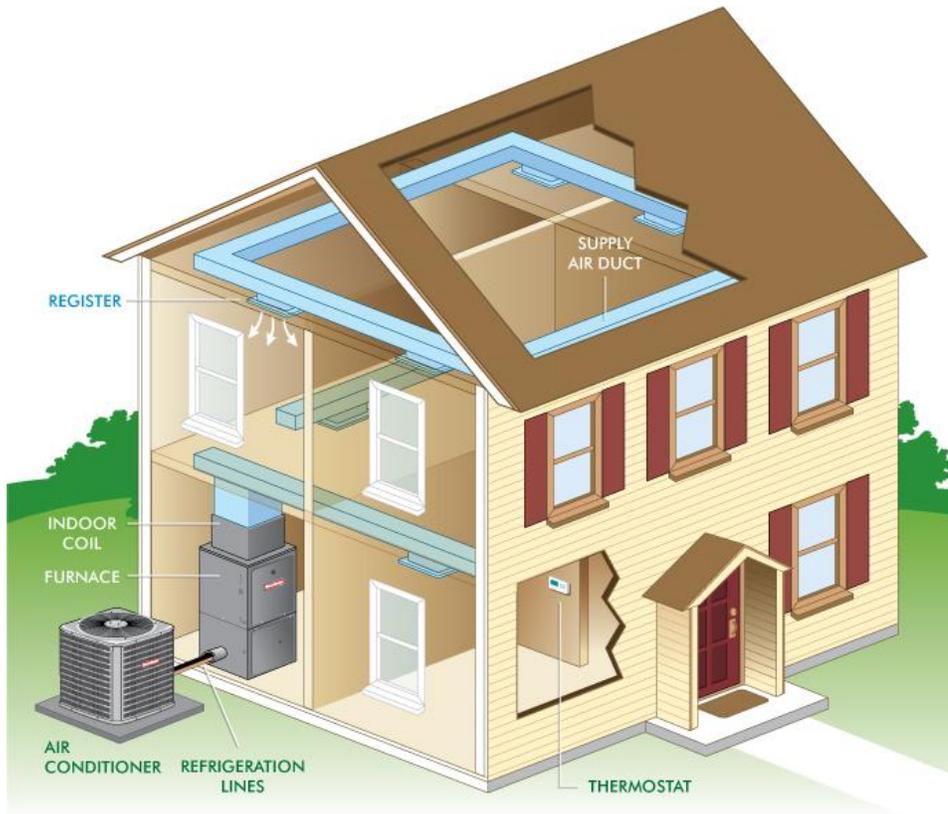


## How a Central Air Conditioner Works



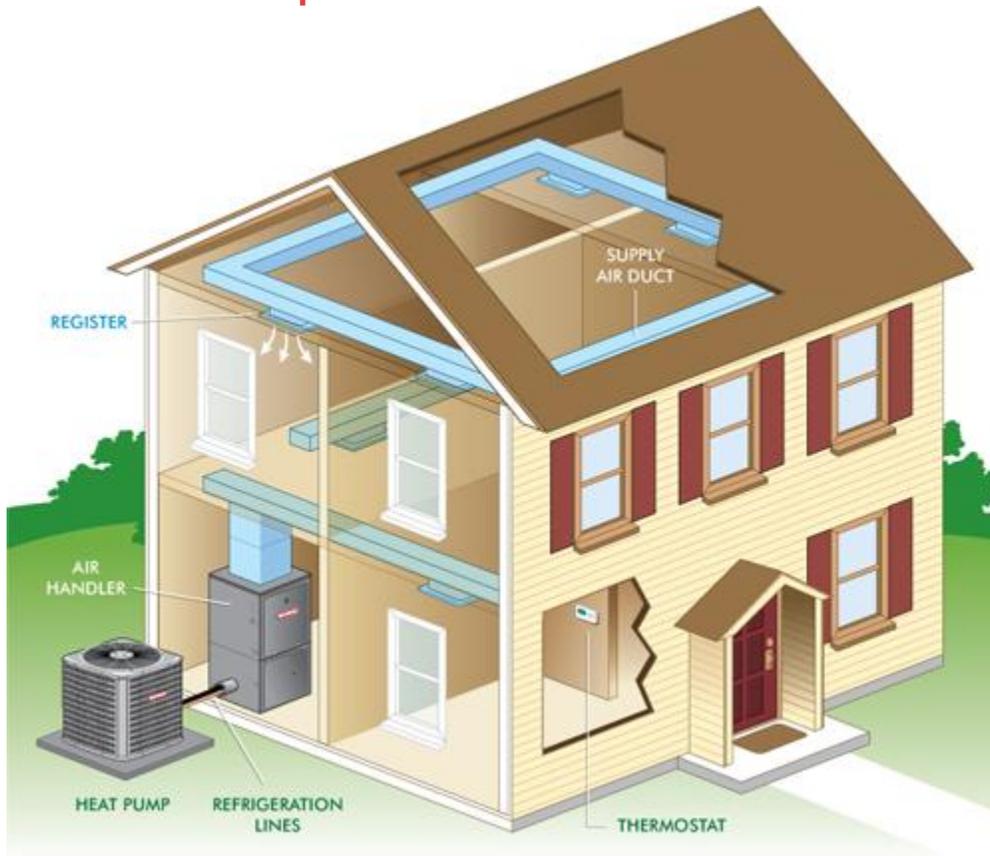
### Facts:

