

# Furnace Facts

Early furnaces differed from today's models because they did not have electricity for a blower to distribute the heat. They relied on convection - the natural way hot air rises - to move the heat around. It wasn't until the mid 1930's that the first forced-air furnace was introduced, using coal as its fuel. We have made various other updates to the furnace systems that heat our homes, but the basic process hasn't changed in more 80 years.

A typical furnace consists of 4 main sections;

Burner – where the fuel is burned to generate the heat.

Heat-exchanger – where the heat the burner generates is converted to warm air that can be distributed through the home.

Blower – to move the warmed air from the heat-exchanger and into the home.

Exhaust – to safely remove the dangerous fumes that result from burning the fuel.

## Types of Furnaces

Fuel is one main option in furnaces. Oil was the preferred choice for fuel in the past, but natural gas has taken over in most regions now.

There are also 3 main types of furnaces available, differing by the way they burn and exhaust their fuel; Older furnaces employed the conventional warm air type of system. A series of ducts known as the cold air return system drew in cooler air from within the house – captured near exterior doors and the bottom of stairways, sent it past the heat exchanger where it was warmed, then distributed it throughout the house using a system of heating ducts. The induced draft type of furnace works similarly, but it uses a fan to vent exhaust gases instead of burning fuel to preheat air to create an updraft for the exhaust. This makes induced draft furnaces more energy-efficient.

A condensing furnace is even more advanced and more energy-efficient. By employing a second heat exchanger to extract heat from water vapour in the hot exhaust gases, they capture a higher percentage of the heat generated.

## Efficiency

In addition to the choice of furnace types, homeowners can choose a mid-efficiency furnace or a high-efficiency one. Today's mid-efficiency models have an energy efficiency rating of around 80% and the high-efficiency ones are around 90% efficient. To illustrate what that means in dollars and 'sense', if you spend \$100 on fuel, a mid-efficiency models wastes about \$20 of that while a high-efficiency one only wastes \$10.

A furnace's energy-efficiency rating is also used to determine the output of the furnace required, measured in BTU's – British Thermal Units. For example, if it is determined that you need a 100,000 BTU system to properly heat your home, a mid-efficiency model with a 125,000 BTU rating would be ideal. ( $125,000 \times 80\% = 100,000$ )

## Two-stage furnaces

Another newer development in furnaces is two-stage heating. With this, a furnace will only operate at around 65% of its full capability unless necessary. This helps ensure that the system stays on long enough to dry out the condensation that builds up naturally. There are also models available with a two-stage variable blower motor that can run at a lower speed to maintain constant dust control and air circulation.



## Controlling the Heat

If you think of the furnace as the heart of your home's heating system, then the thermostat is the brain. Without it, your home's heating system would require a lot of attention to maintain a constant heat and comfort level in your home. The thermostat does that for you. Today's programmable thermostats take that convenience one step further, allowing you to set desired temperatures for different times of the day, days of the week, or even specific days of the year. You can even find models that can be managed remotely by a smart phone from anywhere in the world.

## Heat Distribution

A home's entire heating system consists of more than just the furnace. Once the furnace generates heat, it must rely on a system of heating ducts to distribute that heat throughout the building. Of course, most of the ductwork is hidden inside walls and floors. This means that when updating your furnace, the new model is usually designed to connect to the existing duct system.

## Signs of Trouble

Considering the importance of a home's furnace, it is doubly important to try to avoid a problem by watching for signs of trouble, like these;

**Age** – It is better to plan a furnace replacement than to wait until your furnace breaks down. If your furnace is older than 20 years, it may well be approaching the end of its life. It is also less efficient than new models, so it may make sense to update it now. Check for a note on the furnace itself saying when it was installed.

**Water** – A pool of water accumulating around a furnace can be a sign of a blocked drainage tube. This can lead to rust, an inefficient system and higher fuel consumption.

**Rising Fuel Consumption** – A furnace that is losing efficiency will require more fuel. Watch for rising fuel use.

**Furnace is On Too Often** – An aging, inefficient furnace will need to stay on longer to complete its task. If it seems to stay on too long, it could be time for a replacement.

**Odd sounds** – Just like your car, if something starts to go, you can often hear it first. Listen for unusual sounds emanating from your furnace and have them looked into right away.

## Heating System Maintenance & Buying Tips

Though the internal workings of a furnace are not to be tampered with unless you are a qualified expert in the field, there are a few things that you can do to help your furnace perform up to its full potential. These include;

**Keep the ducts clean.** A build-up of dust, hair, pollen, etc. on the inside of ductwork can reduce the airflow, forcing your furnace to work longer to deliver the heat needed. The amount of debris that accumulates varies from home to home (Rover and Fluffy can be big contributors!), so the frequency of cleaning differs, too. If in doubt, have them cleaned.



Replace filters regularly. As with ducts, how often you need to change your furnace's filter depends on your lifestyle and the home's inhabitants, but every 2 or 3 months is a good suggested interval.

Clear the perimeter. Leave a 30cm (1 ft) area around the furnace and keep the vent pipe clear of any obstruction.

Seal ductwork. By nature, ductwork joints and seams can be less than perfect. A simple seal of an approved tape designed for this purpose will eliminate heat leakage. This is easy to do yourself, but you may have little exposed ductwork that you can get to. At least seal what you can see.

Install a Carbon Monoxide detector. Unseen cracks and wear and tear in a furnace can cause leaks of deadly carbon monoxide. In addition to a smoke detector, be sure a carbon monoxide detector is installed on all floors that have bedrooms. It's now the law.

Bigger is not necessarily better! When it comes time to buy a new furnace, be careful not to buy one that is too large – too many BTU's – as it can actually shorten the life of your furnace.

Have an annual furnace inspection. Your furnace needs a regular inspection each year to make sure there are no problems that have developed, that it is running at peak efficiency, and that it is safe. An inspection by a qualified furnace professional will save you money in the long run and avoid a nasty, unexpected surprise. As part of a complete home inspection Elementary Property Inspection's qualified home inspectors check, record and inspect many aspects of the furnace and heating system, and provide a report on all our findings. Contact Elementary Property Inspections for more information about this article or to schedule a complete home inspection by Elementary Property Inspections.



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