

Heating Options

Furnaces & Boilers

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CONSUMERS GUIDE - TO HOME HEATING OPTIONS

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When considering your heating options, keep in mind that 60% of your energy costs are attributed to space heating. You will want to ensure you are making a good choice when choosing a system.

HEAT DISTRIBUTION

Most heating systems are either forced-air systems or hydronic (hot water) systems. Some houses use space heaters without distribution networks (ducts and registers or pipes and radiators).

Forced-air heating systems with a furnace as the heat source are the most common type of central heating system used in Canada. A forced-air system can filter and humidify the air and can also provide ventilation and central air conditioning.

Hydronic heating systems use hot water that is circulated through the house before returning to the boiler to be reheated.

Other types of systems that are not as popular include room space heaters, radiant space heaters and built-in radiant systems. Room space heaters provide heat directly to the rooms in which they are located and do not have a heat distribution system. Examples include vented oil-fired space heaters and electric or gas-fired baseboard heaters.

ENERGY SOURCE

Energy source options include natural gas, oil, propane, electricity or wood. The choice may be based on energy availability, cost and the environment. Electricity and heating oil are available in most areas, while natural gas may not

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be available in some rural and remote areas. Propane is available in most parts of Canada, although often at a higher operating cost.

BOILERS

A boiler provides heat through a hydronic distribution system. A hydronic system distributes hot water from a boiler to radiators, convectors or under-floor heating systems in each room. In older homes, large cast-iron radiators are common. Modern systems feature smaller boilers, smaller diameter piping and compact radiators that can be regulated to provide temperature control in each room. Hot water piping can be built into the floors of new homes. The temperature can be regulated from room to room. The same system can be used to provide hot water. A possible disadvantage is that there is no duct work available for central air conditioning and typically higher installation cost.

PROPER SIZING

A qualified heating contractor should properly determine the size of heating system for your home. Oversized heating equipment will cycle on and off more frequently. This will cause excessive temperature fluctuations and higher energy use.

ENERGY EFFICIENCY

A central furnace or boiler's efficiency is measured by annual fuel utilization efficiency (AFUE). AFUE is a measure of how efficient the appliance is using electricity or conventional fossil fuels (oil or gas) over the course of a year. The term Annual Fuel Utilization Efficiency (AFUE), is useful to homeowners to identify how much annual heating costs will improve by replacing an existing unit with a higher-efficiency unit.

The minimum allowed AFUE rating for a noncondensing fossil-fueled, warm-air furnace is 78% (also known as mid-efficient); the minimum rating for a condensing fossil fueled furnace is 90% (also known as high efficient); the minimum rating for a fossil-fueled boiler is 80%; and the minimum rating for a fossil-fueled steam boiler is 75%. Although a condensing unit costs more than a noncondensing unit, the increased efficiency of the condensing unit can save you money in annual fuel costs (over the 15 to 20 year life of the unit).

The seasonal efficiency is an important factor in the heating cost equation. For example if a furnace or boiler has an AFUE of 80%, this means that 80% of the heat value in the fuel being used. The other 20% is lost. Improving the efficiency of the heating equipment reduces energy use and cost.

Take into account the overall cost of each system you are considering, including purchase price, installation cost and operating cost. A higher purchase price is usually compensated by lower operating costs.

A high-efficiency furnace or boiler can be vented out a side wall. This makes them more compatible with airtight housing. High-efficiency heating equipment can also increase the value of your home.

Condensing gas furnaces are the most energy-efficient furnaces available. Condensing gas furnaces have an annual fuel utilization efficiency (AFUE) of between 90 and 97 percent. The added cost associated with purchasing a high-efficiency condensing gas furnace will be recovered easily through energy-cost savings.

The condensing process reduces the temperature of the flue gases and can be vented through PVC or ABS plastic pipe out a side wall. This is beneficial since there is no need for a chimney, which is a major cause of heat loss in older homes.

All gas-fired appliances sold in Canada are required to comply with safety standards established by the Canadian Standards Association (CSA). As proof of compliance, they are also required to be certified by an independent body accredited by the Standards Council of Canada.

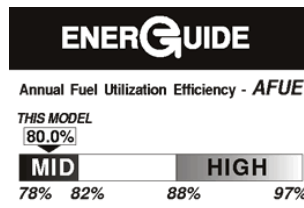
The CSA standards for gas-fired furnaces and boilers also require compliance with efficiency levels currently prescribed in the Federal Energy Efficiency Regulations.

ENERGY EFFICIENCY STANDARDS

All fuel-burning systems (natural gas, oil and propane) lose heat because of start-up, incomplete combustion, or heat carried up the chimney. The extent of these losses determines the efficiency of the furnace or boiler, given as a percentage indicating the amount of original heat that actually warms the house.

The Government of Canada has implemented energy-efficiency standards for some heating equipment and other energy-consuming appliances and products. In addition, various provincial governments have introduced energy-efficiency standards. Generally, these standards establish the minimum acceptable energy-efficiency level for specific types of heating equipment. Models that do not comply with the standard are no longer allowed on the market where the standard applies.

The Government of Canada and the Heating Refrigeration and Air Conditioning Institute of Canada (HRAI) have established an industry managed energy-efficiency rating system for residential gas and propane forced-air furnaces to help consumers identify the energy efficiency of different products. The EnerGuide label with the furnace's AFUE ratings appears in manufacturers' product literature. The label has a rating scale showing the range of efficiencies for the models that are available for sale in Canada. The higher the rating, the more efficient the model.



ENERGUIDE FOR HOUSES

An EnerGuide for Houses evaluation can help identify possible measures to improve overall energy performance of your home. For more information about the EnerGuide for Houses evaluation, consult the Office of Energy Efficiency's web site at oee.nrcan.gc.ca/houses.



