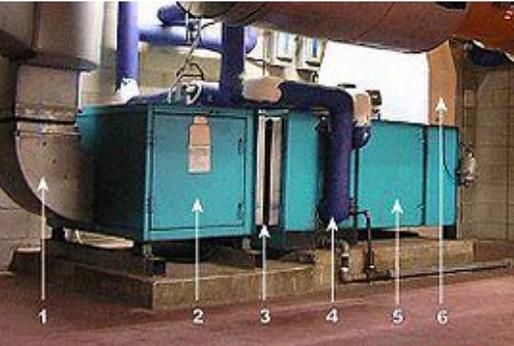


HVAC Systems

Understanding HVAC Systems and their components

Alphabetical Order	How they work	How to Save Energy	Energy Star Requirement as of July 2010
<p>Air Conditioner (window unit)</p> 	<p>Room air conditioners, sometimes referred to as window air conditioners, cool rooms rather than the entire home or business.</p>	<p>Proper sizing is very important for efficient air conditioning. If possible, install the unit in a shaded spot on your home's north or east side and away from heated appliances. Consider using a ceiling fan to spread air evenly.</p>	<p>With louvered sides: EER of 10.7 or greater</p> <p>Without louvered side: EER of 9.9 or greater</p>
<p>Air Handler</p> 	<p>The inside unit of an air conditioning unit is the air handler. It is usually used in place of a gas furnace and is just as cost efficient. The air handler is the unit that circulates air.</p>	<p>Match with outdoor unit; these two air condition parts can result in insufficient heating and air conditioning. A heat recovery device can be added as well as variable speed air handlers.</p>	<p>*Common standards are: Variable Speed, 16-18 SEER</p>
<p>Air Filters</p> 	<p>A particulate air filter is a device composed of fibrous materials which removes solid particulates such as dust, pollen, mold, and bacteria from the air.</p>	<p>Check filter every month, especially during winter and summer. At minimum, change the filter every 3 months. Dirty filters will slow down air flow and make the system work harder.</p>	<p>*US Department of Energy recommends MERV 13</p>

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<p style="text-align: center;">Boilers</p> 	<p>Heat is generated by burning coal, oil, natural gas, or propane, for example.</p> <p>Boilers use water instead of air to move heat through the house.</p>	<p>Consider these improvements for energy savings:</p> <ul style="list-style-type: none">-electric ignition, which eliminates the need to have the pilot light burning all the time-new combustion technologies that extract more heat from the same amount of fuel-sealed combustion that uses outside air to fuel the burner, reducing draft and improving safety	<p>Fuel utilization efficiency (AFUE) rating of 85% or greater</p>
<p style="text-align: center;">Central Air Conditioner</p> 	<p>Central air conditioning is an air conditioning system that uses ducts to distribute cooled and/or dehumidified air to more than one room, or uses pipes to distribute chilled water to heat exchangers in more than one room, and which is not plugged into a standard electrical outlet.</p>	<p>Compressor should properly match indoor unit. Too large a unit will not adequately remove humidity. Too small a unit will not be able to attain a comfortable temperature. Improper unit location, lack of insulation, and improper duct installation can greatly diminish efficiency.</p>	<p>For Split Systems:</p> <p>SEER: 14.5+ EER:12</p>
<p style="text-align: center;">Ceiling Fans</p> 	<p>When it's warm, the blades of a turning ceiling fan normally push air downward, causing cool air near the floor to travel outward and mix with air at the edges of the room. In the winter, change the direction in of the blades which push air up toward the ceiling, where hot air normally rises, and drive it back down.</p>	<p>If you're using air conditioning along with your fan, you can set the thermostat at a higher than normal setting to save on energy. Since heat rises, the upstairs can get hot, as a result, the furnace can run more often, mounting a ceiling fan at the top of the stairway can cut down on heating costs.</p>	<p>Mount in the middle of the room and at least 7 feet above the floor and 18 inches from the walls.</p>

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<p style="text-align: center;">Chillers</p> 	<p>Chillers cool fluids. There are a wide variety of chillers, because there are many different fluids to cool (including air), for a wide variety of uses. A chiller will cool water, which is circulated through a building's cooling system.</p>	<p>Another critical ongoing maintenance task is properly treating water; any accumulation of these contaminants will result in a rapid decrease in operating efficiency.</p>	<p>Look for IPLV/APLV rating (based on a wide range of factors, including geography, type of building, hours of operation and part-load operation)</p>
<p style="text-align: center;">Ducts</p> 	<p>Central heating and air-conditioning systems rely on ductwork to distribute warmed or cooled air throughout the building. The ducts that supply cool air to the furnace are called returns and the ducts that carry warm air to the rooms are called heat registers. Since warm air rises, registers located near the floor will generate the most heat.</p>	<p>Ducts that are too large or small for the amount of air they are supposed to carry--the air conditioner or heater may also be either undersized or too large for the duct system. Changing air filters and sealing ducts with tape and mastic, will also reduce energy loss. A kinked duct drastically reduces the flow of air.</p>	<p>*Recommended Building standard is to insulate Ducts using R-value of 6+ RCD #6 Mastic, UL-181 sealing tape</p>
<p style="text-align: center;">Furnace</p> 	<p>The thermostat turns on the furnace burner. Hot combustion gases produced by the burner circulate inside the heat exchanger causing it to get hot. The blower draws returning cool air from living area and blows it across the outside of the heat exchanger, sending the now-warmed air into the occupied space..</p>	<p>Installing programmable thermostats, upgrading ductwork in forced-air systems, and adding zone control for hot-water systems, will help save energy. Make sure all components, including duct work are maintained properly.</p>	<p>Annual Fuel Utilization Efficiency (AFUE) ratings Gas furnace: 90%+ Oil Furnaces: 85% +</p>

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<p>Geothermal Unit</p> 	<p>Geothermal rely earth's natural heat by bringing it through a series of pipes, called a loop installed below the surface of the ground or submersed in a pond or lake.</p> <p>In the winter, heat moves from the earth into your building. In the summer, heat moves from you're the building and is discharged it into the ground.</p>	<p>The air delivery ductwork distributes the heated or cooled air through the house's duct work, like conventional systems, Look for energy saving that can made through sealing ductwork, changing filters, etc. For further savings, GHPs equipped with a device called a "desuperheater"</p>	<p>Water-to-Air</p> <p>Closed Loop: EER=14.1+ COP=3.3 +</p> <p>Open Loop: EER= 16.2+ COP= 3.6+</p>
<p>Heat Pumps (Air Source)</p> 	<p>Heat pumps use an outdoor unit (called a condenser) and an indoor unit (an evaporator coil). The heat pump transports heat from one of these units to the other. In the summer, for example, the system extracts heat from indoor air and transfers it outside, leaving cooled indoor air to be recirculated through your ducts by a fan.</p>	<p>Select a heat pump with a demand-defrost control. This will minimize the defrost cycles, reducing heat pump energy use. If you're adding a heat pump to an electric furnace, the heat pump coil should usually be placed on the cold (upstream) side of the furnace.</p>	<p>For Split Systems: HSPF= 8.2 + SEER=14.5+ EER=12</p>
<p>Thermostat</p> 	<p>Thermostats control the operation of HVAC systems, turning on the heating or cooling systems to bring the building to the set temperature.</p>	<p>For winter operation, set thermostat at 68 degrees when you are in the building and during summer months at 78 degrees when you are not in the building lower thermostat to save energy.</p>	<p>Programmable thermostats regulate your heating and cooling system, lowering energy waste</p>