Pipe Systems

What is the Best Way to Vent a Condensing Gas Furnace?

Bryant introduced the first high-efficiency condensing gas furnace in the early 1980s. In those days, corrosion-resistant material technology for gas furnaces was in its infancy, and Bryant was very concerned about the long-term durability of the heat exchangers. Since about 70% of furnaces were installed indoors, the risk was great that indoor combustion air, typically rife with corrosive materials, would cause early corrosion failures, high service and maintenance needs, and customer dissatisfaction. So Bryant designed its high-efficiency products to overcome those concerns through the use of direct venting; that is, using outdoor air for combustion.[1]

Outdoor air, on the average, has fewer corrosive contaminants and is of more consistent quality than the indoor air. This consistent quality of air reduces the risk of long-term heat exchanger durability problems and thus allows longer warranties.

The Advantages of Direct Venting

A direct-vent (two-pipe) system also improves comfort by reducing infiltration (the source of draftiness), allowing better humidity control and lowering sound levels. It is designed to bring all outdoor combustion air directly to the combustion chamber through a sealed pipe.

The key distinction of a direct-vent/two-pipe system is that it is "sealed." When a standard non-sealed combustion furnace is located within a conditioned space, it uses the warm, filtered, moist air inside the space to burn the gas, then exhausts it out the flue. The air inside the home used for combustion must be replaced. This forces cold, dry and non-filtered outside air into the home through every crack and leak that exists. The process of outside air coming in is called infiltration. The sealed system reduces this infiltration and the associated drafts by also isolating much of the noise generated by the combustion process. Where comfort, noise and warranties are important customer concerns, a two-pipe venting system offers significant advantages.

Applications for Single-Pipe Venting

Since the development of multi-poise furnaces, more units are being installed in unconditioned areas outside the living space, such as attics, crawlspaces and external closets. When these areas are vented directly to the outdoors, the air quality is often equivalent to outdoor air and there is no need for a separate combustion air pipe. In those conditions, a single-pipe condensing furnace is often used.

Single-pipe condensing furnaces use air from around the furnace – in the attic, crawlspace, garage or basement – for combustion. One vent pipe is used to exhaust the flue gas. The formal term for this type of furnace is non-direct-vent; informally, it's referred to as a single-pipe furnace.

Bryant's Condensing Gas Furnace Line

355CAV *355BAV* *355AAV* *352AAV* *350AAV* *340AAV*

Bryant offers a full line of two-pipe and single-pipe models, including variable-capacity models

Evaluating Quality & Quantity of Air

The mere fact that a location is outside of the home's living spaces, however, does not mean it qualifies for single-pipe venting. Each application must be evaluated in terms of providing the proper *quality* and *quantity* of air for combustion. Many attics, crawlspaces and garages, for example, do not have a free flow of outdoor air. They are often inadvertently sealed and would not provide sufficient air for combustion.

The installer should take care to determine that (1) there will be sufficient combustion air around the furnace and (2) there will be low levels of contaminants (such as detergents, cleaners and aerosols) in the combustion air. If both these criteria can not be met, a two-pipe furnace is often a more cost-effective alternative than relocating the furnace to an area that is free of contaminants.

Determining the Best Venting System

There is no *one* right way to vent a condensing furnace for all applications. The best solution depends on several factors, including the location, the customer's needs, and the quality and quantity of combustion air.

As long as there is sufficient outdoor air for combustion and that air is free from corrosive contaminants, a single-pipe venting system should be adequate. But the installer should be very cautious in evaluating the air quality; a small investment of time can go a long way to ensure greater reliability and a longer service life for the furnace.

If there is any question about the combustion air, it's better to offer the customer a direct-vent/two-pipe condensing furnace. The slight additional time and expense will be well worth the benefits of preserving the dealer's reputation and ensuring the customer's long-term satisfaction.

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1 Direct-vent appliances "are constructed and installed so that all air for combustion is derived (taken) directly from the outside atmosphere and all flue gases are discharged to the outside atmosphere."; National Fuel Gas Code, NFPA 54 / ANSI Z223.1, 1996, Section 1.7, pg. 11.

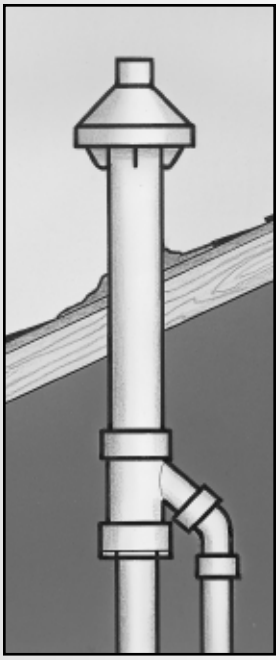
Direct Venting Made Simple

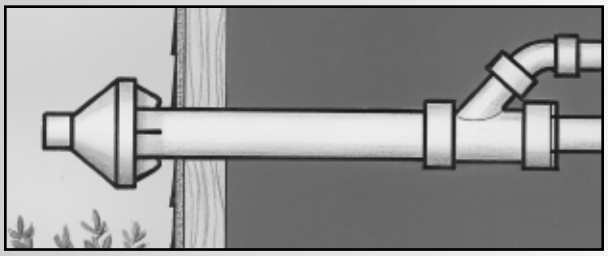
To help customers enjoy the quiet, efficient heating of Bryant high-performance furnaces while maintaining the looks and integrity of their home, a concentric vent is often used. The concentric vent is a pipe within a pipe that allows direct-vent installation without requiring two separate pipes running through and out of the home.

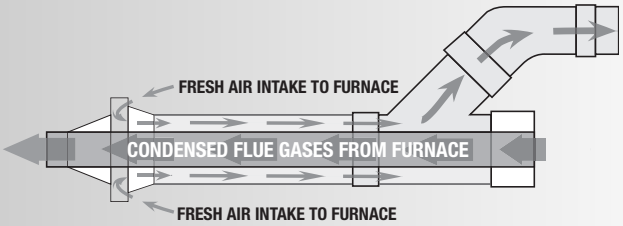
Smart Design, Better Looks

The design is simple. Vent gases flow through the middle pipe while fresh combustion air flows through the outer pipe. Since the two pipes enter and exit the home through one channel, installation is easier, takes less time and looks good both inside and outside the home.

For installation flexibility, the concentric vent can run through a side wall or the roof. Either way, it provides a cleaner, more finished appearance to a high-performance furnace installation.







The concentric vent is a pipe-within-a-pipe system that runs through a sidewall or roof. The outer pipe draws fresh combustible air into the system. The inner pipe carries the vent gases outside the home.

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