ENERGY STAR

Look for the ENERGY STAR symbol on product brochures. ENERGY STAR is the international symbol for energy efficiency. Residential gas furnaces must have an AFUE of 90 or higher to qualify. Residential gas boilers must have an AFUE of 85 or higher. You may see the ENERGY STAR symbol displayed in various ways.



PROGRAMMABLE THERMOSTATS

A programmable thermostat will allow you to preset your home's temperature to maximize your energy savings. As a rule, you will save 2% on your heating bill for every 1% C you turn down the thermostat.

FURNACE FAN

A two-speed fan allows more heat to transfer out of the furnace, while providing for continuous air circulation and even temperatures throughout the house when the furnace is off. However, it will be at a cost of an increased electricity bill.

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VARIABLE SPEED MOTORS

A natural gas furnace requires electricity to power the blower motor that moves air throughout the home. In many cases, these motors can use twice the amount of electricity as a new refrigerator. Choosing a more efficient motor should be considered to reduce electricity costs.

Motor Speeds

Today's furnace systems can provide not only heating, but also ventilation and cooling functions for the home. Each of these functions requires a different motor speed, so that the blower can deliver the appropriate amount of air. A variable speed motor assists with efficiently providing these functions as follows:

Heating - requires one or two medium speeds

Cooling - requires the highest speed to deliver the heavier, cool air

Ventilation - requires the lowest speed to provide continuous circulation

High Efficient Furnace Motors

The conventional PSC (permanent split capacitor) motor which can be made to operate at multiple speeds, is most efficient at its highest operating speed.

When the PSC motor is operated at slower speeds, its efficiency drops off quickly - often 20% or more - meaning you pay more than you need to for its service.

There is a high-efficiency option which is the brushless DC motor. Also known as a variable speed motor, or by the initials ECM™ or ICM™, its speed is controlled with electronics to maintain efficiency at any speed.

Benefits of Variable Speed Motors

Throughout their operating range, high-efficient variable speed motors can use less energy than conventional motors. At higher speeds the savings are typically 1/3; at lower speeds, even greater. That can add up to hundreds of dollars of savings per year. So while it will cost more initially to purchase and install, the reduced operating costs can offset these costs in a matter of a few years.

Two-stage furnaces are designed to add to the furnace's gas efficiency and occupant comfort by operating for longer periods of time than a single-stage furnace. While designed to operate at high or low-fire -- depending on how much heat the house requires -- most of the time they operate at the low-fire stage. At low-fire the blower operates at a slower speed. This is where the high-efficient motor can provide electrical savings compared to a conventional PSC motor.

Comfort

The variable speed feature can add to occupant comfort if the furnace is being used for either heating or ventilation. In the ventilation mode, the airflow can be adjusted to ensure that the volume of air being circulated is comfortable for home occupants. Too great an airflow can create uncomfortable drafts and excessive noise through the duct work. This discourages use of the furnace's ventilation feature where and when it would be most beneficial. Some furnaces even allow occupants to adjust the air circulation rate right from the thermostat.

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In the heating mode, variable speed motors can be programmed to start slowly and then speed up as the furnace comes up to temperature, preventing an initial uncomfortable blast of cool air. The variable speed feature will also provide for better temperature control throughout the house.

Long Motor Life

High efficient motors and controls are generally made with higher quality components and are less susceptible to overheating, stress on the motors and shorter motor life.

Greater Functional Capability

With variable speed capability, these motors are well suited to providing zoning, which can reduce gas consumption. They also offer greater flexibility with the ability to operate over a greater range of speeds. The homeowner can choose to purchase air conditioning, a more efficient air filter or simply to circulate air continuously at a later date.

Above information supplied compliments of BC Hydro

DRAFTPROOFING & INSULATING

Be sure to look at where you can draft proof and insulate your home prior to having your heating system modified or changed. This will help to reduce your heating costs and your house will tend to be cooler in the summer. This will also help control humidity levels. Dry air in a house during the winter is caused by too much outside air making its way inside and when the air is heated it becomes extremely dry.

If the air in your house feels too dry you can add moisture using a humidifier. However, in most cases the moisture generated through cooking and other activities is adequate.

Insulating, caulking and weatherstripping will reduce the amount of heat needed to keep your home comfortable.

INSTALLATION CONSIDERATIONS

Your furnace should be installed by a qualified technician to make sure the work is done properly, safely and according to code. Also take into account the heat loss and heat gain characteristics of your house.

Consider consulting a member of the Heating, Refrigeration and Air Conditioning Contractors of Canada (HRAC). HRAC members are required to carry relevant trade, fuel safety and municipal licenses as well as workers' compensation and liability insurance and must adhere to a code of ethics including developing and maintaining an understanding of proper equipment selection. For a list of HRAC members in good standing, visit www.hrac.ca or call toll-free at 1-877-411-HRAC

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CARBON MONOXIDE

Venting problems can create a carbon monoxide emergency. Your vented gas heating appliances are designed to economically heat the inside of your home and safely send the products of combustion outside through the vent. These products of combustion may include dangerous carbon monoxide (CO). If your vent is not installed properly, is blocked or damaged, deadly levels of carbon monoxide could enter your home.

Know the symptoms of CO poisoning. People with CO poisoning sometimes think they have the flu. They do not realize CO poisoning is making them sick because they can't see it or smell it.

CO Poisoning Symptoms:

- Headache
- Dizziness
- Sleepiness
- Confusion
- Nausea
- Vomiting

Ensure your venting system is checked before each heating season. If you think there is CO entering our home, leave the home immediately and call a qualified heating contractor.