bryant

WHATEVER IT TAKES®

Geothermal Systems

GEOTHERMAL HEAT PUMP COMFORT SYSTEMS

## *Geothermal Comfort, Investing in Savings*

According to the U.S. Environmental Protection Agency (EPA) geothermal systems are, "the most energy-efficient, environmentally clean, and cost-effective space conditioning systems available today." Extremely high levels of efficiency are possible because a geothermal heat pump only uses electricity to move heat, not produce it. A geothermal unit typically supplies four to five kilowatts of heat for every kilowatt of electricity used. Three to four of these kilowatts of heat come directly from the earth itself, and are clean, free and renewable. Geothermal heat pumps also take advantage of the mild ground temperature for extremely high efficiency cooling. Most systems also include a hot water generator, which diverts a portion of the supplied heat to the domestic water heater. This provides a substantial portion of a family's hot water needs at a very low cost. Overall, geothermal technology offers the highest cooling and heating efficiencies of any system available today.

Geothermal systems transfer heat from your home to the earth in the cooling mode, or from the earth to your home in the heating mode. Water is used as the heat transfer medium through a closed loop piping system buried in the ground. By using this stable thermal source, geothermal heat pumps provide energy efficient comfort year around with a factory-tested and sealed packaged unit, without the need for a noisy outdoor fan, or a flue.

The environmental advantages of geothermal systems have caught the eye of governmental agencies such as the Environmental Protection Agency (EPA) and the Department of Energy (DOE). Because geothermal technology is lowest in $CO_2$ emissions, it provides a solution to global warming by primarily using the natural energy of the earth. Puron® (R-410A) zero ozone depletion refrigerant is available for Bryant geothermal heat pumps for an even friendlier system.

In January 2006 the U.S. Federal government changed the minimum efficiency for air conditioners to 13 SEER from the previous minimum requirement of 10 SEER. Geothermal systems are up to twice the minimum required efficiency! As efficiency ratings increase, operating costs decrease. However, efficiency ratings alone do not tell the "whole story" when it comes to operating costs for homeowners. Fuel type, home construction, geographic location and thermostat settings are just some of the factors.

Over the years, geothermal systems have always been the leader in low operating costs. Recently, however, fossil fuels (natural gas, fuel oil and propane) have begun increasing at a much higher rate than electricity. The U.S. Department of Energy predicts that electricity prices will remain stable over the next twenty years, allowing some increase for inflation. Now is the time to consider electric technologies like geothermal heat pumps for heating, cooling and hot water needs.

Even a high efficiency natural gas furnace with a high efficiency air conditioner is still nearly twice the operating costs as a geothermal system. Since these comparisons are for new equipment (i.e. standard efficiencies = 13 SEER efficiency for air conditioners and 80% AFUE efficiency for furnaces), comparisons to existing equipment being replaced by a geothermal system would be even more dramatic. If the existing air conditioner is older, it may have an efficiency of between 8 and 10 SEER. Older furnaces could be as low as 65-70% efficient.

## The Geothermal Concept, Things you should know



## What is a Geothermal Heat Pump, and How Does it Work?

**Q**: *What is a geothermal heat pump?*

**A:** A geothermal or "ground-source" heat pump is an electrically-powered device that uses the natural heat storage ability of the earth and/or the earth's groundwater to heat and cool your home or business.

**Q:** *How does it work?*

**A:** Like any type of heat pump, it simply moves heat energy form one place to another. Your refrigerator works using the same scientific principle. (See "How is a geothermal heat pump like a refrigerator?" on the next page.) By using refrigeration, the geothermal heat pump removes heat energy stored in the earth and/or the earth's groundwater and transfers it to the home.

**Q:** *How is heat transferred between the earth and the home?*

**A:** The earth has the ability to absorb and store heat energy. To use that stored energy, heat is extracted from the earth through a liquid medium (water or an anti-freeze solution) and is pumped to the heat pump heat exchanger. There, the heat is used to heat your home. In summer the process is reversed and indoor heat is extracted from your home and transferred to the earth through the liquid.

**Q:** *You mentioned heating and cooling. Does it do both?*

**A:** One of the things that makes a heat pump so versatile is its ability to be a heating and cooling system in one. You can change from one mode to another with a simple flick of a switch on your indoor thermostat. Plus, a geothermal heat pump can assist in heating hot water year-round.

**Q:** *Do I need separate ground loops for heating and cooling?*

**A:** No. The same loop works for both. All that happens when changing from heating to cooling, or vise versa, is that the flow of heat is reversed inside the unit.

**Q:** *What types of loops are available?*

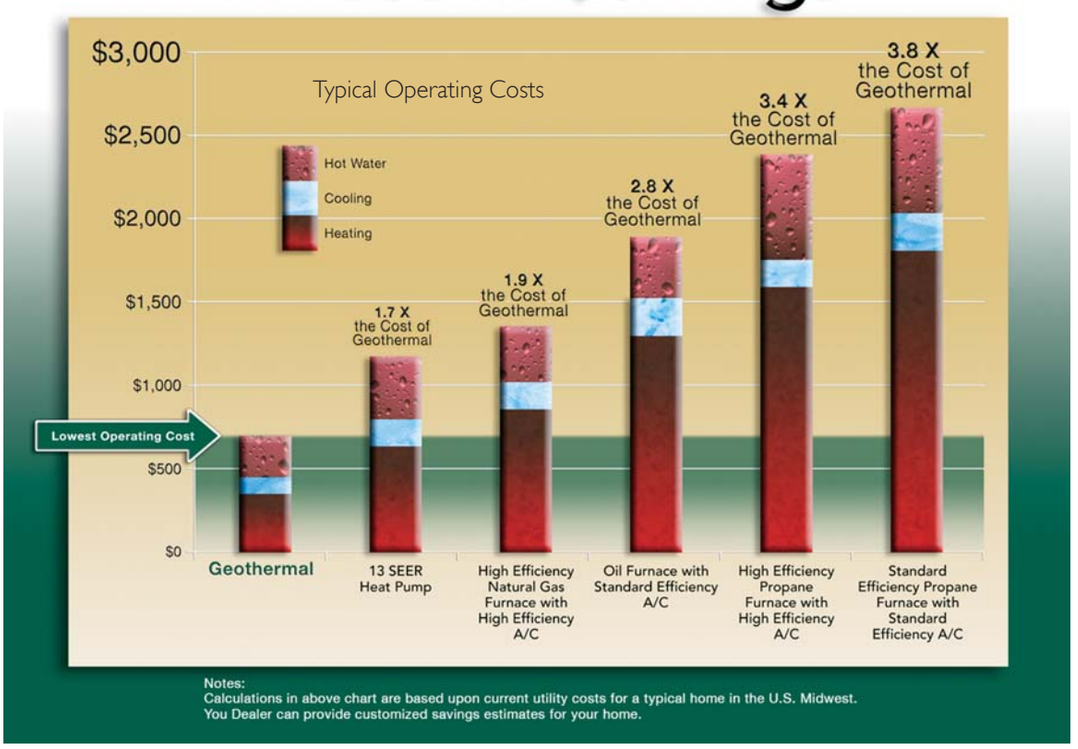
**A:** There are two main types: open and closed. Both of these loops will be addressed later in the brochure.

**Q:** *Does the underground pipe system really work?*

**A:** The buried pipe, or "ground loop", is the biggest technical advancement in heat pump technology to date. The idea to bury pipe in the ground to gather heat energy began in the 1940s. But it's only been in the last twenty-five years that new heat pump designs and improved pipe materials have been combined to make geothermal heat pumps the most efficient heating and cooling systems available.


GT-PX Vertical Geothermal Heat Pump with Puron® Zero Ozone Depletion Refrigerant

# Invest in $avings



## *How is a geothermal heat pump like a refrigerator?*

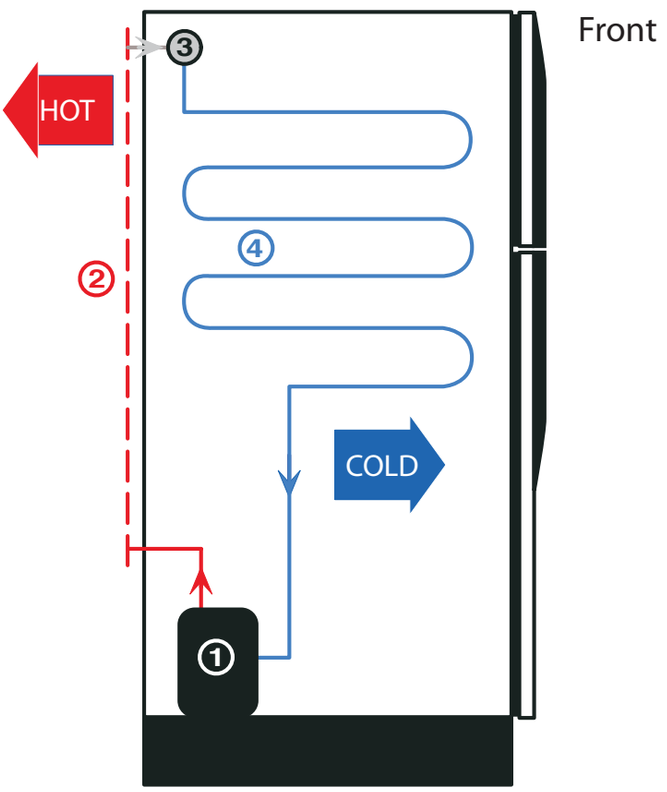
Like a refrigerator, a geothermal heat pump simply transfers heat from one place to another. When a refrigerator is operating, heat is being carried away from the inside food storage area to the outside, your kitchen. Therefore, cooling is not being added to the inside; heat is being taken out.

To understand the operation of a geothermal heat pump, it helps to understand how a refrigerator works. A refrigerator uses a refrigeration circuit with four main components, a compressor (1), a condenser (2), an expansion device (3), and an evaporator (4). Refrigerant (sometimes referred to by the brand name Freon) is pumped through the circuit to transfer heat from the inside of the refrigerator to the outside.

The compressor (1) is the pump. It also pressurizes the refrigerant gas. Since temperature and pressure are directly related, as the pressure increases, the temperature increases. The high temperature/high pressure gas flows from the compressor to the condenser (2). The cooler air in the kitchen (relative to the temperature of the refrigerant, 150 to 180°F [65 to 85°C]) causes the refrigerant to condense into a liquid. When two surfaces at different temperatures touch (or are very near – separated only by tubing), the hotter surface cools and the cooler surface warms. This is a law of physics called the second law of thermodynamics. The condenser therefore releases heat to the kitchen.

The next step in the process involves the expansion device (3). The expansion device is a small orifice that the refrigerant is forced through. The small hole creates a pressure differential between the two sides of the device. Think of an expansion device like a dam on a river with a hole in the dam. The water leaking through the hole is at a low pressure on the downstream side; the water on the other side (being held back by the dam) is at a high pressure. Once again, the pressure/temperature relationship (lower pressure/lower temperature) creates a cold, low pressure liquid refrigerant that gets fed to the evaporator (4).

As warm air inside the refrigerator (relative to the very cold temperature of the refrigerant) passes through the evaporator coil (4), the hotter surface (air inside the refrigerator) gets cooler and the cooler surface (refrigerant in the evaporator (4) tubing) gets warmer. The liquid refrigerant evaporates back into gas form, and the cycle starts over again as the refrigerant enters the compressor (1). The evaporator therefore absorbs heat from the inside of the refrigerator, which keeps the food cold.




An air conditioner or refrigerator transfers heat in only one direction. A heat pump can transfer heat in two directions, thereby heating or cooling the space. Most heat pumps heat or cool the air. Some heat pumps heat or chill water. An additional component, a reversing valve, is added to a heat pump, which allows the refrigerant to change direction, allowing the space that was being cooled to be heated.

A geothermal heat pump has a compressor, a condenser, an expansion device, and an evaporator like a refrigerator, but also includes a reversing valve to allow both heating and cooling. The big difference between a refrigerator or traditional air conditioner and a geothermal heat pump is the way heat is transferred. A geothermal heat pump transfers heat between the refrigerant circuit and the ground instead of between the refrigerant circuit and the air. The ground is a much milder heat source, since the temperature changes very little over the course of the year. The outside air temperature, however, varies significantly over the year, making a geothermal heat pump much more energy efficient than a traditional air conditioner or heat pump. A geothermal heat pump compressor also operates at lower pressures because of the milder heat source/heat sink (the ground), helping provide longer life expectancies.

A geothermal heat pump is a like a refrigerator in many ways. Simple refrigerator technology coupled with the stable temperature of the Earth provides quiet, reliable, and energy efficient heating and cooling systems for today's discerning homeowners.

## *Geothermal Heat Pumps: Closed-Loop Systems.*

**Q:** ***What is a closed-loop system?***
**A:** The term "closed-loop" is used to describe a geothermal heat pump system that uses a continuous loop of special buried plastic pipe as a heat exchanger. The pipe is connected to the indoor heat pump to form a sealed, underground loop through which water or an anti-freeze solution - depending on where you live - is circulated. Unlike an open-loop system that consumes water from a well, a closed-loop system recirculates its heat transferring solution in pressurized pipe.

**Q:** ***Where can this loop be located?***
**A:** That depends on land availability and terrain. Closed-loops are trenched horizontally in yards adjacent to the home if the yard is large enough. Or, for smaller yards, the loops can be installed vertically using a drill rig, much like a water well installation.

**Q:** ***How deep and long will my horizontal trenches be?***
**A:** Trenches are normally four to six feet deep [1.2 - 1.8 meters]. One of the advantages of a horizontal loop system is being able to lay the trenches according to the shape of the land. As a rule of thumb, 125 - 300 feet of trench are required per ton of heat pump capacity [11 - 27 meters per kW of capacity].

An example of a horizontal loop installation

**Q:** ***How many pipes are in a trench?***
**A:** Anywhere from 1 to 6 pipes per trench may be used, depending upon the optimal design for the yard. More pipe per trench shortens the total amount of trench required.

**Q:** ***What if I don't have enough room for a horizontal loop?***
**A:** Closed-loop systems can also be vertical. Holes are bored to about 150 - 300 feet per ton of heat pump capacity [13 - 27 meters per kW of capacity]. U-shaped loops of pipe are inserted in the holes. The holes are then back-filled with a sealing solution (grouting material).

An example of a vertical loop installation

**Q:** *How long will the loop pipe last?*
**A:** Closed-loop systems should only be installed using the appropriate high-density polyethylene pipe. Properly installed, these pipes will last over 50 years. They are inert to chemicals normally found in soil and have good heat conducting properties. PVC pipe should not be used under any circumstances.

**Q:** *How are the buried pipe sections of the loop joined?*
**A:** The only acceptable method to connect pipe sections is by thermal fusion. Pipe connections are heated and fused together to form a joint stronger than the original pipe. Mechanical joining of pipe for an earth loop is never an accepted practice. The use of barbed fittings, clamps and glued joints is certain to result in loop failure due to leaks.

