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Consumers Guide

HEATING, REFRIGERATION and AIR CONDITIONING INSTITUTE of CANADA

Cooling Options

Choosing the Right Air Conditioner for Your Home

Twenty years ago air conditioning was a luxury to most Canadians. Today, it is widely recognized as a must-have to live and work in comfort through the summer months, particularly in those regions with hot and humid summers.

What Air Conditioners Do

In its simplest form, an air conditioner transfers heat and humidity from the home outside while cooling and circulating the inside air to provide a comfortable environment.



Types of Air Conditioners

There are three basic types of home air conditioner that are typically used in Canada. There are "central" or "split" air conditioning systems that are built into the home, combined with a "forced air" heating system.

There are ductless or "mini-split" air conditioners typically used in homes that do not have furnace ductwork, such as those equipped with a boiler or baseboard electric heat.

And then there are "room air conditioners" that typically fit into a

window opening. These are inexpensive, but they can be noisy, inefficient and provide uneven cooling.

If you are having air conditioning installed in a home that doesn't currently have it, it is important to know the alternatives.

Split system

The most common type of system in Canadian homes is the central or split system. The actual air conditioner, or "condensing unit," is located outside the home, typically on a concrete pad/patio stone, or mounted on brackets to the wall of the house. It is connected by small diameter copper pipes, or "lines," that carry refrigerant to the indoor unit or "evaporator coil" – sometimes also referred to as an "A-coil" – that is typically mounted in the ductwork above the furnace. In addition to cooling, the coil removes humidity from the air. The moisture or "condensate" flows through a tube to a nearby drain.

The cooled refrigerant returning from the outdoor unit cools the coil which in turn cools the air. The furnace fan circulates the cooled air throughout the home, using the same ducts as for heating. The temperature is typically controlled by a dual-purpose heating/cooling thermostat. Programmable thermostats that allow

the homeowner to pre-set the air conditioning to cool the home when people are active in the home and let it warm when the house is vacant can help reduce cooling costs.

Mini-Split Systems

Probably the next most common type of air conditioning system is the ductless mini-split unit. This technology is advancing rapidly and is very popular in homes that don't have ductwork for the heating system, such as those heated with a boiler or electric baseboards.

Like the split system, the mini-split has an outdoor condensing unit that removes heat from refrigerant coming back through refrigerant lines and sends cooled refrigerant back into the home. However, the indoor unit is self contained with its own fan to distribute the cooled air. The indoor unit is typically attached to the ceiling or high on a wall and is often controlled with a remote.

Mini-split systems are available in a number of configurations and capacities, often using multiple indoor units, with one on each floor, for example. Ductless units can also be added to a specific area of a home or office that generates excessive heat, such as a computer room.

Hi-Velocity Systems

Many homes, townhouses in particular, have been built in recent years with high-velocity systems. These compact units, which often combine heating and air conditioning, fit into a small space like a closet or an attic and use small diameter pressurized ducts that can easily fit within conventional wall framing to circulate cooled air throughout the home.

Because they are compact and don't require traditional ductwork, they are becoming increasingly popular with new home builders.

Packaged Units

There is a forth type that is very common in commercial buildings, but only occasionally used in homes. These "single-packaged units" consist of all the components of a split air conditioning system in one unit. They generally mount through the wall or roof and, like the split system, move the cooled air through the home via sheet metal ducts.

Different Rooms, Different Temperatures

Sometimes it's nice to have different temperatures in different rooms or different areas of the house. This can be achieved by "zoning" the air conditioning system. There are a number of reasons to do this. In a multiple-storey home, the top floor is likely to require more cooling than the main floor, which in turn requires more cooling than the basement. As well, different people have different comfort levels. A comfortable temperature for one person might be too warm or too cool for another.

One of the common reasons for zoning today is to save energy. It makes sense to cool only those rooms that are actually in use – the living room or family room and kitchen during the day; the bedrooms at night. A programmable thermostat can be set up to automatically change the cooling emphasis through the day and night.

Any central air conditioning system can be zoned. With the split and high velocity systems, dampers in the ductwork automatically open and close to direct the cooling where it is needed. With a mini-split system, a separate indoor unit would be installed in each zone.

And while it is possible to create a separate zone for every room in a home, the result would be an extremely complex and expensive system. The more common approach is to divide a home into individually cooled zones by floor. In a two-storey house, the basement, main floor and upper floor would each have its own thermostat or programmable control.