- The typical central air conditioning system is a split system, with an outdoor air conditioning, or "compressor bearing unit" and an indoor coil
- Using electricity as its power source, the compressor pumps refrigerant through the system to gather heat and moisture from indoors and remove it from the home.
- Heat and moisture are removed from the home when warm air from inside the home is blown over the cooled indoor coil. The heat in the air transfers to the coil, thereby "cooling" the air.
- The heat that has transferred to the coil is then "pumped" to the exterior of the home, while the cooled air is pumped back inside, helping to maintain a comfortable indoor temperature.
- Central air conditioning can also be provided through a package unit or a heat pump

### Benefits:

- **Indoor comfort during warm weather** - Central air conditioning helps keep your home cool and reduces humidity levels.
- **Cleaner air** - As your central air conditioning system draws air out of various rooms in the house through return air ducts, the air is pulled through an air filter, which removes airborne particles such as dust and lint. Sophisticated filters may remove microscopic pollutants, as well. The filtered air is then routed to air supply duct work that carries it back to rooms.
- **Quieter operation** - Because the compressor bearing unit is located outside the home, the indoor noise level from its operation is much lower than that of a free-standing air conditioning unit.

## How a Heat Pump Works



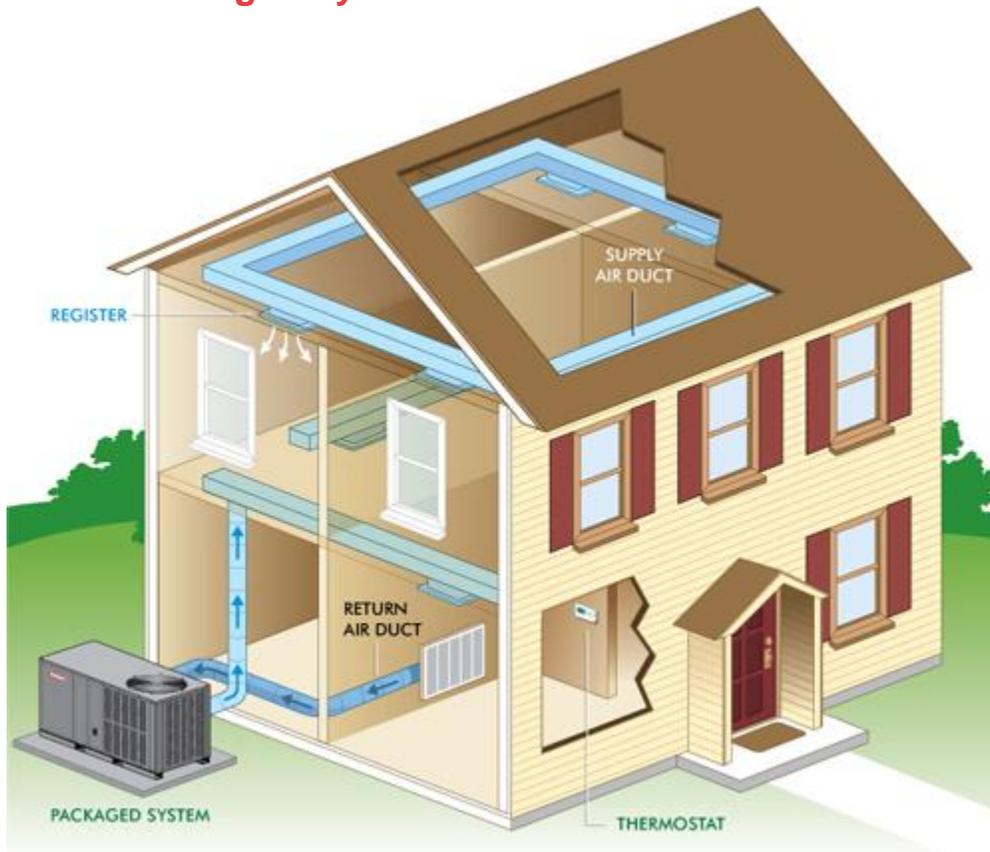
### Facts:

