

Ground Loop Design

Borehole Design Project Report - 3/27/2024



Project Name: Windy Ridge	
Designer Name: LN Consulting	
Date: 3/27/2024	Project Start Date: 3/27/2024
Client Name:	
Address Line 1:	
Address Line 2:	
City:	Phone:
State:	Fax:
Zip:	Email:

Calculation Results

Design Method: <i>Hourly</i>	COOLING	HEATING
Total Bore Length (ft):	8000.0	8000.0
Borehole Number:	16	16
Borehole Length (ft):	500.0	500.0
Ground Temperature Change (°F):	N/A	N/A
Peak Unit Inlet (°F):	79.7	42.2
Peak Unit Outlet (°F):	87.4	39.0
Total Unit Capacity (kBtu/Hr):	513.1	208.0
Peak Load (kBtu/Hr):	513.1	208.0
Peak Demand (kW):	0.0	0.0
Heat Pump EER/COP:	0.0	0.0
Seasonal Heat Pump EER/COP:	0.0	0.0
Avg. Annual Power (kWh):	0.00E+0	0.00E+0
System Flow Rate (gpm):	128.3	52.0

Input Parameters

Fluid		Soil	
Flow Rate	3.0 gpm/ton	Ground Temperature:	49.9 °F
Fluid:	17.7% Propylene Glycol	Thermal Conductivity:	2.00 Btu/(h*ft*°F)
Specific Heat (Cp):	1.01 Btu/(°F*lbm)	Thermal Diffusivity:	1.26 ft^2/day
Density (rho):	62.4 lb/ft^3		

Piping

Pipe Type:	1 1/2 in. (40 mm) - SDR11
Flow Type:	Turbulent
Pipe Resistance:	0.104 h*ft*°F/Btu
U-Tube Configuration:	Single
Radial Pipe Placement:	Average
Borehole Diameter:	6.00 in
Grout Thermal Conductivity:	1.60 Btu/(h*ft*°F)
Borehole Thermal Resistance:	0.176 h*ft*°F/Btu

Input Parameters (Cont.)

Pattern		Modeling Time Period		
Vertical Grid Arrangement:	4 x 4	Prediction Time:	15 years	
Borehole Number:	16	Long Term Soil Temperatures:		
Borehole Separation:	20.0 ft		<i>Cooling:</i> 49.9 °F	
Bores Per Circuit	1		<i>Heating:</i> 49.9 °F	
Fixed Length Mode	On			
Grid File	None			
File:				
Default Heat Pumps		Optional Hybrid Loads		
Manufacturer:	- Default Generic		Cooling	Heating
Series:	Generic High Efficiency	Geo Peak (%)	100%	100%
Design Heat Pump Inlet Load Temperatures:		Geo Total (%)	100%	100%
	<i>Cooling (WB)</i> <i>Heating (DB)</i>	Hybrid Peak (%)	0 %	0 %
Water to Air:	67 °F 70 °F	Hybrid Total (%)	0 %	0 %
Water to Water:	55 °F 100 °F			
Extra kW		Loads File		
Pump Power	0.0 kW	<i>Untitled.zon</i>		
Cooling Tower Pump:	0.0 kW			
Cooling Tower Fan:	0.0 kW			
Additional Power	0.0 kW			