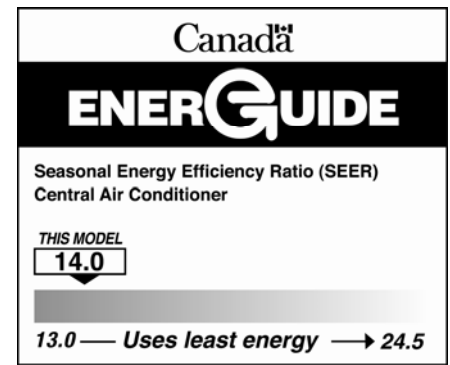
Energy Efficiency

Large strides have been made in air conditioner efficiency in recent years. As a result, many homeowners purchase a new air conditioner not just for a more comfortable home environment and quieter operation, but to reduce their electricity bills.

Air conditioner efficiency is rated by the unit's Seasonal Energy Efficiency Ratio, or SEER. The higher the number the greater the efficiency and the less it costs to operate the system. An air conditioner's SEER rating is determined by dividing the total cooling achieved over a year divided by the amount of energy used to generate that cooling.

In Canada, central air conditioners are covered by the federal government's Energy Efficiency Regulations, which came into effect in 1995. The minimum allowable efficiency level is 13 SEER. Units with a rating of 14.5 or higher will have an Energy Star designation. Energy Star is an international symbol applied to equipment that achieves a premium level of energy efficiency. Some of today's central air conditioners are rated as high as 25 SEER. Also look for the EnerGuide rating system which provides you with a standardized method of comparing the energy-efficiency of different models and brands of EnerGuide rating label that

can be found in manufacturer's product literature.



Visit <http://hrai.ca/PDFs/energuideestar-1.pdf> for more information on Energy Star.

There is another rating system that is sometimes used. The Energy Efficiency Ratio (EER) is a measure of how much cooling is provided for a given amount of electricity consumption. As with SEER, the higher the number the more efficient the unit.

Some of today's air conditioners use high efficiency – and quiet – electronically commutated motors (ECM). They use substantially less electricity than older motors.

Your contractor must carefully size the system to suit your home and ensure the different components in the system are designed to work together. More information on sizing systems is available at <http://www.hrai.ca/PDFs/factsheets/ChosetheRightSize.pdf> while details on matched systems can be obtained at <http://www.hrai.ca/PDFs/factsheets/MatchedSystems.pdf>.

Rebate Programs

The minimum allowable level may be 13 SEER, however various provincial government and utility rebate programs encourage the installation of higher efficiency equipment by providing rebates to the homeowner. An installation may qualify for multiple rebates which can substantially reduce the homeowner's cost of installing a new air conditioner. Visit

<http://oee.nrcan.gc.ca> for more information on rebate programs.

Choosing a Contractor

Choosing the right contractor is a critical step. A good contractor will make a detailed analysis of your existing system and make recommendations to replace it. The contractor will talk to you about your needs, your concerns with the previous system if any, and recommend equipment for your home.

While getting several quotes is a wise strategy, it is important to ensure that those quotes are equivalent. Ask for a written quote that details the equipment that the contractor intends to install, warranties and safe disposal of the old equipment. A lower bid may mean substandard equipment that will not meet your comfort and efficiency needs.

Consider consulting a member contractor of the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). HRAI Contractors Division members are required to carry relevant trade and municipal licensing, liability insurance, workers' compensation and must adhere to a code of ethics that includes developing and maintaining an understanding of proper equipment selection. For more information, visit www.hrai.ca and click on "contractors." The "Contractor Locator" on this site will help you find pre-screened contractors in your area.

Care and Maintenance

It is important to maintain your air conditioning equipment to ensure long life, maximum efficiency and a comfortable indoor environment.

There are a number of things the homeowner can do. Any regular furnace filter should be inspected, cleaned or replaced once a month during the cooling (and heating) seasons. A dirty filter increases energy use and reduces cooling efficiency.

As well, a qualified technician should be called in once a year to check and service your air conditioner. He or she

will inspect the condensate drain and electrical connections, clean both indoor and outdoor components, check the refrigerant pressures and levels, adjusting if necessary and clean and adjust the blower components.

Failure to do these checks and adjustments annually may result in reduced cooling efficiency of the unit and may cause noisy running, excessive energy use, odours, dust and other symptoms of poor maintenance. In other words, maintenance should be performed as per the manufacturer's specifications.

Carefully selected and maintained, a central air conditioner should provide quiet, efficient and reliable cooling for 10 to 15 years.

We hope that this information will help make your purchase and use of an air conditioner a positive and painless and painless experience that brings the cooling comfort you desire. A central air conditioner is a big ticket purchase for most home owners. But when the temperatures soar as spring turns to summer, it's a purchase that every member of the family, including your pets, will find most welcome!