- Using electricity as its energy source, heat pumps are used for either the heating or cooling of your home by transferring heat between two reservoirs.
- In the warmer months, the heat pump acts like an air conditioner, removing heat from the air inside your home and transferring it outside.
- During colder months, heat from outdoor air is extracted and transferred to the interior of your home. Believe it or not, even a 32° Fahrenheit day produces enough heat to warm a home via a heat pump.

### Benefits:

- **Year-round, energy-efficient indoor comfort for moderate climates** - A central heat pump helps maintain comfortable temperatures inside your home and reduces humidity levels year-round. Homes located in regions with severely cold temperatures may either require supplemental heating or be better served with an air conditioner/furnace combination.
- **Cleaner air** - As your heat pump system draws air out of various rooms in the house through return air ducts, the air is pulled through an air filter, which removes airborne particles such as dust and lint. Sophisticated filters may remove microscopic pollutants, as well. The filtered air is then routed to air supply duct work that carries it back to rooms. Whenever the air conditioner is running, this cycle repeats continually, constantly filtering and cleaning the air in your home.
- **Quieter operation** - Because the compressor bearing unit of the typical central heat pump system is located outside the home, the indoor noise level from its operation is much lower than that of a free-standing air conditioning unit.

## How a Packaged System Works



### Facts:

- Package units are unique, all-in-one systems that supply both cooling and heating equipment in one "package." These units sit on the ground or rooftop outside of your home or business.
- Package units come in three forms:
  - Packaged heat pumps offer heating and cooling using heat pump technology.
  - Packaged air conditioners cool your home and can heat it as well, using electrical strip heat.
  - Packaged gas-electric units offer all-in-one air conditioning and natural gas-powered furnace performance.

### Benefits:

- **Space efficiency** - Unlike split-system units, all components of a complete heating and cooling system are contained in one location, making package units ideal for situations in which indoor space is at a premium.
- **Energy-efficient heating and cooling performance** - All Goodman package units offer 13 SEER or higher cooling performance. Our package gas/electric units offer 80% AFUE heating performance, as well.

## Frequently Asked Questions

### Why should I purchase a new heating or air conditioning system?

#### *Efficiency and cost savings*

- We realize that purchasing a heating or air conditioning system is no small matter. However, if your existing system is old, in need of repair or simply inefficient, purchasing a new unit, one which can be as much as 60% more efficient than a system purchased just 10 years ago, can offer long-term benefits.
- Rather than continuing to pay for ongoing maintenance and costly monthly bills, invest in a new system today that will save you money for years to come.

### How can I find the system that's right for me?

#### *Get the facts from an expert*

- There are many heating and air conditioning systems to choose from today. AATSI can draw on a vast degree of heating and air conditioning knowledge and experience to help you decide on the system that best fits your specific needs. The size and age of your home, as well as the number of rooms, climate, local and regional utility costs, and utility incentive/rebate programs are all factors that will affect the functionality and, therefore, selection of your system.
- Consumers seeking to replace an existing system often choose a new unit with equal or higher efficiency ratings compared to their previous system. Replacing a unit that is 10 to 15 years old may reduce electricity costs by 30 to 50%.
- Contact a us directly to help determine initial cost, warranty protection, service options, maintenance options, operating cost and proper installation.

### How do I determine the size, or capacity, of my HVAC system?

- Factors affecting the size of your new system include the climate in your region, humidity levels, the number of windows in your dwelling, total square footage of your home, the direction your home faces, the number of heat-producing appliances in your home, the type of insulation you have and the number of people that live in your residence.
- AATSI can perform the proper calculations to determine the appropriate heating or cooling unit for your home and lifestyle.