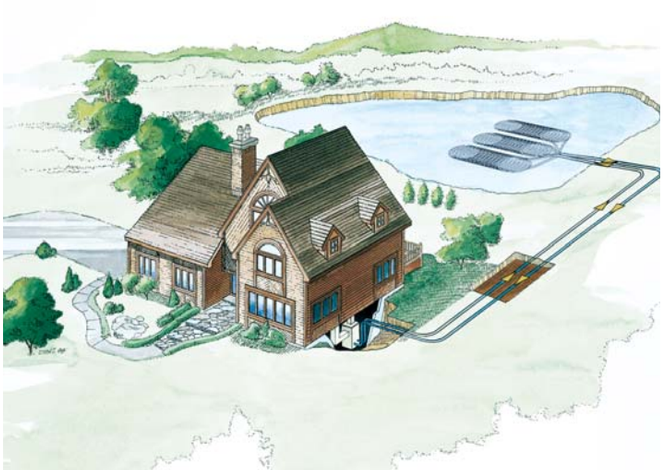
**Q:** *Will an earth loop affect my lawn or landscape?*
**A:** No. Research has proven that loops have no adverse effect on grass, trees or shrubs. Most horizontal loop installations use trenches about 3 feet [1 meter] or less wide. This, of course, will leave temporary bare areas that can be restored with grass seed or sod. Vertical loops require little space and result in minimal lawn damage.

**Q:** *Can I reclaim heat from my septic system disposal field?*
**A:** No. Depending upon your geographic location, an earth loop will reach temperatures below freezing during extreme conditions and may freeze your septic system. Such usage is banned in many areas.

**Q:** *If the loop falls below freezing, will it hurt the system?*
**A:** No. The antifreeze solution used in loops that operate at low temperatures will keep it from freezing down to about 15°F [-9°C] fluid temperature. In the U.S. and Canada, three types of antifreeze solution are acceptable: propylene glycol, methyl alcohol, and ethyl alcohol. Some states/provinces may require one type over another.

**Q:** *Can I install an earth loop myself?*
**A:** It's not recommended. In addition to thermal fusion of the pipe, good pipe-to-soil contact is very important for successful loop operation. Nonprofessional installations may result in less than optimum heat pump performance.

**Q:** *I have a pond near my home. Can I put a loop in it?*
**A:** Yes, if it's deep enough and large enough. A minimum of 8 - 10 feet [2.5 - 3 meters] in depth at its lowest level during the year is needed for a pond to be considered. In pond loops, polyethylene pipe must be used. Generally, a minimum of 1/2 acre [0.2 hectare] pond is required to provide adequate surface area for heat transfer.



An example of a pond loop installation

# *Geothermal Heat Pumps: Open-Loop Systems.*

**Q:** ***What is an open-loop system?***

**A:** The term "Open-Loop" is commonly used to describe a geothermal heat pump system that uses groundwater from a conventional well as a heat source in winter and a heat sink in summer. The groundwater is pumped through the heat pump where heat is extracted (in winter) or rejected (in summer), then the water is disposed of in an appropriate manner. Since groundwater is a relatively constant temperature year-round, it is an excellent heat source/heat sink.

An example of a groundwater installation

**Q:** ***What do I do with the discharge water?***

**A:** There are a number of ways to dispose of water after it has passed through the heat pump. The open discharge method is the easiest and least expensive. Open discharge simply involves releasing the water into a stream, river, lake, pond, ditch or drainage tile. Obviously, one of these alternatives must be readily available and must possess the capacity to accept the amount of water used by the heat pump before open discharge is feasible.

A second means of water discharge is the return well. A return well is a second well bore that returns the water to the ground aquifer. A return well must have enough capacity to dispose of the water passed through the heat pump. A new return well should be installed by a qualified well driller. Likewise, a professional should test the capacity of an existing well before it is used as a return.

**Q:** ***How much groundwater does an open-loop system need?***

**A:** Geothermal heat pumps used in open-loop systems need differing amounts of water depending on the size of the unit. The water requirement of a specific model is usually expressed in gallons per minute (l/s) and is listed in the specifications for that unit. Your heating and cooling contractor should be able to provide this information. Generally, the average system will use 6-10 G.P.M. [0.4 - 0.6 l/s] while operating. An extremely cold day might result in a usage of 6,000-10,000 gallons [23,000 - 38,000 liters] of water.

Your well and pump combination should be large enough to supply the water needed by the heat pump in addition to your domestic water requirements. You will probably need to enlarge your pressure tank or modify your plumbing to supply adequate water to the heat pump.

**Q:** ***What problems can be caused by poor water quality?***

**A:** Poor water quality can cause serious problems in open-loop systems. Your water should be tested for hardness, acidity and iron content before a heat pump is installed. Your contractor can tell you what level of water quality is acceptable.

Mineral deposits can build up inside the heat pump's heat exchanger. Sometimes a periodic cleaning with a mild acid solution is all that's needed to remove the build-up.

Impurities, particularly iron, can eventually clog a return well. If your water has a high iron content you should be sure that the discharge water is not aerated before it's injected into a return well.

Finally, you should opt against using water from a spring, pond, lake or river as a source for your heat pump system unless it's proven to be free of excessive particles and organic matter. They can clog a heat pump system and make it inoperable in a short time.

*If water quality is a concern, a closed-loop system should be used.*

**Q:** ***Does an open-loop system cause environmental damage?***

**A:** No. They are pollution free. The heat pump merely removes heat from or adds heat to the water. No pollutants are added whatsoever. The only change in the water returned to the environment is a slight increase or decrease in temperature.

**Q:** ***Are there any laws that apply to open-loop installations?***

**A:** In some localities, all or parts of the installation may be subject to local ordinances, codes, covenants or licensing requirements. Check with local authorities to determine if any restrictions apply in your area.

## *Geothermal Heat Pumps: Parts of the System.*

**Q:** ***What are the components of a geothermal heat pump system?***

**A:** The three main parts are the heat pump unit, the liquid heat exchange medium (open or closed loop), and the air delivery system (ductwork).

**Q:** ***Are all geothermal heat pumps alike?***

**A:** No. There are different kinds of geothermal heat pumps designed for specific applications. Many geothermal heat pumps, for example, are intended for use only with higher temperature ground water encountered in open-loop systems. Others will operate at entering water temperatures as low as 20°F [-7°C] which is required for closed-loop systems.

Geothermal heat pumps can also differ in the way they are designed. Self-contained units combine the blower, compressor, water heat exchanger and air coil in a single cabinet. Split systems allow the coil to be added to a forced-air furnace and utilize the existing blower.

**Q:** ***Will I have to add insulation to my home if I install one of these systems?***

**A:** Geothermal heat pumps will reduce your heating and cooling costs regardless of how well your home is insulated. However, insulating and weatherizing are key factors in realizing the most savings from any type of heating and cooling system.

**Q:** ***Can a geothermal heat pump also heat water for my home?***

**A:** Yes. Using what's called a Hot Water Generator (HWG), some types of geothermal heat pumps can save you up to 50 percent on your water heating bill by pre-heating tank water. The HWG is a factory-installed option.

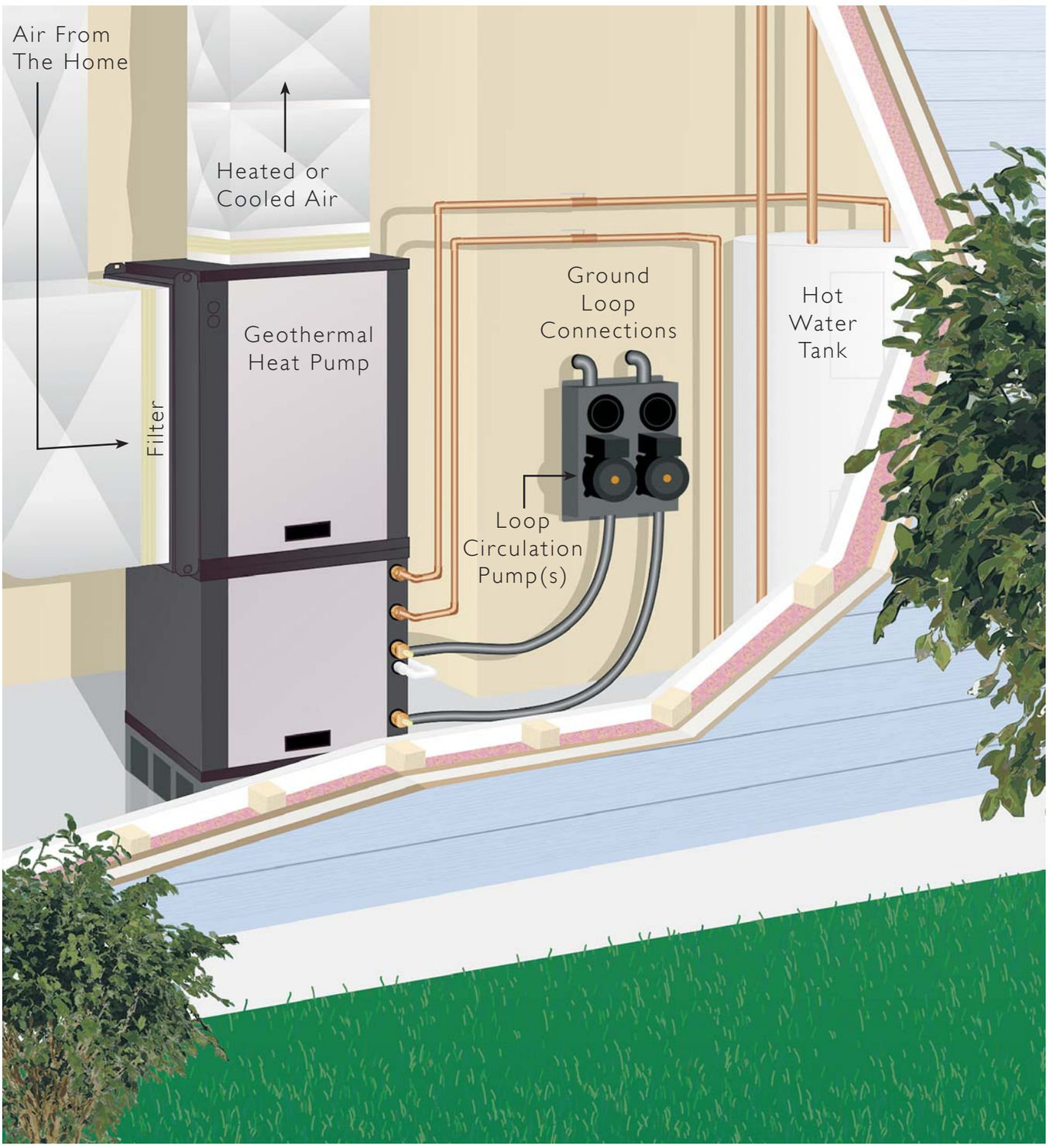
**Q:** ***Is a geothermal heat pump difficult to install?***

**A:** Most units are easy to install, especially when they are replacing another forced-air system. They can be installed in areas unsuitable for fossil fuel furnaces because there is no combustion, thus, no need to vent exhaust gases.

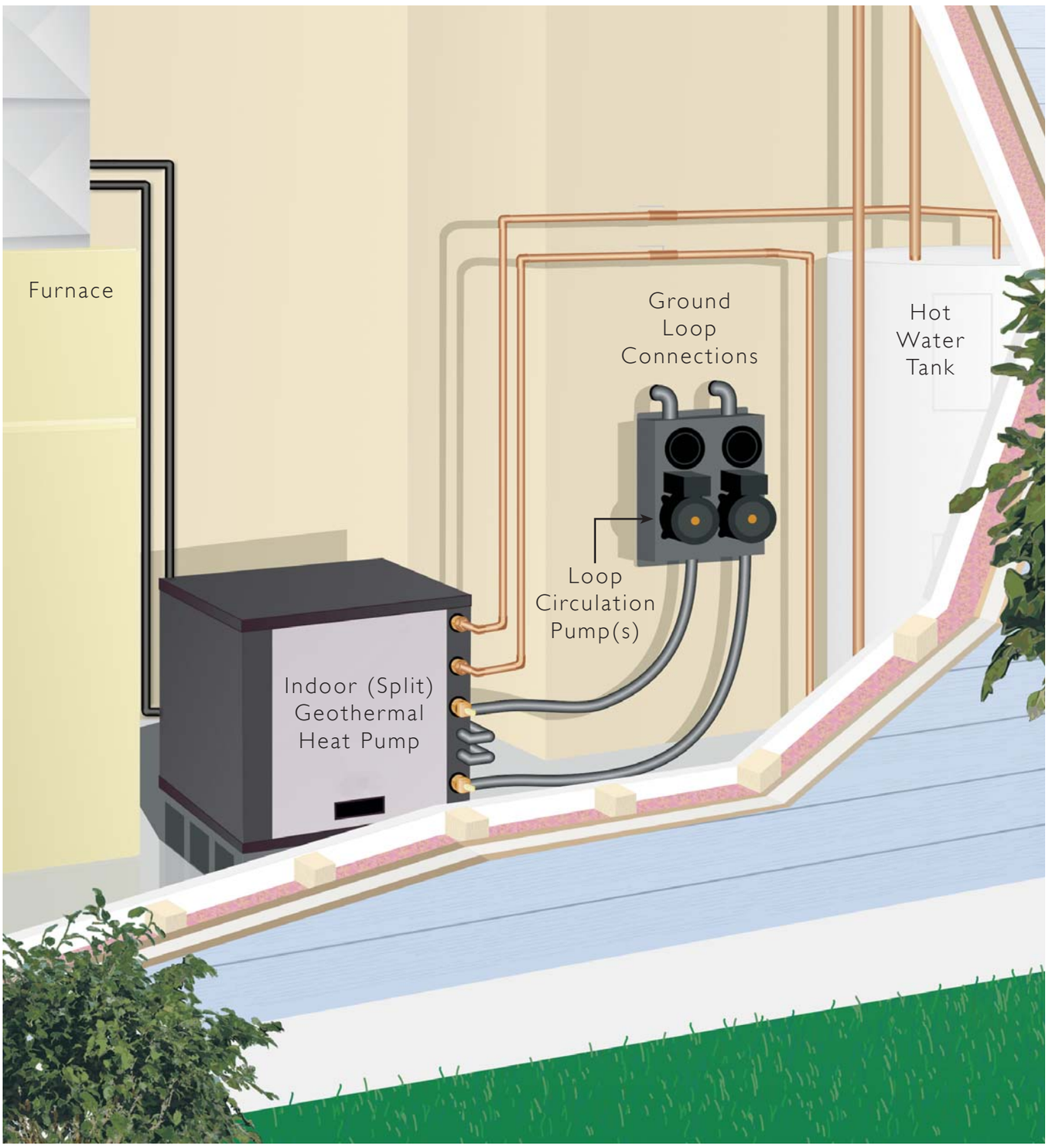
Ductwork must be installed in homes that don't have an existing air distribution system. The difficulty of installing ductwork will vary and should be assessed by a contractor.

