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## **Ground Loop Design 2010**

The industry leading Groundloop Design software just got better! Our comprehensive suite of flexible design tools for vertical, horizontal, surface water and hybrid installations features commercial-grade accuracy and powerful design simulation options that are unsurpassed in the industry. GLD2010 features exceptional functionality, superior flexibility and unsurpassed accuracy for serious designers.



## **Latest Features in GLD2010**

### **Thermal Conductivity Module**

The TC module enables designers to quickly import raw conductivity test data from the GeoCube (a test unit manufactured by [www.precisiongeothermal.com](http://www.precisiongeothermal.com)) as well as from other test units. Details about this module, which is sold separately, can be found [here](#). The new version has more automatic functions, calculates borehole thermal resistance (BTR) from in-situ data and offers enhanced graphing capabilities

### **Computational Fluid Dynamics Module**

This new module enables designers to easily model, analyze and optimize the piping systems that comprise the foundation of ground heat exchanger systems. Piping systems consist of a wide possible range of connected components including: Manifolds/Vaults, Supply and Return Runouts, Supply and Return Headers, single and double u-bends, the fittings that connect the systems together and circulation pumps. Utilizing a new, patent-pending visual interface for viewing and creating a design via a drag and drop methodology, the CFD module can automatically design optimal flow-balanced (direct and reverse return) systems while providing designers with the flexibility they need for standard and non-standard systems. Outputs include flow rates, fluid velocities, Reynold's numbers, pressure drop, fluid volume and the like for every single point in a dynamic geothermal piping system. The GLD CFD Module is the first tool in humanity's toolbox for modeling the complex fluid dynamics in geothermal heat exchanger systems.

### **Hourly Simulations**

With a new g function engine based off of recent heat transfer research advances, GLD can now model the bore and fluid temperatures and equipment performance hour by hour over one or more design years. The hourly simulation provides very fine control over design and optimization & enables (for example) advanced solar thermal recharge simulations and more precise average annual kWh consumption and performance (COP/EER) calculations. The hourly output reports are well suited for inclusion in LEED submittal materials. GLD accepts hourly inputs from programs such as Trane Trace, the IES Virtual Environment and Excel.

### **Time of Use Modeling**

Time of Use (TOU) modeling is becoming more common globally as utilities have started charging differential rates for electricity based on its time of use. Therefore, modeling TOU consumption for geothermal systems is growing in importance. With GLD 2010 and hourly loads data, TOU modeling based off of any type of TOU schedule is a straightforward process. After a system is designed and an hourly energy simulation is run, the user can view hourly kWh consumption and use these data to calculate TOU-based costs.

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## **Latest Features in GLD2010**

### **Predicted KWh Consumption**

Demonstrating to clients the projected kWh consumption for a particular loopfield traditionally has been a daunting task. Now GLD performs these complex calculations automatically using monthly or hourly loads data, a dynamic heat pump model, and the details of a particular design. Predicted average annual kWh consumption is reported with each design iteration.

### **Design Dashboard Results Comparator**

The design dashboard is a new tool that enables the designer to quickly review and compare the results from design day, monthly and hourly simulations of a particular vertical borehole system. By being able to easily view the results from each type of simulation, the designer is in a better position to understand the impact of the loads profile and loopfield design on the system performance and then to make modifications to the design (and possibly building design) to design an optimal system.

### **Weighted Average Thermal Conductivity Calculator**

In addition to manual input controls for thermal conductivity and diffusivity parameters, the new version of GLD includes a weighted average conductivity/diffusivity calculator that enables a designer to use a drilling log to estimate thermal conductivity and diffusivity via weighted average calculations. Although an in-situ thermal conductivity/response test is considered the gold standard, the weighted average calculation is a useful alternative when tests aren't possible. GLD includes a database of approximately 100 soil types.

### **Updated User Interface**

The new user interface enables designers to effortlessly select from the three calculation methodologies (design day, monthly and hourly) via a selection box. This interface ensures that designers select their preferred design methodology with ease.

### **New Graphing Module**

A powerful new graphing module provides designers with the ability to visually analyze design results in new ways. For example, users can zoom in easily on an area of interest and then zoom back out to review the entire data set as necessary.

### **Energy Simulation Features**

Designers can now import monthly and/or hourly loads files from leading energy simulation tools including the IES Virtual Environment and the Trane Trace Product Line. After designing a system, users can then export their calculated results back to these programs for integration into the overall building simulation.

### **Loopfield Export to AutoCAD**

Designers can now export their vertical loopfield designs directly into AutoCAD.

### **Customize Report Graphics**

Designers can now include their company logo in GLD-generated reports. Users can also pre-populate reports with standard company information.

Suggestions for new program features are always appreciated. Let us help you do your projects more efficiently and effectively!

Thank you from the Thermal Dynamics Support Staff