### What goes into installing a new system?

#### *It's all about the ductwork.*

- Putting a new system in a home that has not had central air and heat before will require the installation of ductwork, insulation, refrigerant piping, electrical service, wiring, thermostat, condensate piping, flue piping, flue terminations, chimney liner, slabs, filter, driers, registers, grills, drain pans and evaporator coil. Beyond equipment, the most important component installed with a new system, however, is the ductwork.
- Ductwork is composed of two parts, supply and return. Supply duct is attached to the outflow of the new system, delivering air to each zone in a home. The amount of air reaching each zone is determined by the size of supply ductwork connecting it to your system. Your dealer will help you determine the size of all the supply ductwork in your home.
- The second part of the ductwork, the return duct, attaches to the inlet of the new system and draws air out of the spaces to be heated or cooled. Attached to the return duct is the filter. The filter should be placed as near to the furnace or air handler as possible. Ductwork can be either fiberglass or metal and must be properly sized in order to evenly distribute the proper amount of air to each room.

## What happens when I replace my old system?

### *Start with a detailed inspection*

- To install the most efficient HVAC system in your household, a detailed inspection should first be performed by your installation contractor.
- The inspection by your contractor should include, as a minimum, the inspection of your home's ductwork, insulation, refrigerant piping, electrical service, wiring, thermostat, condensate piping, flue piping, flue terminations, chimney liner, slabs, filter, driers, registers, grills, drain pans and evaporator coil.

## How long will my system last?

### *Proper maintenance is key*

- Maintenance and service play a key role in the life-cycle of a heating or air conditioning system. If all recommended maintenance and service actions are taken, an air conditioner can last 12 to 15 years and a gas furnace 20 to 25 years.

## Do I need to change my indoor coil?

- It is generally a good idea to replace the indoor coil if you are also replacing your air conditioner or heat pump. There is a correlation between the efficiency of your heating or cooling system and the performance of the indoor coil and changing out the current indoor coil for a new one may be critical to optimizing the performance, the efficiency and the savings potential of your new system. Most municipalities have passed regulations prohibiting the replacement of the indoor coil only, and the outdoor condenser only can be changed as a single piece in limited areas, as well. Check with AATSI or your local municipality for more information.

## Where can I locate my air handler or furnace system?

### *You may have options based on your home's design*

- The system can actually be located in several different places. A system with up-flow application might be located in the basement, while a system with a horizontal application may be found in your attic. A self-contained, or single package unit, could be located outside on a slab or on the roof. Your garage could house an up-flow, down-flow or horizontal application system.

## What is a heat pump?

### *Air movement from point A to point B*

- A heat pump is a device used for either the heating or cooling of a space by transferring hot and cold between two reservoirs.
- A heat pump can act like an air conditioner, transferring heat from inside to out, or like a heater as it transfers exterior heat to the interior. A winter day with a temperature of 32° Fahrenheit still produces enough heat to warm a space when the air is transferred by heat pump.

## What can I do to control the humidity levels in my home?

### *It's all about variability*

- Humidity levels can be reduced by using a variable-speed furnace or air handler as part of your HVAC system. Variable speed units run longer, at lower speeds, allowing air to constantly circulate against the cooling coil and remove more moisture.
- Variable-speed motors also use less electricity than regular motors, reducing your energy costs.

### What can I do before calling someone to service my system?

HVAC systems are complicated networks of machinery that should be serviced by a certified professional. However, if your HVAC system seems to be malfunctioning, you can try a few basic steps, which *may* correct your problem, prior to calling a service professional. If you do not feel comfortable performing any of these tasks, however, do not hesitate to call an HVAC contractor.

- Disconnect and reconnect your indoor and outdoor switches.
- Make sure your circuit breakers are in the ON position.
- Make sure your filters are clean.
- Open supply and return vents and make sure they are unobstructed.
- Check the settings on your thermostat.
- If a de-humidistat is installed, be sure it is in the "ON" position
- Make sure the system switch is on the appropriate COOL or HEAT setting.

### What is AFUE?

- AFUE is the abbreviation for Annual Fuel Utilization Efficiency ratio. AFUE is used to rate furnace efficiencies by dividing the ratio of heat output by heat input. This measurement describes how well fuel, gas or oil is consumed to produce heat by a furnace. As the AFUE rate increases, the efficiency of your furnace also increases, lowering your fuel costs. Furnaces manufactured in the United States are required to have at least an 80% AFUE.