**Q:** ***Can a geothermal heat pump be added to my fossil fuel (Gas, oil, propane) furnace?***

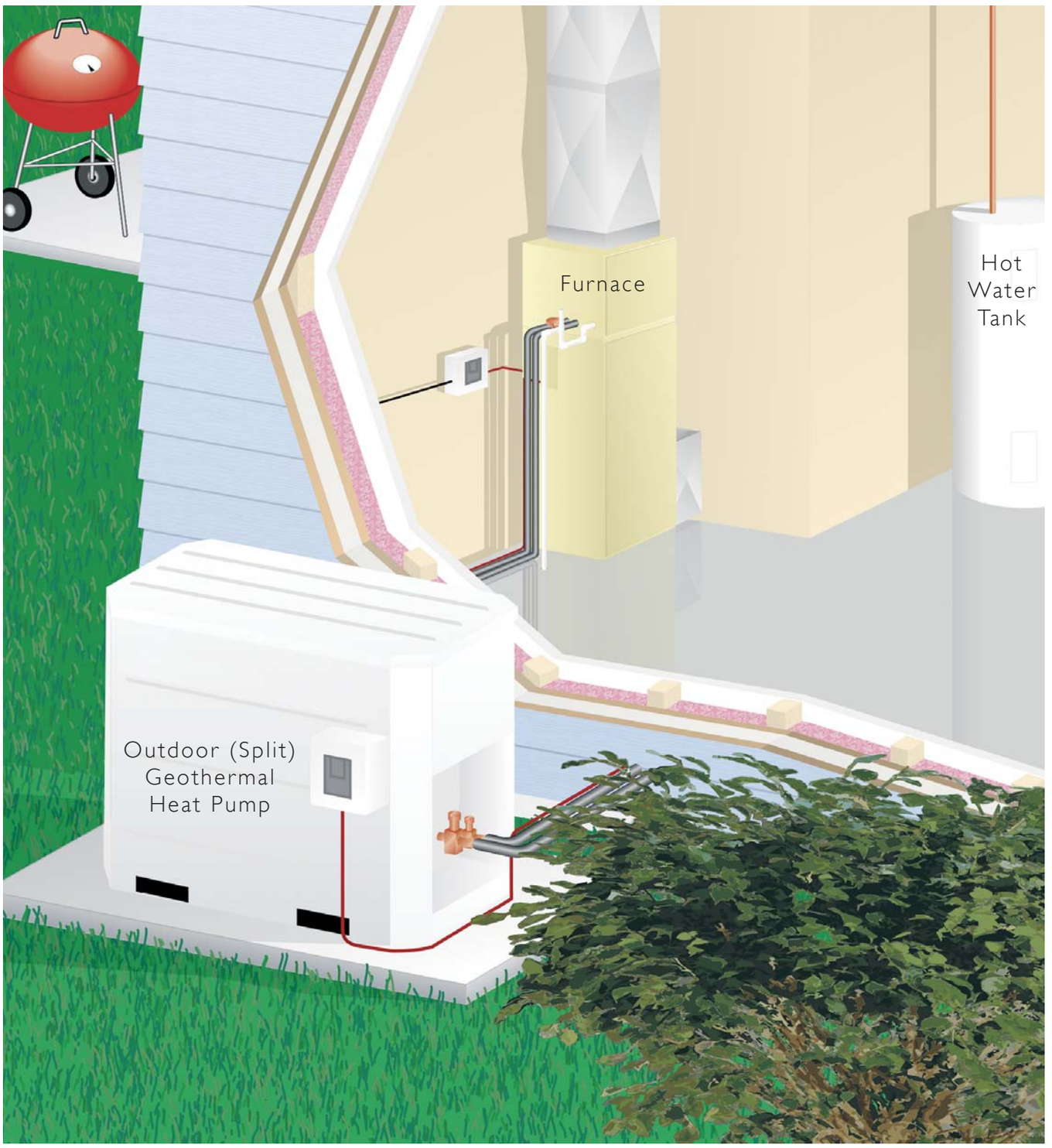
**A:** Split systems can easily be added to existing furnaces for those wishing to have a dual-fuel system. Use the heat pump as the main heating source and a furnace as a supplement in extremely cold weather if additional heat is needed.




An example of a vertical upflow unit installation




An example of a indoor split unit installation




An example of a outdoor split unit installation

**Q:** *I have ductwork, but will it work with this system?*
**A:** In all probability, yes. Your installing contractor should be able to determine ductwork requirements and any minor modifications, if needed.

**Q:** *Do I need to increase the size of my electric service?*
**A:** Geothermal heat pumps don't use large amounts of resistance heat, so your existing service may be adequate. Generally, a 200-amp service service will have enough capacity, and smaller amp services may be large enough in some cases. Your electric utility or contractor can determine your service needs.

**Q:** *Should I buy a heat pump large enough to heat my home with no supplemental heat?*
**A:** Your contractor should provide a heating and cooling load calculation (Heat Loss/Heat Gain) to guide your equipment selection. Geothermal heat pumps are sized to meet all your cooling requirements. Depending on your heating needs, a geothermal heat pump will supply 80-100 percent of your designed heating load. Sizing the heat pump to handle your entire heating needs may result in slightly lower heating costs, but the savings may not offset the added cost of the larger heat pump unit. Also, some oversized units can cause dehumidification problems during the cooling mode, resulting in a loss of summer comfort.

## *Other Types of Installations:*

- **Horizontal**
- **Vertical Downflow**
- **Water-to-Water (Radiant Floor Heating)**

## *Geothermal Heat Pumps: What Are the Major Benefits?*

**Q:** *How efficient is a geothermal heat pump?*
**A:** Geothermal heat pumps are 3.5 - 5 times as efficient as the most efficient fossil fuel furnace. Instead of burning a combustible fuel to make heat, they simply move heat that already exists. By doing so, they provide 3.5 - 5 units of energy for every unit used to power the heat-pump system.

**Q:** *What does a system like this cost?*
**A:** A system for the typical home will cost more than if you bought a separate forced-air furnace and central air conditioning system. But you wouldn't be comparing "apples to apples". To get an accurate comparison of costs you need to consider the following:

- Payback, or how long it takes to recover the difference in costs between the two systems using energy savings. Payback for most geothermal heat pump systems runs three to five years.
- Energy efficiency of the two systems. To get an accurate picture, make sure efficiency claims are substantiated. Your lifestyle and how well your home is insulated affect how economical a system will be.
- Total operating savings from heating, cooling and domestic hot water must be combined to get an accurate picture of total energy savings.
- Energy costs and availability, both present and future.
- Maintenance costs and system reliability.
- System lifespan.
- Bryant GeoDesigner software can calculate annual operating costs for geothermal systems and compare to other technologies.

**Q:** *What about comfort?*
**A:** In winter, a geothermal heat pump system moves warm air (90° - 105°F) [32° - 41°C] throughout your home via a standard duct network. Typically, a very even comfort level is found throughout the home. This is because the warm air is moved in slightly higher volumes and, therefore, saturates the home with warmth more evenly. This even helps out hot or cold spots and eliminates the hot air blasts common with fossil fuel furnaces.

In summer, cool, dehumidified air is dispersed through the same duct network.

It's also a great comfort to know that you've reduced your energy consumption while using an inexhaustible energy source - the earth.

**Q:** *Can I get a tax credit for installing this system?*
**A:** It depends on where you live. Some states and provinces do have tax credits for installing geothermal systems. Check with your electric utility, Department of Commerce or Ministry of Revenue for further details. Federal governments also offer tax credits and rebates in some cases.

**Q:** *Which system is best, open- or closed-loop?*
**A:** The net results in operating cost and efficiency are virtually the same. Which system to choose depends mainly on whether you have an adequate groundwater supply and means of disposal. If you do, an open loop can be used very effectively. If not, either a horizontal or vertical closed-loop system is your best choice.

Over a period of years, a closed-loop system will require less maintenance because it's sealed and pressurized, eliminating the possible build-up of minerals or iron deposits.

## *Geothermal Heat Pumps: Questions You Should Ask About a New Heating and Cooling System.*

Regardless of the type of heating and cooling system you may be considering for your home or business, there are specific questions you should ask the dealer/installer. These questions deal with finding out the actual efficiency of the system, any operating limitations it may have, and the bottom line of operating costs. The answers here are meant as a guide for what you should try to find out with your questions.

**Q:** *What is the Btuh [kW] size of the heat pump or furnace that's being proposed?*
**A:** Heating systems are designed to provide specific amounts of heat energy per hour. The term "Btuh" [kW] refers to how much heat can be produced by the unit. Before you can know what size system you'll need, you must have a heat loss/heat gain calculation done on your home. From that, an accurate determination can be made on the size of the heating/cooling system. Many fossil fuel furnaces are substantially oversized for home heating requirements, resulting in increased operating costs.

**Q:** *Is the efficiency rating actual or just a manufacturer's average?*
**A:** All types of heating and cooling systems have a rated efficiency. Fossil fuel furnaces have a percentage efficiency rating. Natural gas, propane and fuel oil furnaces have efficiency ratings based on laboratory conditions. To get an accurate installed efficiency rating, factors such as flue gas heat losses, cycling losses caused by oversizing, blower fan electrical usage, etc., must be included. Air conditioners are normally rated in SEER (Seasonal Energy Efficiency Ratio). SEER and EER (Energy Efficiency Ratio) cannot be directly compared without the use of software.

Geothermal heat pumps, as well as all other types of heat pumps, have efficiencies rated according to their Coefficient of Performance or COP for heating and EER for cooling. It's a scientific way of determining how much energy the system produces versus how much it uses.

Most geothermal heat pumps systems have COPs of 3.5 - 5.0. That means for every one unit of energy used to power the system, 3.5 to 5 units are supplied as heat. Whereas a fossil fuel furnace may be 80-90 percent efficient, a geothermal heat pump is about 450 percent efficient. Some geothermal heat pump manufacturers and electric utilities use software to accurately determine the operating efficiency of a system for your home. Software like Bryant GeoDesigner allows comparisons in dollars to avoid the confusion of the various rating systems.

**Q:** *Will the minimum entering water temperature have an affect on which heat pump I buy?*
**A:** Yes. If you have an open-loop system, your entering

water temperatures (EWTs) may range from the 70s°F [20s°C] in the southern United States to the 40s°F [single digits, °C] in Canada. All heat pumps can handle temperatures in the moderate to warm ranges. A closed-loop system, on the other hand, may encounter EWTs below freezing. Not all ground-source heat pumps will operate at those low temperatures. It's important for you to know what EWTs your heat pump will handle.

**Q:** *Are the dealer and loop installers qualified?*
**A:** Don't be afraid to ask for references from dealers. A reputable dealer won't hesitate to give you names and numbers to call to confirm his capabilities. The same applies to the loop installer.

**Q:** *Will open- or closed-loop be best for you?*
**A:** That depends on several factors, as stated earlier. A dealer should be willing to install what's best for you, not for him.

**Q:** *Will the loop joints be heat fused?*
**A:** The only acceptable method for joining buried sections of the special pipe used for closed loop systems is heat fusion. Any other method will eventually result in the failure of the loop.

**Q:** *How long is the payback period for your ground-source heat pump system*?
**A:** To figure this accurately, you must know how much per year you'll save in energy costs with a ground-source system, and the difference between it and a traditional heating system and central air conditioner. As an example: if you'll save $700 per year with a ground-source system and the costs difference is $2,000, your payback would be less than three years.

**Q:** *If a home has ceiling cable heat or baseboard heat, do air ducts need to be installed?*
**A:** Not always. It may be desirable to install ground-source heat pump room units. For some small homes, one room unit would provide most of the heating and cooling needs. Ceiling cable or baseboard units could then be used for supplemental heat.

**Q:** *Can I use a geothermal heat pump for radiant floor heating (warm floors)?*
**A:** Yes. Water-to-Water heat pumps heat water instead of air. The principle is the same as far as loop piping is concerned. Warm water is circulated through the floor to heat the home.

**Q:** *If I want to know more about geothermal heat pump systems, whom should I contact?*
**A:** Visiting www.bryantgeo.com, or speaking with the dealer that provided this brochure can provide you with a wealth of additional information about geothermal heat pumps. One of the many resources provided at www.bryantgeo.com is a dealer locator to find the nearest Bryant installer. Additionally, your local electric utility can provide you with information.

***A glossary of terms is located in the back of this publication.***

## *Indoor Air Quality*

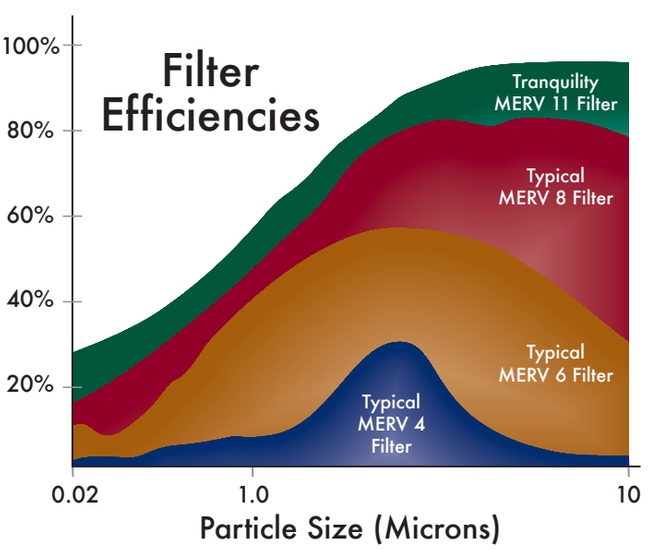
Recent EPA studies indicate that indoor levels of many pollutants may be 25 times, and occasionally more than 100 times, higher than outdoor levels. In general, indoor air is four to five times more polluted than outdoor air. Many homeowners are not aware of these potential pollution levels. Additionally, the EPA ranks indoor air pollution among the top five environmental risks to public health.

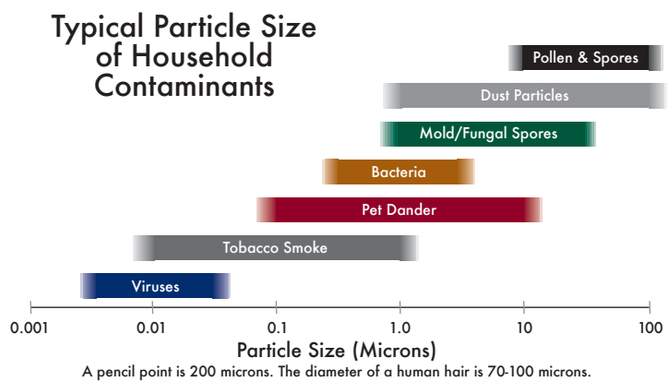
Fortunately, Bryant Geothermal Heat Pumps offer a variety of standard and optional features that can take all the worry out of the indoor air quality in your home.

## MERV 11 Filters

The GT-PX and GT-PG Series ships with a standard 2 inch MERV 11 air filter. These filters offer the latest technology in filter media and performance that's unmatched. In fact, the standard filter that ships with all GT-PX and GT-PG models is more efficient than many aftermarket air cleaner systems.

MERV is an industry standard rating, which indicates a filter's ability to trap particles from the air we breathe. Residential filters typically are rated in the range of MERV 1-11. Higher ratings indicate more efficient filters. MERV simplifies your shopping experience. You can compare products and make an informed choice based on the performance of products. Higher MERV ratings trap more of the smaller particles in the air, leading to a healthier indoor environment.






## E-Coated Air Coils

Modern home building materials such as counter-tops, floor coverings, paints, and other materials can "out gas" chemicals into your home's air. Some of these chemicals are suspected of contributing to air-coil corrosion.

All Bryant GT-G, GT-PX, and GT-PG Series packaged geothermal heating and cooling systems feature E-Coated air-coils. This process will provide additional protection against coil corrosion from airborne chemicals resulting from modern building material outgassing and most air borne environmental chemicals. In fact, Bryant's exclusive E-Coated air-coils enhance corrosion protection to nearly 20 times that of a traditional uncoated coil.

Studies have also shown that coated air-coils improve moisture shedding and therefore improve our unit's moisture removal capability. The net result; a more comfortable home for you. E-Coating is your assurance of both maximum air-coil life and comfort.

