

Ground-Source Heat Pumps



THE MOST ENERGY-EFFICIENT CHOICE

WHAT IS A GROUND-SOURCE HEAT PUMP?

Also called an earth-coupled heat pump, or a geothermal heat pump, a ground-source heat pump operates much like the common air-source heat pump by transferring heat, rather than creating it. Unlike air-source, a ground-source heat pump transfers heat to and from the earth to provide cooling and heating for your home.

Below the frost line, the temperature of the earth in Nebraska stays fairly constant at 55°F. In summer, the soil temperature is cooler than the outside air. In winter, it's warmer. A ground-source heat pump uses this constant temperature to heat and cool your home very efficiently.

AT HOME WITH THE ENVIRONMENT

Geothermal is the most earth-friendly home heating and cooling system available today. When you install a geothermal system, you're investing in a home that uses less energy, consumes fewer natural resources and keeps the air clean and fresh. There's no flame, no flue, no odor and no pollutants.

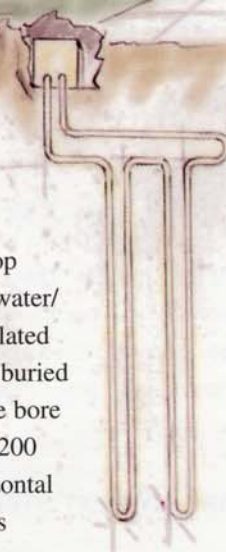
COST-EFFECTIVE HEATING

In the heating season, a ground-source heat pump supplies three to four units of heat to your home for every unit of electrical energy required to operate the system. So you get two to three kilowatt hours (kWh) of free energy for every one kWh of electrical energy you pay for. In other words, a ground-source heat pump is 300% to 400% efficient.



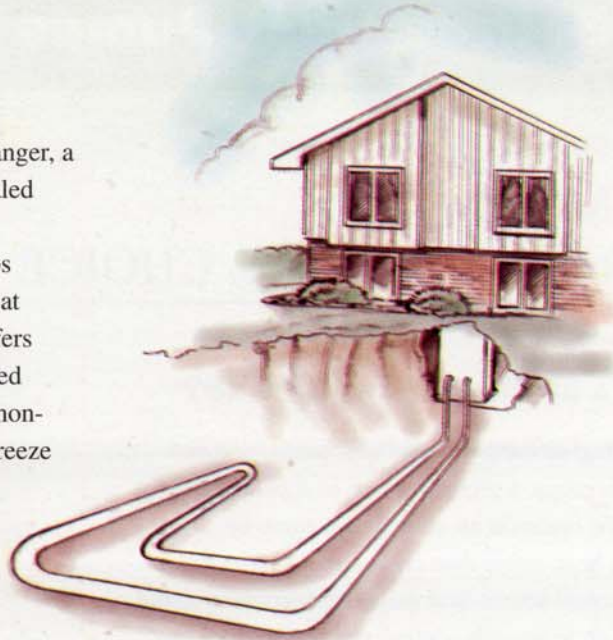
VERTICAL CLOSED-LOOP

In a vertical closed-loop ground heat exchanger, a water/antifreeze mixture is circulated through sealed pipe loops buried in vertical bore holes. The bore holes are typically 150 to 200 feet deep. As with a horizontal closed-loop system, heat is transferred by the heat pump system, from the ground during the winter and to the ground during the summer. A vertical heat exchanger can be installed on smaller lots rather than a horizontal system.



HORIZONTAL CLOSED-LOOP

In a horizontal closed-loop ground heat exchanger, a water/antifreeze mixture is circulated through sealed pipe loops buried horizontally, about six feet underground. During cold weather, the pipe loops absorb heat from the earth and deliver it to the heat pump located in the house. The heat pump transfers heat from the loop to warm the air that is circulated throughout the house by ductwork. The special, non-toxic antifreeze ensures that the system will not freeze during severe winter weather. In the summer, the process is reversed for air conditioning, and the heat pump system transfers heat from the house to the ground.



WELL WATER SYSTEM

As its name suggests, this system utilizes two wells and underground water. Water from one well is pumped through the heat pump, then returned to a second well or discharged into a pond. This system requires three to five gallons of water per minute, per ton, to operate.

Because water is returned to the earth, the underground water supply is not depleted by the heat pump's operation.

WHAT ARE MY NEXT STEPS?

- Pick a heating contractor that has experience with installing geothermal heat pumps.
- Ask your heating contractor to accurately evaluate your home for the installation of a heat pump system. This evaluation could consist of a computer generated heating analysis showing the amount of heating and cooling needed to condition your home for winter and summer.
- Request bids for a Standard efficient, Middle efficient, and a High efficient geothermal heat pump.
- Once you receive the bids, have your contractor explain the EFFICIENCY of the heat pump he or she sells. The efficiency rating for the heat pump air conditioning cycle is called the Energy Efficiency Ratio or EER. The EER rating can range from 10 EER to 24 EER. The efficiency rating for the heat pump heating cycle is called the Coefficient of Performance or COP. The COP rating can range from 3 COP to 4.5 COP.
- Find out the size of your heating system. This includes the tonnage of the heat pump and the BTU output of the heating system.
- **The important thing to remember is: the larger the EER and COP rating, the more efficient your heat pump will be.** It is recommended that you purchase the most efficient system that you can afford. As time goes on, the more efficient heating system that you buy today will save you money tomorrow.