### What is HSPF?

- HSPF is the abbreviation for the Heating Seasonal Performance Factor, which is a rating of the efficiency level of the heating operation of a heat pump. The higher the HSPF, the more efficient the heating performance of a heat pump. New units in the United States have HSPF ratings from 7.0 to 9.4.

### What is R-22?

- R-22 is the common name for hydro-chlorofluorocarbon (HCFC). R-22 has been used as a refrigerant by HVAC manufacturers for over 40 years, but studies in the past decade have shown that HCFCs contain chlorine, an ozone-depleting agent. For this reason, the United States Clean Air Act has set a target date for January 1, 2010, on which HVAC manufacturers must cease the production of products that use R-22.

### What is R-410A?

- R-410A is the common name for an emerging hydro-fluorocarbon (HFC) that is being used as a refrigerant in the HVAC industry. R-410A is more environmentally friendly than R-22 and is being seen as the most likely replacement for R-22 by HVAC manufacturers. At the beginning of 2010, the use of alternate refrigerant will be required in HVAC manufacturing.

### What is ENERGY STAR?

- ENERGY STAR is a program that was created by the US Environmental Protection Agency (EPA) to help businesses and individuals make energy efficient purchases.
- This program places the ENERGY STAR label, a small blue and white logo, on items that meet superior energy efficiency standards. This label provides an easy way for consumers to identify quality, high efficiency products.
- For more information about the Energy Star program, please view their website at [www.energystar.gov](http://www.energystar.gov).

## Why should I perform preventive maintenance?

- Heating and cooling systems work incredibly hard to perform their functions for your household. The constant stopping, starting and continual operation can wear down a machine quickly and unexpectedly if the proper care and maintenance is delayed. However, by performing preventive maintenance, or servicing your system regularly, you can maximize the lifecycle of your heating or cooling unit and guard against many unexpected failures
- Preventive maintenance inspections performed on a regular basis can uncover leaks, rust, rot, soot, frayed wires and corroded electrical contacts.

## What equipment requires preventive maintenance?

- At least once a year, we suggest that homeowners schedule a professional tune-up for the central heating and cooling system in their home.
- Most manufacturers require routine maintenance to be performed by a licensed professional at least once per year to keep their limited warranty in effect.
- Heat pump and air conditioning unit inspections should include inspections of the fan, compressor, indoor coils, outdoor coils and refrigerant lines.

## What type of filter should I use?

- Standard furnace filters work well to keep your system and its ductwork clean, but they don't really improve indoor air quality. To do that you need a media filter. The media filter rests between the main return duct and the blower cabinet and will improve dust and particle removal by seven times that of a standard furnace filter. However, upgrading to a pleated media filter will remove everything from insecticide dust to airborne viruses from the filtered air.
- A media filter can have a life exceeding two years, and its only drawback is that its tight fiber weave can cause your furnace to have to work harder to blow air through the house. Always choose a filter that matches your blower's capacity.

## What are the preventive maintenance measures for my ducts?

- Although modern technology has made significant advances in air filters over the past decade, a fractional amount of dust still finds its way past heating and cooling filters and into your home's ducts. As this dust accumulates throughout your home, it creates the perfect environment for the growth of mold, mites and harmful bacteria. To check your ducts for dust buildup, pull off several supply and return registers and see how much dust has accumulated in the system. If you choose to clean your system, your best option is to contact a professional duct cleaner.
- Although duct cleaning has little effect on the actual air quality, it will eliminate a house-wide breeding ground for harmful bacteria and mold in addition to helping your heating and cooling system operate more efficiently. If you are installing a new system, you should consider sanitizing or completely replacing the ducts at the same time. New systems are often more powerful than old systems and can stir up dust that is sitting in the existing ductwork, therefore we do not recommend or endorse ductwork cleaning.

## What is the most efficient way to run my heating and cooling system?

Here are several tips to help you keep your system running at its most efficient level:

- Keep your thermostat at a constant temperature; the recommended temperature is 78°, even when no one is home.
- Change your filters every month.
- Check the outside condensing unit regularly for any grass clippings or leaves stuck to the coil. If it is dirty:
  - Disconnect the power at the circuit breaker FIRST!
  - Use a shop-vac with a brush attachment to vacuum off the debris.
  - Run water from a garden hose through the coil until the water passing through it is clear.
  - Turn the power back on.
- Have the unit serviced once per year by a licensed service company.