

## Intro to Gas Furnace Training Flyer

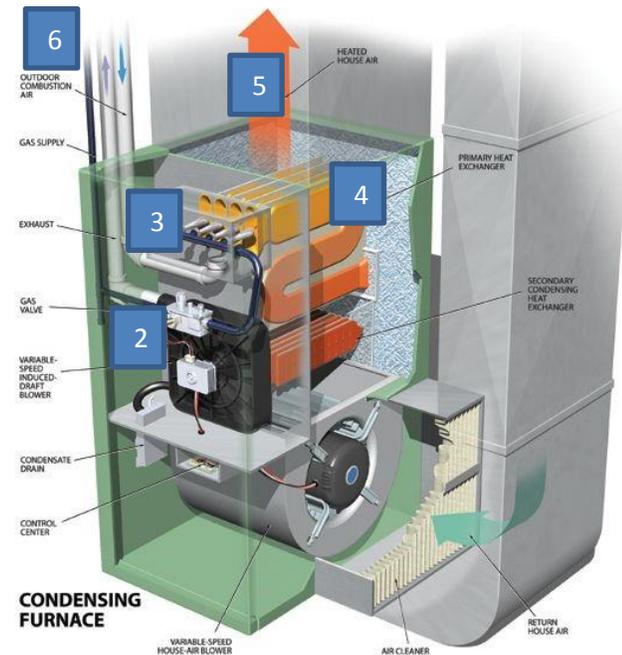
Being in the Plumbing Wholesale Distribution Business means we should have at least a basic understanding of the products we sell. One product being used a lot this time of year is a gas furnace. These are used in gas fueled HVAC systems to heat homes and commercial buildings. This flyer is intended to cover the basic operation of a gas furnace.



### How does a gas furnace work?

The basic steps of how a gas furnace works are detailed below:

1. The thermostat senses the room temperature is below the desired set point and signals to the furnace hot air is needed.
2. Once the furnace is signaled it opens a valve and delivers gas to the burners and turns the blower on.
3. The furnace's pilot or electronic ignition lights the burner inside the combustion chamber.
4. This creates heat in the furnaces heat exchanger.
  - a. A heat exchanger is a metal chamber around which the cooler supply air flows.
5. Once the heat exchanger surface is hot, air is pushed over it and into the duct work of a home.
6. The combustion gases created by burning fuel are vented through a flue in the roof or, with high-efficiency furnaces, through a wall.



### More on the heat exchanger:

The heat exchanger is one of the primary components in a furnace. The heat exchanger chamber is heated from the inside through one opening while the second opening draws the products of combustion out of the home's chimney. Once the heat exchanger is heated to the factory temperature, the furnace's indoor blower motor blows air between and over each heat exchanger chamber to warm the house.

### Efficiencies:

New gas furnaces are assigned an Annual Fuel Utilization Efficiency efficiencies rating. The AFUE rating, which is typically listed as a whole percentage, refers to the amount of fuel a heating system uses to keep your home or business warm. As an example, a heater with an AFUE rating of 85 percent uses that percentage of its fuel and wastes 15 percent of it through venting.

We offer basic 80% efficient gas furnaces up to furnaces with 98% efficiency. There are a few ways a furnace can become more efficient. Below is a basic overview of some of them.

- **Single Stage vs 2-stage:** A single stage furnace is either on at 100% capacity or off. If only a small amount of heat is needed the unit is still running at full capacity. A 2-stage unit will start at the lowest level and step up the capacity, in pre-determined levels, until the set point temperature is reached. In this case, if only a small amount of heat is needed it will satisfy it at the lower capacity level and use less energy.

**Efficiencies (cont.):**

- **2-Stage vs Modulating:** A 2-stage system described on the previous page will only **step up** in capacity levels where a modulating system will **step capacity up and down** so it is always using the optimal level of capacity and therefore the optimal level of fuel consumption.
- **Variable Speed Furnace:** The terms discussed so far deal with the amount of fuel being burned to heat the exchanger. When someone says variable speed furnace they are talking about the speed of the blower motor that blows the air over the heat exchanger. On a variable speed motor the output is set in cubic feet per minute (CFM) of air output. The motor will adjust up and down to meet that CFM output. The efficiency is gained because it is a DC motor rather than AC. This type of motor is beneficial to both comfort and efficiency.