### What is E-Coating?

E-Coating (also known as electro-coat) is a highly specialized electrostatic coating process which applies a corrosion resistant, epoxy-based electrically charged coating particles that are attracted to oppositely charged air coil and distributor components.

### Added Protection for Coil Durability

- E-Coating provides superior corrosion resistance.
- E-Coated coils have a significantly longer life span than uncoated coils, or coils using older coating technologies.
- E-Coated coils tested with salt spray for 2,000 hours have shown no damage to the coating or coil.

Bryant geothermal heat pumps are backed by a standard 10-year limited warranty on major refrigerant circuit components and a 5-year limited warranty on all remaining covered components.

## Whole House Dehumidification Option

Unlike other dehumidifiers, which require an external unit and an additional compressor ("the box"), all Whole House Dehumidification components are inside the Bryant unit. Plus, Whole House Dehumidification uses heat that would have been rejected to the ground for reheating the air, making Whole House Dehumidification the most efficient method for dehumidification available today.

Why is dehumidification important? Figure 2 shows the potential health effects of excess humidity. Potential structure or furnishing damage may result from high humidity levels, as well. Indoor air quality is a major concern of experts with today's construction techniques. Tightly-built homes usually require some amount of fresh air to dilute pollutants from carpeting, furnishing and people. Even when fresh air is introduced, the indoor air quality may suffer in the summer time due to the added humidity of the outside air. Few residential air conditioning systems are designed to handle these conditions. Whole House Dehumidification, on the other hand, can operate as a whole house dehumidifier, or it can operate in the air conditioning or heating modes as required by the thermostat. Whole House Dehumidification is so effective, a typical system can take 8.9 pounds [4.0 kilograms] of water per hour out of the air!

The benefits of Whole House Dehumidification drastically improve comfort, and indoor air quality. A Bryant system equipped with the Whole House Dehumidification option provides year-round control of temperature and humidity. Features include:

- **Ultimate in flexibility:** No matter what the loop temperature is, Whole House Dehumidification automatically adjusts the amount of reheat to provide neutral air temperature to the space, avoiding overcooling or overheating the air when only dehumidification is needed.
- **Ultra high efficiency:** Whole House Dehumidification is unlike any other dehumidifier. Instead of using a separate dehumidifier, the Whole House Dehumidification option is integrated into the Bryant unit, eliminating additional components and a second compressor. The dehumidification mode operates at the high efficiencies of a geothermal heat pump.
- **Easy-to-use control system:** A humidistat can be connected to the Whole House Dehumidification control board to activate the dehumidification mode when humidity in the space is too high. The thermostat controls the summer and winter room temperatures, while the humidistat controls room relative humidity.
- **Low maintenance:** The addition of Whole House Dehumidification to a Bryant GT-PX or GT-PG geothermal unit adds very few parts, unlike a stand-alone or portable dehumidifier. Fewer moving parts equals less maintenance. Since Whole House Dehumidification is integrated into the unit, there are no tanks to empty.
- **Better control:** Too much humidity can create environments where mold, mildew and bacteria can thrive. Whole House Dehumidification maintains lower humidity, helping to improve indoor air quality.

**Figure 1: GT-PX with Whole House Dehumidification**

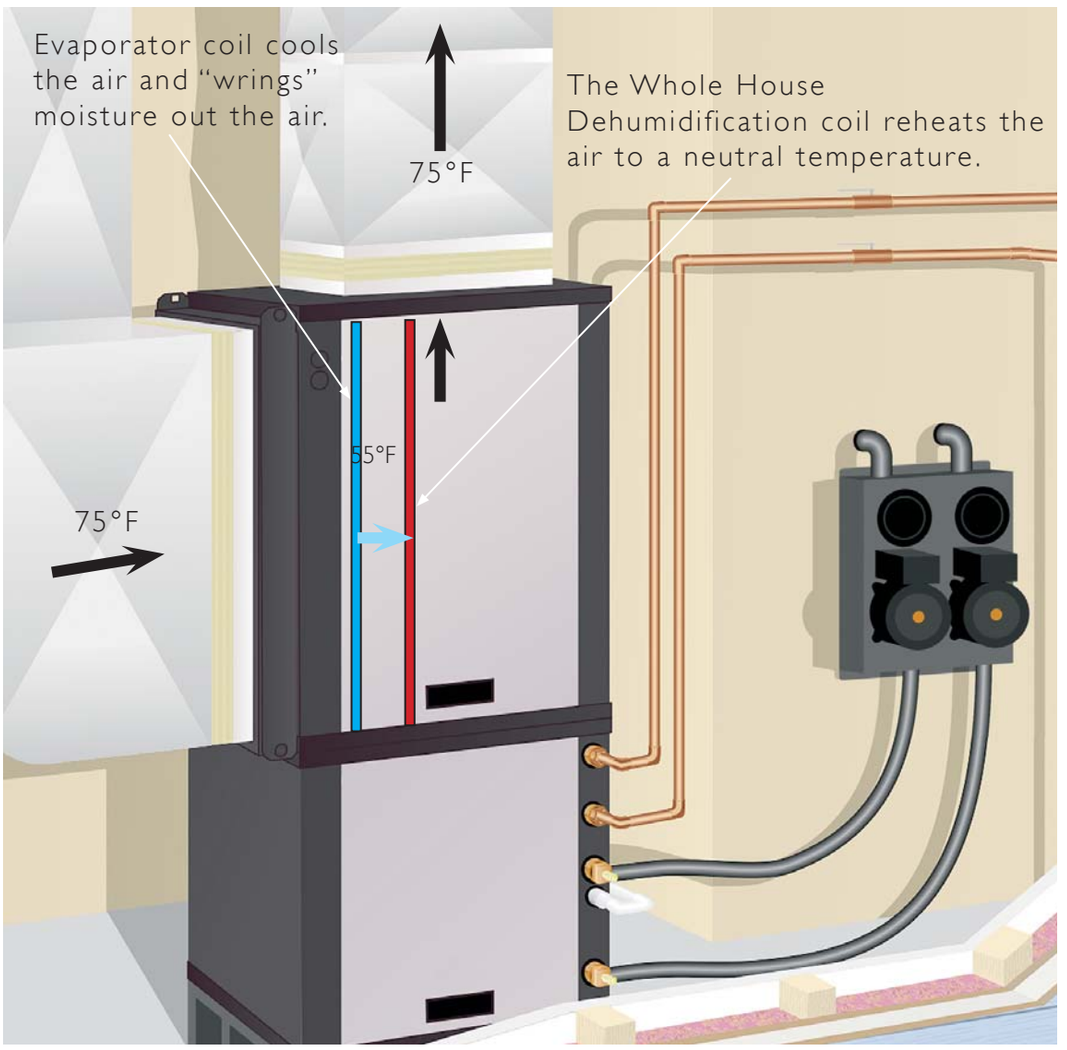
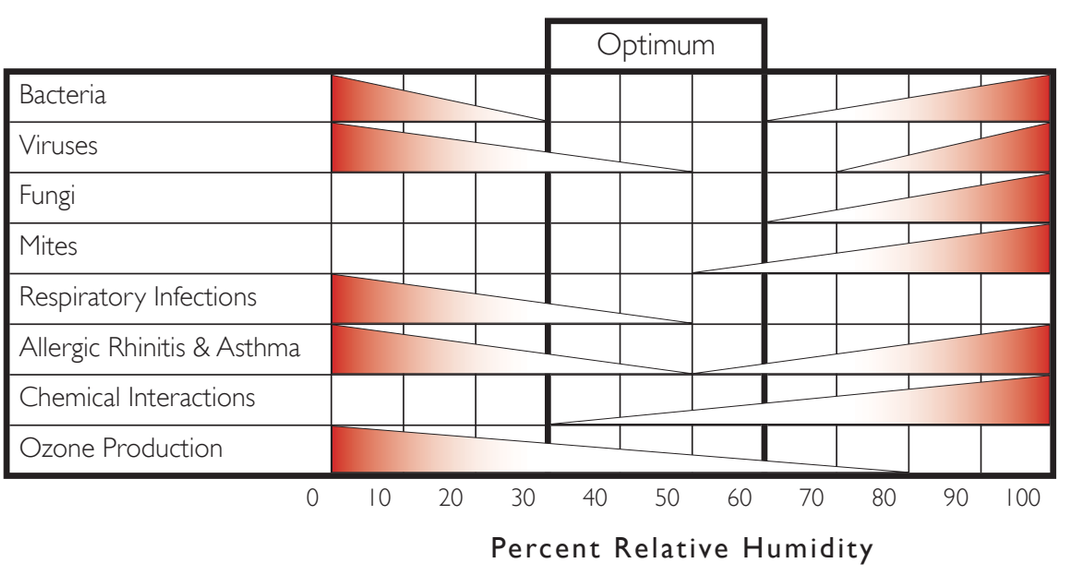



**Figure 2: Optimum Humidity Levels for the Reduction of Harmful Contaminants**



## *Accessories*

A playground just wouldn't be a playground if it didn't have a slide. That one little accessory can make or break how much enjoyment you could have. The same holds true for your heating and air conditioning system. The right combination of options and accessories will deliver the maximum about of performance and enjoyment your family will have from a new geothermal heating and cooling system.

Bryant not only offers the most innovative geothermal heating and cooling systems, but the most comprehensive selection of options and accessories to fit any application.

## Loop Circulation Modules

Bryant Flow Controllers contain all of the components necessary for providing the maximum heat transfer from the ground loop to the geothermal heat pump. Quiet, water-cooled circulator pump(s) are installed in a polystyrene cabinet that is fully insulated to prevent condensation during winter operation. In addition, brass or composite 3-way valves provide the installer a convenient means for purging air from the loop piping system and for sealing/pressurizing the system when installation is complete. The attractive charcoal cabinet and black pump(s) match nicely with either GT-G, GT-GS. GT-PX, GT-PXS, GT-PG series geothermal heat pumps.

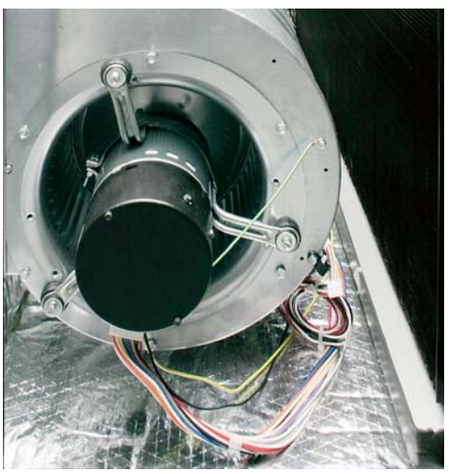
## AG Series:
## Internal Auxiliary Electric Heaters

The AG Series internal auxiliary electric heater is available for Bryant GT-G, GT-PX, or GT-PG series geothermal heat pumps to boost heating capacity during very cold weather. Depending upon geographic location, Bryant heat pumps can handle 80% to 100% of the heating requirements. The remainder is supplied by the auxiliary heater. Since the amount of auxiliary heat required is typically very small, AG Series electric heaters make good economic sense, and help avoid oversizing of equipment, which can increase installation costs and decrease comfort. AG Series heaters are installed inside vertical units, saving mechanical room space and simplifying thermostat wiring.

## Geothermal Loop Pipe


Closed loop systems use a network of buried high-density polyethylene (plastic) pipe, circulating a water/antifreeze solution from the ground to the heat pump. These systems are sealed and pressured, and thus recirculate the fluid, eliminating any water usage. Polyethylene pipe is always utilized to insure long life and system reliability. Milk jugs are made from polyethylene. Polyethylene is a very tough plastic, especially when considering the wall thickness of a milk jug (pipe wall thickness is many times greater), but it is also extremely flexible, which allows the pipe to avoid damage even as the ground shifts. All connections are heat fused, which is a welding process, whereby the pipe and fitting are heated up to the melting point, around 500°F [260°C]. The two pieces are joined together while the plastic is still in its molten state. Once cooled, the joint is stronger than the pipe itself. Therefore, leak potential of the in-ground piping is nearly nonexistent. Properly installed, loop piping will last more than 50 years!

## ECM Variable Speed Fan Motors



One of the most important aspects of a geothermal heating and cooling system is it's ability to deliver the conditioned or heated air into your home. For the ultimate in airflow control, Bryant offers an available ECM Variable Speed fan motor on the GT-G and GT-PG Series (Standard on GT-PX).

Unlike a conventional blower motor, which is designed to operate at one speed, the ECM motor can run in a wide range of speeds. This ability allows the motor to match the unit airflow to the ductwork system in any home.

The ECM motors are preprogrammed from the factory for the specific unit series they're placed in. There are also retrofit kits available for later upgrade installations.

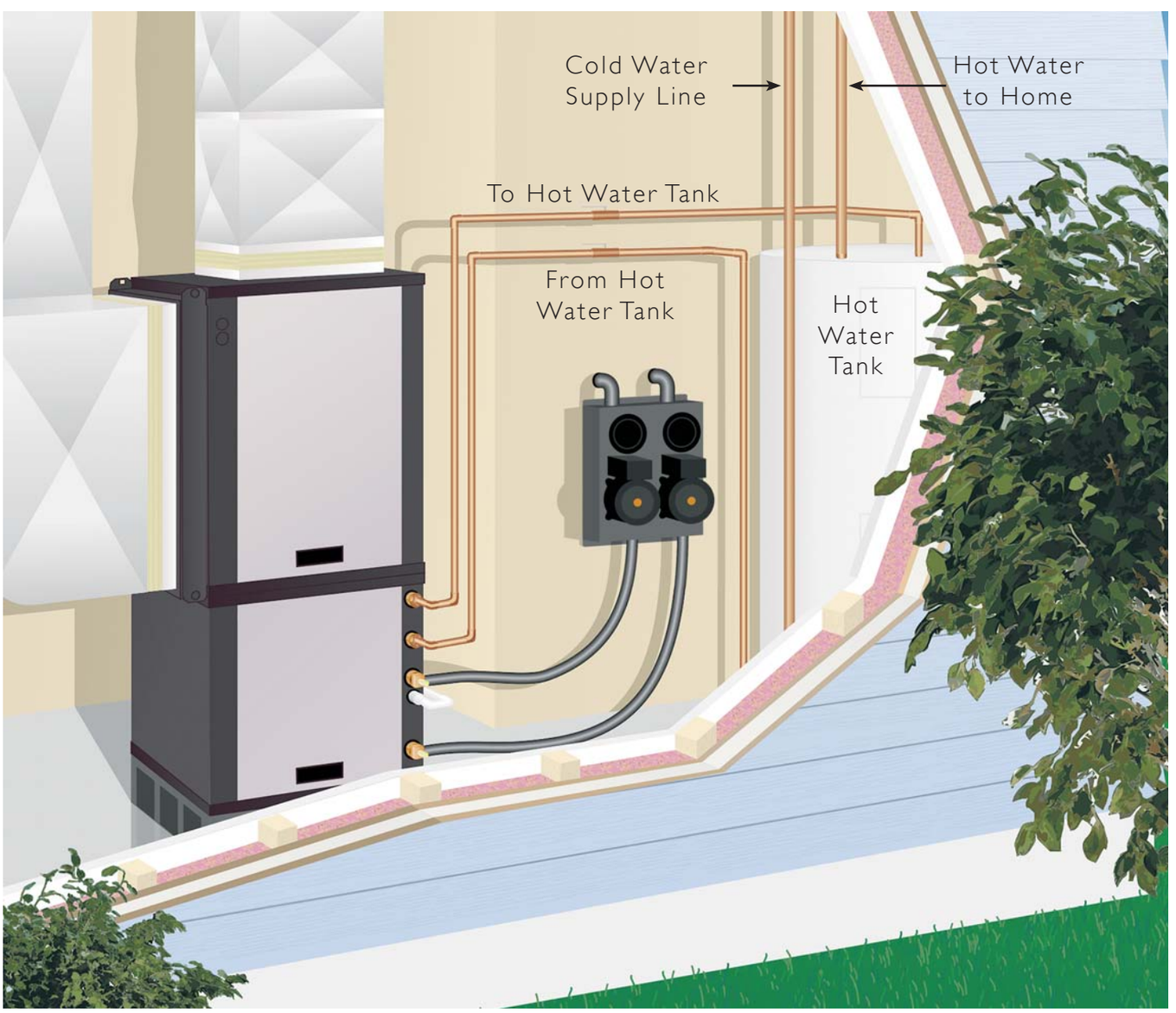
## Unit Sound Pad

Not only are geothermal systems the most efficient heating and cooling systems, but they're also the quietest. A wide array of innovative features inside the unit dampen vibration and operating sound.

