

# Using a Ground Source Heat Pump for Pool Room Dehumidification

ThermLink designed and supplied a complete system for pool heating and dehumidifying the new Best Western Inn & Suites in Shelby, Montana.

### Background

On the way to Glacier Park and close to the Canadian Border, the Shelby Inn & Suites is a popular destination for road trippers and outdoor lovers. Among many amenities offered by the hotel is an indoor pool and spa.

### Operating Results

In operation since January 2013, the system has created a very comfortable pool room environment – **maintaining an air temperature of 82°F with humidity at 50%** – right at the desired set points.

### Cost Savings

The installation cost of the system was **over \$10,000 less than** comparable dehumidification systems.

Operating costs are also expected to bring an attractive financial return. The payback period is projected to be **less than 5 years** versus a conventional exhaust and reheat system.

Best Western  
Shelby Inn & Suites  
Shelby, Montana



With an eye towards energy efficiency and cost savings, the developers of the hotel were looking for an alternative to the conventional HVAC pool room systems that exhaust the moist air from the room and reheat fresh air with a furnace.

Not only are these conventional systems inefficient and expensive to operate since a significant amount of energy is wasted, but they also have a difficult time keeping the pool room dry on cold winter days.

Looking for a way to drive down expenses and increase the comfort of the pool room, the ownership group contacted ThermLink for a solution to this problem. ThermLink proposed a state-of-the-art energy recapturing system utilizing a geothermal heat pump that harnesses the energy from the moist air to re-heat the room and the pool. This system has proven to be very cost effective and efficient at controlling the humidity in the room.

## Design

ThermLink designed a complete dehumidification system based on a water-to-air ground source (geothermal) heat pump. The heat pump operating in cooling mode pulls the warm moist air from the pool room and removes the moisture from the air. This process generates heat which is transferred to the water lines connected to the heat pump. The incoming water line picks up heat from the heat pump and then supplies three heating needs:

- 1) The first priority is to re-heat the air going back into the pool room. This is done using hot water air coils in the outgoing air plenum.
- 2) The second priority is to supply heat for domestic hot water using a hot water coil in a buffer tank.
- 3) Finally, the third priority is to supply heat to the pool through a heat exchanger.

## Products Included

### Geothermal Heat Pump

- ClimateMaster, 8-Ton Water-Air Heat Pump, Bronze Glow Coating

### Boilers

- Viessmann Vitodens 200, 285,000 BTU/hr boilers

### Ventilation

- LifeBreath HRVs

### Coils & Heat Exchangers

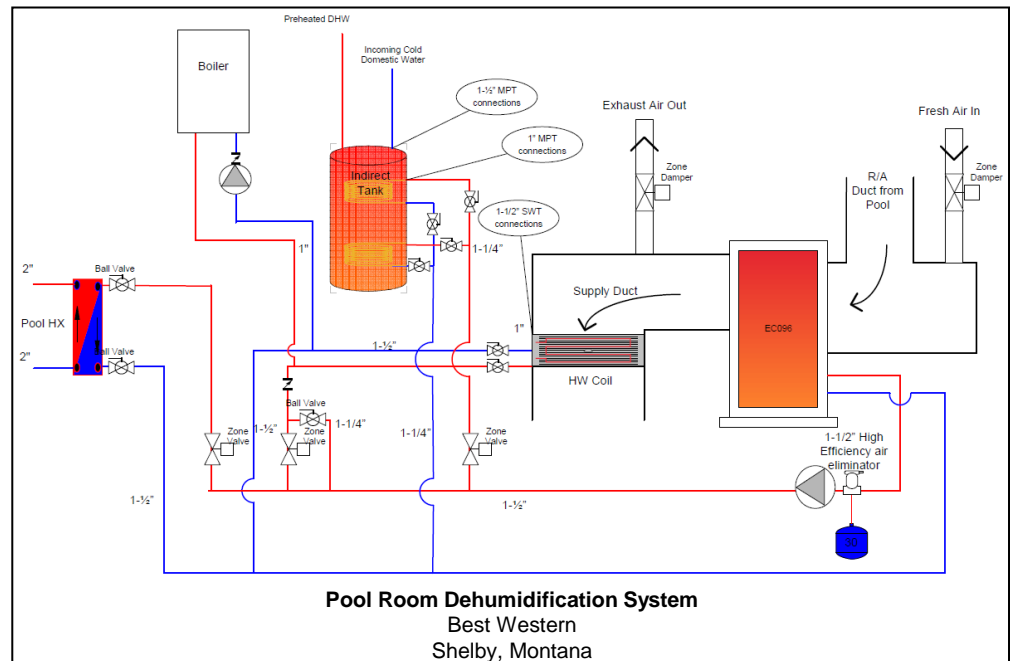
- Custom Hot Water Air Coils
- 119 Gallon, Viessmann Vitocell Indirect Tank
- SP Series Btu Shell & Tube Heat Exchangers

