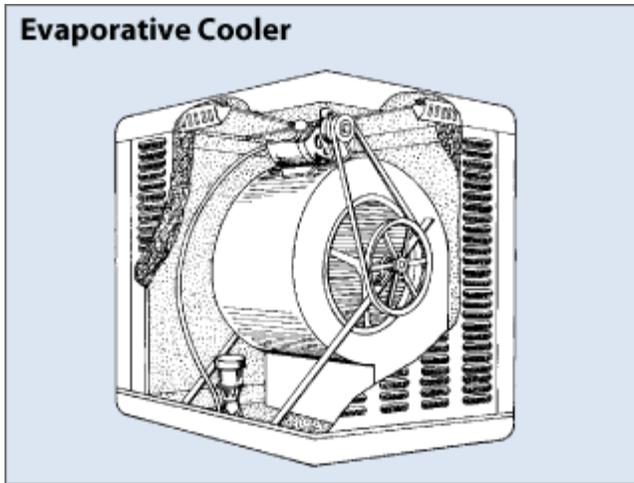


Evaporative Coolers

In low-humidity areas, evaporating water into the air provides a natural and energy-efficient means of cooling. Evaporative coolers, also called swamp coolers, rely on this principle, cooling outdoor air by passing it over water-saturated pads, causing the water to evaporate into it. The 15°- to 40°F-cooler air is then directed into the home, and pushes warmer air out through windows.



When operating an evaporative cooler, windows are opened part way to allow warm indoor air to escape as it is replaced by cooled air. Unlike [central air conditioning systems](#) that recirculate the same air, evaporative coolers provide a steady stream of fresh air into the house.

Evaporative coolers cost about one-half as much to install as central air conditioners and use about one-quarter as much energy. However, they require more frequent maintenance than refrigerated air conditioners and they're suitable only for areas with low humidity.

Sizing and Selection

Evaporative coolers are rated by the cubic feet per minute (cfm) of air that they deliver to the house. Most models range from 3,000 to 25,000 cfm. Manufacturers recommend providing enough air-moving capacity for 20 to 40 air changes per hour, depending on climate.

Installation

Evaporative coolers are installed in one of two ways: the cooler blows air into a central location, or the cooler connects to ductwork, which distributes the air to different rooms. Central-location installations work well for compact houses that are open from room to room. Ducted systems are required for larger houses with hallways and multiple bedrooms.

Most people install down-flow evaporative coolers on the roofs of their houses. However, many experts prefer to install ground-mounted horizontal units, which feature easier maintenance and less risk of roof leaks.

Small horizontal-flow coolers are installed in windows to cool a room or section of a home. These portable evaporative coolers work well in moderate climates, but may not be able to cool a room adequately in hot climates. Room evaporative coolers are becoming more popular in areas of the western United States with milder summer weather. They can reduce the temperature in a single room by 5° to 15°F.

Small, portable evaporative coolers on wheels are now available as well. Although the units have the advantage of portability, their cooling ability is limited by the humidity within your home. Generally, these units will provide only a slight cooling effect.

Operation

An evaporative cooler should have at least two speeds and a vent-only option. During vent-only operation, the water pump does not operate and the outdoor air is not humidified. This lets you use the evaporative cooler as a [whole-house fan](#) during mild weather.

Control the cooler's air movement through the house by adjusting window openings. Open the windows or vents on the leeward side of the house to provide 1 to 2 square feet of opening for each 1,000 cfm of cooling capacity. Experiment to find the right windows to open and the correct amount to open them. If the windows are open too far, hot air will enter. If the windows are not open far enough, humidity will build up in the home.

You can regulate both temperature and humidity by opening windows in the areas you want to cool, and closing windows in unoccupied areas. Where open windows create a security issue, install up-ducts in the ceiling. Up-ducts open to exhaust warm air into the attic as cooler air comes in from the evaporative cooler. Evaporative coolers installed with up-ducts will need additional attic ventilation.

Optional filters remove most of the dust from incoming air -- an attractive option for homeowners concerned about allergies. Filters can also reduce the tendency of some coolers to pull water droplets from the pads into the blades of the fan. Most evaporative coolers do not have air filters as original equipment, but they can be fitted to the cooler during or after installation.

Evaporative Cooler Maintenance

Save yourself a lot of work and money by draining and cleaning your evaporative cooler regularly. Build-up of sediment and minerals should be regularly removed. Coolers need a major cleaning every season, and may need routine maintenance several times during the cooling season.

The more a cooler runs, the more maintenance it will need. In hot climates where the cooler operates much of the time, look at the pads, filters, reservoir, and pump at least once a month. Replace the pads at least twice during the cooling season, or as often as once a month during continuous operation.

Some paper and synthetic cooler pads can be cleaned with soap and water or a weak acid according to manufacturer's instructions. Filters should be cleaned when the pads are changed or cleaned. Be sure to disconnect the electricity to the unit before servicing it.

Two-Stage Evaporative Coolers

Two-stage evaporative coolers are newer and even more efficient. They use a pre-cooler, more effective pads, and more efficient motors, and don't add as much humidity to the home as single-stage evaporative coolers. Because of their added expense, they are most often used in areas where daytime temperatures frequently exceed 100°F.

Drawbacks of Evaporative Coolers

Evaporative coolers should not be used in humid climates because they add humidity to the air in your home. Also, they cool your house down to a higher temperature than an air conditioner would, and they require simple maintenance about once a month. If the cooler is installed on the roof, there is some roof deterioration caused

by routine maintenance trips. A sunlit rooftop cooler will be about 1°F less effective than a shaded cooler. Rooftop maintenance also requires using a ladder, which may be an inconvenience.

By their nature, evaporative coolers also continually use water. In areas with limited water supplies, homeowners may be concerned about the water-use impact of adding an evaporative cooler.

Handout provided by <http://energy.gov/energysaver/evaporative-coolers>