The unit sound pad helps to eliminate any vibration or sound transmission into the home and makes the installation more attractive. A sound pad is recommended for every vertical unit installation.

## Hot Water Generator

The hot water generator option, also known as a desuperheater, reclaims excess heat produced throughout the year and delivers it to the home for substantially less cost than electric or gas water heaters. Typical savings are 40 to 50%, which can amount to hundreds of Dollars, depending upon hot water usage. The hot water generator operates any time the geothermal system is heating or cooling. The option includes an additional heat exchanger and circulation pump built into the unit. Piping is connected from the geothermal heat pump to a standard electric water heater, using the water heater as a storage tank and for back up hot water generation when the unit is not heating or cooling in the spring or fall, or during mild outdoor temperatures. Most homeowners choose this option for their geothermal system, since the savings can be dramatic.



## *Who Is Bryant?*

This mission for Bryant Geothermal as the world's largest and most progressive leader in the Water-Source and geothermal heat pump industry reveals our commitment to excellence - not only in the design and manufacture of our products, but in our people and services.

### Bryant Design

From concept to product, Bryant Geothermal's Integrated Product Development Team brings a fusion of knowledge and creativity that is unmatched in the industry today. Drawing from every aspect of our business: Engineering, Sales, Marketing, and Manufacturing, our Development Team has created some of the most advanced, efficient, and versatile products available.

### Innovation, Concept, Needs

Great products are born from necessity. Whether it is a need to reduce sound, fit in a smaller space, make easier to service, achieve better efficiencies, or due to changing technologies, or new government regulations, Bryant Geothermal leads the industry in advancing the form, fit and function of geothermal heat pumps. Our Design Team continually strives for even the slightest improvement to our products. It is this continual drive for excellence that sets Bryant Geothermal apart from all other manufacturers.

### Start To Finish

At Bryant Geothermal, every product development project begins with a comprehensive set of specifications. These specifications are a culmination of input from the market, a specific need, or a number of other factors. From these detailed specifications, prototypes are constructed and testing begins. After a rigorous testing period in Bryant Geothermal's own state-of-the-art lab facility, the data is compared to the project specifications. Once the Design Team is satisfied that all of the specs are met, the unit is sent to the production department for pilot runs. After the pilot runs are completed, unit literature is finalized and the product is released to the marketplace. Every unit we produce follows this strict and sequenced path insuring no stone is left unturned, and no detail is missed.

### Bryant Production

Innovative products demand innovative manufacturing processes. Bryant Geothermal's integrated production process combines every aspect of the manufacturing of our equipment into an organized, balanced, and controlled whole.

### Fabrication

Every sheet-metal component of a Bryant Geothermal unit is produced in our fabrication department. Panels are precisely constructed of galvanized or stainless steel using computerized cutting, punching, and forming equipment. This precise fabrication means a tighter fit

that makes for a more solid unit and reduced vibration, which equals reduced noise. On certain series, an optional powder coating is then applied to increase corrosion resistance and enhance the look of the unit. The final step is the addition of fiberglass insulation to the inside as an additional layer of sound deadening. This insulation meets stringent NFPA regulations, and includes antibacterial material.

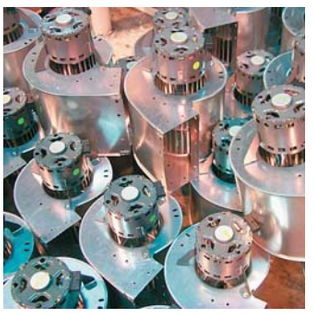
## Assembly

Bryant's 250,000 square foot production facility produces over 130,000 units per year using the most stringent quality control standards in the industry. Each unit is assembled under the close supervision of our Integrated Process Control System or IPCS. This multi-million dollar computer system watches each unit as it comes down the assembly line.

To back up the IPCS system, our Quality department is stationed on each line and performs random audits not only on the units, but also on component parts. All component parts must pass each and every quality checkpoint before a unit is packaged and shipped. These systems and processes are maximized due to the comprehensive and ongoing training every employee receives from the date they are hired.

## Component Parts

To produce a quality unit, you have to start with quality components. Bryant Geothermal's purchasing department is relentless in its search for the best components for our products - while securing these components at prices that keep costs low. Any new component must go through a grueling testing phase before it ever sees the production line. Working closely with vendors and their engineers, we continually find new ways to not only improve our units, but to ensure component quality as well. Sister companies allow Bryant Geothermal to provide components specifically designed for our applications.



## Bryant Awards

Bryant Geothermal leads the industry in product awards and certifications. From 100% Air-Conditioning and Refrigeration Institute (ARI) performance ratings to industry awards for innovation, Bryant Geothermal applies cutting-edge technology to every product we design and manufacture.

## Engineering Lab Facilities

Bryant Geothermal has one of the largest testing facilities of any Water-Source heat pump manufacturer. Innovation and product improvements are a mainstay of the Bryant Geothermal Engineering Lab. Our people are what make the difference in the development of superior products in a timely manner. Our certified facility has six automated test cells capable of testing a wide variety of unit types under varying conditions. These cells are capable of producing data twenty-four hours a day, seven days a week. The development time of equipment is significantly reduced allowing Bryant Geothermal Engineers and Lab Technicians to spend more time on the actual development process. This team effort has allowed us to maintain a high degree of competence

in our industry. Our test cells and test equipment are calibrated and certified periodically, per recognized industry standards, to insure the data is accurate and repeatable. In addition to testing new concept units, the lab continually audits production units throughout the year to insure quality performance and reliability.

## Industry Affiliations and Associations

Bryant works closely with the International Standards Organization (ISO), the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), the Environmental Testing Laboratories (ETL), and Conformité Européene (CE) to insure that our equipment not only meets the highest performance standards, but meets the highest industry standards as well. In a recent milestone, Bryant celebrated three consecutive years of 100% success rate in ARI's performance certification program. An uncommon feat in the industry, this award is a testament to the craftsmanship, design, and construction of every Bryant unit.

ARI PERFORMANCE CERTIFIED ™

INTERTEK ETL LISTED C US

energy ENERGY STAR PARTNER

## *The Bryant Advantage: Our Family of Products*

To millions of people who use our equipment, our name stands for reliability and quality. You've probably visited, shopped, worked, or slept in a Bryant-controlled building.

Our products provide homeowners with a wealth of industry leading advantages and innovative features for creating the perfect indoor environment while preserving the outdoor environment.

## Homeowner Advantages

- **Low Utility Bills:** Components and design so highly evolved make Bryant geothermal heat pumps the most efficient energy saver anywhere.
- **Flexibility:** You get heating, central air conditioning, and domestic hot water... three important benefits from a single compact unit.
- **Comfort:** A system that automatically adjusts to satisfy changing weather conditions by using advanced Two-Stage compressors and an air delivery system that responds to your comfort needs.
- **Safe and Clean:** Geothermal heating and cooling has no flame, no flue, no odors, and no danger of fumes.
- **Homeowner Satisfaction:** Independent consumer surveys rate geothermal systems as having the highest customer satisfaction compared to other types of heating and cooling systems.
- **Noise-Free Operation:** Unlike traditional air conditioners or heat pumps, geothermal units have no noisy outdoor fans to disturb you or your neighbors.
- **Unit Performance Sentinel™:** Automatic alert system let's you know if the system is not running at peak performance.
- **Long System Life:** The elegant yet durable design ensures long life, dependable operation and low maintenance. All residential air coils are specifically treated for longevity.
- **MERV 11:** Superior air filtration improves indoor air quality. Compared to traditional fiberglass air filters, the MERV 11 removes up to 9 times more dust, lasts 3 times longer and captures nearly 100% of pollen and spores. (Standard on GT-PX and GT-PG Models)


**1 GT-PX (50YD) Series**

Two-Stage Horizontal, Vertical, & Split Systems - 2 to 6 Tons

Advanced Two-Stage Technology allows the GT-PX to operate at the most efficient level for all weather conditions. The GT-PX has one of the industry's highest efficiency ratings.

**2 GT-PG (50YE) Series**

Single-Stage Horizontal & Vertical Systems - 1.5 to 6 Tons

The energy-efficiency criteria for geothermal heat pumps to qualify for the Energy Star program requires an EER rating of 14.1 (closed loop systems) or 16.2 (open loop system). The GT-PG (single stage) has a EER rating of 20 – showing that not all Energy Star qualified systems are equal.

**3 GT-G (50YC) Series**

Horizontal, Vertical, & Split Systems - 1.5 to 6 Tons

The GT-G product line is the most flexible geothermal technology available today. It is designed with the installer in mind to improve reliability and reduce installed costs.

**4 Water-to-Water (GSW) Series**

Water-to-Water Systems - 3 to 10 Tons

As Bryant's most adaptable R-22 refrigerant units, the GSW Series can be used for radiant floor heating, snow/ice melt, chilled water for fan coils, industrial process control, potable hot water generation, hot/chilled water for make-up air, and many other types of HVAC and industrial applications.

**5 GT-S (38WQS) Series**

Outdoor Split Systems - 1.5 to 5 Tons

The innovative design of the GT-S offers a variety of cost saving installation options available for the first time with a geothermal system. Our unique engineering allows the unit to be installed outside using your current system connections with no changes or special modifications. Just add a loop.

## *The GT-PX Series*

Using Puron® Ozone Safe Refrigerant, the GT-PX is a breakthrough in efficiency – providing you with the greatest energy savings of any space conditioning system and unprecedented environmental protection at the same time. The GT-PX with two-stage compressor and variable speed fan offers the latest in geothermal heat pump technology.

The GT-PX is so sophisticated it automatically adjusts itself to provide the optimum, consistent indoor air temperatures regardless of the weather extremes.

Advanced Two-Stage Technology allows the GT-PX to operate at the most efficient level for all weather conditions. The GT-PX has some of the industry's highest efficiency ratings.

Advanced two-stage design allows the GT-PX to "match" performance to meet all weather conditions:

- On those cold winter days the second stage automatically engages when needed to keep your home warm and comfortable.
- During the hottest months the second stage automatically engages when needed to provide additional cooling.
- In mild spring and fall months only the first stage is needed to provide optimum indoor comfort.
- Ninety percent of the year the GT-PX runs on first stage. The second stage kicks in automatically only when needed in the hottest and coldest months of the year. Using an electronic variable-speed fan motor, the GT-PX assures you of high comfort, maximum efficiency, superior dehumidification, and low utility bills.

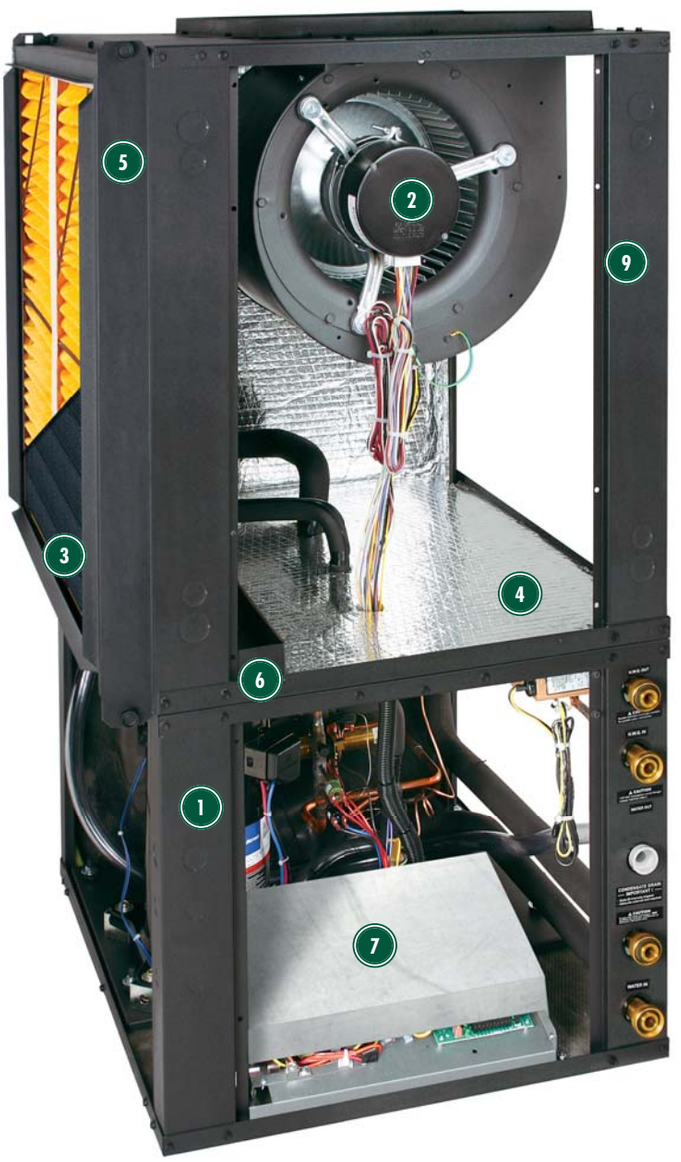
The energy-efficiency criteria for geothermal heat pumps to qualify for the Energy Star program requires an EER rating of 14.1 (closed loop systems) or 16.2 (open loop systems). The GT-PX has a EER rating of 27 – showing that not all Energy Star qualified systems are equal.

GT-PX. One of the most energy efficient space conditioning system available from any manufacturer, anywhere on the planet.


