

air conditioners

how to choose a cooling system



taking responsibility

As an individual, your efficient use of energy brings benefits such as lower bills, improved comfort levels in your home and a reduced personal impact on the environment.

Acting together, our individual choices add up—for the benefit of our community, our environment and our energy future. That's the power of working together.

As your community energy company, we are committed to sharing our experience and energy expertise. You can always contact us for:

- Answers to your energy questions.
- Energy-efficiency information and advice.
- Help in evaluating energy-saving options.
- Assistance in finding energy-efficient products.

How to stay cool

There are many options to consider when selecting home cooling equipment. This booklet aims to give you a higher level of comfort with the decisions you make. We take a look at the three types of air conditioners—whole-house fans, central air and room units—and share energy-saving advice for each. For more information, please visit mge.com or call us at 252-7117.

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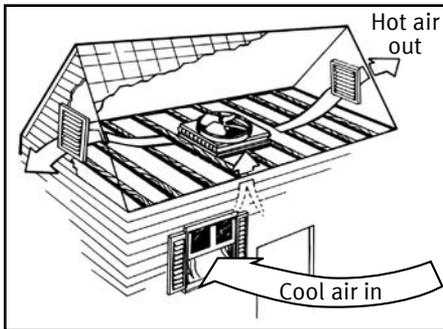
Cooling options

Look at all the options before deciding how to keep your home cool during the summer. The wrong choice may cause disappointment and put an unnecessary drain on your energy budget. Choose from three types of cooling equipment:

- Whole-house fans pull heat out of the house and draw cooler air in through open windows.
- Central air conditioners cool and dehumidify the entire house.
- Room air conditioners cool and dehumidify one or two rooms.

Whole-house fans

Whole-house fans pull cool air in through open windows and doors and expel warm air through attic vents. They cool the entire home but don't dehumidify. If you're allergic to pollen, whole-house fans aren't a good choice unless you place filters



The cool air is pulled in and hot air is exhausted outdoors.

in the open windows.

Whole-house fans are far less expensive to operate than central air conditioners. A mid-efficiency air conditioner costs about \$150 per year to operate while a whole-house fan costs only \$25 per year.

Purchasing and installing fans

Whole-house fans are sold by most home building centers and some department stores. Electrical and carpentry skills are required to install the fan. Ask the dealer for details.

Practical features include:

- Variable speeds for comfort and noise control.
- Timer or thermostat for automatically starting and stopping the fan.
- Insulated airtight cover to stop winter heat loss.
- Automatic shutoff to turn off fan in case of fire.
- Certification by Home Ventilating Institute (HVI) and Underwriters Laboratory listing.

How to size a whole-house fan

Determine the total square footage of living space. Multiply the length times the width of each floor. Exclude the basement, garage and attic. Multiply the square footage by “3” for 8-foot ceilings. A larger fan is needed for homes with higher ceilings. The fan should ventilate the entire home. Fan capacity is measured in cubic feet per minute (CFM).

Example: House dimensions: 40' x 50'
Square footage: $40' \times 50' = 2,000$ square feet
 $2,000 \times 3 = 6,000$
Minimum fan capacity = 6,000 CFM

Attic exhaust vents

A whole-house fan requires attic vents to exhaust hot air. To determine the necessary square footage of attic vents, divide the fan's CFM rating by 750.

Example: Fan capacity: 6,000 CFM
 $6,000 \div 750 = 8$ square feet

Room air conditioners

A correctly sized room air conditioner can cool and dehumidify one or two rooms. Portable fans placed in doorways of air-conditioned rooms may pull cool air into other rooms.

Sizing

The cooling capacity of room air conditioners is expressed in British thermal units per hour (Btu/h). Use the chart on the next page to find the size needed.

Air conditioners should be properly sized. Units that are too small have trouble cooling on hot days. Units that are too large cool quickly but dehumidify poorly, making the room feel cool and clammy.