**Below is a list of some of the types of gas furnaces we stock:**

**UP TO 98% CONDENSING GAS FURNACES**

- 4-WAY MULTI-POSITION

QuietComfort Deluxe	QuietComfort Deluxe 96	QuietComfort 96	QuietComfort 96
 <p><b>G9MAE</b>                      - Up to 98% AFUE                      - 60 - 120 MBTUh                      - Modulating gas valve                      - Communicating and self-configuring capabilities                      - ECM variable-speed blower motor                      - 5-stage cooling compatible</p> 	 <p><b>G9MVE</b>                      - Up to 96% AFUE                      - 40 - 120 MBTUh                      - 2-stage heat                      - Communicating and self-configuring capabilities                      - ECM variable-speed blower motor                      - 1-pipe or 2-pipe venting                      - 5-stage cooling compatible</p>	 <p><b>G9MXT</b>                      - Up to 96% AFUE                      - 40 - 120 MBTUh                      - 2-stage heat                      - High-efficiency ECM blower motor                      - 1-pipe or 2-pipe venting                      - 2-stage cooling compatible</p>	<p><b>G9MXE</b>                      - Up to 96% AFUE                      - 26 - 120 MBTUh                      - Single-stage heat                      - High-efficiency ECM blower motor                      - 1-pipe or 2-pipe venting</p>
<p>Limited Warranties:**                      - Heat exchanger - Lifetime - Parts - 10 Yrs.                      - No Hassle Replacement - 10 Yrs.</p>		<p>Limited Warranties:**                      - Heat exchanger - Lifetime - Parts - 10 Yrs.                      - No Hassle Replacement - 5 Yrs.</p>	<p>Limited Warranties:**                      - Heat exchanger - Lifetime - Parts - 10 Yrs.                      - No Hassle Replacement - 1 Yr.</p>
Performance 95	Performance 92	R-Series	
 <p><b>N9MSE</b>                      - Up to 95.5% AFUE                      - 26 - 140 MBTUh                      - Single-stage heat                      - PSC blower motor                      - 1-pipe or 2-pipe venting                      - Low NOx</p>	<p><b>N9MSB</b>                      - Up to 92.1% AFUE                      - 40 - 120 MBTUh                      - Single-stage heat                      - PSC blower motor                      - 1-pipe or 2-pipe venting                      - Low NOx</p>	<p><b>R9MSB</b>                      - Up to 92.1% AFUE                      - 60 - 120 MBTUh                      - Single-stage heat                      - PSC blower motor                      - 1-pipe or 2-pipe venting                      - Low NOx                      - Sold as Maratherm brand</p>	
<p>Limited Warranties:** - Heat exchanger - 20 Yrs. - Parts - 10 Yrs.</p>			

**80% GAS FURNACES - 4-WAY MULTI-POSITION**

QuietComfort Deluxe 80	QuietComfort 80	Performance 80	R-Series
 <p><b>G8MVL</b>                      - 66 - 132 MBTUh                      - ECM variable-speed blower motor                      - Communicating and self-configuring capabilities                      - 33.3-inches tall                      - 2-stage heat                      - 5-stage cooling compatible                      - Low NOx</p> <p>Limited Warranties:**                      - Heat exchanger - 20 Yrs.                      - Parts - 10 Yrs.                      - No Hassle Replacement - 10 Yrs.</p>	 <p><b>G8MTL</b>                      - 44 - 132 MBTUh                      - PSC blower motor                      - 33.3-inches tall                      - 2-stage heat                      - 2-stage cooling compatible                      - Low NOx</p> <p>Limited Warranties:**                      - Heat exchanger - 20 Yrs.                      - Parts - 10 Yrs.                      - No Hassle Replacement - 5 Yrs.</p>	 <p><b>N8MXL</b>                      - 44 - 132 MBTUh                      - High-efficiency ECM blower motor                      - 33.3-inches tall                      - Single-stage heat                      - Low NOx</p> <p><b>N8MS</b>                      - 44 - 154 MBTUh                      - PSC blower motor                      - 33.3-inches tall                      - Single-stage heat                      - Low NOx models available</p> <p>Limited Warranties:**                      - Heat exchanger - 20 Yrs. - Parts - 10 Yrs.</p>	<p><b>R8MXL</b>                      - 44 - 132 MBTUh                      - High-efficiency ECM blower motor                      - 33.3-inches tall                      - Single-stage heat                      - Low NOx                      - Sold as Maratherm brand</p> <p><b>R8MS</b>                      - 44 - 154 MBTUh                      - PSC blower motor                      - 33.3-inches tall                      - Single-stage heat                      - Low NOx models available                      - Sold as Maratherm brand</p>