Also available in an indoor split configuration as the GT-PX Split (50YDS) Series

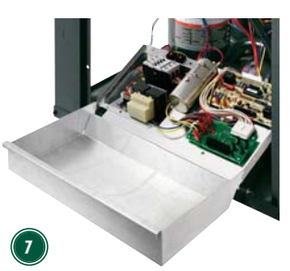
## GT-PX Packaged Unit

1. Copeland™ Ultra-Tech™ Two-Stage Unloading Scroll Compressor
2. State-Of-The-Art GE Variable Speed Blower Motor
3. E-Coated Air Coil
4. Foil Faced Insulation In The Blower Section for Easy of Cleaning; Fully Insulated Compressor Section for Maximum Sound Attenuation
5. Two Inch Filter Rack With High Performance MERV 11 Pleated Air Filter
6. Stainless Steel Drain Pan For Long Life
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Five Easy, Lift-out Service Access Panels With Stainless Steel Front Panels



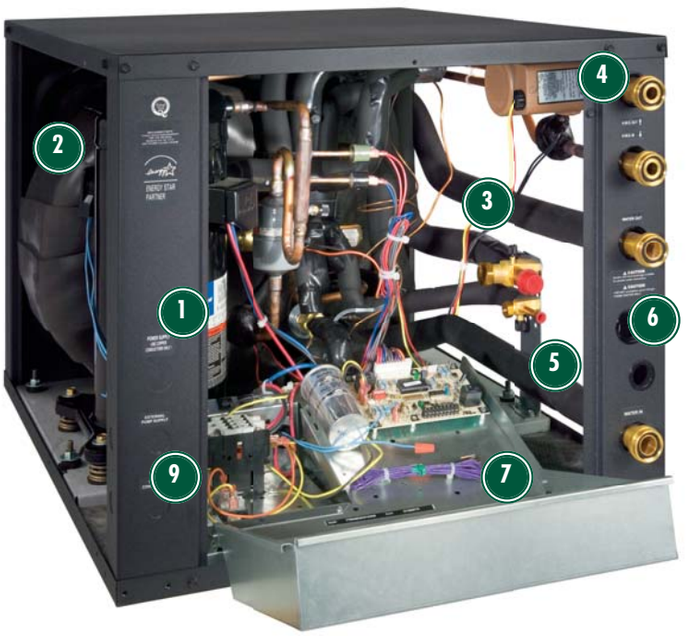

Features Puron® HFC-410A Zero Ozone Depletion Refrigerant

Puron®
the environmentally sound refrigerant

## GT-PX Split Unit

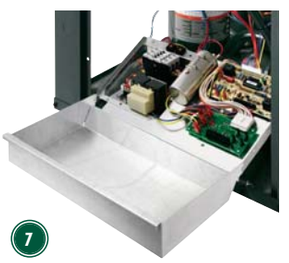
1. Copeland™ Ultra-Tech™ Two-Stage Unloading Scroll Compressor
2. Oversized Water Coil
3. Fully Insulated Water and Refrigerant Lines
4. Optional Factory Installed Hot Water Generator with Internal Pump
5. Backseating Brass Service Valves with Service Port
6. Brass Swivel Water Connections
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Three Easy, Lift-out Service Access Panels With Stainless Steel Front Panels




Features Puron®
HFC-410A Zero Ozone
Depletion Refrigerant

Puron
the environmentally sound refrigerant


8


7

## Performance Ratings

| *The GT-PX Series by Bryant* | | | | | |
|---|---|---|---|---|---|
| **Model (50YDD/H/V) Series** | **026** | **038** | **049** | **064** | **072** |
| **Ground Water (Open Loop) Heat Pumps** | | | | | |
| *Cooling Capacity, Btuh (kW)* | 28,900 (8.5) | 41,200 (12.1) | 54,600 (16.0) | 68,600 (20.1) | 77,100 (22.6) |
| *EER (Energy Efficiency Ration)* | 30.8 | 31.5 | 28.7 | 29.7 | 24.5 |
| *Heating Capacity, Btuh (kW)* | 25,700 (7.5) | 36,700 (10.8) | 48,300 (14.2) | 59,600 (17.5) | 70,200 (20.6) |
| *COP (Coefficient of Performance)* | 5.1 | 5.1 | 5.1 | 4.7 | 4.3 |
| **Ground Loop (Geothermal) Heat Pumps** | | | | | |
| *Cooling Capacity, Btuh (kW)* | 26,600 (7.8) | 38,200 (11.2) | 50,600 (14.8) | 64,800 (19.0) | 71,600 (21.0) |
| *EER (Energy Efficiency Ration)* | 26.0 | 27.0 | 24.9 | 25.3 | 21.4 |
| *Heating Capacity, Btuh (kW)* | 19,800 (5.8) | 29,000 (8.5) | 37,500 (11.0) | 48,000 (14.1) | 54,100 (15.9) |
| *COP (Coefficient of Performance)* | 4.6 | 4.5 | 4.6 | 4.3 | 3.9 |

All ratings based upon ASHRAE/ARI/ISO standard 13256-1 for Ground Water and Ground Loop heat pumps.
Efficiencies shown are at part load; capacities are shown at full load.

| *The GT-PX Split Series by Bryant* | | | | |
|---|---|---|---|---|
| **Model (50YDS) Series** | **026** | **038** | **049** | **064** |
| **Ground Water (Open Loop) Heat Pumps** | | | | |
| *Cooling Capacity, Btuh (kW)* | 28,600 (8.4) | 40,100 (11.8) | 53,900 (15.8) | 63,800 (18.7) |
| *EER (Energy Efficiency Ration)* | 29.4 | 27.1 | 26.8 | 25.7 |
| *Heating Capacity, Btuh (kW)* | 25,600 (7.5) | 35,900 (10.5) | 47,700 (14.0) | 58,800 (17.2) |
| *COP (Coefficient of Performance)* | 4.6 | 4.6 | 4.7 | 4.4 |
| **Ground Loop (Geothermal) Heat Pumps** | | | | |
| *Cooling Capacity, Btuh (kW)* | 26,400 (7.7) | 37,300 (10.9) | 50,200 (14.7) | 59,500 (17.4) |
| *EER (Energy Efficiency Ration)* | 24.5 | 23.7 | 22.8 | 22.2 |
| *Heating Capacity, Btuh (kW)* | 19,500 (5.7) | 27,000 (7.9) | 37,200 (10.9) | 45,700 (13.4) |
| *COP (Coefficient of Performance)* | 4.1 | 4.1 | 4.2 | 4.0 |

All ratings based upon ASHRAE/ARI/ISO standard 13256-1 for Ground Water and Ground Loop heat pumps.
Efficiencies shown are at part load; capacities are shown at full load.

## Unit Dimensions - Packaged Units

| Upflow Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 026 | in. | 22.4 | 25.6 | 48.6 |
| | mm. | 568 | 651 | 1234 |
| 038 | in. | 25.4 | 30.6 | 50.4 |
| | mm. | 645 | 778 | 1280 |
| 049 | in. | 25.4 | 30.6 | 54.4 |
| | mm. | 645 | 778 | 1382 |
| 064 | in. | 25.4 | 30.6 | 58.4 |
| | mm. | 645 | 778 | 1483 |
| 072 | in. | 25.4 | 30.6 | 58.4 |
| | mm. | 645 | 778 | 1483 |

| Horizontal Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 026 | in. | 22.4 | 62.2 | 19.3 |
| | mm. | 568 | 1580 | 489 |
| 038 | in. | 25.4 | 71.2 | 21.3 |
| | mm. | 645 | 1808 | 540 |
| 049 | in. | 25.4 | 76.2 | 21.3 |
| | mm. | 645 | 1935 | 540 |
| 064 | in. | 25.4 | 81.2 | 21.3 |
| | mm. | 645 | 2062 | 540 |
| 072 | in. | 25.4 | 81.2 | 21.3 |
| | mm. | 645 | 2062 | 540 |

Note: Add 4 inches [101.6 mm] for downflow units


GT-PX Upflow
(50YDV Model)


GT-PX Downflow
(50YDD Model)


GT-PX Horizontal
(50YDH Model)

## Unit Dimensions - Split Units

| Split Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 026 | in. | 22.4 | 25.6 | 19.3 |
| | mm. | 568 | 650 | 490 |
| 038 | in. | 25.4 | 30.6 | 21.3 |
| | mm. | 645 | 778 | 541 |
| 049 | in. | 25.4 | 30.6 | 21.3 |
| | mm. | 645 | 778 | 541 |
| 064 | in. | 25.4 | 30.6 | 21.3 |
| | mm. | 645 | 778 | 541 |


GT-PX Split
(50YDS Model)

## System Summary

| GT-PX (50YD) Series | Packaged Units | | | Split Units | | |
|---|---|---|---|---|---|---|
| | Standard Feature | Factory Option | Field Accessory | Standard Feature | Factory Option | Field Accessory |
| Puron® HFC-410A Refrigerant | ● | | | ● | | |
| Two-Stage Copeland UltraTech Scroll Compressor | ● | | | ● | | |
| Geothermal Capable | ● | | | ● | | |
| Copper Coil | ● | | | ● | | |
| Cupro-Nickel Coil | | ● | | | ● | |
| GE ECM2 Variable Speed Fan Motor | ● | | | Not Applicable | | |
| E-Coated Air Coil | ● | | | Not Applicable | | |
| MERV 11 2" Air Filter | ● | | | Not Applicable | | |
| Hot Water Generator | | ● | | | ● | |
| Thermal Expansion Valve | ● | | | ● | | |
| Dual Level Grommet & Spring Compressor Isolation | ● | | | ● | | |
| Field Convertible Discharge (Horizontal Units) | ● | | | Not Applicable | | |
| DownFlow Configuration | ● | | | Not Applicable | | |
| 3 Compressor Section Access Panels | ● | | | ● | | |
| 2 Airflow Section Access Panels | ● | | | Not Applicable | | |
| Polyester Powder Coat Paint | ● | | | ● | | |
| Stainless Steel Front Access Panels | ● | | | ● | | |
| Factory Installed Hanger Brackets (Horizontal Units) | ● | | | Not Applicable | | |
| Remote Reset at Thermostat | ● | | | ● | | |
| Condensate Overflow Protection | ● | | | Not Applicable | | |
| Microprocessor CXM Controls | ● | | | ● | | |
| Unit Performance Sentinel™ Performance Monitor | ● | | | ● | | |
| Whole House Dehumidification System | | ● | | Not Applicable | | |
| Extended Labor Allowance and Service Warranty | | ● | | | ● | |
| Digital Multi-Stage Thermostat | | | ● | | | ● |
| Flow Controller Loop Pumping Module | | | ● | | | ● |
| Internal Auxiliary Electric Heat | | | ● | | | ● |

ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

Optional variable speed (ECM) fan design allows the GT-PG to "match" performance to meet all weather conditions:

- On those cold winter days up to three stages of heat automatically engage when needed to keep your home warm and comfortable.
- During humid days a special dehumidification mode may be used to provide exceptional moisture removal.
- In mild spring and fall months only first stage heating or cooling is needed to provide optimum indoor comfort.

The GT-PG assures you of high comfort, maximum efficiency, superior dehumidification, and low utility bills.

The energy-efficiency criteria for geothermal heat pumps to qualify for the Energy Star program requires an EER rating of 14.1 (closed loop systems) or 16.2 (open loop system). The GT-PG has a EER rating of 20 – showing that not all Energy Star qualified systems are equal.

## *The GT-PG Series*

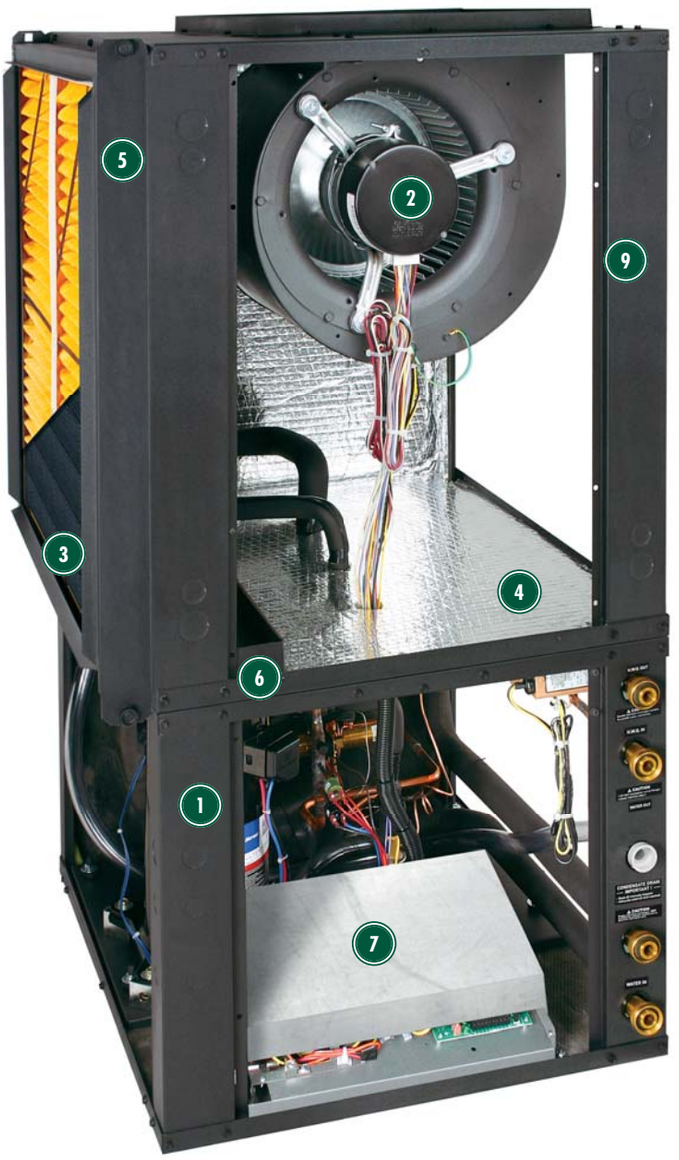
Using Puron® Ozone Safe Refrigerant, the GT-PG is a breakthrough in efficiency – providing you with the greatest energy savings of any space conditioning system and unprecedented environmental protection at the same time. The GT-PG offers the latest in single-stage geothermal heat pump technology.

Advanced scroll compressor technology and microprocessor controls allow the GT-PG to operate at the most efficient level for all weather conditions. The GT-PG has some of the industry's highest single stage efficiency ratings.