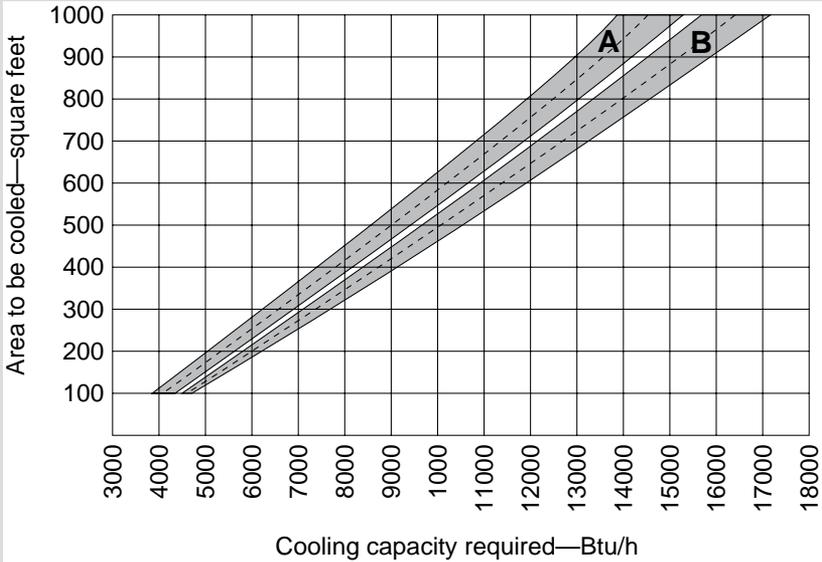


Make sure the air conditioner fits the window.

Efficiency

Look for the ENERGY STAR® and EnergyGuide labels. The higher the energy efficiency rating (EER), the more efficient the air conditioner. MGE recommends purchasing an ENERGY STAR model.

Sizing guide - square feet method



Size selection guide

To calculate the size of the room air conditioner:

1. Determine the area to be cooled by multiplying each room's length by its width. Add room areas. This is the area to be cooled.
2. Determine the type of ceiling in the area to be cooled. If the ceiling has occupied space above it, choose Band "A" on the chart. If the ceiling is insulated and is directly under an attic, choose Band "B."
3. Move within the band to adjust for exposure: left for a northerly or well-shaded exposure or right for a westerly exposure.
4. Move to the bottom of the chart to determine the Btu/h required.
5. Adjust for use patterns. Mostly night use reduces Btu/h required by about 30%. To calculate, multiply Btu/h from the chart by 0.7.

Energy-saving tips

- Seal around the unit so cool air cannot escape.
- Give the unit time to cool the room. Setting the temperature lower won't cool the room faster—it just costs more.
- Turn off the air conditioner and open windows to bring in cool night air.
- Keep window coverings closed during the day to keep out the sun's heat.
- Clean the filter during high-use periods. Clean the outdoor cooling fins annually.
- Use a timer to turn on the air conditioner just before you get home. Some newer air conditioners have timers that save



energy and cut the demand for electricity.

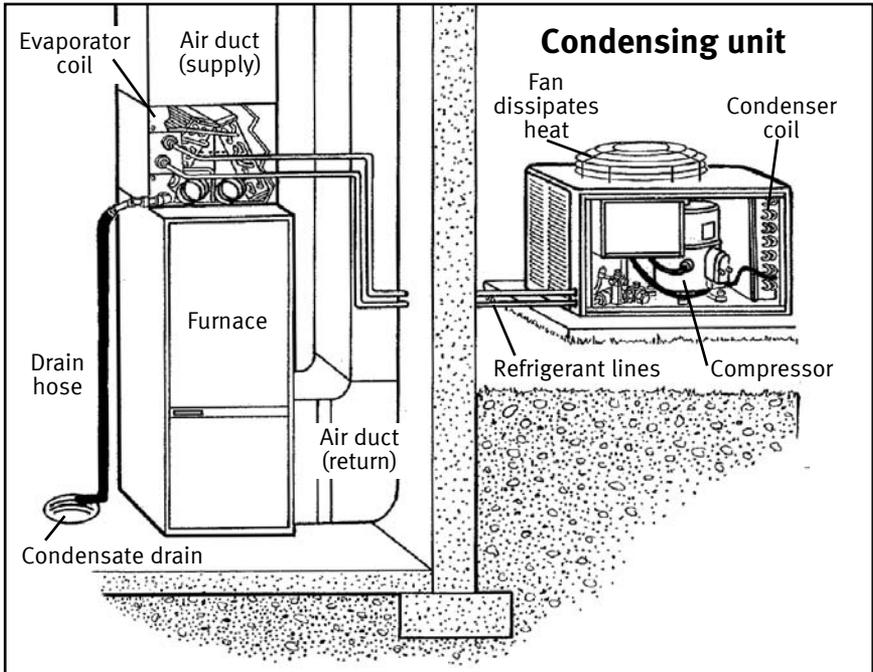
- Remove window air conditioners in the fall to reduce cold drafts.
- Put an insulated and weather-stripped interior cover on through-the-wall air conditioners in the fall.