### Pumps, Valves & Tanks

- Grundfos 43-100F Circulator
- NBF-25 Bronze Circulator
- Bell & Gossett HFT-30 Expansion Tank
- Honeywell Commercial Zone Valves

### Controls

- Honeywell Prestige 2.0 Thermostats
- Honeywell Wireless Indoor Air Sensor
- Honeywell RedLink-Enabled Internet Gateway
- Honeywell Aquastat
- Tekmar 150 One Stage Setpoint Control




## Installation

The installation was completed by Applied Mechanical, a well-respected mechanical company from Kalispell, MT. The complete installation took one week and was simplified by the fact that all of the installation took place within the mechanical room.

Installation included installing the heat pump, boiler and other equipment; installing the piping and ductwork; and adding the controls. The start-up and commissioning was assisted by ThermLink and took one day.

## Controls

The design also included advanced controls from Honeywell which utilize wireless sensors in the pool room to control the system. The system is also Internet-enabled so the system can be monitored and controlled remotely. This feature is especially useful for the maintenance staff since they are often offsite.



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Control Center → My Locations → Thermostat(s) in Shelby Best Western → THERMOSTAT Control

### THERMOSTAT Control

Indoor: **78°** | Outdoor: **32°** | 5-Day Forecast | 69% Humidity

51% Humidity

Set To: **76°** | Following Schedule

SYSTEM: HEAT (selected), COOL, AUTO, OFF

Fan: ON, AUTO, FOLLOW SCHEDULE (selected)

Menu | Submit ✓ | Back

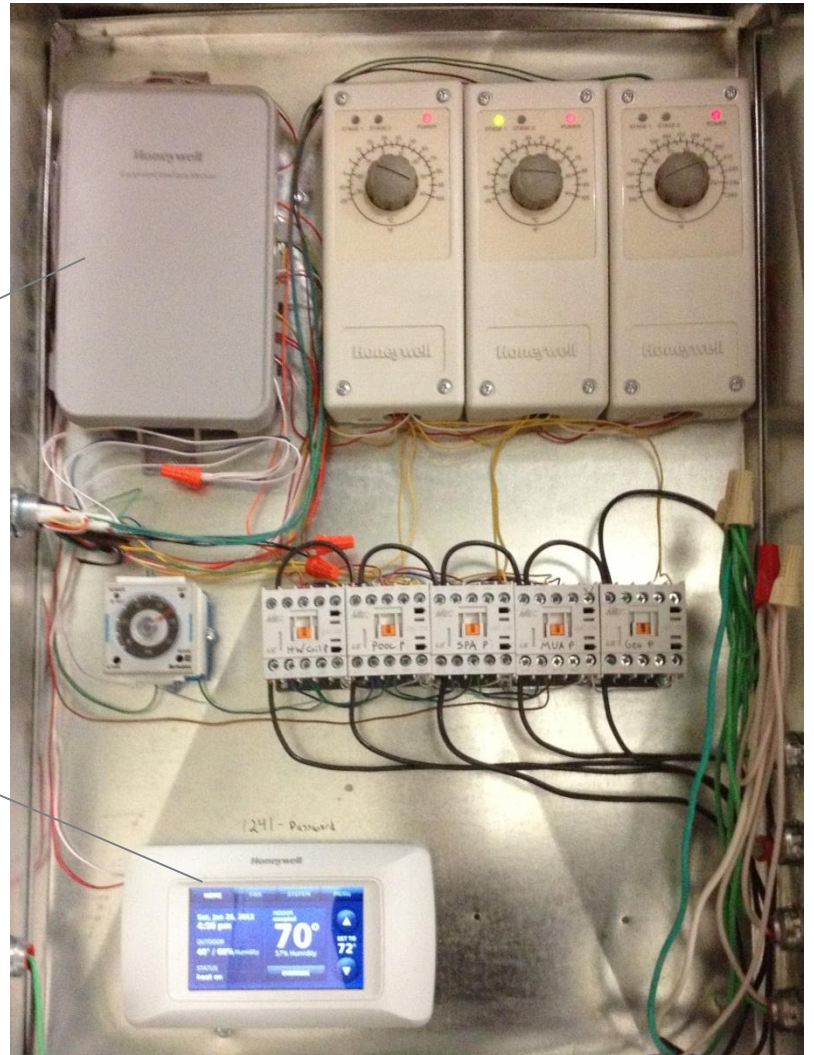
**Internet-Enabled Thermostat**  
Snapshot taken 18-Apr-2013  
Best Western  
Shelby, Montana





Honeywell Equipment Interface Module

Honeywell Prestige IAQ Thermostat



Honeywell Wireless Indoor Air Sensor