The GT-PG Packaged Upflow (50YEV) Series

## GT-PG Packaged Unit

1. Copeland™ High Efficiency Single-Stage Scroll Compressor
2. State-Of-The-Art GE Variable Speed Blower Motor (Optional)
3. E-Coated Air Coil
4. Foil Faced Insulation In The Blower Section for Easy of Cleaning; Fully Insulated Compressor Section for Maximum Sound Attenuation
5. Two Inch Filter Rack With High Performance MERV 11 Pleated Air Filter
6. Stainless Steel Drain Pan For Long Life
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Five Easy, Lift-out Service Access Panels With Stainless Steel Front Panels




Features Puron® HFC-410A Zero Ozone Depletion Refrigerant

Puron®
the environmentally sound refrigerant


## Performance Ratings

| *The GT-PG Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Water (Open Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW) [Variable Speed Fan]* | *EER (Energy Efficiency Ratio) [Variable Speed Fan]* | *Heating Capacity, Btuh (kW) [Variable Speed Fan]* | *COP (Coefficient of Performance) [Variable Speed Fan]* |
| **Model (50YED/H/V) Series** | | | | |
| **018** | 20,200 (5.9) [20,500 (6.0)] | 26.7 [28.1] | 17,400 (5.1) [17,500 (5.1)] | 4.6 [4.9] |
| **024** | 28,600 (8.4) [28,100 (8.2)] | 25.7 [27.4] | 25,000 (7.3) [25,100 (7.4)] | 4.3 [4.6] |
| **030** | 31,700 (9.3) [32,200 (9.4)] | 22.9 [23.9] | 29,400 (8.6) [29,400 (8.6)] | 4.4 [4.6] |
| **036** | 37,300 (10.9) [37,300 (10.9)] | 25.1 [26.5] | 32,900 (9.6) [32,900 (9.6)] | 4.8 [5.1] |
| **042** | 42,900 (12.6) [44,200 (13.0)] | 24.3 [27.1] | 40,100 (11.8) [39,300 (11.5)] | 4.6 [4.9] |
| **048** | 53,900 (15.8) [54,100 (15.9)] | 23.3 [24.6] | 49,000 (14.4) [48,700 (14.3)] | 4.4 [4.5] |
| **060** | 67,000 (19.6) [67,200 (19.7)] | 23.2 [24.3] | 58,700 (17.2) [59,100 (17.3)] | 4.5 [4.6] |
| **070** | 77,100 (22.6) [77,000 (22.6)] | 21.6 [23.5] | 69,400 (20.3) [69,000 (20.2)] | 4.3 [4.4] |

| *The GT-PG Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Loop (Closed Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW) [Variable Speed Fan]* | *EER (Energy Efficiency Ratio) [Variable Speed Fan]* | *Heating Capacity, Btuh (kW) [Variable Speed Fan]* | *COP (Coefficient of Performance) [Variable Speed Fan]* |
| **Model (50YED/H/V) Series** | | | | |
| **018** | 18,300 (5.4) [18,600 (5.5)] | 19.0 [19.8] | 13,400 (3.9) [13,500 (4.0)] | 3.7 [4.0] |
| **024** | 26,300 (7.7) [26,000 (7.6)] | 19.1 [20.0] | 19,000 (5.6) [19,400 (5.7)] | 3.7 [3.8] |
| **030** | 29,400 (8.6) [29,800 (8.7)] | 17.6 [18.0] | 23,600 (6.9) [23,700 (6.9)] | 3.8 [3.9] |
| **036** | 34,500 (10.1) [34,600 (10.1)] | 19.2 [20.2] | 25,700 (7.5) [25,800 (7.6)] | 3.9 [4.2] |
| **042** | 39,300 (11.5) [40,000 (11.7)] | 18.4 [20.0] | 31,600 (9.3) [30,400 (8.9)] | 3.8 [4.0] |
| **048** | 49,900 (14.6) [50,100 (14.7)] | 17.6 [18.5] | 39,000 (11.4) [38,400 (11.3)] | 3.7 [3.8] |
| **060** | 63,300 (18.6) [64,000 (18.8)] | 18.2 [19.0] | 46,500 (13.6) [46,700 (13.7)] | 3.7 [3.8] |
| **070** | 70,800 (20.8) [70,000 (20.5)] | 16.6 [17.8] | 54,000 (15.8) [53,900 (15.8)] | 3.6 [3.6] |

All ratings based upon ASHRAE/ARI/ISO standard 13256-1 for Ground Water and Ground Loop heat pumps.

## Unit Dimensions

| Upflow Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 018 | in. | 22.4 | 25.6 | 44.6 |
| | mm. | 568 | 651 | 1133 |
| 024-030 | in. | 22.4 | 25.6 | 48.5 |
| | mm. | 568 | 651 | 1232 |
| 036 | in. | 25.4 | 30.6 | 50.4 |
| | mm. | 645 | 778 | 1280 |
| 042-048 | in. | 25.4 | 30.6 | 54.4 |
| | mm. | 645 | 778 | 1382 |
| 060-070 | in. | 25.4 | 30.6 | 58.4 |
| | mm. | 645 | 778 | 1483 |

| Horizontal Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 018 | in. | 22.4 | 62.2 | 19.3 |
| | mm. | 568 | 1580 | 489 |
| 024-030 | in. | 22.4 | 62.2 | 19.3 |
| | mm. | 568 | 1580 | 489 |
| 036 | in. | 25.4 | 71.2 | 21.3 |
| | mm. | 645 | 1808 | 540 |
| 042-048 | in. | 25.4 | 76.2 | 21.3 |
| | mm. | 645 | 1935 | 540 |
| 060-070 | in. | 25.4 | 81.2 | 21.3 |
| | mm. | 645 | 2062 | 540 |

Note: Add 4 inches [101.6 mm] for downflow units


GT-PG Upflow
(50YEV Model)


GT-PG Downflow
(50YED Model)


GT-PG Horizontal
(50YEH Model)

## System Summary

| GT-PG (50YE) Series | Standard Feature | Factory Option | Field Accessory |
|---|---|---|---|
| Puron® HFC-410A Refrigerant | ● | | |
| Single-Stage Copeland Scroll Compressor | ● | | |
| Geothermal Capable | ● | | |
| Copper Coil | ● | | |
| Cupro-Nickel Coil | | ● | |
| GE ECM2 Variable Speed Fan Motor | | ● | ● |
| E-Coated Air Coil | ● | | |
| MERV 11 2" Air Filter | ● | | |
| Hot Water Generator | | ● | |
| Thermal Expansion Valve | ● | | |
| Dual Level Grommet & Spring Compressor Isolation | ● | | |
| Field Convertible Discharge (Horizontal Units) | ● | | |
| DownFlow Configuration | ● | | |
| 3 Compressor Section Access Panels | ● | | |
| 2 Airflow Section Access Panels | ● | | |
| Polyester Powder Coat Paint | ● | | |
| Stainless Steel Front Access Panels | ● | | |
| Factory Installed Hanger Brackets (Horizontal Units) | ● | | |
| Remote Reset at Thermostat | ● | | |
| Condensate Overflow Protection | ● | | |
| Microprocessor CXM Controls | ● | | |
| Unit Performance Sentinel™ Performance Monitor | ● | | |
| Whole House Dehumidification System | | ● | |
| Extended Labor Allowance and Service Warranty | | ● | |
| Digital Multi-Stage Thermostat | | | ● |
| Flow Controller Loop Pumping Module | | | ● |
| Internal Auxiliary Electric Heat | | | ● |

ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

## *The GT-G Series*

The GT-G Series offers high efficiency and low operating costs in a single packaged unit. So efficient and environmentally friendly that the Environmental Protection Agency rates Geothermal Systems "best technology" and is termed the "clean" alternative.

The GT-G Indoor and GT-S Outdoor Split Series Units can be easily connected to your existing furnace or installed with a new Air Handler from your Bryant dealer to heat and cool your entire home quietly, efficiently, and economically. Easily connected to fossil fuel or electric furnaces, the GT-G Split is ideal for "add-on" installations, providing you with the maximum inconvenience and comfort at a reduced installed cost.

The perfect combination for energy savings, comfort, and reduced operating costs – the GT-G Split geothermal heating and cooling system can be matched with most high-efficiency air-coils and air-handlers.

Since the GT-S Outdoor Split replaces your current outdoor unit, you can connect directly to your existing interior equipment and avoid additional installation and remodeling expenses.

The innovative design of the GT-S Outdoor offers a variety of cost saving installation options available for the first time with a geothermal system. This unique engineering allows the unit to be installed outside, using your current system connections without changes or special modifications. Just add a ground loop, and you are in business.

If you care about the lowest annual energy costs, maximum comfort, longest system life, least expensive maintenance, then you are talking about Bryant geothermal heating and cooling systems.


The GT-G Upflow
(50YCV) Series


The indoor and outdoor split configurations,
GT-G Indoor and GT-S Outdoor Split
(50YCS and 38WQS) Series

## GT-G Packaged Unit

1. Copeland™ High Efficiency Single-Stage Scroll Compressor (Rotary Compressor on Smaller Models)
2. Optional State-Of-The-Art GE Variable Speed Blower Motor
3. E-Coated Air Coil
4. Fully Insulated Blower Section and Compressor Section for Maximum Sound Attenuation
5. Integrated Filter Rack with Return Air Duct Connection
6. Sloped Drain Pan with Condensate Overflow Sensor
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Five Easy, Lift-out Service Access Panels




ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

## GT-G Indoor Split Unit

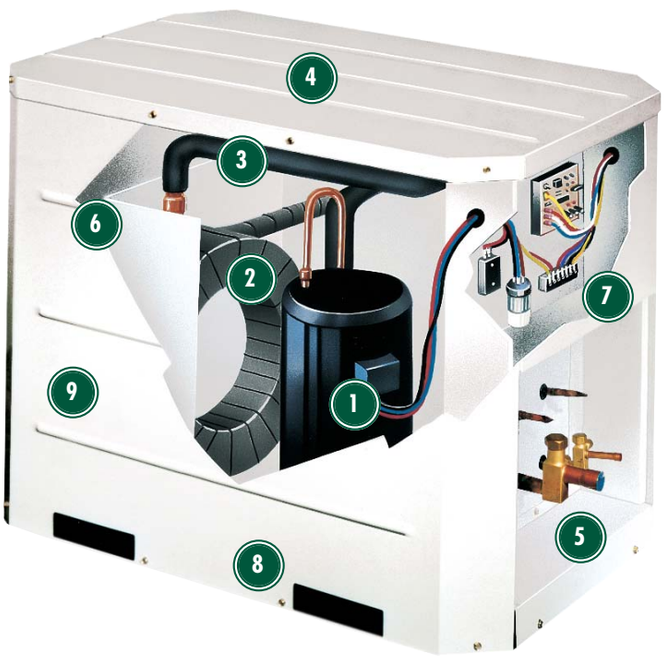

1. Copeland™ High Efficiency Single-Stage Scroll Compressor
2. Oversized Water Coil
3. Fully Insulated Water and Refrigerant Lines
4. Optional Factory Installed Hot Water Generator with Internal Pump
5. Backseating Brass Service Valves with Service Port
6. Brass Swivel Water Connections
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Three Easy, Lift-out Service Access Panels

8

ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

## GT-S Outdoor Split Unit




1. Copeland™ High Efficiency Single-Stage Scroll Compressor
2. Oversized Water Coil
3. Fully Insulated Water and Refrigerant Lines
4. Powder Coat Painted Weather Resistant Cabinet
5. Backseating Brass Service Valves with Service Port
6. Brass Swivel Water Connections
7. Unit Performance Sentinel™: Automatic Alert System Lets You Know If The System Is Not Running At Peak Performance
8. Integrated Carrying Handles for Easy Jobsite Placement
9. Multiple Easy Access Service Panels

ENERGY STAR PARTNER

ARI PERFORMANCE CERTIFIED™

## Performance Ratings

| *The GT-G Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Water (Open Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW) [Variable Speed Fan]* | *EER (Energy Efficiency Ratio) [Variable Speed Fan]* | *Heating Capacity, Btuh (kW) [Variable Speed Fan]* | *COP (Coefficient of Performance) [Variable Speed Fan]* |
| **Model (50YCH/V) Series** | | | | |
| **015** | 15,600 (5.4) | 23.9 | 12,900 (3.9) | 4.1 |
| **018** | 19,000 (5.9) | 22.7 | 16,000 (5.1) | 4.1 |
| **024** | 26,500 (8.4)<br>[26,500 (8.2)] | 21.2<br>[21.3] | 23,500 (7.3)<br>[23,500 (7.4)] | 4.0<br>[4.0] |
| **030** | 31,100 (9.3)<br>[31,100 (9.4)] | 21.4<br>[21.5] | 27,200 (8.6)<br>[27,200 (8.6)] | 4.0<br>[4.1] |
| **036** | 36,000 (10.9)<br>[36,000 (10.9)] | 20.8<br>[20.8] | 32,900 (9.6)<br>[32,900 (9.6)] | 4.0<br>[4.1] |
| **042** | 45,400 (12.6)<br>[45,400 (13.0)] | 20.3<br>[20.4] | 39,000 (11.8)<br>[39,000 (11.5)] | 4.0<br>[4.1] |
| **048** | 49,000 (15.8)<br>[49,100 (15.9)] | 19.9<br>[20.1] | 43,300 (14.4)<br>[43,200 (14.3)] | 4.0<br>[4.1] |
| **060** | 59,600 (19.6)<br>[59,600 (19.7)] | 17.7<br>[17.8] | 58,900 (17.2)<br>[58,800 (17.3)] | 3.8<br>[3.9] |
| **070** | 70,000 (22.6)<br>[70,200 (22.6)] | 16.8<br>[17.1] | 62,900 (20.3)<br>[62,700 (20.2)] | 3.8<br>[3.8] |

ECM Fan not available on Sizes 015 and 018.

| *The GT-G Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Loop (Closed Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW) [Variable Speed Fan]* | *EER (Energy Efficiency Ratio) [Variable Speed Fan]* | *Heating Capacity, Btuh (kW) [Variable Speed Fan]* | *COP (Coefficient of Performance) [Variable Speed Fan]* |
| **Model (50YCH/V) Series** | | | | |
| **015** | 14,900 (5.4) | 18.5 | 11,200 (3.9) | 3.8 |
| **018** | 18,300 (5.4) | 16.7 | 13,200 (3.9) | 3.6 |
| **024** | 26,000 (7.7)<br>[26,300 (7.6)] | 17.1<br>[17.5] | 19,200 (5.6)<br>[19,000 (5.7)] | 3.6<br>[3.8] |
| **030** | 30,700 (8.6)<br>[31,000 (8.7)] | 16.9<br>[17.5] | 22,200 (6.9)<br>[21,900 (6.9)] | 3.6<br>[3.7] |
| **036** | 35,800 (10.1)<br>[36,000 (10.1)] | 16.4<br>[17.2] | 25,700 (7.5)<br>[26,400 (7.6)] | 3.4<br>[3.5] |
| **042** | 43,300 (11.5)<br>[43,700 (11.7)] | 16.0<br>[16.7] | 32,700 (9.3)<br>[32,400 (8.9)] | 3.7<br>[3.8] |
| **048** | 48,900 (14.6)<br>[49,400 (14.7)] | 16.4<br>[17.3] | 36,900 (11.4)<br>[35,900 (11.3)] | 3.7<br>[3.8] |
| **060** | 59,400 (18.6)<br>[59,800 (18.8)] | 14.6<br>[15.6] | 48,700 (13.6)<br>[47,500 (13.7)] | 3.6<br>[3.7] |
| **070** | 67,100 (20.8)<br>[67,800 (20.5)] | 13.4<br>[14.6] | 53,400 (15.8)<br>[51,500 (15.8)] | 3.6<br>[3.7] |

ECM fan not available on Sizes 015 and 018. All ratings based upon ASHRAE/ARI/ISO standard 13256-1 for Ground Water and Ground Loop heat pumps.

## Performance Ratings

| *The GT-G Indoor and GT-S Outdoor Split Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Water (Open Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW)* | *EER (Energy Efficiency Ratio)* | *Heating Capacity, Btuh (kW)* | *COP (Coefficient of Performance)* |
| **Model (50YCS & 38WQS) Series** | | | | |
| **018** | 18,500 (5.4) | 22.1 | 15,500 (4.5) | 4.0 |
| **024** | 25,700 (7.5) | 20.6 | 22,800 (6.7) | 3.9 |
| **030** | 30,200 (8.9) | 20.8 | 26,400 (7.7) | 3.9 |
| **036** | 34,900 (10.2) | 20.1 | 31,900 (9.3) | 3.9 |
| **042** | 44,100 (12.9) | 19.7 | 37,800 (11.1) | 3.9 |
| **048** | 47,500 (13.9) | 19.3 | 42,000 (12.3) | 3.9 |
| **060** | 57,800 (16.9) | 17.2 | 57,100 (16.7) | 3.7 |

| *The GT-G Indoor and GT-S Outdoor Split Series by Bryant* | | | | |
|---|---|---|---|---|
| **Ground Loop (Closed Loop) Heat Pumps** | *Cooling Capacity, Btuh (kW)* | *EER (Energy Efficiency Ratio)* | *Heating Capacity, Btuh (kW)* | *COP (Coefficient of Performance)* |
| **Model (50YCS & 38WQS) Series** | | | | |
| **018** | 17,800 (5.2) | 16.2 | 12,800 (3.8) | 3.5 |
| **024** | 25,200 (7.7) | 16.6 | 18,600 (5.5) | 3.5 |
| **030** | 29,800 (8.7) | 16.4 | 21,500 (6.3) | 3.5 |
| **036** | 34,700 (10.2) | 15.9 | 25,900 (7.6) | 3.3 |
| **042** | 42,000 (12.3) | 15.5 | 31,700 (9.3) | 3.6 |
| **048** | 47,400 (13.9) | 15.9 | 35,800 (10.5) | 3.6 |
| **060** | 57,600 (16.9) | 14.2 | 47,200 (13.8) | 3.5 |

All ratings based upon ASHRAE/ARI/ISO standard 13256-1 for Ground Water and Ground Loop heat pumps.

