

Questions & Answers for geothermal heat pumps

What makes a geothermal heat pump better than other systems?

- Transfers heat from the earth which is heated by the sun, not burning a fuel to create heat
- Can be over 5 times more efficient for heating than propane or natural gas furnaces
- Lower maintenance costs with no outside equipment that can be damaged or affected by extreme weather conditions
- Most environmentally friendly heating & cooling system
- Constant comfort—humidity levels are ideal with no blasts of hot air or cold air
- Safety—no burning fuel so no carbon monoxide or explosion concerns
- A desuperheater may be added to system that allows reduced hot water heating costs
- Very quiet operation

How does a geothermal heat pump work?

- Transfers heat either from or to the ground through an open or closed loop system
- Since the temperature of the soil below 10 feet is constant, around 55 degrees in Nebraska, efficiencies of up to 500% can be achieved
- Three main parts of a system—the equipment, loops (open or closed) and ductwork
- All of the equipment is located indoors
- Electric heat strips are usually part of geothermal heat pumps for emergency back up needs

Can a geothermal heat pump also heat water?

- Can add a desuperheater which uses excess heat to provide hot water for your home
- Can provide up to 50% savings on your water heating bill
- During the summer when heat is transferred from your home, water heating is free
- During the winter a portion of your water heating needs will be met

How efficient is a geothermal heat pump?

- Can achieve over 500% efficiency compared to 98% efficiency for the best natural gas or propane systems during the heating season
- Provides reduced hot water heating costs with a desuperheater
- Cooling efficiencies are 20 to 40% higher than air conditioners

How can I save money with a geothermal heat pump?

- In both operating and maintenance costs, since both will be lower than what you are now paying
- Investment payback is usually around 5-7 years without incentives or tax credits
- Positive cash flow because of savings experienced
- Incentives available from Twin Valleys Public Power District
- 30% tax credit available for the entire installation cost of a geothermal heat pump system
- Equipment lasts longer, often up to 20 years

What are factors that may affect the cost of a geothermal heat pump?

- Size of your house
- Quality of insulation
- Size, location and quality of your windows
- Air infiltration of the house
- Size and terrain of the building lot
- Soil type

Do geothermal heat pump systems require much maintenance?

- Practically maintenance free.
- The unit's equipment is housed inside the house so it is protected from the weather and other contaminants.
- Contains fewer mechanical components
- The buried loops have a 50 year warranty on the pipe.
- Periodic checks and filter changes are usually the required maintenance.

What does a geothermal heat pump mean for the environment?

- Uses less energy
- Consumes fewer natural resources
- There is no fuel being burned so there is no pollutants, carbon monoxide or odor
- Minimizes the threat of acid rain, air pollution and greenhouse gases
- Use the new R-410A refrigerant that will not harm the earth's ozone layer
- Works with the environment, not against it

Should I buy a geothermal heat pump large enough to heat without supplemental heat?

- Geothermal heat pumps are normally sized to meet your cooling requirements
- Normally a geothermal heat pump will supply 80% to 100% of your heating needs
- Sizing the heat pump to meet all the heating needs will cost more for larger equipment and more loops
- Added cost normally will not be offset by efficiency gains
- An oversized unit can cause dehumidification problems in the cooling mode

Do I need to increase the size of my electrical service?

- A geothermal heat pump doesn't use a large amount of resistance heat
- Generally a 200-amp service will have enough capacity

Are all geothermal heat pumps alike?

- There are many different kinds designed for specific applications
- Can be used to provide in floor radiant heat
- Some use newer, more efficient motors

Do I need an underground loop?

- Is the most important part of a geothermal heat pump
- Transfers the heat to and from the earth

Are there different types of loops?

- Two different types—open or closed loop
- Closed loop type offers several options

How does a closed loop system work?

- A water and anti-freeze mix is circulated in the plastic pipe loop to transfer the heat from the ground or from the house
- There is normally one loop per ton of heat pump capacity
- The loops can be vertical, horizontal or rolled up in a pond

What are the different types of closed loops?

- There are vertical, horizontal and pond loops
- A continuous loop of plastic pipe that is connected to the indoor heat pump unit
- Vertical loops—drilled vertically into the ground with two plastic pipes, connected with a u-bend, inserted into each well
- The depth of the well will vary depending on the soil type, but normally is around 175-225 feet in depth for our area
- Horizontal loops can be straight pipe in an open trench, a coiled (slinky design) pipe in a trench or horizontally bored similar to vertical bored loops
- Pond loops are usually set at the bottom of a pond that has a constant depth of at least 8 foot

What are the advantages and disadvantages of vertical closed loops?

- Works good if land is limited
- May be more expensive to install
- With the loops being deeper into the ground where the temperature is the most constant they can be more efficient to operate
- There is less pipe used with a vertical loop

What are the advantages and disadvantages of a horizontal closed loop?

- Simpler to install and more expensive equipment is not needed to install
- Trench depths are usually 6-8 feet
- More pipe is needed for these loop options
- Straight pipe loops take more pipe than vertical loops
- Coiled or slinky design loops take the most plastic pipe
- Horizontal loops take more land space, usually 100 to 400 feet in length, with the slinky design requiring less space than the straight pipe
- Performance can be affected by the season, rainfall, and burial depth
- Drought potential needs to be considered

How does an open loop system work?

- Utilizes the water from a well which is at a relative constant temperature year round
- The water is discharged into another well, pond, river, creek or stock tanks, not causing any problem for the environment
- The discharged water is safe to be used
- Does not require any plastic pipe filled with an anti-freeze mix

What are the advantages and disadvantages of an open loop?

- Three things need to be considered—water quality, water quantity, and maintenance issues
- Water quality—water needs to be tested to make sure it will not damage the heat pump equipment
- Water quantity—will need at least 1½ gals per minute per ton of heat pump capacity
- Maintenance issues—water quality will have an affect on how well certain portions of the heat pump will last. There will need to be precautions taken that require scheduled maintenance.
- Pumping costs are usually higher
- Installation costs are usually lower due to closed loops not being installed

How do I know if the dealer and/or loop installer are qualified?

- Ask for references from people who have had a geothermal heat pump installed by dealer or loops by the loop installer
- Expect a home evaluation from the dealer to determine the size & type of loops and size of the system
- Check training credentials—should have continued training each year
- The dealer should also be trained by the manufacturer of the unit he is installing

Geothermal heat pump technology is proven, safe and reliable

“Electricity”—your best energy value, keeping your life running, delivered with reliability by people who care about you



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