Room vs. central air-conditioning

Want more than just a few rooms cooled? Look at central air-conditioning or a whole-house fan.

Central air conditioners

Almost any home can have a central air conditioner installed. Most central air conditioners make use of existing furnace ductwork. If you don't have a forced-air furnace, see "Special cooling systems" on page 11.



The evaporator coil cools and dehumidifies the house air that is blown through it by the furnace fan. Refrigerant cools the evaporator coil. The liquid refrigerant is sent to the evaporator coil by the compressor. Warmed refrigerant gas returns to the condensing unit where the heat from the house is released outdoors.

Sizing

The contractor must size the air conditioner correctly. A unit that is too small may not cool the home on hot days. A unit that is too large costs more to purchase and cools rapidly without dehumidifying. It also runs less efficiently.

Central air conditioners are sized by the ton: 1 ton = 12,000 Btu/h. If contractors recommend different sizes, ask them to explain their sizing recommendations. Oversizing is a more common problem than undersizing.

Accurate sizing also depends on you. Tell the contractor about problems such as uneven cooling or if you plan to build an addition.

Efficiency

The higher the seasonal energy efficiency rating (SEER), the more efficient the unit. The current minimum SEER is 13. ENERGY STAR central air conditioners have a SEER of at least 14.

The SEER changes with different condensing unit and coil combinations. Ask contractors to verify the SEER of the combination they recommend.

Dehumidification

For better comfort during humid weather:

- Don't run the furnace fan continuously.
- Use exhaust fans to remove moisture from showering and cooking.
- See MGE's brochure *Dehumidifiers and Humidifiers* for more information.

Other considerations

- Plan for: (1) The noise the unit will make (ask for a sound rating). Try to keep the unit away from bedroom windows. (2) The amount of shade the unit will have. North and east sides are best.
- Replace electric appliances with natural gas models as an alternative to upgrading the electric service to handle an air conditioner.
- Look for models with a TXV (thermal expansion valve).
- Ask about models with “scroll compressors.” They have fewer moving parts and tolerate difficult operating conditions better.
- Install additional return registers near the ceilings to get adequate air flow. (The hot air near the ceiling is pulled back to the air conditioner instead of the cool air near the floor. Registers with dampers allow closing floor returns in the summer.)
- Ask the installer about an access panel in the ductwork over the furnace for cleaning the evaporator coil. Also ask whether a cover over the outside condensing unit is needed during the winter.

Choosing a contractor

Get bids from three different installers. Your contractor should make sure the air conditioner has the proper refrigerant charge and airflow.

Ducts

Leaky ducts should be sealed with foil tape or water-based duct sealant. Despite its name, duct tape doesn't seal well. Ducts that run through attics, garages, etc., should be both sealed and insulated.