## Unit Dimensions - Packaged Units

| Upflow Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 015-018 | in. | 22.4 | 25.6 | 40.4 |
| | mm. | 568 | 651 | 1026 |
| 024-030 | in. | 22.4 | 25.6 | 44.4 |
| | mm. | 568 | 651 | 1128 |
| 036 | in. | 22.4 | 25.6 | 48.4 |
| | mm. | 568 | 651 | 1229 |
| 042-048 | in. | 25.4 | 30.6 | 50.4 |
| | mm. | 645 | 778 | 1282 |
| 060 | in. | 25.4 | 30.6 | 54.4 |
| | mm. | 645 | 778 | 1382 |
| 070 | in. | 25.4 | 30.6 | 58.4 |
| | mm. | 645 | 778 | 1483 |

| Horizontal Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 015-018 | in. | 22.4 | 53.0 | 19.3 |
| | mm. | 568 | 1346 | 489 |
| 024-030 | in. | 22.4 | 63.0 | 19.3 |
| | mm. | 568 | 1601 | 489 |
| 036 | in. | 22.4 | 63.0 | 19.3 |
| | mm. | 568 | 1601 | 489 |
| 042-048 | in. | 25.4 | 72.0 | 21.3 |
| | mm. | 645 | 1830 | 541 |
| 060 | in. | 25.4 | 77.0 | 21.3 |
| | mm. | 645 | 1956 | 541 |
| 070 | in. | 25.4 | 82.0 | 21.3 |
| | mm. | 645 | 2083 | 541 |

Note: Add 4 inches [101.6 mm] for downflow units

GT-G Upflow
(50YCV Model)

GT-G Downflow
(50YCV Model)

GT-G Horizontal
(50YCH Model)

## Unit Dimensions - Split Units

| Model | | | Overall Cabinet | | |
|---|---|---|---|---|---|
| | | | Width | Depth | Height |
| Indoor | 018-036 | in. | 22.4 | 25.6 | 19.3 |
| | | mm. | 568 | 651 | 490 |
| | 042-060 | in. | 25.4 | 30.6 | 21.3 |
| | | mm. | 645 | 778 | 541 |
| Outdoor | 018-060 | in. | 22.0 | 33.0 | 26.0 |
| | | mm. | 559 | 838 | 660 |

GT-G
Indoor Split
(50YCS Model)

GT-S
Outdoor Split
(38WQS Model)

## System Summary

| GT-G (50YC & 38WQS) Series | Packaged Units | | | Indoor Split | | | Outdoor Split | | |
|---|---|---|---|---|---|---|---|---|---|
| | Standard Feature | Factory Option | Field Accessory | Standard Feature | Factory Option | Field Accessory | Standard Feature | Factory Option | Field Accessory |
| Single-Stage Copeland Scroll Compressor | ● | | | ● | | | ● | | |
| Geothermal Capable | ● | | | ● | | | ● | | |
| Copper Coil | ● | | | ● | | | ● | | |
| Cupro-Nickel Coil | | ● | | | ● | | | ● | |
| GE ECM2 Variable Speed Fan Motor | | ● | ● | Not Applicable | | | Not Applicable | | |
| E-Coated Air Coil | ● | | | Not Applicable | | | Not Applicable | | |
| Integrated Filter Rack/Duct Collar | ● | | | Not Applicable | | | Not Applicable | | |
| Hot Water Generator | | ● | | | ● | | | | ● |
| Thermal Expansion Valve | ● | | | ● | | | ● | | |
| Dual Level Grommet & Spring Compressor Isolation | ● | | | ● | | | Not Applicable | | |
| Field Convertible Discharge (Horizontal Units) | ● | | | Not Applicable | | | Not Applicable | | |
| DownFlow Configuration | ● | | | Not Applicable | | | Not Applicable | | |
| 3 Compressor Section Access Panels | ● | | | ● | | | Not Applicable | | |
| 2 Airflow Section Access Panels | ● | | | Not Applicable | | | Not Applicable | | |
| Polyester Powder Coat Paint | ● | | | ● | | | ● | | |
| Factory Installed Hanger Brackets (Horizontal Units) | ● | | | Not Applicable | | | Not Applicable | | |
| Remote Reset at Thermostat | ● | | | ● | | | ● | | |
| Condensate Overflow Protection | ● | | | Not Applicable | | | Not Applicable | | |
| Microprocessor CXM Controls | ● | | | ● | | | ● | | |
| Unit Performance Sentinel™ Performance Monitor | ● | | | ● | | | ● | | |
| Extended Labor Allowance and Service Warranty | | ● | | | ● | | | ● | |
| Digital Programmable Thermostat | | | ● | | | ● | | | ● |
| Flow Controller Loop Pumping Module | | | ● | | | ● | | | ● |
| Internal Auxiliary Electric Heat | | | ● | | | ● | | | ● |

## *The GSW Water-to-Water Series*

The GSW water-to-water series offers high efficiency with advanced features, extremely quiet operation and application flexibility at competitive prices. As Bryant's most adaptable R-22 refrigerant units, the GSW series can be used for radiant floor heating, snow/ice melt, spa and pool water heating, domestic hot water heating, and many other options.

Available in sizes 3 ton [10.6 kW], 5 ton [17.6 kW] and 10 ton [29.3 kW] the GSW series offers a wide range of units for most any installation.

Bryant's exclusive double isolation compressor mounting system makes the GSW series the quietest water-to-water unit on the market. Compressors are mounted on vibration isolation springs to a heavy gauge mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration/sound attenuation.

### GSW Water-to-Water and Radiant Floor Heating Systems

Radiant floor heating has been used for centuries. The Romans channeled hot air under the floors of their villas. In the 1930s, architect Frank Lloyd Wright piped hot water through the floors of many of his buildings. Some home builders' surveys have shown that, if given a choice, most new home owners prefer radiant floor heat over other types of systems. A simple 1" [25mm] diameter pipe can carry as much heat as a 10" x 19" [254 x 483 mm] rectangular duct carrying hot air at 130°F [54°C].

A 15 by 20 foot [5 x 6 meter] room with radiant floor heating will have an average floor temperature of 85°F [29°C] with an overall room temperature of 70°F [21°C].

Conventional cast iron radiators or fin-tube baseboard units often present obstacles to the effective use of floor and wall space within a room. They severely restrict the placement of furniture, as well as the placement of paintings, wall hangings, and other decor. With radiant floor technology, these obstacles are eliminated giving homeowners more freedom to arrange their rooms as they choose.

### Advantages of Geothermal Radiant Floor Heating

1. Independent zoning
2. Lower operating costs than forced air systems
3. Ductless
4. Quiet
5. Reliable, fewer moving parts
6. Easily controlled
7. Space savings - Fewer limitations of furniture or room arrangements
8. Can be matched to another system for air conditioning, if needed
9. Equipment requires smaller installation footprint than a standard boiler installation
10. Does not require complex ventilation to vent away potentially harmful combustion gases
11. No combustion chamber to maintain and clean.
12. No risk of carbon monoxide (CO) poisoning

Most people who own radiant floor heating feel that the most important advantages are comfort and quiet operation. Radiant floor systems allow even heating throughout the whole floor, not just in localized spots as with other types of heating systems. The room heats from the bottom up, warming the feet and body first.

Even heat distribution may result in lower heating bills. With radiant floor heating, you may be able to set the thermostat several degrees lower, relative to other types of central heating systems. This is because the entire surface of the floor radiates about the same amount of heat that the human body does, making the occupant feel warm even though the air temperature might be only 65°F [18°C]. It also radiates this heat for a long period of time. Radiant systems may result in less infiltration of outside air into the house compared to houses with forced-air heating. Radiant floor heating proponents claim that fuel savings of 15% to 20% over forced air systems are possible.

Radiant floor heating also allows for lower water temperatures, which uses less energy and lowers utility bills. Radiant floors operate between 85-130°F [29-54°C], compared to other hydronic heating systems' range of 130-160°F [54-71°C].

To some, the greatest advantage of radiant floor heating is aesthetic. The system is "invisible." There are no heat registers or radiators to obstruct furniture arrangements and interior design plans. Radiant floor systems also eliminate the fan noise of forced hot air systems.

## Putting it All Together

Combining the advantages of radiant floor heating with the advantages of geothermal technology provides unmatched comfort and savings. Plus, Bryant GSW series water-to-water units can provide chilled water for distribution to small fan coil units for zoned forced air cooling if desired. Most systems, however, use a separate forced air geothermal system for the ultimate in comfort, energy cost savings and ease of control. The cooling system shares the same geothermal loop piping system with the water-to-water (radiant floor heating) units, which allows both systems to take advantage of the mild ground temperature. Radiant floor heating and geothermal systems provide home owners with state-of-the art heating and cooling.

Ceiling:
60°F [15°C]

Main Space:
70°F [21°C]

Floor:
85°F [29°C]

An example of radiant floor tubing under a tile floor in a living room

## GSW Water-to-Water Unit


1. Copeland™ High Efficient Scroll Compressor
2. Optional Hot Water Generator With Internal Pump
3. Fully Insulated Water and Refrigerant Lines
4. Fully Insulated Compressor Section
5. Stackable Powder Coated Steel Cabinet For Long Life
6. System Operating LED Lights
7. Exclusive Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
8. Five Easy, Lift-out Service Access Panels

7

## Performance Ratings

| *The GSW Water-to-Water Series by Bryant* | | | |
|---|---|---|---|
| **Model (GSW) Series** | **036** | **060** | **120** |
| **Ground Water (Open Loop) Heat Pumps** | | | |
| *Cooling Capacity, Btuh (kW)* | 31,200 (9.1) | 49,200 (14.4) | 98,100 (28.8) |
| *EER (Energy Efficiency Ration)* | 20.6 | 17.5 | 16.9 |
| *Heating Capacity, Btuh (kW)* | 33,400 (9.8) | 53,000 (15.5) | 106,200 (31.1) |
| *COP (Coefficient of Performance)* | 4.0 | 3.5 | 3.5 |
| **Ground Loop (Geothermal) Heat Pumps** | | | |
| *Cooling Capacity, Btuh (kW)* | 29,800 (8.7) | 46,100 (13.5) | 91,800 (26.9) |
| *EER (Energy Efficiency Ration)* | 16.2 | 13.6 | 13.2 |
| *Heating Capacity, Btuh (kW)* | 27,200 (8.0) | 40,900 (12.0) | 82,000 (24.0) |
| *COP (Coefficient of Performance)* | 3.3 | 2.9 | 2.8 |

All ratings based upon ASHRAE/ARI/ISO standard 13256-2 for Ground Water and Ground Loop heat pumps.

## Unit Dimensions

| Model | | Overall Cabinet | | |
|---|---|---|---|---|
| | | Width | Depth | Height |
| 036 | in. | 25.6 | 22.4 | 29.5 |
| | mm. | 651 | 568 | 749 |
| 060 | in. | 30.6 | 25.4 | 33.0 |
| | mm. | 778 | 645 | 838 |
| 120 | in. | 26.0 | 41.1 | 40.1 |
| | mm. | 660 | 1045 | 1019 |


GSW Water-to-Water Family
(GSW Model)

## System Summary

| GSW Water-to-Water (GSW) Series | Standard Feature | Factory Option | Field Accessory |
|---|---|---|---|
| Single-Stage Copeland Scroll Compressor* | ● | | |
| Geothermal Capable | ● | | |
| Radiant Floor Ready | ● | | |
| Chilled Water Capable | ● | | |
| Fully Insulated Water and Refrigerant Lines | ● | | |
| Copper Coil | ● | | |
| Cupro-Nickel Coil | | ● | |
| Hot Water Generator | | ● | |
| Thermal Expansion Valve | ● | | |
| Dual Level Grommet & Spring Compressor Isolation | ● | | |
| 3 Compressor Section Access Panels | ● | | |
| Polyester Powder Coat Paint | ● | | |
| Microprocessor CXM Controls | ● | | |
| Extended Labor Allowance and Service Warranty | | ● | |
| Flow Controller Loop Pumping Module | | | ● |

ENERGY STAR PARTNER

*Glossary:*

**Closed-loop heat pump system:** A heat pump system that uses a loop of buried plastic pipe as a heat exchanger. Loops can be horizontal or vertical.

**COP (Coefficient of Performance):** The ratio of heating provided by a heat pump (or other refrigeration machine) to the energy consumed by the system under designated operating conditions. The higher the COP, the more efficient the system.

**Compressor:** The central part of a heat pump system. The compressor increases the pressure and temperature of the refrigerant and simultaneously reduces the volume while causing the refrigerant to move through the system.

**Cycling losses:** The actual efficiency of a heating or cooling system is reduced due to start-up and shut-down losses. Over sizing a heating or cooling system increases cycling losses.

**EER (Energy Efficiency Ratio):** The ratio of cooling provided by a heat pump (or other refrigeration machine) to the energy consumed by the system under designated operating conditions. The higher the EER, the more efficient the system.

**Fossil fuel:** Any of several types of combustible fuels formed from the decomposition of organic matter. Examples are natural gas, propane, fuel oil, and coal.

**Geothermal heat pump:** A heat pump that uses the earth as a heat source and heat sink.

**Heat exchanger:** A device designed to transfer heat between two physically separated fluids or mediums of different temperatures.

**Heat pump:** A mechanical device used for heating and cooling which operates by pumping heat from a cooler to a warmer location. Heat pumps can extract heat from air, water, or the earth. They are classified as either air-source or ground-source (geothermal) units.

**Heat sink:** The medium - air, water or earth - which receives heat rejected from a heat pump.

**Heat source:** The medium - air, water or earth - from which heat is extracted by a heat pump.

**Hot Water Generator:** A device for recovering superheat from the compressor discharge gas of a heat pump or central air conditioner for use in heating or preheating water.

**Open-loop heat pump system:** A heat pump system that uses groundwater from a well. The water is returned to the environment.

**Payback:** A method of calculating how long it will take to recover the difference in costs of two different heating and cooling systems by using the energy and maintenance cost savings from the more efficient system.

**Supplemental heating:** A heating system used during extremely cold weather when additional heat is needed to moderate indoor temperatures. May be in the form of electric resistance or fossil fuel.

bryant®

WHATEVER IT TAKES℠

Geothermal Systems

GEOTHERMAL HEAT PUMP COMFORT SYSTEMS

7300 S.W. 44th Street
Oklahoma City, OK 73179
Phone: 405-745-2920
Fax: 405-745-6620
www.bryantgeo.com



BR001



Rev.: 17 April, 2007D