

Ground source geothermal heat pumps

Warmboard is a proven product that has set the highest standards in the industry when evaluating efficiency, comfort and response times.

Ground source geothermal heat pumps can be a practical solution for those who want low energy bills, low energy consumption and are attracted to using a renewable energy source.

The purpose of integrating a heat pump is to increase efficiencies. A heat pump has the ability to take one unit of heat, (one Kilowatt hour, 3413 BTU's) and convert it to five units of heat (five Kilowatt hours, 17065 BTU's). This example of a heat pump transferring one unit of heat and converting to five units of heat is referred to as a "Coefficient of Performance" (COP) of five. A standard electric boiler or water heater has COP of one. The COP of a heat pump can vary from one to six.

When a heat pump is in operation, the COP will increase as water temperatures decrease.

A Typical Example

An 80 gallon storage tank of water is heated by a ground source heat pump. The required water temperature for floor heating is 100°F (37.7°C). When this storage tank reaches this set point the heat pump will shut down. During this operational mode the heat pump will experience high efficiency ratings of COP's of 4.8.

- ▶ "Heat pump COP"= Coefficient of Performance
- ▶ "LWT" = load water temperatures.
- ▶ "Entering source fluid temperature" = ground source loop of 50* (per this example)

If the same 80 gallon tank is requiring 130°F (54.4°C) water, the heat pump efficiencies drop to 3.4 COP's in order to reach this temperature.

In some instances, a heat pump will be unable to achieve these higher water temperatures and an additional electric boiler or heating element will be required to supplement the heating demands.

In the example above, the heat pump will use 29% less electricity to achieve a water temperature of 100°F (37.7°C) than 130°F (54.4°C).

Warmboard is the ideal heating panel to interface with water-to-water ground source geothermal heat pumps. Our low water temperatures of 100°F (or below) are common while many other radiant methods require water 20–60°F (-7–50.4°C) hotter. Warmboard is a proven product that has set the highest standards in the industry when evaluating efficiency, comfort and response time.