Energy-saving tips*

- Check the furnace filter every month.
- Check the drain hose to make sure water drains freely.
- Close lower return registers for better cooling if you have return registers near the ceiling.
- Hose off the outdoor condensing unit in the spring to remove dirt and leaves.
- Set the thermostat at 78 degrees. Every degree lower increases the operating cost.
- Give the unit time to cool the home. Setting the temperature lower won't cool the house faster—it just costs more.
- Turn up the temperature (to about 85 degrees) or turn off the air conditioner when leaving. Install a setback thermostat to cool the house before getting home.



- Run a whole-house fan instead of the air conditioner. It pulls cool outside air into the house.
 - Have the system serviced every two years. Choose a qualified contractor.
- *Note: Shut off the power at the fuse or breaker box for maintenance or cleaning.

Special cooling systems

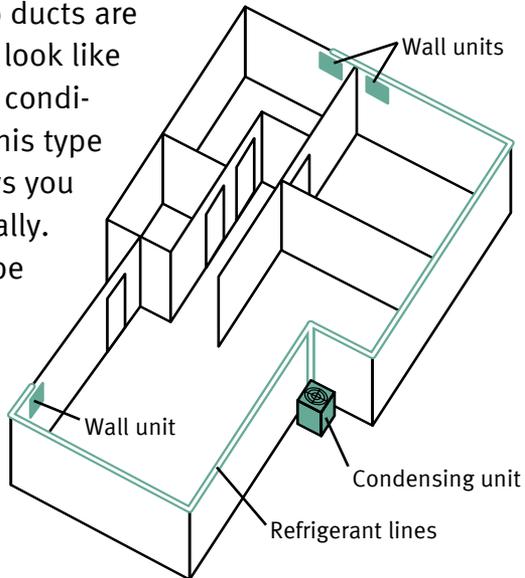
For houses without forced-air heat, air-conditioning is possible. Attic ductwork or ductless split systems can be added.

Attic-mount system

This system has the condensing unit outdoors. The condensing unit sends the liquid refrigerant to an evaporator coil and blower located in the attic. The cool air is distributed through small vents in the ceiling. The special ductwork and blower in the attic add to the expense of these systems.

Ductless split system

A ductless system has the condensing unit outdoors. The condensing unit is connected to up to three wall units, each with its own evaporator coil and fan. These wall units are connected to the outdoor condensing unit by a small hose running through the wall, so no ducts are needed. The wall units look like wall-mounted room air conditioners, only thinner. This type of air conditioner allows you to cool rooms individually. Ductless systems can be expensive.



Ductless split system

Power Control for central air conditioners

Air-conditioning creates an intense need for electricity on the hottest days of the year. To help meet this need, MGE developed the Power Control program to provide emergency reserves. MGE pays participants \$8 per hour when their air conditioners are shut off.

Join Power Control and MGE will install an electronic switch on or near the compressor of your air conditioner. When a need for reserve power occurs, MGE sends a radio signal to shut off the compressor. When the need has passed, the air conditioner will be turned back on again.

We estimate Power Control will be used once every 10 years.

For more information or to sign up for Power Control, call MGE at 252-7117 or e-mail at askexperts@mge.com.

Look for this symbol when you shop



ENERGY STAR labeled products use less energy, reduce your energy costs and help to protect the environment. We're an ENERGY STAR partner. Learn more about qualifying products at www.energystar.gov or call the MGE Home Energy Line at 252-7117.

Resources

Focus on Energy
1-800-762-7077
www.focusonenergy.com

listening. learning.

MGE takes responsibility to provide information and education to serve our customers and stakeholders. We educate customers today to help inform their decision making. We educate tomorrow's stakeholders so they can help plan our energy future.

If we all reduce our central air conditioner use by just 10% in the summer, we can save 10 million pounds of coal.

Working together we can make a difference.

Contact us for information about:

- Heating/Air-conditioning.
- Insulating/Weatherizing.
- Lighting.
- Windows/Doors.
- Appliances.
- Water heating.

Get more home energy information at:

- mge.com/home.
- Home Energy Line 608-252-7117.
- 1-800-245-1125.

Questions about billing? Call:

- 608-252-7222.
- 800-245-1125.

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